RSS199§4.3
Transmitter Frequency Stability

a. The transmitter frequency stability limit shall be determined as follows:

The frequency offset shall be measured according to the procedure described in RSS-Gen and recorded;

b. Using a resolution bandwidth equal to that permitted within the 1 MHz band immediately outside the channel edge, as found in clause 4.6, reference points will be selected at the unwanted emission levels which comply with the attenuation specified in 4.6, for the type of device under test, on the emission mask of the lowest and highest channels, and the frequency at these points shall be recorded as fL and fH respectively.

The applicant shall ensure frequency stability by showing that fL minus the frequency offset and fH plus the frequency offset shall be within the frequency range that the equipment is designed to operate.

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = −30°C to +50°C
- Voltage = (85% - 115%)

  Low voltage, 3.23VDC (-15%), Normal, 3.8VDC and High voltage, 4.37VDC (15%).
  End Voltage, 2.72VDC.

Frequency Stability vs Temperature:
The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

Frequency Stability vs Voltage:
The peak frequency error is recorded (worst-case).

MODES TESTED

GPRS 850
GPRS 1900
CDMA BC0
CDMA BC1
CDMA BC10
UTMS BAND 2
UTMS BAND 4
UTMS BAND 5

RESULTS

See the following pages.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.1.1. GSM

ID:	44410	Date:	2/26/18

GPRS 850MHz

Limit		824.00	849.00	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	824.0204	848.9773		
Extreme (50C)		824.0204	848.9773	-26.6	-0.032
Extreme (40C)		824.0204	848.9773	-28.5	-0.034
Extreme (30C)		824.0204	848.9773	23.3	0.028
Extreme (10C)		824.0204	848.9773	25.6	0.031
Extreme (0C)		824.0204	848.9773	25.1	0.030
Extreme (-10C)		824.0204	848.9773	25.3	0.030
Extreme (-20C)		824.0204	848.9773	28.6	0.034
Extreme (-30C)		824.0204	848.9773	-27.8	-0.033
20C	15%	824.0204	848.9773	24.9	0.030
	-15%	824.0204	848.9773	-28.0	-0.033
	End Point	824.0204	848.9773	-35.3	-0.042

GPRS 1900MHz

Limit		1850.00	1910.00	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1850.0275	1909.9672		
Extreme (50C)		1850.0274	1909.9671	-63.8	-0.034
Extreme (40C)		1850.0274	1909.9671	-60.7	-0.032
Extreme (30C)		1850.0276	1909.9673	65.6	0.035
Extreme (10C)		1850.0276	1909.9673	100.5	0.053
Extreme (0C)		1850.0276	1909.9673	70.7	0.038
Extreme (-10C)		1850.0276	1909.9673	82.0	0.044
Extreme (-20C)		1850.0276	1909.9673	82.6	0.044
Extreme (-30C)		1850.0276	1909.9673	70.2	0.037
20C	15%	1850.0276	1909.9673	71.0	0.038
	-15%	1850.0276	1909.9673	71.8	0.038
	End Point	1850.0276	1909.9673	66.4	0.035

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.1.2. CDMA

ID:	50893	Date:	3/20/18

CDMA 1xRTT BC0

Limit		824.00	849.00	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	824.0232	848.9904		
Extreme (50C)		824.0232	848.9904	-13.0	-0.015
Extreme (40C)		824.0232	848.9904	-11.6	-0.014
Extreme (30C)		824.0232	848.9904	-10.1	-0.012
Extreme (10C)		824.0232	848.9904	11.8	0.014
Extreme (0C)		824.0232	848.9904	-10.3	-0.012
Extreme (-10C)		824.0232	848.9905	49.4	0.059
Extreme (-20C)		824.0232	848.9905	21.9	0.026
		824.0232	848.9904	-9.6	-0.011
20C	15%	824.0232	848.9904	-11.4	-0.014
	-15%	824.0232	848.9904	-19.9	-0.024
	End Point	824.0232	848.9905	23.7	0.028

CDMA 1xRTT BC1

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	1850.5769	1909.4224		
Extreme (50C)		1850.5767	1909.4222	-165.7	-0.088
Extreme (40C)		1850.5768	1909.4223	-101.2	-0.054
Extreme (30C)		1850.5770	1909.4224	83.0	0.044
Extreme (10C)		1850.5770	1909.4224	61.5	0.033
Extreme (0C)		1850.5769	1909.4224	50.9	0.027
Extreme (-10C)		1850.5768	1909.4223	-48.0	-0.026
Extreme (-20C)		1850.5768	1909.4223	-46.5	-0.025
Extreme (-30C)		1850.5768	1909.4223	-43.3	-0.023
20C	15%	1850.5768	1909.4222	-131.8	-0.070
	-15%	1850.5768	1909.4222	-132.4	-0.070
	End Point	1850.5768	1909.4223	-105.8	-0.056

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

CDMA 1xRTT BC10

Limit		816	824	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	816.5365	823.4739		
Extreme (50C)		816.5364	823.4739	-15.0	-0.018
Extreme (40C)		816.5364	823.4739	-17.7	-0.022
Extreme (30C)		816.5364	823.4739	-20.5	-0.025
Extreme (10C)		816.5365	823.4739	17.4	0.021
Extreme (0C)		816.5364	823.4739	-13.7	-0.017
Extreme (-10C)		816.5364	823.4739	-30.0	-0.037
Extreme (-20C)		816.5365	823.4739	15.3	0.019
Extreme (-30C)		816.5364	823.4739	-9.7	-0.012
20C	15%	816.5365	823.4739	17.7	0.022
	-15%	816.5365	823.4739	18.4	0.022
	End Point	816.5364	823.4739	-12.4	-0.015

9.1.3. WCDMA

ID:	10646	Date:	2/26/18

WCDMA REL 99 BAND 5

Limit		824.00	849.00	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (20C)	Normal	824.0832	848.9171		
Extreme (50C)		824.0832	848.9171	-5.2	-0.006
Extreme (40C)		824.0832	848.9171	7.3	0.009
Extreme (30C)		824.0832	848.9171	-8.0	-0.010
Extreme (10C)		824.0832	848.9171	7.1	0.008
Extreme (0C)		824.0832	848.9171	7.2	0.009
Extreme (-10C)		824.0832	848.9171	6.3	0.008
Extreme (-20C)		824.0832	848.9171	10.5	0.013
Extreme (-30C)		824.0832	848.9171	5.0	0.006
20C	15%	824.0832	848.9171	-5.8	-0.007
	-15%	824.0832	848.9171	-5.5	-0.007
	End Point	824.0832	848.9171	-8.8	-0.011

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

WCDMA REL 99 BAND 2

Limit		1850.00	1910.00	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.1004	1909.9003		
Extreme (50C)		1850.1004	1909.9003	37.4	0.020
Extreme (40C)		1850.1004	1909.9003	-14.2	-0.008
Extreme (30C)		1850.1004	1909.9003	-10.7	-0.006
Extreme (10C)		1850.1004	1909.9003	-23.9	-0.013
Extreme (0C)		1850.1004	1909.9003	38.4	0.020
Extreme (-10C)		1850.1003	1909.9002	-51.7	-0.027
Extreme (-20C)		1850.1003	1909.9002	-66.6	-0.035
Extreme (-30C)		1850.1005	1909.9004	57.4	0.031
20C	15%	1850.1005	1909.9004	96.1	0.051
	-15%	1850.1005	1909.9004	77.6	0.041
	End Point	1850.1003	1909.9002	-80.0	-0.043

WCDMA REL 99 BAND 4

Limit		1710.00	1755.00	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.0835	1754.0172		
Extreme (50C)		1710.0835	1754.0172	-14.6	-0.008
Extreme (40C)		1710.0835	1754.0172	-15.3	-0.009
Extreme (30C)		1710.0835	1754.0172	-15.4	-0.009
Extreme (10C)		1710.0835	1754.0172	-14.6	-0.008
Extreme (0C)		1710.0835	1754.0172	-14.5	-0.008
Extreme (-10C)		1710.0835	1754.0172	-13.6	-0.008
Extreme (-20C)		1710.0835	1754.0172	-14.6	-0.008
Extreme (-30C)		1710.0835	1754.0172	-14.5	-0.008
20C	15%	1710.0836	1754.0173	81.7	0.047
	-15%	1710.0836	1754.0173	65.7	0.038
	End Point	1710.0835	1754.0172	-49.0	-0.028

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.2. PEAK-TO-AVERAGE POWER RATIO

LIMIT

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

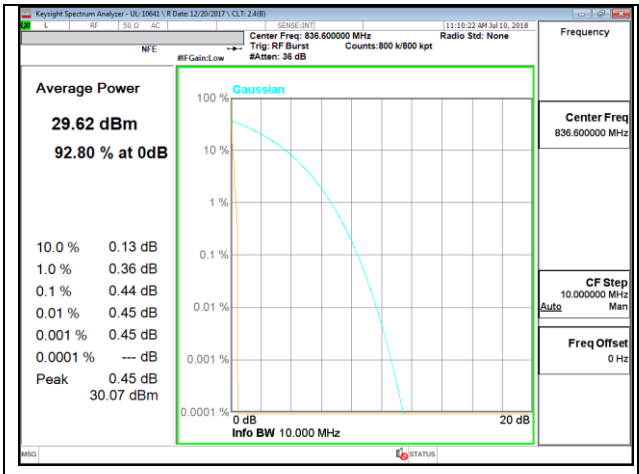
RESULT

Antenna 1 was used to measure as the worst case. The results from all CCDF plots are passed with 13dB peak-to-average power ratio criteria.

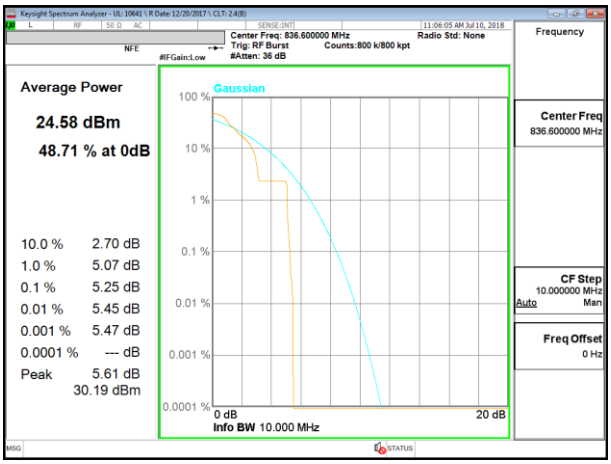
ID:	38602	**Date:**	5/17/18

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

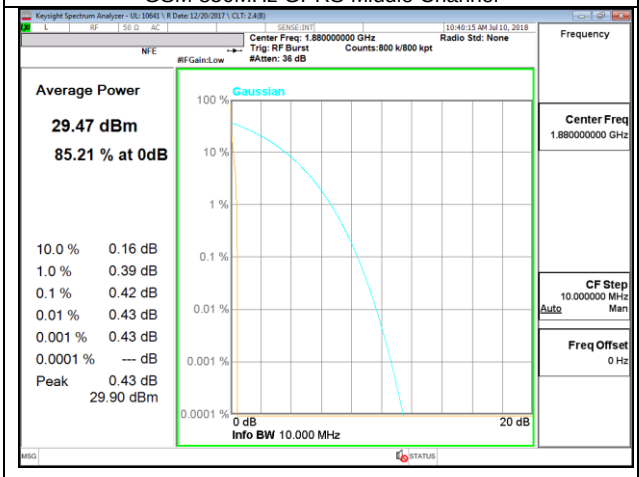
9.2.1. GSM



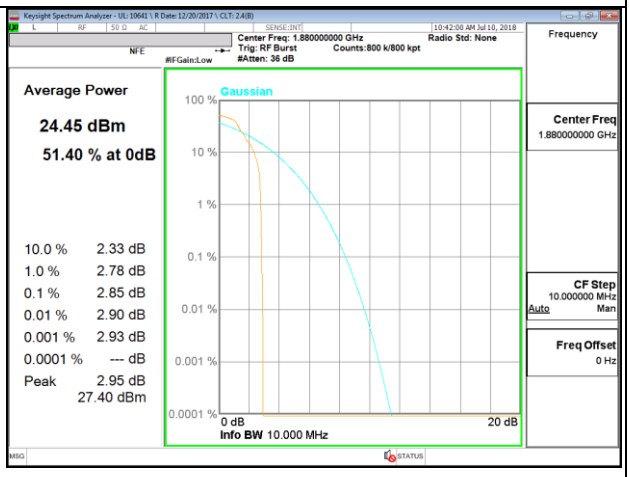
GSM 850MHz GPRS Middle Channel



GSM 850MHz EGPRS Middle Channel



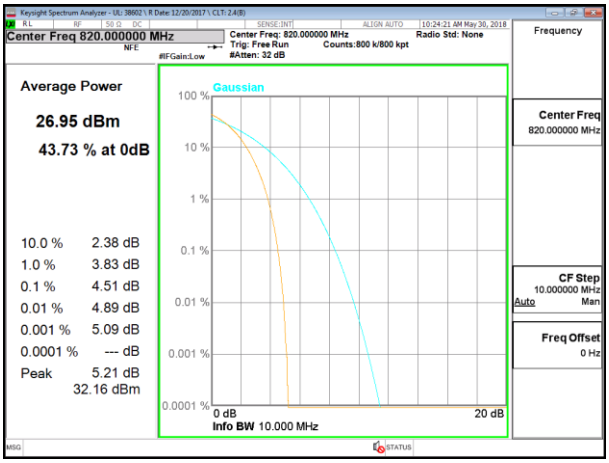
GSM 1900MHz GPRS Middle Channel



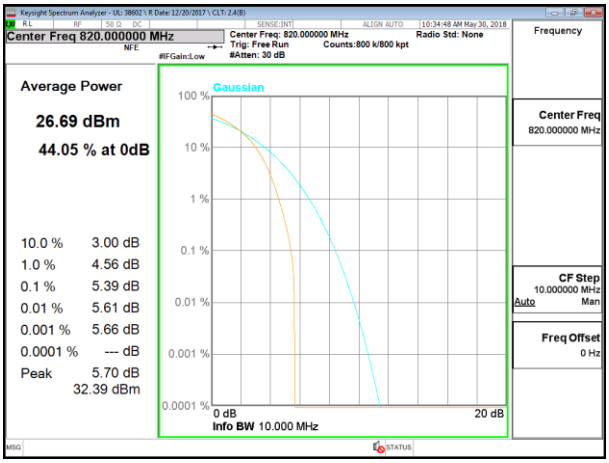
GSM 1900MHz EGPRS Middle Channel

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

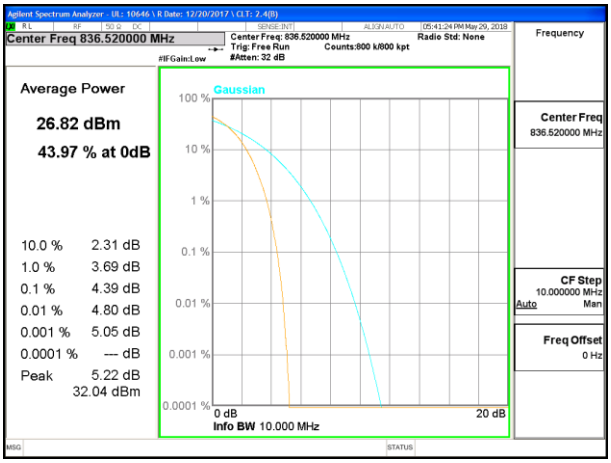
9.2.2. CDMA



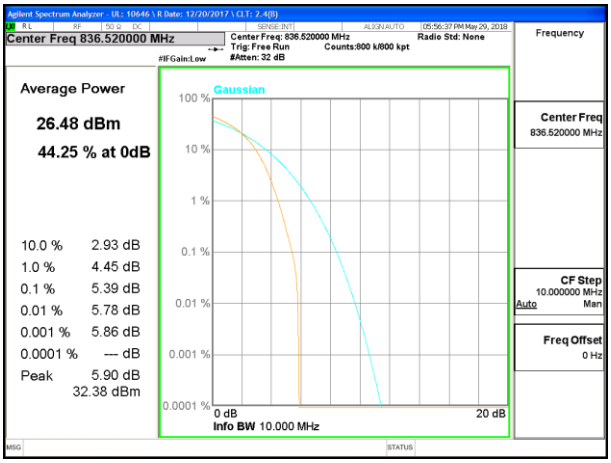
CDMA BC10 1xRTT Middle Channel



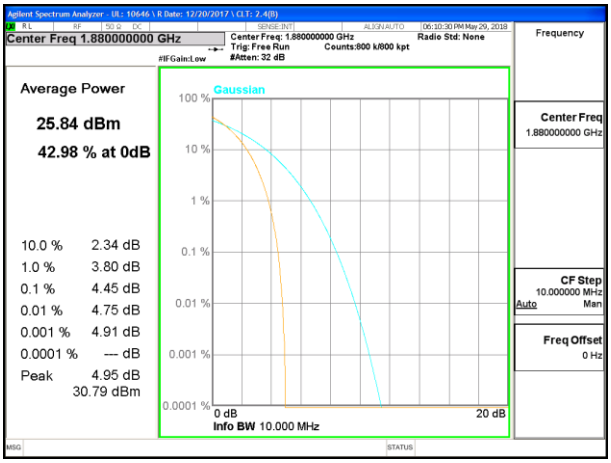
CDMA BC10 1xEV-DO Rev A Middle Channel



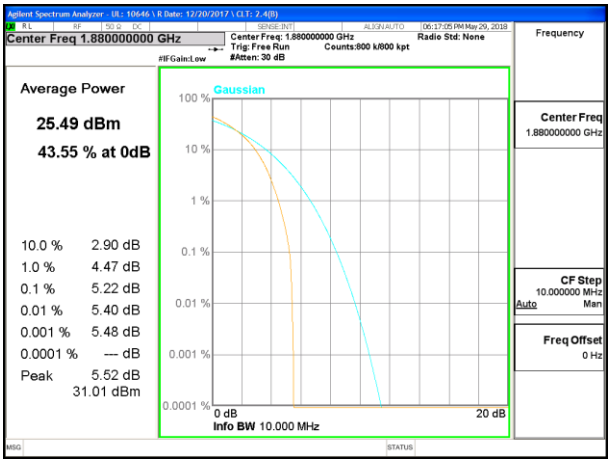
CDMA BC0 1xRTT Middle Channel



CDMA BC0 1xEV-DO Rev A Middle Channel



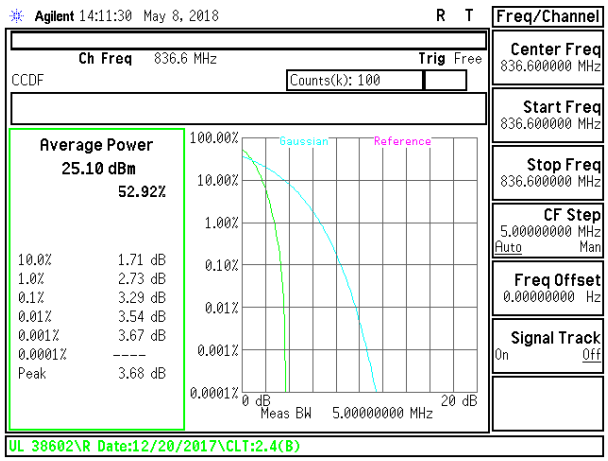
CDMA BC1 1xRTT Middle Channel



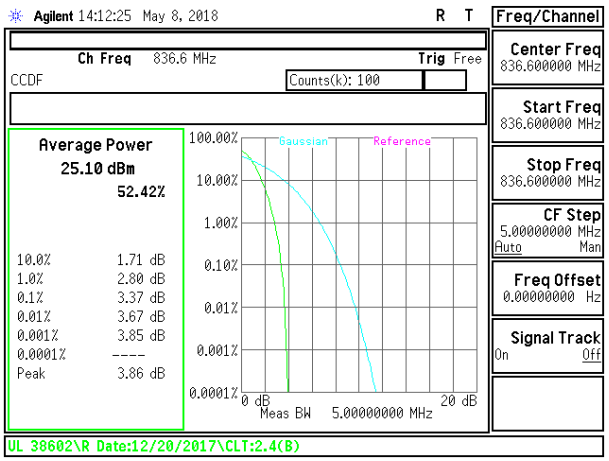
CDMA BC1 1xEV-DO Rev A Middle Channel

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

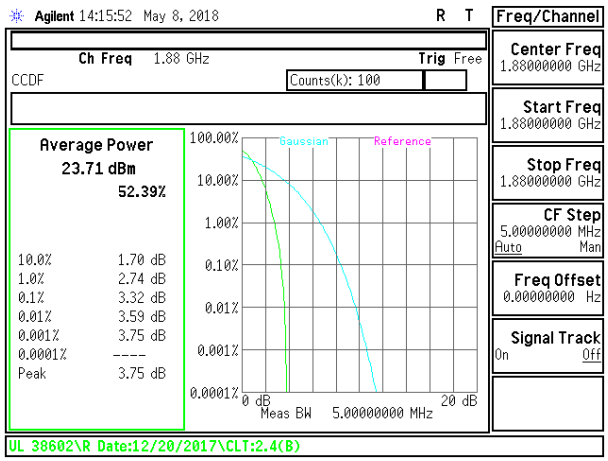
9.2.3. WCDMA



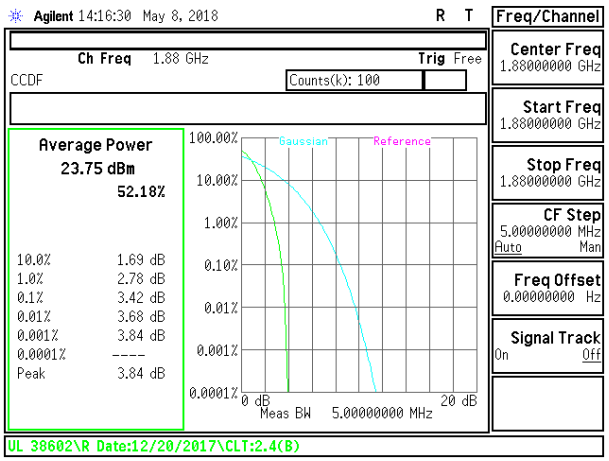
WCDMA Band 5 Rel 99 Middle Channel ID:38602



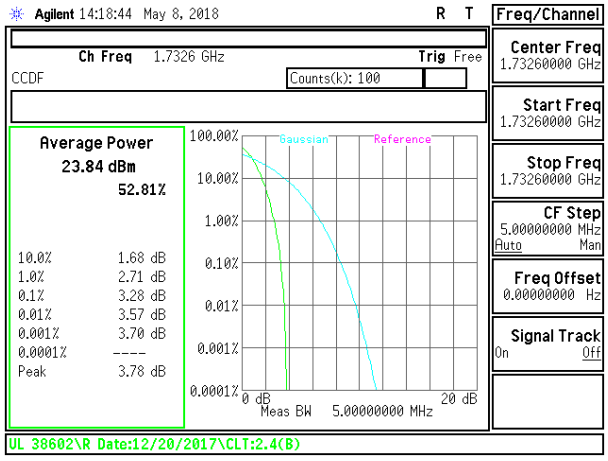
WCDMA Band 5 HSDPA Middle Channel ID:38602



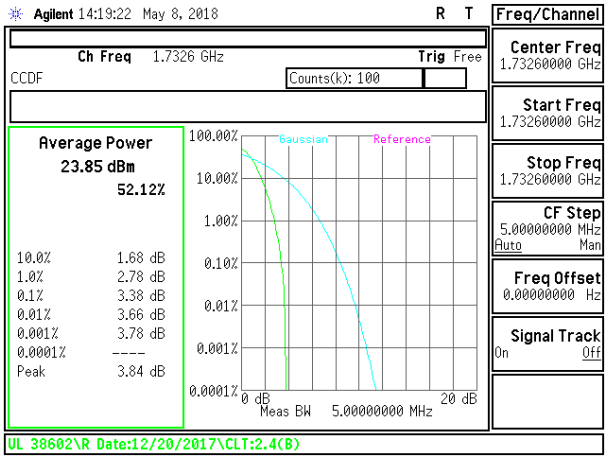
WCDMA Band 2 Rel 99 Middle Channel ID:38602



WCDMA Band 2 HSDPA Middle Channel ID:38602



WCDMA Band 4 Rel 99 Middle Channel ID:38602



WCDMA Band 4 HSDPA Middle Channel ID:38602

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10. RADIATED TEST RESULTS

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53 and §90.691.
IC: RSS132§5.5; RSS133§6.5 and RSS139§6.6

LIMIT

FCC: §22.917(a), §24.238(a), §27.53 (h), §90.691
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.

RSS132§5.5
Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p (watts).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

RSS133§6.5
Equipment shall comply with the limits in (i) and (ii) below.

(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts).

(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

RSS139§6.6

(i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,Footnote2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least43 + 10 log10 p (watts) dB.

(ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

TEST PROCEDURE

KDB 971168 D01 Section 7

RESULTS

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.1. FIELD STRENGTH OF SPURIOUS RADIATION, Ant 1

10.1.1. GSM

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 12204524
Date: 4/17/2018
Test Engineer: 10643
Configuration: EUT Only
Mode: GPRS 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.2MHz)										
1.65	-58.1	H	3.0	-18.7	37.7	1.0	-55.4	-13.0	-42.4	
2.47	-62.0	H	3.0	-18.0	37.0	1.0	-54.1	-13.0	-41.1	
3.30	-63.8	H	3.0	-16.0	37.9	1.0	-52.9	-13.0	-39.9	
1.65	-58.5	V	3.0	-17.9	37.7	1.0	-54.6	-13.0	-41.6	
2.45	-60.8	V	3.0	-16.7	37.0	1.0	-52.7	-13.0	-39.7	
3.30	-63.3	V	3.0	-16.5	37.9	1.0	-53.3	-13.0	-40.3	
Mid Channel (836.6MHz)										
1.67	-60.9	H	3.0	-20.4	37.8	1.0	-57.2	-13.0	-44.2	
2.51	-63.1	H	3.0	-18.9	37.1	1.0	-56.0	-13.0	-42.0	
3.35	-63.9	H	3.0	-16.1	37.8	1.0	-52.9	-13.0	-39.9	
1.67	-60.4	V	3.0	-19.7	37.8	1.0	-56.4	-13.0	-43.4	
2.51	-64.0	V	3.0	-19.8	37.1	1.0	-55.9	-13.0	-42.9	
3.35	-64.2	V	3.0	-17.3	37.8	1.0	-54.1	-13.0	-41.1	
High Channel (848.8MHz)										
1.70	-62.6	H	3.0	-21.9	37.8	1.0	-58.6	-13.0	-45.6	
2.55	-62.1	H	3.0	-17.6	37.2	1.0	-53.8	-13.0	-40.8	
3.40	-64.0	H	3.0	-16.2	37.7	1.0	-52.9	-13.0	-39.9	
1.70	-61.6	V	3.0	-20.6	37.8	1.0	-57.4	-13.0	-44.4	
2.55	-62.6	V	3.0	-18.3	37.2	1.0	-54.4	-13.0	-41.4	
3.40	-63.9	V	3.0	-16.9	37.7	1.0	-53.7	-13.0	-40.7	

Rev. 03.19.15

GSM 850MHz GPRS

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 12204524
Date: 4/17/2018
Test Engineer: 10643
Configuration: EUT Only
Mode: EGPRS 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.2MHz)										
1.65	-61.2	H	3.0	-20.8	37.7	1.0	-57.6	-13.0	-44.6	
2.47	-63.5	H	3.0	-19.5	37.0	1.0	-55.5	-13.0	-42.5	
3.30	-63.4	H	3.0	-15.6	37.9	1.0	-52.4	-13.0	-39.4	
1.65	-56.9	V	3.0	-16.3	37.7	1.0	-53.0	-13.0	-40.0	
2.47	-62.1	V	3.0	-18.0	37.0	1.0	-54.0	-13.0	-41.0	
3.30	-64.3	V	3.0	-17.5	37.9	1.0	-54.4	-13.0	-41.4	
Mid Channel (836.6MHz)										
1.67	-59.8	H	3.0	-19.3	37.8	1.0	-56.0	-13.0	-43.0	
2.51	-63.0	H	3.0	-18.8	37.1	1.0	-54.9	-13.0	-41.9	
3.35	-64.2	H	3.0	-16.4	37.8	1.0	-53.2	-13.0	-40.2	
1.67	-59.1	V	3.0	-18.3	37.8	1.0	-55.0	-13.0	-42.0	
2.51	-62.3	V	3.0	-18.1	37.1	1.0	-54.2	-13.0	-41.2	
3.35	-64.2	V	3.0	-17.3	37.8	1.0	-54.1	-13.0	-41.1	
High Channel (848.8MHz)										
1.70	-64.1	H	3.0	-23.3	37.8	1.0	-60.1	-13.0	-47.1	
2.69	-61.1	H	3.0	-16.4	37.3	1.0	-52.7	-13.0	-39.7	
3.40	-64.1	H	3.0	-16.3	37.7	1.0	-53.0	-13.0	-40.0	
1.70	-62.6	V	3.0	-21.6	37.8	1.0	-58.4	-13.0	-45.4	
2.69	-62.3	V	3.0	-17.8	37.3	1.0	-54.0	-13.0	-41.0	
3.40	-64.9	V	3.0	-17.8	37.7	1.0	-54.6	-13.0	-41.6	

Rev. 03.19.15

GSM 850MHz EGPRS

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 12204524
Date: 4/17/2018
Test Engineer: 10643
Configuration: EUT Only
Mode: GPRS 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-60.3	H	3.0	-12.4	37.4	1.0	-48.8	-13.0	-35.8	
5.55	-65.6	H	3.0	-14.7	36.7	1.0	-50.5	-13.0	-37.5	
7.40	-70.4	H	3.0	-16.7	36.0	1.0	-51.7	-13.0	-38.7	
3.70	-61.0	V	3.0	-13.3	37.4	1.0	-49.7	-13.0	-36.7	
5.55	-68.0	V	3.0	-17.0	36.7	1.0	-52.7	-13.0	-39.7	
7.40	-69.8	V	3.0	-16.3	36.0	1.0	-51.3	-13.0	-38.3	
Mid Channel (1880.0MHz)										
3.76	-56.8	H	3.0	-8.9	37.4	1.0	-45.2	-13.0	-32.2	
5.64	-62.8	H	3.0	-11.7	36.7	1.0	-47.4	-13.0	-34.4	
7.52	-70.1	H	3.0	-16.2	35.9	1.0	-51.1	-13.0	-38.1	
3.76	-59.1	V	3.0	-11.2	37.4	1.0	-47.6	-13.0	-34.6	
5.64	-67.3	V	3.0	-16.1	36.7	1.0	-51.8	-13.0	-38.8	
7.52	-69.9	V	3.0	-16.3	35.9	1.0	-51.2	-13.0	-38.2	
High Channel (1909.8MHz)										
3.82	-55.8	H	3.0	-7.8	37.3	1.0	-44.1	-13.0	-31.1	
5.73	-65.9	H	3.0	-14.6	36.7	1.0	-50.3	-13.0	-37.3	
7.54	-69.6	H	3.0	-15.7	35.9	1.0	-50.6	-13.0	-37.6	
3.82	-58.8	V	3.0	-10.9	37.3	1.0	-47.2	-13.0	-34.2	
5.73	-67.1	V	3.0	-15.8	36.7	1.0	-51.5	-13.0	-38.5	
7.54	-68.4	V	3.0	-14.7	35.9	1.0	-49.6	-13.0	-36.6	

Rev. 03.19.15

GSM 1900MHz GPRS

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 12204524
Date: 4/17/2018
Test Engineer: 10643
Configuration: EUT Only
Mode: EGPRS 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-60.1	H	3.0	-12.1	37.4	1.0	-48.5	-13.0	-35.5	
5.55	-66.9	H	3.0	-16.0	36.7	1.0	-51.7	-13.0	-38.7	
7.40	-70.6	H	3.0	-16.8	36.0	1.0	-51.9	-13.0	-38.9	
3.70	-61.0	V	3.0	-13.3	37.4	1.0	-49.7	-13.0	-36.7	
5.55	-68.4	V	3.0	-17.4	36.7	1.0	-53.1	-13.0	-40.1	
7.40	-69.8	V	3.0	-16.3	36.0	1.0	-51.4	-13.0	-38.4	
Mid Channel (1880.0MHz)										
3.76	-56.4	H	3.0	-8.4	37.4	1.0	-44.8	-13.0	-31.8	
5.64	-62.3	H	3.0	-11.2	36.7	1.0	-46.9	-13.0	-33.9	
7.52	-68.4	H	3.0	-14.5	35.9	1.0	-49.5	-13.0	-36.5	
3.76	-58.4	V	3.0	-10.6	37.4	1.0	-46.9	-13.0	-33.9	
5.64	-66.0	V	3.0	-14.9	36.7	1.0	-50.6	-13.0	-37.6	
7.52	-70.2	V	3.0	-16.6	35.9	1.0	-51.5	-13.0	-38.5	
High Channel (1909.8MHz)										
3.82	-55.9	H	3.0	-7.9	37.3	1.0	-44.2	-13.0	-31.2	
5.73	-66.7	H	3.0	-15.4	36.7	1.0	-51.1	-13.0	-38.1	
7.54	-70.7	H	3.0	-16.9	35.9	1.0	-51.8	-13.0	-38.8	
3.82	-57.2	V	3.0	-9.2	37.3	1.0	-45.5	-13.0	-32.5	
5.73	-68.1	V	3.0	-16.9	36.7	1.0	-52.6	-13.0	-39.6	
7.54	-68.3	V	3.0	-14.7	35.9	1.0	-49.6	-13.0	-36.6	

Rev. 03.19.15

GSM 1900MHz EGPRS

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.1.2. CDMA

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/03/18
Test Engineer: 10649
Configuration: EUT only
Mode: 1xRTT 800MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (817.25MHz)										
1.63	-61.7	H	3.0	-19.3	37.8	1.0	-56.2	-13.0	-43.2	
2.45	-64.7	H	3.0	-19.9	38.4	1.0	-57.2	-13.0	-44.2	
3.27	-65.9	H	3.0	-17.1	38.5	1.0	-54.5	-13.0	-41.5	
1.63	-56.3	V	3.0	-14.2	37.8	1.0	-51.1	-13.0	-38.1	
2.45	-63.8	V	3.0	-18.8	38.4	1.0	-56.2	-13.0	-43.2	
3.27	-64.1	V	3.0	-15.5	38.5	1.0	-53.0	-13.0	-40.0	
Mid Channel (820MHz)										
1.64	-57.7	H	3.0	-15.2	37.8	1.0	-52.1	-13.0	-39.1	
2.46	-64.9	H	3.0	-20.0	38.4	1.0	-57.4	-13.0	-44.4	
3.28	-65.7	H	3.0	-16.8	38.5	1.0	-54.3	-13.0	-41.3	
1.64	-56.5	V	3.0	-14.4	37.8	1.0	-51.3	-13.0	-38.3	
2.46	-64.5	V	3.0	-19.3	38.4	1.0	-56.8	-13.0	-43.8	
3.28	-64.2	V	3.0	-15.6	38.5	1.0	-53.1	-13.0	-40.1	
High Channel (822.75MHz)										
1.65	-62.7	H	3.0	-20.3	37.8	1.0	-57.1	-13.0	-44.1	
2.47	-63.7	H	3.0	-18.7	38.5	1.0	-56.1	-13.0	-43.1	
3.29	-66.0	H	3.0	-17.1	38.5	1.0	-54.5	-13.0	-41.5	
1.65	-63.7	V	3.0	-21.5	37.8	1.0	-58.4	-13.0	-45.4	
2.47	-64.9	V	3.0	-19.8	38.5	1.0	-57.2	-13.0	-44.2	
3.29	-65.7	V	3.0	-17.1	38.5	1.0	-54.5	-13.0	-41.5	

Rev. 03.19.15

CDMA BC10 1xRTT

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/03/18
Test Engineer: 10649
Configuration: EUT only
Mode: Rev 0/A, 800MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (817.25MHz)										
1.63	-64.5	H	3.0	-22.1	37.8	1.0	-58.9	-13.0	-45.9	
2.45	-65.2	H	3.0	-20.3	38.4	1.0	-57.7	-13.0	-44.7	
3.27	-65.8	H	3.0	-16.9	38.5	1.0	-54.4	-13.0	-41.4	
1.63	-64.9	V	3.0	-22.9	37.8	1.0	-59.7	-13.0	-46.7	
2.45	-64.6	V	3.0	-19.4	38.4	1.0	-56.8	-13.0	-43.8	
3.27	-64.2	V	3.0	-15.6	38.5	1.0	-53.1	-13.0	-40.1	
Mid Channel (820MHz)										
1.64	-64.9	H	3.0	-22.4	37.8	1.0	-59.3	-13.0	-46.3	
2.46	-64.0	H	3.0	-19.1	38.4	1.0	-56.5	-13.0	-43.5	
3.28	-65.1	H	3.0	-16.1	38.5	1.0	-53.6	-13.0	-40.6	
1.64	-63.9	V	3.0	-21.8	37.8	1.0	-58.6	-13.0	-45.6	
2.46	-64.7	V	3.0	-19.6	38.4	1.0	-57.0	-13.0	-44.0	
3.28	-65.3	V	3.0	-16.6	38.5	1.0	-54.1	-13.0	-41.1	
High Channel (822.75MHz)										
1.65	-63.3	H	3.0	-20.9	37.8	1.0	-57.7	-13.0	-44.7	
2.47	-65.5	H	3.0	-20.5	38.5	1.0	-57.9	-13.0	-44.9	
3.29	-66.3	H	3.0	-17.4	38.5	1.0	-54.8	-13.0	-41.8	
1.65	-66.7	V	3.0	-14.6	37.8	1.0	-51.4	-13.0	-38.4	
2.47	-64.0	V	3.0	-18.8	38.5	1.0	-56.2	-13.0	-43.2	
3.29	-65.7	V	3.0	-17.0	38.5	1.0	-54.5	-13.0	-41.5	

Rev. 03.19.15

CDMA BC10 1xEV-DO Rev A

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/03/18
Test Engineer: 44410
Configuration: EUT Only
Mode: 1xRTT 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.7MHz)										
1.65	-62.0	H	3.0	-19.6	37.8	1.0	-56.4	-13.0	-43.4	
2.47	-63.9	H	3.0	-18.9	38.5	1.0	-56.4	-13.0	-43.4	
3.30	-65.7	H	3.0	-16.7	38.5	1.0	-54.2	-13.0	-41.2	
1.65	-60.7	V	3.0	-18.5	37.8	1.0	-55.4	-13.0	-42.4	
2.47	-64.7	V	3.0	-19.5	38.5	1.0	-57.0	-13.0	-44.0	
3.30	-64.4	V	3.0	-15.7	38.5	1.0	-53.2	-13.0	-40.2	
Mid Channel (836.52MHz)										
1.67	-64.8	H	3.0	-22.3	37.8	1.0	-59.2	-13.0	-46.2	
2.51	-66.8	H	3.0	-21.6	38.6	1.0	-59.2	-13.0	-46.2	
3.35	-65.7	H	3.0	-16.6	38.5	1.0	-54.1	-13.0	-41.1	
1.67	-63.8	V	3.0	-21.6	37.8	1.0	-58.4	-13.0	-45.4	
2.51	-66.1	V	3.0	-20.7	38.6	1.0	-58.3	-13.0	-45.3	
3.35	-66.2	V	3.0	-17.3	38.5	1.0	-54.8	-13.0	-41.8	
High Channel (848.31MHz)										
1.70	-64.4	H	3.0	-21.9	37.9	1.0	-58.7	-13.0	-45.7	
2.54	-65.5	H	3.0	-20.1	38.6	1.0	-57.7	-13.0	-44.7	
3.39	-65.9	H	3.0	-16.7	38.5	1.0	-54.2	-13.0	-41.2	
1.70	-64.6	V	3.0	-22.2	37.9	1.0	-59.0	-13.0	-46.0	
2.54	-64.5	V	3.0	-19.0	38.6	1.0	-56.6	-13.0	-43.6	
3.39	-66.0	V	3.0	-17.0	38.5	1.0	-54.5	-13.0	-41.5	

Rev. 03.19.15

CDMA BC0 1xRTT

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/03/18
Test Engineer: 10649
Configuration: EUT only
Mode: Rev 0/A 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.7MHz)										
1.65	-62.4	H	3.0	-20.9	37.8	1.0	-57.8	-13.0	-44.8	
2.47	-64.1	H	3.0	-21.0	36.6	1.0	-56.6	-13.0	-43.6	
3.30	-64.6	H	3.0	-18.6	36.5	1.0	-54.2	-13.0	-41.2	
1.65	-60.9	V	3.0	-19.2	37.8	1.0	-56.0	-13.0	-43.0	
2.47	-65.4	V	3.0	-21.4	36.6	1.0	-57.0	-13.0	-44.0	
3.30	-64.1	V	3.0	-18.2	36.5	1.0	-53.7	-13.0	-40.7	
Mid Channel (836.52MHz)										
1.67	-64.6	H	3.0	-23.1	37.8	1.0	-59.9	-13.0	-46.9	
2.51	-65.6	H	3.0	-22.4	36.4	1.0	-57.7	-13.0	-44.7	
3.35	-66.3	H	3.0	-20.3	36.5	1.0	-55.7	-13.0	-42.7	
1.67	-62.2	V	3.0	-20.4	37.8	1.0	-57.3	-13.0	-44.3	
2.51	-64.1	V	3.0	-19.9	36.4	1.0	-55.3	-13.0	-42.3	
3.35	-66.0	V	3.0	-19.9	36.5	1.0	-55.4	-13.0	-42.4	
High Channel (848.31MHz)										
1.70	-61.4	H	3.0	-19.8	37.8	1.0	-56.7	-13.0	-43.7	
2.54	-63.3	H	3.0	-20.0	36.4	1.0	-55.4	-13.0	-42.4	
3.39	-66.2	H	3.0	-20.1	36.4	1.0	-55.6	-13.0	-42.6	
1.70	-60.9	V	3.0	-19.1	37.8	1.0	-56.0	-13.0	-43.0	
2.54	-64.9	V	3.0	-20.6	36.4	1.0	-56.0	-13.0	-43.0	
3.39	-64.1	V	3.0	-17.9	36.4	1.0	-53.3	-13.0	-40.3	

Rev. 03.19.15

CDMA BC0 1xEV-DO Rev A

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/03/18
Test Engineer: 44410
Configuration: EUT only
Mode: 1xRTT 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1851.25MHz)										
3.70	-59.1	H	3.0	-9.2	38.6	1.0	-46.8	-13.0	-33.8	
5.55	-64.6	H	3.0	-10.6	38.6	1.0	-48.2	-13.0	-35.2	
7.41	-66.1	H	3.0	-8.4	37.8	1.0	-45.2	-13.0	-32.2	
3.70	-60.7	V	3.0	-10.9	38.6	1.0	-48.5	-13.0	-35.5	
5.55	-63.9	V	3.0	-10.2	38.6	1.0	-47.7	-13.0	-34.7	
7.41	-66.5	V	3.0	-9.0	37.8	1.0	-45.8	-13.0	-32.8	
Mid Channel (1880MHz)										
3.76	-60.8	H	3.0	-10.7	38.6	1.0	-48.3	-13.0	-35.3	
5.64	-64.2	H	3.0	-9.9	38.5	1.0	-47.5	-13.0	-34.5	
7.52	-66.9	H	3.0	-8.1	37.7	1.0	-44.8	-13.0	-31.8	
3.76	-58.9	V	3.0	-8.9	38.6	1.0	-46.5	-13.0	-33.5	
5.64	-63.8	V	3.0	-9.9	38.5	1.0	-47.4	-13.0	-34.4	
7.52	-66.4	V	3.0	-8.8	37.7	1.0	-45.6	-13.0	-32.6	
High Channel (1908.75MHz)										
3.82	-61.1	H	3.0	-10.8	38.7	1.0	-48.5	-13.0	-35.5	
5.73	-64.9	H	3.0	-10.5	38.5	1.0	-48.0	-13.0	-35.0	
7.64	-66.4	H	3.0	-8.4	37.7	1.0	-45.1	-13.0	-32.1	
3.82	-60.3	V	3.0	-10.0	38.7	1.0	-47.7	-13.0	-34.7	
5.73	-64.1	V	3.0	-10.0	38.5	1.0	-47.5	-13.0	-34.5	
7.64	-65.8	V	3.0	-8.0	37.7	1.0	-44.7	-13.0	-31.7	

Rev. 03.19.15

CDMA BC1 1xRTT

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/03/18
Test Engineer: 10649
Configuration: EUT only
Mode: Rev 0/A 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1851.25MHz)										
3.70	-63.0	H	3.0	-13.0	38.6	1.0	-50.6	-13.0	-37.6	
5.55	-65.5	H	3.0	-11.4	38.6	1.0	-49.0	-13.0	-36.0	
7.41	-65.9	H	3.0	-8.2	37.8	1.0	-45.0	-13.0	-32.0	
3.70	-62.3	V	3.0	-12.5	38.6	1.0	-50.1	-13.0	-37.1	
5.55	-65.0	V	3.0	-11.3	38.6	1.0	-48.8	-13.0	-35.8	
7.41	-66.1	V	3.0	-8.6	37.8	1.0	-45.4	-13.0	-32.4	
Mid Channel (1880MHz)										
3.76	-60.4	H	3.0	-10.3	38.6	1.0	-47.9	-13.0	-34.9	
5.64	-63.6	H	3.0	-9.4	38.5	1.0	-46.9	-13.0	-33.9	
7.52	-65.9	H	3.0	-8.0	37.7	1.0	-44.8	-13.0	-31.8	
3.76	-62.0	V	3.0	-11.9	38.6	1.0	-49.5	-13.0	-36.5	
5.64	-64.2	V	3.0	-10.3	38.5	1.0	-47.8	-13.0	-34.8	
7.52	-67.0	V	3.0	-9.4	37.7	1.0	-46.2	-13.0	-33.2	
High Channel (1908.75MHz)										
3.82	-62.0	H	3.0	-11.7	38.7	1.0	-49.4	-13.0	-36.4	
5.73	-65.2	H	3.0	-10.7	38.5	1.0	-48.2	-13.0	-35.2	
7.64	-67.3	H	3.0	-9.4	37.7	1.0	-46.0	-13.0	-33.0	
3.82	-62.4	V	3.0	-12.1	38.7	1.0	-49.8	-13.0	-36.8	
5.73	-65.2	V	3.0	-11.1	38.5	1.0	-48.6	-13.0	-35.6	
7.64	-66.8	V	3.0	-9.0	37.7	1.0	-45.7	-13.0	-32.7	

Rev. 03.19.15

CDMA BC1 1xEV-DO Rev A

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.1.3. WCDMA

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: REL 99, 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (826.4MHz)										
1.65	-53.8	H	3.0	-11.4	37.8	1.0	-48.2	-13.0	-35.2	
2.48	-65.4	H	3.0	-20.4	38.5	1.0	-57.9	-13.0	-44.9	
3.31	-66.3	H	3.0	-17.4	38.5	1.0	-54.8	-13.0	-41.8	
1.65	-63.8	V	3.0	-21.6	37.8	1.0	-58.5	-13.0	-45.5	
2.48	-66.1	V	3.0	-20.8	38.5	1.0	-58.3	-13.0	-45.3	
3.31	-65.6	V	3.0	-16.9	38.5	1.0	-54.4	-13.0	-41.4	
Mid Channel (836.6MHz)										
1.67	-53.4	H	3.0	-10.9	37.8	1.0	-47.7	-13.0	-34.7	
2.51	-65.9	H	3.0	-20.7	38.6	1.0	-58.3	-13.0	-45.3	
3.35	-65.1	H	3.0	-16.1	38.5	1.0	-53.6	-13.0	-40.6	
1.67	-65.5	V	3.0	-23.2	37.8	1.0	-60.0	-13.0	-47.0	
2.51	-66.2	V	3.0	-20.8	38.6	1.0	-58.4	-13.0	-45.4	
3.35	-66.4	V	3.0	-17.6	38.5	1.0	-55.1	-13.0	-42.1	
High Channel (846.6MHz)										
1.69	-49.6	H	3.0	-7.1	37.9	1.0	-43.9	-13.0	-30.9	
2.54	-66.4	H	3.0	-21.0	38.6	1.0	-58.5	-13.0	-45.5	
3.39	-65.0	H	3.0	-15.9	38.5	1.0	-53.4	-13.0	-40.4	
1.69	-64.7	V	3.0	-22.3	37.9	1.0	-59.1	-13.0	-46.1	
2.54	-66.0	V	3.0	-20.5	38.6	1.0	-58.1	-13.0	-45.1	
3.39	-66.5	V	3.0	-17.6	38.5	1.0	-55.1	-13.0	-42.1	

Rev. 03.19.15

WCDMA Band 5 Rel 99

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: HSDPA 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (826.4MHz)										
1.65	-53.1	H	3.0	-10.6	37.8	1.0	-47.5	-13.0	-34.5	
2.48	-66.0	H	3.0	-21.0	38.5	1.0	-58.5	-13.0	-45.5	
3.31	-65.1	H	3.0	-16.1	38.5	1.0	-53.6	-13.0	-40.6	
1.65	-54.4	V	3.0	-12.3	37.8	1.0	-49.1	-13.0	-36.1	
2.48	-64.5	V	3.0	-19.3	38.5	1.0	-56.7	-13.0	-43.7	
3.31	-65.4	V	3.0	-16.7	38.5	1.0	-54.2	-13.0	-41.2	
Mid Channel (836.6MHz)										
1.67	-52.0	H	3.0	-9.5	37.8	1.0	-46.4	-13.0	-33.4	
2.51	-65.8	H	3.0	-20.6	38.6	1.0	-58.2	-13.0	-45.2	
3.35	-65.6	H	3.0	-16.5	38.5	1.0	-54.0	-13.0	-41.0	
1.67	-63.2	V	3.0	-21.0	37.8	1.0	-57.8	-13.0	-44.8	
2.51	-66.0	V	3.0	-20.5	38.6	1.0	-58.2	-13.0	-45.2	
3.35	-66.6	V	3.0	-17.8	38.5	1.0	-55.3	-13.0	-42.3	
High Channel (846.6MHz)										
1.69	-47.3	H	3.0	-4.7	37.9	1.0	-41.6	-13.0	-28.6	
2.54	-65.4	H	3.0	-20.0	38.6	1.0	-57.5	-13.0	-44.5	
3.39	-66.1	H	3.0	-17.0	38.5	1.0	-54.5	-13.0	-41.5	
1.69	-63.9	V	3.0	-21.5	37.9	1.0	-58.4	-13.0	-45.4	
2.54	-65.3	V	3.0	-19.8	38.6	1.0	-57.3	-13.0	-44.3	
3.39	-66.3	V	3.0	-17.3	38.5	1.0	-54.8	-13.0	-41.8	

Rev. 03.19.15

WCDMA Band 5 HSDPA

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: REL 99, 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.70	-62.8	H	3.0	-12.9	38.6	1.0	-50.5	-13.0	-37.5	
5.56	-64.8	H	3.0	-10.7	38.6	1.0	-48.2	-13.0	-35.2	
7.41	-66.4	H	3.0	-8.7	37.8	1.0	-45.6	-13.0	-32.6	
3.70	-62.8	V	3.0	-12.9	38.6	1.0	-50.5	-13.0	-37.5	
5.55	-64.1	V	3.0	-10.4	38.6	1.0	-48.0	-13.0	-35.0	
7.42	-65.8	V	3.0	-8.4	37.8	1.0	-45.2	-13.0	-32.2	
Mid Channel (1880MHz)										
3.76	-61.9	H	3.0	-11.8	38.6	1.0	-49.4	-13.0	-36.4	
5.64	-63.2	H	3.0	-8.9	38.5	1.0	-46.5	-13.0	-33.5	
7.52	-67.5	H	3.0	-9.7	37.7	1.0	-46.5	-13.0	-33.5	
3.76	-62.8	V	3.0	-12.8	38.6	1.0	-50.4	-13.0	-37.4	
5.64	-64.9	V	3.0	-10.9	38.5	1.0	-48.5	-13.0	-35.5	
7.52	-67.6	V	3.0	-10.0	37.7	1.0	-46.8	-13.0	-33.8	
High Channel (1907.6MHz)										
3.81	-61.1	H	3.0	-10.9	38.7	1.0	-48.5	-13.0	-35.5	
5.72	-64.0	H	3.0	-9.6	38.5	1.0	-47.1	-13.0	-34.1	
7.66	-66.2	H	3.0	-8.2	37.7	1.0	-44.9	-13.0	-31.9	
3.82	-63.2	V	3.0	-13.0	38.7	1.0	-50.5	-13.0	-37.5	
5.72	-65.4	V	3.0	-11.3	38.5	1.0	-48.8	-13.0	-35.8	
7.63	-66.9	V	3.0	-9.1	37.7	1.0	-45.8	-13.0	-32.8	

Rev. 03.19.15

WCDMA Band 2 Rel 99

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: HSDPA 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.70	-61.2	H	3.0	-11.3	38.6	1.0	-48.9	-13.0	-35.9	
5.56	-64.2	H	3.0	-10.2	38.6	1.0	-47.7	-13.0	-34.7	
7.41	-65.2	H	3.0	-7.6	37.8	1.0	-44.4	-13.0	-31.4	
9.26	-68.2	H	3.0	-8.3	36.6	1.0	-43.9	-13.0	-30.9	
3.70	-62.9	V	3.0	-13.0	38.6	1.0	-50.6	-13.0	-37.6	
5.56	-64.1	V	3.0	-10.3	38.6	1.0	-47.9	-13.0	-34.9	
7.41	-66.1	V	3.0	-8.7	37.8	1.0	-45.5	-13.0	-32.5	
9.26	-67.6	V	3.0	-7.8	36.6	1.0	-43.4	-13.0	-30.4	
Mid Channel (1880MHz)										
3.76	-61.5	H	3.0	-11.4	38.6	1.0	-49.0	-13.0	-36.0	
5.64	-64.8	H	3.0	-10.6	38.5	1.0	-48.1	-13.0	-35.1	
7.52	-66.1	H	3.0	-8.3	37.7	1.0	-45.0	-13.0	-32.0	
9.40	-66.7	H	3.0	-6.6	36.5	1.0	-42.1	-13.0	-29.1	
3.76	-61.5	V	3.0	-11.4	38.6	1.0	-49.1	-13.0	-36.1	
5.64	-64.8	V	3.0	-10.9	38.5	1.0	-48.4	-13.0	-35.4	
7.52	-66.1	V	3.0	-8.5	37.7	1.0	-45.2	-13.0	-32.2	
9.40	-66.7	V	3.0	-6.7	36.5	1.0	-42.2	-13.0	-29.2	
High Channel (1907.6MHz)										
3.82	-61.4	H	3.0	-11.2	38.7	1.0	-48.8	-13.0	-35.8	
5.72	-64.2	H	3.0	-9.8	38.5	1.0	-47.3	-13.0	-34.3	
7.63	-67.3	H	3.0	-9.4	37.7	1.0	-46.1	-13.0	-33.1	
9.54	-68.0	H	3.0	-7.8	36.4	1.0	-43.2	-13.0	-30.2	
3.82	-61.4	V	3.0	-11.2	38.7	1.0	-48.9	-13.0	-35.9	
5.72	-66.7	V	3.0	-11.6	38.5	1.0	-49.1	-13.0	-36.1	
7.63	-67.3	V	3.0	-9.6	37.7	1.0	-46.3	-13.0	-33.3	
9.54	-68.0	V	3.0	-7.8	36.4	1.0	-43.3	-13.0	-30.3	

Rev. 03.19.15

WCDMA Band 2 HSDPA

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: REL 99, 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.42	-67.4	H	3.0	-18.1	38.5	1.0	-55.7	-13.0	-42.7	
5.14	-64.5	H	3.0	-11.4	38.7	1.0	-49.1	-13.0	-36.1	
6.85	-66.6	H	3.0	-9.8	38.1	1.0	-46.9	-13.0	-33.9	
8.56	-67.4	H	3.0	-8.3	37.1	1.0	-44.4	-13.0	-31.4	
3.42	-66.7	V	3.0	-17.7	38.5	1.0	-55.2	-13.0	-42.2	
5.14	-63.5	V	3.0	-10.7	38.7	1.0	-48.3	-13.0	-35.3	
6.85	-66.0	V	3.0	-9.4	38.1	1.0	-46.6	-13.0	-33.6	
8.56	-66.5	V	3.0	-7.5	37.1	1.0	-43.6	-13.0	-30.6	
Mid Channel (1732.6MHz)										
3.47	-67.2	H	3.0	-17.8	38.5	1.0	-55.3	-13.0	-42.3	
5.20	-64.7	H	3.0	-11.4	38.7	1.0	-49.1	-13.0	-36.1	
6.93	-65.2	H	3.0	-8.1	38.1	1.0	-45.2	-13.0	-32.2	
8.66	-67.0	H	3.0	-7.8	37.0	1.0	-43.8	-13.0	-30.8	
3.47	-66.9	V	3.0	-17.7	38.5	1.0	-55.2	-13.0	-42.2	
5.20	-64.9	V	3.0	-11.9	38.7	1.0	-49.6	-13.0	-36.6	
6.93	-66.8	V	3.0	-10.0	38.1	1.0	-47.1	-13.0	-34.1	
8.66	-67.4	V	3.0	-8.4	37.0	1.0	-44.4	-13.0	-31.4	
High Channel (1752.6MHz)										
3.51	-66.4	H	3.0	-17.0	38.5	1.0	-54.6	-13.0	-41.6	
5.26	-65.3	H	3.0	-11.9	38.7	1.0	-49.6	-13.0	-36.6	
7.01	-66.5	H	3.0	-9.3	38.1	1.0	-46.4	-13.0	-33.4	
8.76	-66.6	H	3.0	-7.3	36.9	1.0	-43.3	-13.0	-30.3	
3.51	-66.6	V	3.0	-17.3	38.5	1.0	-54.9	-13.0	-41.9	
5.26	-65.1	V	3.0	-12.0	38.7	1.0	-49.7	-13.0	-36.7	
7.01	-66.4	V	3.0	-9.5	38.1	1.0	-46.5	-13.0	-33.5	
8.76	-67.0	V	3.0	-7.8	36.9	1.0	-43.7	-13.0	-30.7	

Rev. 03.19.15

WCDMA Band 4 Rel 99

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: HSDPA 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.42	-66.2	H	3.0	-16.9	38.5	1.0	-54.4	-13.0	-41.4	
5.14	-63.6	H	3.0	-10.4	38.7	1.0	-48.1	-13.0	-35.1	
6.85	-65.7	H	3.0	-8.9	38.1	1.0	-46.0	-13.0	-33.0	
8.56	-65.1	H	3.0	-8.0	37.1	1.0	-42.1	-13.0	-29.1	
3.42	-66.1	V	3.0	-17.1	38.5	1.0	-54.6	-13.0	-41.6	
5.14	-64.0	V	3.0	-11.2	38.7	1.0	-48.8	-13.0	-35.8	
6.85	-66.0	V	3.0	-9.4	38.1	1.0	-46.5	-13.0	-33.5	
8.56	-66.3	V	3.0	-7.4	37.1	1.0	-43.4	-13.0	-30.4	
Mid Channel (1732.6MHz)										
3.47	-66.9	H	3.0	-17.5	38.5	1.0	-55.0	-13.0	-42.0	
5.20	-64.0	H	3.0	-10.7	38.7	1.0	-48.4	-13.0	-35.4	
6.93	-64.8	H	3.0	-7.8	38.1	1.0	-44.9	-13.0	-31.9	
8.66	-67.9	H	3.0	-8.7	37.0	1.0	-44.7	-13.0	-31.7	
3.47	-65.9	V	3.0	-16.7	38.5	1.0	-54.2	-13.0	-41.2	
5.20	-64.3	V	3.0	-11.3	38.7	1.0	-49.0	-13.0	-36.0	
6.93	-64.6	V	3.0	-7.9	38.1	1.0	-45.0	-13.0	-32.0	
8.66	-66.7	V	3.0	-7.7	37.0	1.0	-43.7	-13.0	-30.7	
High Channel (1752.6MHz)										
3.51	-65.9	H	3.0	-16.4	38.5	1.0	-53.9	-13.0	-40.9	
5.26	-64.8	H	3.0	-11.4	38.7	1.0	-49.1	-13.0	-36.1	
7.01	-66.1	H	3.0	-8.9	38.1	1.0	-45.9	-13.0	-32.9	
8.76	-68.0	H	3.0	-8.7	36.9	1.0	-44.7	-13.0	-31.7	
3.51	-66.2	V	3.0	-16.8	38.5	1.0	-54.4	-13.0	-41.4	
5.26	-65.9	V	3.0	-12.8	38.7	1.0	-50.5	-13.0	-37.5	
7.01	-67.5	V	3.0	-10.5	38.1	1.0	-47.6	-13.0	-34.6	
8.76	-66.3	V	3.0	-7.2	36.9	1.0	-43.1	-13.0	-30.1	

Rev. 03.19.15

WCDMA Band 4 HSDPA

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.2. FIELD STRENGTH OF SPURIOUS RADIATION, Ant 2

10.2.1. GSM

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 12204524
Date: 4/17/2018
Test Engineer: 10643
Configuration: EUT Only
Mode: GPRS 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.2MHz)										
1.65	-56.9	H	3.0	-15.5	37.7	1.0	-52.3	-13.0	-39.3	
2.47	-62.5	H	3.0	-18.6	37.0	1.0	-54.6	-13.0	-41.6	
3.30	-64.5	H	3.0	-16.7	37.9	1.0	-53.6	-13.0	-40.6	
1.65	-59.2	V	3.0	-18.6	37.7	1.0	-56.3	-13.0	-42.3	
2.47	-62.6	V	3.0	-18.5	37.0	1.0	-54.5	-13.0	-41.5	
3.30	-63.6	V	3.0	-16.8	37.9	1.0	-53.6	-13.0	-40.6	
Mid Channel (836.6MHz)										
1.67	-58.9	H	3.0	-18.4	37.8	1.0	-55.1	-13.0	-42.1	
2.51	-64.1	H	3.0	-20.0	37.1	1.0	-56.1	-13.0	-43.1	
3.35	-64.8	H	3.0	-16.9	37.8	1.0	-53.7	-13.0	-40.7	
1.67	-62.1	V	3.0	-21.4	37.8	1.0	-58.1	-13.0	-45.1	
2.51	-63.5	V	3.0	-19.3	37.1	1.0	-55.4	-13.0	-42.4	
3.35	-64.3	V	3.0	-17.4	37.8	1.0	-54.2	-13.0	-41.2	
High Channel (848.8MHz)										
1.70	-60.3	H	3.0	-19.6	37.8	1.0	-56.3	-13.0	-43.3	
2.55	-63.4	H	3.0	-19.0	37.2	1.0	-55.2	-13.0	-42.2	
3.40	-64.2	H	3.0	-16.4	37.7	1.0	-53.2	-13.0	-40.2	
1.70	-62.7	V	3.0	-21.7	37.8	1.0	-58.5	-13.0	-45.5	
2.55	-63.7	V	3.0	-19.3	37.2	1.0	-55.5	-13.0	-42.5	
3.40	-65.2	V	3.0	-18.2	37.7	1.0	-54.9	-13.0	-41.9	

Rev. 03.19.15

GSM 850MHz GPRS

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 12204524
Date: 4/17/2018
Test Engineer: 10643
Configuration: EUT Only
Mode: EGPRS 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.2MHz)										
1.65	-57.4	H	3.0	-17.0	37.7	1.0	-53.8	-13.0	-40.8	
2.47	-63.0	H	3.0	-19.0	37.0	1.0	-55.1	-13.0	-42.1	
3.30	-63.6	H	3.0	-15.8	37.9	1.0	-52.6	-13.0	-39.6	
1.65	-59.6	V	3.0	-19.0	37.7	1.0	-55.7	-13.0	-42.7	
2.47	-62.4	V	3.0	-18.3	37.0	1.0	-54.4	-13.0	-41.4	
3.30	-63.1	V	3.0	-16.3	37.9	1.0	-53.2	-13.0	-40.2	
Mid Channel (836.6MHz)										
1.67	-58.6	H	3.0	-18.0	37.8	1.0	-54.8	-13.0	-41.8	
2.51	-62.6	H	3.0	-18.5	37.1	1.0	-54.6	-13.0	-41.6	
3.35	-64.2	H	3.0	-16.4	37.8	1.0	-53.2	-13.0	-40.2	
1.67	-61.0	V	3.0	-20.2	37.8	1.0	-57.0	-13.0	-44.0	
2.51	-62.2	V	3.0	-18.0	37.1	1.0	-54.1	-13.0	-41.1	
3.35	-64.1	V	3.0	-17.2	37.8	1.0	-54.0	-13.0	-41.0	
High Channel (848.8MHz)										
1.70	-60.8	H	3.0	-20.0	37.8	1.0	-56.8	-13.0	-43.8	
2.55	-63.1	H	3.0	-18.6	37.2	1.0	-54.8	-13.0	-41.8	
3.40	-63.9	H	3.0	-16.1	37.7	1.0	-52.8	-13.0	-39.8	
1.70	-61.4	V	3.0	-20.4	37.8	1.0	-57.2	-13.0	-44.2	
2.55	-63.8	V	3.0	-19.4	37.2	1.0	-55.6	-13.0	-42.6	
3.40	-63.6	V	3.0	-16.6	37.7	1.0	-53.4	-13.0	-40.4	

Rev. 03.19.15

GSM 850MHz EGPRS

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 12204524
Date: 4/17/2018
Test Engineer: 10643
Configuration: EUT Only
Mode: GPRS 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-60.4	H	3.0	-12.5	37.4	1.0	-48.9	-13.0	-35.9	
5.55	-67.2	H	3.0	-16.2	36.7	1.0	-52.0	-13.0	-39.0	
7.40	-70.2	H	3.0	-16.5	36.0	1.0	-51.5	-13.0	-38.5	
3.70	-59.4	V	3.0	-11.8	37.4	1.0	-48.2	-13.0	-35.2	
5.55	-62.6	V	3.0	-11.6	36.7	1.0	-47.3	-13.0	-34.3	
7.40	-70.4	V	3.0	-16.9	36.0	1.0	-52.0	-13.0	-39.0	
Mid Channel (1880.0MHz)										
3.76	-59.1	H	3.0	-11.2	37.4	1.0	-47.5	-13.0	-34.5	
5.64	-63.4	H	3.0	-12.4	36.7	1.0	-48.1	-13.0	-35.1	
7.52	-69.2	H	3.0	-15.4	35.9	1.0	-50.3	-13.0	-37.3	
3.76	-57.4	V	3.0	-9.6	37.4	1.0	-46.0	-13.0	-33.0	
5.64	-62.0	V	3.0	-10.9	36.7	1.0	-46.6	-13.0	-33.6	
7.52	-70.0	V	3.0	-16.4	35.9	1.0	-51.3	-13.0	-38.3	
High Channel (1909.8MHz)										
3.82	-58.7	H	3.0	-10.7	37.3	1.0	-47.0	-13.0	-34.0	
5.73	-66.6	H	3.0	-15.3	36.7	1.0	-51.0	-13.0	-38.0	
7.54	-70.1	H	3.0	-16.2	35.9	1.0	-51.1	-13.0	-38.1	
3.82	-57.2	V	3.0	-9.3	37.3	1.0	-45.6	-13.0	-32.6	
5.73	-65.4	V	3.0	-14.1	36.7	1.0	-49.8	-13.0	-36.8	
7.54	-69.4	V	3.0	-15.8	35.9	1.0	-50.7	-13.0	-37.7	

Rev. 03.19.15

GSM 1900MHz GPRS

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 12204524
Date: 4/17/2018
Test Engineer: 10643
Configuration: EUT Only
Mode: EGPRS 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-61.3	H	3.0	-13.3	37.4	1.0	-49.8	-13.0	-36.8	
5.55	-67.0	H	3.0	-16.1	36.7	1.0	-51.9	-13.0	-38.9	
7.40	-70.7	H	3.0	-16.9	36.0	1.0	-52.0	-13.0	-39.0	
3.70	-60.3	V	3.0	-12.6	37.4	1.0	-49.0	-13.0	-36.0	
5.55	-63.2	V	3.0	-12.2	36.7	1.0	-47.9	-13.0	-34.9	
7.40	-69.9	V	3.0	-16.4	36.0	1.0	-51.4	-13.0	-38.4	
Mid Channel (1880.0MHz)										
3.76	-59.2	H	3.0	-11.3	37.4	1.0	-47.6	-13.0	-34.6	
5.64	-63.1	H	3.0	-12.0	36.7	1.0	-47.7	-13.0	-34.7	
7.52	-69.7	H	3.0	-15.8	35.9	1.0	-50.7	-13.0	-37.7	
3.76	-56.7	V	3.0	-8.9	37.4	1.0	-45.3	-13.0	-32.3	
5.64	-63.2	V	3.0	-12.0	36.7	1.0	-47.7	-13.0	-34.7	
7.52	-70.2	V	3.0	-16.5	35.9	1.0	-51.5	-13.0	-38.5	
High Channel (1909.8MHz)										
3.82	-59.5	H	3.0	-11.5	37.3	1.0	-47.8	-13.0	-34.8	
5.73	-66.6	H	3.0	-15.3	36.7	1.0	-51.0	-13.0	-38.0	
7.54	-69.9	H	3.0	-16.0	35.9	1.0	-50.9	-13.0	-37.9	
3.82	-56.7	V	3.0	-8.8	37.3	1.0	-45.1	-13.0	-32.1	
5.73	-67.1	V	3.0	-15.8	36.7	1.0	-51.5	-13.0	-38.5	
7.54	-70.6	V	3.0	-16.9	35.9	1.0	-51.8	-13.0	-38.8	

Rev. 03.19.15

GSM 1900MHz EGPRS

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.2.2. CDMA

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/03/18
Test Engineer: 10649
Configuration: EUT only
Mode: 1xRTT 800MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (817.25MHz)										
1.63	-62.2	H	3.0	-20.7	37.8	1.0	-57.6	-13.0	-44.6	
2.45	-65.3	H	3.0	-22.2	36.7	1.0	-57.9	-13.0	-44.9	
3.27	-66.1	H	3.0	-20.3	36.5	1.0	-55.8	-13.0	-42.8	
1.63	-59.5	V	3.0	-17.8	37.8	1.0	-54.6	-13.0	-41.6	
2.45	-63.1	V	3.0	-19.3	36.7	1.0	-55.0	-13.0	-42.0	
3.27	-64.8	V	3.0	-19.0	36.5	1.0	-54.5	-13.0	-41.5	
Mid Channel (820MHz)										
1.64	-59.8	H	3.0	-18.3	37.8	1.0	-55.2	-13.0	-42.2	
2.46	-64.8	H	3.0	-21.7	36.7	1.0	-57.3	-13.0	-44.3	
3.28	-64.9	H	3.0	-19.0	36.5	1.0	-54.5	-13.0	-41.5	
1.64	-56.8	V	3.0	-15.0	37.8	1.0	-51.8	-13.0	-38.8	
2.46	-63.5	V	3.0	-19.6	36.7	1.0	-55.2	-13.0	-42.2	
3.28	-64.9	V	3.0	-19.0	36.5	1.0	-54.6	-13.0	-41.6	
High Channel (822.75MHz)										
1.65	-62.9	H	3.0	-21.4	37.8	1.0	-58.2	-13.0	-45.2	
2.47	-65.4	H	3.0	-22.3	36.6	1.0	-57.9	-13.0	-44.9	
3.29	-65.2	H	3.0	-19.3	36.5	1.0	-54.8	-13.0	-41.8	
1.65	-61.8	V	3.0	-20.0	37.8	1.0	-56.9	-13.0	-43.9	
2.47	-65.2	V	3.0	-21.2	36.6	1.0	-56.8	-13.0	-43.8	
3.29	-66.4	V	3.0	-20.6	36.5	1.0	-56.1	-13.0	-43.1	

Rev. 03.19.15

CDMA BC10 1xRTT

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/04/18
Test Engineer: 10649
Configuration: EUT only
Mode: Rev 0/A, 800MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (817.25MHz)										
1.63	-59.2	H	3.0	-16.8	37.8	1.0	-53.6	-13.0	-40.6	
2.45	-60.0	H	3.0	-16.1	38.4	1.0	-52.5	-13.0	-39.5	
3.27	-60.4	H	3.0	-11.5	38.5	1.0	-49.0	-13.0	-36.0	
1.63	-56.7	V	3.0	-14.6	37.8	1.0	-51.5	-13.0	-38.5	
2.45	-60.0	V	3.0	-14.9	38.4	1.0	-52.3	-13.0	-39.3	
3.27	-59.9	V	3.0	-11.3	38.5	1.0	-48.8	-13.0	-35.8	
Mid Channel (820MHz)										
1.64	-58.6	H	3.0	-16.1	37.8	1.0	-53.0	-13.0	-40.0	
2.46	-58.6	H	3.0	-13.6	38.4	1.0	-51.1	-13.0	-38.1	
3.28	-60.7	H	3.0	-11.8	38.5	1.0	-49.3	-13.0	-36.3	
1.64	-56.7	V	3.0	-14.6	37.8	1.0	-51.4	-13.0	-38.4	
2.46	-59.8	V	3.0	-14.7	38.4	1.0	-52.1	-13.0	-39.1	
3.28	-60.0	V	3.0	-11.3	38.5	1.0	-48.8	-13.0	-35.8	
High Channel (822.75MHz)										
1.65	-59.4	H	3.0	-17.0	37.8	1.0	-53.8	-13.0	-40.8	
2.47	-59.5	H	3.0	-14.5	38.5	1.0	-51.9	-13.0	-38.9	
3.29	-60.4	H	3.0	-11.4	38.5	1.0	-48.9	-13.0	-35.9	
1.65	-59.5	V	3.0	-17.3	37.8	1.0	-54.2	-13.0	-41.2	
2.47	-69.1	V	3.0	-23.9	38.5	1.0	-61.3	-13.0	-48.3	
3.29	-60.0	V	3.0	-11.4	38.5	1.0	-48.8	-13.0	-35.8	

Rev. 03.19.15

CDMA BC10 1xEV-DO Rev A

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/03/18
Test Engineer: 10649
Configuration: EUT Only
Mode: 1xRTT 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.7MHz)										
1.65	-60.4	H	3.0	-17.9	37.8	1.0	-54.8	-13.0	-41.8	
2.47	-64.3	H	3.0	-19.3	38.5	1.0	-56.7	-13.0	-43.7	
3.30	-65.2	H	3.0	-16.3	38.5	1.0	-53.8	-13.0	-40.8	
1.65	-59.5	V	3.0	-17.4	37.8	1.0	-54.2	-13.0	-41.2	
2.47	-63.1	V	3.0	-18.0	38.5	1.0	-55.4	-13.0	-42.4	
3.30	-64.8	V	3.0	-16.1	38.5	1.0	-53.6	-13.0	-40.6	
Mid Channel (836.52MHz)										
1.67	-65.4	H	3.0	-22.9	37.8	1.0	-59.8	-13.0	-46.8	
2.51	-65.6	H	3.0	-20.4	38.6	1.0	-57.9	-13.0	-44.9	
3.35	-65.4	H	3.0	-16.3	38.5	1.0	-53.8	-13.0	-40.8	
1.67	-65.4	V	3.0	-23.2	37.8	1.0	-60.0	-13.0	-47.0	
2.51	-63.8	V	3.0	-18.4	38.6	1.0	-56.0	-13.0	-43.0	
3.35	-64.1	V	3.0	-15.2	38.5	1.0	-52.7	-13.0	-39.7	
High Channel (848.31MHz)										
1.70	-59.1	H	3.0	-16.5	37.9	1.0	-53.4	-13.0	-40.4	
2.54	-65.5	H	3.0	-20.1	38.6	1.0	-57.6	-13.0	-44.6	
3.39	-66.1	H	3.0	-16.9	38.5	1.0	-54.4	-13.0	-41.4	
1.70	-67.4	V	3.0	-25.0	37.9	1.0	-61.8	-13.0	-48.8	
2.54	-66.0	V	3.0	-20.4	38.6	1.0	-58.0	-13.0	-45.0	
3.39	-66.7	V	3.0	-17.7	38.5	1.0	-56.2	-13.0	-42.2	

Rev. 03.19.15

CDMA BC0 1xRTT

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/04/18
Test Engineer: 10649
Configuration: EUT only
Mode: Rev 0/A 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (824.7MHz)										
1.65	-58.2	H	3.0	-15.7	37.8	1.0	-52.6	-13.0	-39.6	
2.47	-65.0	H	3.0	-20.0	38.5	1.0	-57.4	-13.0	-44.4	
3.30	-65.6	H	3.0	-15.7	38.5	1.0	-54.2	-13.0	-41.2	
1.65	-62.1	V	3.0	-19.9	37.8	1.0	-56.8	-13.0	-43.8	
2.47	-65.2	V	3.0	-20.0	38.5	1.0	-57.5	-13.0	-44.5	
3.30	-65.8	V	3.0	-17.1	38.5	1.0	-54.6	-13.0	-41.6	
Mid Channel (836.52MHz)										
1.67	-64.6	H	3.0	-22.1	37.8	1.0	-59.0	-13.0	-46.0	
2.51	-65.7	H	3.0	-20.4	38.6	1.0	-58.0	-13.0	-45.0	
3.35	-66.0	H	3.0	-16.9	38.5	1.0	-54.4	-13.0	-41.4	
1.67	-59.3	V	3.0	-17.1	37.8	1.0	-53.9	-13.0	-40.9	
2.51	-65.4	V	3.0	-20.0	38.6	1.0	-57.6	-13.0	-44.6	
3.35	-65.2	V	3.0	-16.4	38.5	1.0	-53.9	-13.0	-40.9	
High Channel (848.31MHz)										
1.70	-64.9	H	3.0	-22.3	37.9	1.0	-59.2	-13.0	-46.2	
2.54	-65.6	H	3.0	-20.2	38.6	1.0	-57.7	-13.0	-44.7	
3.39	-65.3	H	3.0	-16.2	38.5	1.0	-53.7	-13.0	-40.7	
1.70	-63.6	V	3.0	-21.2	37.9	1.0	-58.1	-13.0	-45.1	
2.54	-66.0	V	3.0	-20.5	38.6	1.0	-58.0	-13.0	-45.0	
3.39	-65.5	V	3.0	-16.6	38.5	1.0	-54.1	-13.0	-41.1	

Rev. 03.19.15

CDMA BC0 1xEV-DO Rev A

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/03/18
Test Engineer: 10649
Configuration: EUT only
Mode: 1xRTT 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1851.25MHz)										
3.70	-60.8	H	3.0	-10.8	38.6	1.0	-48.5	-13.0	-35.5	
5.55	-64.3	H	3.0	-10.2	38.6	1.0	-47.8	-13.0	-34.8	
7.41	-65.2	H	3.0	-7.5	37.8	1.0	-44.3	-13.0	-31.3	
3.70	-59.9	V	3.0	-10.0	38.6	1.0	-47.6	-13.0	-34.6	
5.55	-64.1	V	3.0	-10.4	38.6	1.0	-48.0	-13.0	-35.0	
7.41	-66.1	V	3.0	-8.6	37.8	1.0	-45.4	-13.0	-32.4	
Mid Channel (1880MHz)										
3.76	-61.3	H	3.0	-11.2	38.6	1.0	-48.8	-13.0	-35.8	
5.64	-64.7	H	3.0	-10.5	38.5	1.0	-48.0	-13.0	-35.0	
7.52	-66.9	H	3.0	-9.1	37.7	1.0	-45.8	-13.0	-32.8	
3.76	-59.7	V	3.0	-9.7	38.6	1.0	-47.3	-13.0	-34.3	
5.64	-63.8	V	3.0	-9.9	38.5	1.0	-47.5	-13.0	-34.5	
7.52	-65.9	V	3.0	-8.2	37.7	1.0	-45.0	-13.0	-32.0	
High Channel (1908.75MHz)										
3.82	-61.5	H	3.0	-11.2	38.7	1.0	-48.9	-13.0	-35.9	
5.73	-65.2	H	3.0	-10.8	38.5	1.0	-48.3	-13.0	-35.3	
7.64	-66.6	H	3.0	-8.7	37.7	1.0	-46.3	-13.0	-32.3	
3.82	-60.6	V	3.0	-10.4	38.7	1.0	-48.0	-13.0	-35.0	
5.73	-64.5	V	3.0	-10.4	38.5	1.0	-47.9	-13.0	-34.9	
7.64	-66.3	V	3.0	-8.6	37.7	1.0	-46.2	-13.0	-32.2	

Rev. 03.19.15

CDMA BC1 1xRTT

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/04/18
Test Engineer: 10649
Configuration: EUT only
Mode: Rev 0/A 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1851.25MHz)										
3.70	-57.3	H	3.0	-7.3	38.6	1.0	-44.9	-13.0	-31.9	
5.55	-59.5	H	3.0	-5.5	38.6	1.0	-43.1	-13.0	-30.1	
7.41	-60.0	H	3.0	-2.3	37.8	1.0	-39.1	-13.0	-26.1	
3.70	-57.4	V	3.0	-7.5	38.6	1.0	-46.1	-13.0	-32.1	
5.55	-58.9	V	3.0	-5.2	38.6	1.0	-42.7	-13.0	-29.7	
7.41	-60.9	V	3.0	-3.4	37.8	1.0	-40.2	-13.0	-27.2	
Mid Channel (1880MHz)										
3.76	-55.7	H	3.0	-5.6	38.6	1.0	-43.3	-13.0	-30.3	
5.64	-58.8	H	3.0	-4.6	38.5	1.0	-42.1	-13.0	-29.1	
7.52	-61.5	H	3.0	-3.7	37.7	1.0	-40.4	-13.0	-27.4	
3.76	-56.7	V	3.0	-4.6	38.6	1.0	-44.3	-13.0	-31.3	
5.64	-57.7	V	3.0	-3.8	38.5	1.0	-41.3	-13.0	-28.3	
7.52	-61.2	V	3.0	-3.6	37.7	1.0	-40.3	-13.0	-27.3	
High Channel (1908.75MHz)										
3.82	-56.1	H	3.0	-5.9	38.7	1.0	-43.5	-13.0	-30.5	
5.73	-60.2	H	3.0	-5.8	38.5	1.0	-43.3	-13.0	-30.3	
7.64	-62.2	H	3.0	-4.2	37.7	1.0	-40.9	-13.0	-27.9	
3.82	-56.2	V	3.0	-5.9	38.7	1.0	-43.6	-13.0	-30.6	
5.73	-58.3	V	3.0	-4.2	38.5	1.0	-41.7	-13.0	-28.7	
7.64	-60.6	V	3.0	-2.9	37.7	1.0	-39.6	-13.0	-26.6	

Rev. 03.19.15

CDMA BC1 1xEV-DO Rev A

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.2.3. WCDMA

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 44410
Configuration: EUT Only
Mode: REL 99, 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (826.4MHz)										
1.65	-64.4	H	3.0	-22.0	37.8	1.0	-58.8	-13.0	-45.8	
2.48	-65.1	H	3.0	-20.1	38.5	1.0	-57.6	-13.0	-44.6	
3.31	-66.2	H	3.0	-17.2	38.5	1.0	-54.7	-13.0	-41.7	
1.65	-65.2	V	3.0	-23.0	37.8	1.0	-59.9	-13.0	-46.9	
2.48	-65.1	V	3.0	-19.8	38.5	1.0	-57.3	-13.0	-44.3	
3.31	-65.8	V	3.0	-17.1	38.5	1.0	-54.5	-13.0	-41.5	
Mid Channel (836.6MHz)										
1.67	-65.6	H	3.0	-23.1	37.8	1.0	-60.0	-13.0	-47.0	
2.51	-65.9	H	3.0	-20.7	38.6	1.0	-58.3	-13.0	-45.3	
3.35	-65.9	H	3.0	-16.8	38.5	1.0	-54.3	-13.0	-41.3	
1.67	-64.7	V	3.0	-22.4	37.8	1.0	-59.3	-13.0	-46.3	
2.51	-65.3	V	3.0	-19.9	38.6	1.0	-57.5	-13.0	-44.5	
3.35	-66.0	V	3.0	-17.2	38.5	1.0	-54.7	-13.0	-41.7	
High Channel (846.6MHz)										
1.69	-64.1	H	3.0	-21.6	37.9	1.0	-58.4	-13.0	-45.4	
2.54	-65.4	H	3.0	-20.0	38.6	1.0	-57.6	-13.0	-44.6	
3.39	-65.1	H	3.0	-15.9	38.5	1.0	-53.4	-13.0	-40.4	
1.69	-64.3	V	3.0	-21.9	37.9	1.0	-58.8	-13.0	-45.8	
2.54	-64.5	V	3.0	-19.0	38.6	1.0	-56.6	-13.0	-43.6	
3.39	-64.9	V	3.0	-16.0	38.5	1.0	-53.5	-13.0	-40.5	

Rev. 03.19.15

WCDMA Band 5 Rel 99

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 44410
Configuration: EUT Only
Mode: HSDPA 850MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (826.4MHz)										
1.65	-65.1	H	3.0	-22.6	37.8	1.0	-59.4	-13.0	-46.4	
2.48	-64.9	H	3.0	-19.9	38.5	1.0	-57.4	-13.0	-44.4	
3.31	-64.8	H	3.0	-15.8	38.5	1.0	-53.3	-13.0	-40.3	
1.65	-64.6	V	3.0	-22.4	37.8	1.0	-59.2	-13.0	-46.2	
2.48	-65.4	V	3.0	-20.2	38.5	1.0	-57.7	-13.0	-44.7	
3.31	-65.4	V	3.0	-16.7	38.5	1.0	-54.1	-13.0	-41.1	
Mid Channel (836.6MHz)										
1.67	-65.1	H	3.0	-22.6	37.8	1.0	-59.4	-13.0	-46.4	
2.51	-65.5	H	3.0	-20.3	38.6	1.0	-57.9	-13.0	-44.9	
3.35	-65.3	H	3.0	-16.2	38.5	1.0	-53.7	-13.0	-40.7	
1.67	-65.5	V	3.0	-23.2	37.8	1.0	-60.1	-13.0	-47.1	
2.51	-66.2	V	3.0	-20.8	38.6	1.0	-58.4	-13.0	-45.4	
3.35	-66.0	V	3.0	-17.1	38.5	1.0	-54.6	-13.0	-41.6	
High Channel (846.6MHz)										
1.69	-64.2	H	3.0	-21.6	37.9	1.0	-58.5	-13.0	-45.5	
2.54	-64.0	H	3.0	-18.6	38.6	1.0	-56.1	-13.0	-43.1	
3.39	-65.6	H	3.0	-16.4	38.5	1.0	-53.9	-13.0	-40.9	
1.69	-64.7	V	3.0	-22.3	37.9	1.0	-59.2	-13.0	-46.2	
2.54	-65.9	V	3.0	-20.4	38.6	1.0	-58.0	-13.0	-45.0	
3.39	-66.0	V	3.0	-17.0	38.5	1.0	-54.5	-13.0	-41.5	

Rev. 03.19.15

WCDMA Band 5 HSDPA

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 44410
Configuration: EUT Only
Mode: REL 99, 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.70	-61.4	H	3.0	-11.4	38.6	1.0	-49.0	-13.0	-36.0	
5.56	-64.1	H	3.0	-10.0	38.6	1.0	-47.6	-13.0	-34.6	
7.41	-66.0	H	3.0	-9.3	37.8	1.0	-46.1	-13.0	-32.1	
3.70	-61.9	V	3.0	-12.0	38.6	1.0	-49.6	-13.0	-36.6	
5.56	-63.0	V	3.0	-9.3	38.6	1.0	-46.9	-13.0	-33.9	
7.42	-65.7	V	3.0	-8.2	37.8	1.0	-45.0	-13.0	-32.0	
Mid Channel (1880MHz)										
3.76	-61.2	H	3.0	-11.1	38.6	1.0	-48.7	-13.0	-35.7	
5.64	-63.0	H	3.0	-8.8	38.5	1.0	-46.3	-13.0	-33.3	
7.52	-65.7	H	3.0	-7.9	37.7	1.0	-44.7	-13.0	-31.7	
3.76	-62.7	V	3.0	-12.6	38.6	1.0	-50.3	-13.0	-37.3	
5.64	-64.3	V	3.0	-10.4	38.5	1.0	-47.9	-13.0	-34.9	
7.52	-67.4	V	3.0	-9.8	37.7	1.0	-46.6	-13.0	-33.6	
High Channel (1907.6MHz)										
3.82	-61.2	H	3.0	-10.9	38.7	1.0	-48.5	-13.0	-35.5	
5.72	-62.0	H	3.0	-7.5	38.6	1.0	-45.1	-13.0	-32.1	
7.66	-63.3	H	3.0	-7.3	37.7	1.0	-44.0	-13.0	-31.0	
3.82	-62.1	V	3.0	-11.9	38.7	1.0	-49.5	-13.0	-36.5	
5.72	-61.1	V	3.0	-7.0	38.6	1.0	-44.5	-13.0	-31.5	
7.63	-66.0	V	3.0	-8.3	37.7	1.0	-44.9	-13.0	-31.9	

Rev. 03.19.15

WCDMA Band 2 Rel 99

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: HSDPA 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.70	-62.8	H	3.0	-12.8	38.6	1.0	-50.4	-13.0	-37.4	
5.56	-65.2	H	3.0	-11.1	38.6	1.0	-48.6	-13.0	-35.6	
7.41	-67.1	H	3.0	-9.4	37.8	1.0	-46.2	-13.0	-33.2	
9.26	-68.4	H	3.0	-8.5	36.6	1.0	-44.1	-13.0	-31.1	
3.70	-62.7	V	3.0	-12.8	38.6	1.0	-50.5	-13.0	-37.5	
5.56	-65.5	V	3.0	-11.8	38.6	1.0	-49.4	-13.0	-36.4	
7.41	-65.8	V	3.0	-8.4	37.8	1.0	-45.2	-13.0	-32.2	
9.26	-68.5	V	3.0	-8.7	36.6	1.0	-44.3	-13.0	-31.3	
Mid Channel (1880MHz)										
3.76	-62.9	H	3.0	-12.8	38.6	1.0	-50.4	-13.0	-37.4	
5.64	-64.6	H	3.0	-10.4	38.5	1.0	-47.9	-13.0	-34.9	
7.52	-66.9	H	3.0	-9.0	37.7	1.0	-45.8	-13.0	-32.8	
9.40	-67.1	H	3.0	-7.0	36.5	1.0	-42.5	-13.0	-29.5	
3.76	-62.2	V	3.0	-12.1	38.6	1.0	-49.7	-13.0	-36.7	
5.64	-64.8	V	3.0	-10.9	38.5	1.0	-48.4	-13.0	-35.4	
7.52	-67.6	V	3.0	-9.9	37.7	1.0	-46.7	-13.0	-33.7	
9.40	-67.8	V	3.0	-7.8	36.5	1.0	-43.3	-13.0	-30.3	
High Channel (1907.6MHz)										
3.82	-61.5	H	3.0	-11.2	38.7	1.0	-48.9	-13.0	-35.9	
5.72	-65.5	H	3.0	-11.1	38.5	1.0	-48.6	-13.0	-35.6	
7.63	-66.8	H	3.0	-8.8	37.7	1.0	-45.5	-13.0	-32.5	
9.54	-68.0	H	3.0	-7.7	36.4	1.0	-43.2	-13.0	-30.2	
3.82	-62.8	V	3.0	-12.5	38.7	1.0	-50.2	-13.0	-37.2	
5.72	-64.7	V	3.0	-10.6	38.5	1.0	-48.1	-13.0	-35.1	
7.63	-67.6	V	3.0	-9.8	37.7	1.0	-46.5	-13.0	-33.5	
9.54	-67.5	V	3.0	-7.3	36.4	1.0	-42.7	-13.0	-29.7	

Rev. 03.19.15

WCDMA Band 2 HSDPA

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: REL 99, 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.42	-65.9	H	3.0	-16.7	38.5	1.0	-54.2	-13.0	-41.2	
5.14	-64.8	H	3.0	-11.6	38.7	1.0	-49.3	-13.0	-36.3	
6.85	-66.5	H	3.0	-9.6	38.1	1.0	-46.8	-13.0	-33.8	
3.42	-66.2	V	3.0	-17.2	38.5	1.0	-54.7	-13.0	-41.7	
5.14	-64.0	V	3.0	-11.1	38.7	1.0	-48.8	-13.0	-35.8	
6.85	-65.6	V	3.0	-9.0	38.1	1.0	-46.1	-13.0	-33.1	
Mid Channel (1732.6MHz)										
3.47	-66.8	H	3.0	-17.5	38.5	1.0	-55.0	-13.0	-42.0	
5.20	-64.6	H	3.0	-11.3	38.7	1.0	-49.0	-13.0	-36.0	
6.93	-65.7	H	3.0	-8.6	38.1	1.0	-45.7	-13.0	-32.7	
3.47	-67.0	V	3.0	-17.8	38.5	1.0	-55.3	-13.0	-42.3	
5.20	-65.1	V	3.0	-12.1	38.7	1.0	-49.8	-13.0	-36.8	
6.93	-67.0	V	3.0	-10.2	38.1	1.0	-47.3	-13.0	-34.3	
High Channel (1752.6MHz)										
3.51	-66.4	H	3.0	-16.9	38.5	1.0	-54.4	-13.0	-41.4	
5.26	-65.0	H	3.0	-11.5	38.7	1.0	-49.2	-13.0	-36.2	
7.01	-66.4	H	3.0	-9.2	38.1	1.0	-46.2	-13.0	-33.2	
3.51	-66.5	V	3.0	-17.2	38.5	1.0	-54.7	-13.0	-41.7	
5.26	-66.3	V	3.0	-13.3	38.7	1.0	-50.9	-13.0	-37.9	
7.01	-65.7	V	3.0	-8.8	38.1	1.0	-45.9	-13.0	-32.9	

Rev. 03.19.15

WCDMA Band 4 Rel 99

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: HSDPA 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.42	-66.5	H	3.0	-17.8	34.6	1.0	-51.4	-13.0	-38.4	
5.14	-64.3	H	3.0	-11.6	34.2	1.0	-44.7	-13.0	-31.7	
6.85	-66.6	H	3.0	-11.1	33.9	1.0	-44.0	-13.0	-31.0	
3.42	-67.1	V	3.0	-18.2	34.6	1.0	-51.8	-13.0	-38.8	
5.14	-63.3	V	3.0	-10.3	34.2	1.0	-43.5	-13.0	-30.5	
6.85	-66.3	V	3.0	-10.9	33.9	1.0	-43.9	-13.0	-30.9	
Mid Channel (1732.6MHz)										
3.47	-67.1	H	3.0	-18.3	34.6	1.0	-51.8	-13.0	-38.8	
5.20	-63.1	H	3.0	-10.2	34.2	1.0	-43.4	-13.0	-30.4	
6.93	-66.9	H	3.0	-11.2	33.9	1.0	-44.1	-13.0	-31.1	
3.47	-66.6	V	3.0	-17.5	34.6	1.0	-51.1	-13.0	-38.1	
5.20	-65.2	V	3.0	-12.1	34.2	1.0	-45.2	-13.0	-32.2	
6.93	-66.7	V	3.0	-10.2	33.9	1.0	-43.1	-13.0	-30.1	
High Channel (1752.6MHz)										
3.51	-66.9	H	3.0	-17.8	34.5	1.0	-51.4	-13.0	-38.4	
5.26	-65.3	H	3.0	-12.3	34.2	1.0	-45.5	-13.0	-32.5	
7.01	-66.5	H	3.0	-10.8	33.9	1.0	-43.7	-13.0	-30.7	
3.51	-66.7	V	3.0	-16.5	34.5	1.0	-50.0	-13.0	-37.0	
5.26	-66.3	V	3.0	-12.0	34.2	1.0	-45.2	-13.0	-32.2	
7.01	-65.7	V	3.0	-10.1	33.9	1.0	-43.0	-13.0	-30.0	

Rev. 03.19.15

WCDMA Band 4 HSDPA

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.3. FIELD STRENGTH OF SPURIOUS RADIATION, Ant 3

10.3.1. GSM

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 12204524
Date: 4/17/2018
Test Engineer: 10643
Configuration: EUT Only
Mode: GPRS 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-58.0	H	3.0	-10.0	37.4	1.0	-46.4	-13.0	-33.4	
5.55	-65.6	H	3.0	-14.7	36.7	1.0	-50.4	-13.0	-37.4	
7.40	-69.4	H	3.0	-15.6	36.0	1.0	-50.7	-13.0	-37.7	
3.70	-59.3	V	3.0	-11.6	37.4	1.0	-48.0	-13.0	-35.0	
5.55	-64.0	V	3.0	-12.9	36.7	1.0	-48.7	-13.0	-35.7	
7.40	-69.3	V	3.0	-15.8	36.0	1.0	-50.8	-13.0	-37.8	
Mid Channel (1880.0MHz)										
3.76	-59.0	H	3.0	-11.1	37.4	1.0	-47.4	-13.0	-34.4	
5.64	-63.4	H	3.0	-12.3	36.7	1.0	-48.0	-13.0	-35.0	
7.52	-69.3	H	3.0	-15.4	35.9	1.0	-50.3	-13.0	-37.3	
3.76	-60.0	V	3.0	-12.2	37.4	1.0	-48.6	-13.0	-35.6	
5.64	-65.3	V	3.0	-14.1	36.7	1.0	-49.8	-13.0	-36.8	
7.52	-69.5	V	3.0	-15.9	35.9	1.0	-50.8	-13.0	-37.8	
High Channel (1909.8MHz)										
3.82	-58.3	H	3.0	-10.3	37.3	1.0	-46.6	-13.0	-33.6	
5.73	-64.9	H	3.0	-13.7	36.7	1.0	-49.4	-13.0	-36.4	
7.54	-70.4	H	3.0	-16.5	35.9	1.0	-51.4	-13.0	-38.4	
3.82	-61.2	V	3.0	-13.2	37.3	1.0	-49.5	-13.0	-36.5	
5.73	-66.7	V	3.0	-15.4	36.7	1.0	-51.1	-13.0	-38.1	
7.54	-69.6	V	3.0	-16.0	35.9	1.0	-50.9	-13.0	-37.9	

Rev. 03.19.15

GSM 1900MHz GPRS

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 12204524
Date: 4/17/2018
Test Engineer: 10643
Configuration: EUT Only
Mode: EGPRS 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber G	3m Chamber G	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-57.7	H	3.0	-10.9	36.2	1.0	-46.1	-13.0	-33.1	
5.55	-66.9	H	3.0	-16.6	36.1	1.0	-51.7	-13.0	-38.7	
7.40	-70.1	H	3.0	-17.0	35.2	1.0	-51.2	-13.0	-38.2	
3.70	-60.1	V	3.0	-13.0	36.2	1.0	-48.2	-13.0	-35.2	
5.55	-67.5	V	3.0	-17.4	36.1	1.0	-52.6	-13.0	-39.6	
7.40	-70.5	V	3.0	-17.5	35.2	1.0	-51.7	-13.0	-38.7	
Mid Channel (1880.0MHz)										
3.76	-57.7	H	3.0	-10.8	36.2	1.0	-46.0	-13.0	-33.0	
5.64	-64.5	H	3.0	-14.1	36.1	1.0	-49.1	-13.0	-36.1	
7.52	-69.8	H	3.0	-16.6	35.1	1.0	-50.7	-13.0	-37.7	
3.76	-58.7	V	3.0	-11.3	36.2	1.0	-46.5	-13.0	-33.5	
5.64	-65.2	V	3.0	-14.9	36.1	1.0	-50.0	-13.0	-37.0	
7.52	-69.4	V	3.0	-16.3	35.1	1.0	-50.4	-13.0	-37.4	
High Channel (1909.8MHz)										
3.82	-58.2	H	3.0	-11.2	36.1	1.0	-46.4	-13.0	-33.4	
5.73	-64.9	H	3.0	-14.3	36.1	1.0	-49.3	-13.0	-36.3	
7.54	-69.9	H	3.0	-16.7	35.1	1.0	-50.8	-13.0	-37.8	
3.82	-60.4	V	3.0	-12.9	36.1	1.0	-48.0	-13.0	-35.0	
5.73	-67.0	V	3.0	-16.6	36.1	1.0	-51.6	-13.0	-38.6	
7.54	-71.3	V	3.0	-18.2	35.1	1.0	-52.3	-13.0	-39.3	

Rev. 03.19.15

GSM 1900MHz EGPRS

10.3.2. WCDMA

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: REL 99, 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.70	-61.9	H	3.0	-12.1	34.4	1.0	-45.5	-13.0	-32.5	
5.56	-66.5	H	3.0	-12.1	34.1	1.0	-45.2	-13.0	-32.2	
7.41	-67.4	H	3.0	-11.1	33.6	1.0	-43.7	-13.0	-30.7	
3.70	-62.2	V	3.0	-12.3	34.4	1.0	-45.7	-13.0	-32.7	
5.55	-64.0	V	3.0	-10.4	34.1	1.0	-43.5	-13.0	-30.5	
7.42	-66.2	V	3.0	-10.0	33.6	1.0	-42.6	-13.0	-29.6	
Mid Channel (1880MHz)										
3.76	-62.8	H	3.0	-12.8	34.4	1.0	-46.2	-13.0	-33.2	
5.64	-64.4	H	3.0	-10.9	34.1	1.0	-44.0	-13.0	-31.0	
7.52	-67.3	H	3.0	-10.8	33.5	1.0	-43.3	-13.0	-30.3	
3.76	-62.7	V	3.0	-12.6	34.4	1.0	-46.1	-13.0	-33.1	
5.64	-64.8	V	3.0	-11.1	34.1	1.0	-44.2	-13.0	-31.2	
7.52	-68.3	V	3.0	-12.0	33.5	1.0	-44.5	-13.0	-31.5	
High Channel (1907.6MHz)										
3.81	-62.8	H	3.0	-12.7	34.4	1.0	-46.0	-13.0	-33.0	
5.72	-64.6	H	3.0	-10.9	34.1	1.0	-44.0	-13.0	-31.0	
7.66	-67.9	H	3.0	-11.2	33.4	1.0	-43.6	-13.0	-30.6	
3.82	-60.4	V	3.0	-10.1	34.4	1.0	-43.5	-13.0	-30.5	
5.72	-66.3	V	3.0	-11.4	34.1	1.0	-44.5	-13.0	-31.5	
7.63	-66.4	V	3.0	-10.0	33.4	1.0	-42.4	-13.0	-29.4	

Rev. 03.19.15

WCDMA Band 2 Rel 99

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: HSDPA 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.70	-62.3	H	3.0	-12.4	38.6	1.0	-50.0	-13.0	-37.0	
5.56	-64.2	H	3.0	-10.1	38.6	1.0	-47.7	-13.0	-34.7	
7.41	-67.3	H	3.0	-9.6	37.8	1.0	-46.5	-13.0	-33.5	
9.26	-67.3	H	3.0	-7.3	36.6	1.0	-43.0	-13.0	-30.0	
3.70	-62.3	V	3.0	-12.5	38.6	1.0	-50.1	-13.0	-37.1	
5.56	-64.7	V	3.0	-11.0	38.6	1.0	-48.6	-13.0	-35.6	
7.41	-67.5	V	3.0	-10.0	37.8	1.0	-46.8	-13.0	-33.8	
9.26	-67.4	V	3.0	-7.6	36.6	1.0	-43.2	-13.0	-30.2	
Mid Channel (1880MHz)										
3.76	-63.0	H	3.0	-12.9	38.6	1.0	-50.5	-13.0	-37.5	
5.64	-64.0	H	3.0	-8.8	38.5	1.0	-47.3	-13.0	-34.3	
7.52	-67.3	H	3.0	-9.5	37.7	1.0	-46.2	-13.0	-33.2	
9.40	-68.1	H	3.0	-8.0	36.5	1.0	-43.5	-13.0	-30.5	
3.76	-61.8	V	3.0	-11.8	38.6	1.0	-49.4	-13.0	-36.4	
5.64	-64.4	V	3.0	-10.5	38.5	1.0	-48.0	-13.0	-35.0	
7.52	-66.9	V	3.0	-8.3	37.7	1.0	-45.0	-13.0	-32.0	
9.40	-67.6	V	3.0	-7.6	36.5	1.0	-43.1	-13.0	-30.1	
High Channel (1907.6MHz)										
3.82	-62.4	H	3.0	-12.1	38.7	1.0	-49.8	-13.0	-36.8	
5.72	-64.2	H	3.0	-8.8	38.5	1.0	-47.3	-13.0	-34.3	
7.63	-66.5	H	3.0	-7.6	37.7	1.0	-44.2	-13.0	-31.2	
9.54	-67.3	H	3.0	-7.1	36.4	1.0	-42.5	-13.0	-29.5	
3.82	-61.6	V	3.0	-11.3	38.7	1.0	-49.0	-13.0	-36.0	
5.72	-64.0	V	3.0	-9.9	38.5	1.0	-47.4	-13.0	-34.4	
7.63	-66.8	V	3.0	-8.0	37.7	1.0	-44.7	-13.0	-31.7	
9.54	-67.2	V	3.0	-7.0	36.4	1.0	-42.4	-13.0	-29.4	

Rev. 03.19.15

WCDMA Band 2 HSDPA

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: REL 99, 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.42	-66.6	H	3.0	-17.4	38.5	1.0	-54.9	-13.0	-41.9	
5.14	-63.1	H	3.0	-9.9	38.7	1.0	-47.6	-13.0	-34.6	
6.85	-65.5	H	3.0	-8.7	38.1	1.0	-45.8	-13.0	-32.8	
8.56	-65.9	H	3.0	-6.8	37.1	1.0	-42.9	-13.0	-29.9	
3.42	-67.0	V	3.0	-18.0	38.5	1.0	-55.5	-13.0	-42.5	
5.14	-64.1	V	3.0	-11.3	38.7	1.0	-49.0	-13.0	-36.0	
6.85	-66.0	V	3.0	-9.4	38.1	1.0	-46.5	-13.0	-33.5	
8.56	-67.2	V	3.0	-8.3	37.1	1.0	-44.4	-13.0	-31.4	
Mid Channel (1732.6MHz)										
3.47	-66.0	H	3.0	-16.7	38.5	1.0	-54.2	-13.0	-41.2	
5.20	-64.3	H	3.0	-11.0	38.7	1.0	-48.7	-13.0	-35.7	
6.93	-66.5	H	3.0	-9.4	38.1	1.0	-46.5	-13.0	-33.5	
8.66	-67.5	H	3.0	-8.3	37.0	1.0	-44.3	-13.0	-31.3	
3.47	-66.7	V	3.0	-17.5	38.5	1.0	-55.0	-13.0	-42.0	
5.20	-64.2	V	3.0	-11.2	38.7	1.0	-48.9	-13.0	-35.9	
6.93	-65.8	V	3.0	-9.0	38.1	1.0	-46.1	-13.0	-33.1	
8.66	-66.9	V	3.0	-7.9	37.0	1.0	-43.9	-13.0	-30.9	
High Channel (1752.6MHz)										
3.51	-66.0	H	3.0	-16.5	38.5	1.0	-54.0	-13.0	-41.0	
5.26	-65.4	H	3.0	-12.0	38.7	1.0	-49.6	-13.0	-36.6	
7.01	-66.3	H	3.0	-9.1	38.1	1.0	-46.1	-13.0	-33.1	
8.76	-67.8	H	3.0	-8.5	36.9	1.0	-44.4	-13.0	-31.4	
3.51	-66.9	V	3.0	-17.6	38.5	1.0	-55.1	-13.0	-42.1	
5.26	-66.2	V	3.0	-13.2	38.7	1.0	-50.8	-13.0	-37.8	
7.01	-66.4	V	3.0	-9.5	38.1	1.0	-46.6	-13.0	-33.6	
8.76	-66.4	V	3.0	-7.2	36.9	1.0	-43.1	-13.0	-30.1	

Rev. 03.19.15

WCDMA Band 4 Rel 99

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: HSDPA 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.42	-66.1	H	3.0	-16.9	38.5	1.0	-54.4	-13.0	-41.4	
5.14	-64.1	H	3.0	-10.9	38.7	1.0	-48.6	-13.0	-35.6	
6.85	-65.6	H	3.0	-8.7	38.1	1.0	-45.9	-13.0	-32.9	
8.56	-67.3	H	3.0	-8.2	37.1	1.0	-44.3	-13.0	-31.3	
3.42	-67.4	V	3.0	-18.4	38.5	1.0	-55.9	-13.0	-42.9	
5.14	-64.4	V	3.0	-11.6	38.7	1.0	-49.2	-13.0	-36.2	
6.85	-66.1	V	3.0	-9.5	38.1	1.0	-46.6	-13.0	-33.6	
8.56	-67.4	V	3.0	-8.4	37.1	1.0	-44.5	-13.0	-31.5	
Mid Channel (1732.6MHz)										
3.47	-66.5	H	3.0	-17.1	38.5	1.0	-54.7	-13.0	-41.7	
5.20	-63.8	H	3.0	-10.5	38.7	1.0	-48.2	-13.0	-35.2	
6.93	-66.3	H	3.0	-8.3	38.1	1.0	-45.4	-13.0	-32.4	
8.66	-68.2	H	3.0	-9.0	37.0	1.0	-45.0	-13.0	-32.0	
3.47	-65.8	V	3.0	-16.6	38.5	1.0	-54.1	-13.0	-41.1	
5.20	-63.7	V	3.0	-10.7	38.7	1.0	-48.4	-13.0	-35.4	
6.93	-65.6	V	3.0	-8.8	38.1	1.0	-45.9	-13.0	-32.9	
8.66	-67.2	V	3.0	-8.2	37.0	1.0	-44.2	-13.0	-31.2	
High Channel (1752.6MHz)										
3.51	-67.0	H	3.0	-17.5	38.5	1.0	-55.0	-13.0	-42.0	
5.26	-65.8	H	3.0	-12.3	38.7	1.0	-50.0	-13.0	-37.0	
7.01	-66.1	H	3.0	-8.9	38.1	1.0	-46.0	-13.0	-33.0	
8.76	-67.9	H	3.0	-8.6	36.9	1.0	-44.5	-13.0	-31.5	
3.51	-65.8	V	3.0	-16.5	38.5	1.0	-54.1	-13.0	-41.1	
5.26	-65.9	V	3.0	-12.9	38.7	1.0	-50.5	-13.0	-37.5	
7.01	-67.4	V	3.0	-10.5	38.1	1.0	-47.5	-13.0	-34.5	
8.76	-67.3	V	3.0	-8.1	36.9	1.0	-44.0	-13.0	-31.0	

Rev. 03.19.15

WCDMA Band 4 HSDPA

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.4. FIELD STRENGTH OF SPURIOUS RADIATION, Ant 4

10.4.1. GSM

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 12204524
Test Engineer: 4/17/2018
Configuration: 10643
Mode: EUT Only
GPRS 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber H | Pre-amplifer: 3m Chamber H | Filter: Filter | Limit: EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-59.1	H	3.0	-11.2	37.4	1.0	-47.6	-13.0	-34.6	
5.55	-65.1	H	3.0	-14.2	36.7	1.0	-49.9	-13.0	-36.9	
7.40	-67.8	H	3.0	-14.1	36.0	1.0	-49.1	-13.0	-36.1	
3.70	-60.6	V	3.0	-12.9	37.4	1.0	-49.4	-13.0	-36.4	
5.55	-65.8	V	3.0	-14.7	36.7	1.0	-50.5	-13.0	-37.5	
7.40	-70.1	V	3.0	-16.6	36.0	1.0	-51.6	-13.0	-38.6	
Mid Channel (1880.0MHz)										
3.76	-57.9	H	3.0	-10.0	37.4	1.0	-46.3	-13.0	-33.3	
5.64	-64.9	H	3.0	-13.8	36.7	1.0	-49.5	-13.0	-36.5	
7.52	-69.0	H	3.0	-15.1	35.9	1.0	-50.1	-13.0	-37.1	
3.76	-59.7	V	3.0	-11.8	37.4	1.0	-48.2	-13.0	-35.2	
5.64	-65.4	V	3.0	-14.3	36.7	1.0	-50.0	-13.0	-37.0	
7.52	-68.6	V	3.0	-15.0	35.9	1.0	-50.0	-13.0	-37.0	
High Channel (1909.8MHz)										
3.82	-58.9	H	3.0	-10.9	37.3	1.0	-47.2	-13.0	-34.2	
5.73	-67.2	H	3.0	-16.0	36.7	1.0	-51.7	-13.0	-38.7	
7.54	-68.2	H	3.0	-14.3	35.9	1.0	-49.2	-13.0	-36.2	
3.82	-57.0	V	3.0	-9.0	37.3	1.0	-45.3	-13.0	-32.3	
5.73	-66.7	V	3.0	-15.4	36.7	1.0	-51.1	-13.0	-38.1	
7.54	-69.2	V	3.0	-15.6	35.9	1.0	-50.5	-13.0	-37.5	

Rev. 03.19.15

GSM 1900MHz GPRS

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 12204524
Test Engineer: 4/17/2018
Configuration: 10643
Mode: EUT Only
EGPRS 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber H | Pre-amplifer: 3m Chamber H | Filter: Filter | Limit: EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1850.2MHz)										
3.70	-59.2	H	3.0	-11.2	37.4	1.0	-47.7	-13.0	-34.7	
5.55	-67.2	H	3.0	-16.2	36.7	1.0	-52.8	-13.0	-39.8	
7.40	-70.2	H	3.0	-16.5	36.0	1.0	-51.5	-13.0	-38.5	
3.70	-62.5	V	3.0	-14.8	37.4	1.0	-51.2	-13.0	-38.2	
5.55	-65.5	V	3.0	-14.4	36.7	1.0	-50.2	-13.0	-37.2	
7.40	-68.8	V	3.0	-15.3	36.0	1.0	-50.3	-13.0	-37.3	
Mid Channel (1880.0MHz)										
3.76	-57.3	H	3.0	-9.4	37.4	1.0	-45.7	-13.0	-32.7	
5.64	-64.5	H	3.0	-13.4	36.7	1.0	-49.1	-13.0	-36.1	
7.52	-69.1	H	3.0	-15.3	35.9	1.0	-50.2	-13.0	-37.2	
3.76	-62.3	V	3.0	-14.5	37.4	1.0	-50.9	-13.0	-37.9	
5.64	-64.5	V	3.0	-13.4	36.7	1.0	-49.1	-13.0	-36.1	
7.52	-69.0	V	3.0	-15.4	35.9	1.0	-50.3	-13.0	-37.3	
High Channel (1909.8MHz)										
3.82	-59.8	H	3.0	-11.9	37.3	1.0	-48.1	-13.0	-35.1	
5.73	-66.9	H	3.0	-15.7	36.7	1.0	-51.4	-13.0	-38.4	
7.54	-68.7	H	3.0	-14.9	35.9	1.0	-49.8	-13.0	-36.8	
3.82	-56.9	V	3.0	-8.9	37.3	1.0	-45.2	-13.0	-32.2	
5.73	-66.2	V	3.0	-14.9	36.7	1.0	-50.6	-13.0	-37.6	
7.54	-69.4	V	3.0	-15.8	35.9	1.0	-50.7	-13.0	-37.7	

Rev. 03.19.15

GSM 1900MHz EGPRS

10.4.2. WCDMA

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: REL 99, 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber E | Pre-amplifer: 3m Chamber E | Filter: Filter | Limit: EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.70	-63.2	H	3.0	-13.3	38.6	1.0	-50.9	-13.0	-37.9	
5.56	-64.7	H	3.0	-10.6	38.6	1.0	-48.2	-13.0	-35.2	
7.42	-66.5	H	3.0	-8.8	37.8	1.0	-45.6	-13.0	-32.6	
3.70	-62.9	V	3.0	-13.0	38.6	1.0	-50.6	-13.0	-37.6	
5.55	-64.5	V	3.0	-10.8	38.6	1.0	-48.4	-13.0	-35.4	
7.42	-66.2	V	3.0	-8.7	37.8	1.0	-45.6	-13.0	-32.5	
Mid Channel (1880MHz)										
3.76	-62.3	H	3.0	-12.2	38.6	1.0	-49.8	-13.0	-36.8	
5.64	-65.0	H	3.0	-10.7	38.5	1.0	-48.3	-13.0	-35.3	
7.52	-66.4	H	3.0	-8.6	37.7	1.0	-45.4	-13.0	-32.4	
3.76	-63.0	V	3.0	-13.0	38.6	1.0	-50.6	-13.0	-37.6	
5.64	-65.4	V	3.0	-11.5	38.5	1.0	-49.0	-13.0	-36.0	
7.52	-66.3	V	3.0	-8.7	37.7	1.0	-45.4	-13.0	-32.4	
High Channel (1907.6MHz)										
3.81	-62.8	H	3.0	-12.6	38.7	1.0	-50.2	-13.0	-37.2	
5.72	-66.2	H	3.0	-11.7	38.5	1.0	-49.2	-13.0	-36.2	
7.66	-65.6	H	3.0	-7.6	37.7	1.0	-44.3	-13.0	-31.3	
3.82	-61.3	V	3.0	-11.1	38.7	1.0	-48.7	-13.0	-35.7	
5.72	-65.3	V	3.0	-11.2	38.5	1.0	-48.7	-13.0	-35.7	
7.63	-65.4	V	3.0	-7.6	37.7	1.0	-44.3	-13.0	-31.3	

Rev. 03.19.15

WCDMA Band 2 Rel 99

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: HSDPA 1900MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber E | Pre-amplifer: 3m Chamber E | Filter: Filter | Limit: EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1852.4MHz)										
3.70	-62.7	H	3.0	-12.8	38.6	1.0	-50.4	-13.0	-37.4	
5.56	-65.1	H	3.0	-11.1	38.6	1.0	-48.6	-13.0	-35.6	
7.41	-66.5	H	3.0	-8.8	37.8	1.0	-45.6	-13.0	-32.6	
9.26	-66.8	H	3.0	-6.9	36.6	1.0	-42.5	-13.0	-29.5	
3.70	-62.5	V	3.0	-12.6	38.6	1.0	-50.3	-13.0	-37.3	
5.56	-65.4	V	3.0	-11.6	38.6	1.0	-49.2	-13.0	-36.2	
7.41	-66.8	V	3.0	-9.3	37.8	1.0	-46.1	-13.0	-33.1	
Mid Channel (1880MHz)										
3.76	-62.1	H	3.0	-12.0	38.6	1.0	-49.6	-13.0	-36.6	
5.64	-64.1	H	3.0	-9.8	38.5	1.0	-47.4	-13.0	-34.4	
7.52	-67.1	H	3.0	-9.3	37.7	1.0	-46.1	-13.0	-33.1	
9.40	-66.4	H	3.0	-6.4	36.5	1.0	-41.9	-13.0	-28.9	
3.76	-63.3	V	3.0	-13.2	38.6	1.0	-50.9	-13.0	-37.9	
5.64	-64.6	V	3.0	-10.7	38.5	1.0	-48.2	-13.0	-35.2	
7.52	-66.7	V	3.0	-9.1	37.7	1.0	-45.9	-13.0	-32.9	
High Channel (1907.6MHz)										
3.82	-61.6	H	3.0	-11.4	38.7	1.0	-49.0	-13.0	-36.0	
5.72	-64.9	H	3.0	-10.5	38.5	1.0	-48.0	-13.0	-35.0	
7.63	-67.2	H	3.0	-9.3	37.7	1.0	-45.9	-13.0	-32.9	
9.54	-67.6	H	3.0	-7.3	36.4	1.0	-42.7	-13.0	-29.7	
3.82	-62.1	V	3.0	-11.9	38.7	1.0	-49.6	-13.0	-36.6	
5.72	-65.1	V	3.0	-11.0	38.5	1.0	-48.5	-13.0	-35.5	
7.63	-66.7	V	3.0	-8.9	37.7	1.0	-45.6	-13.0	-32.6	

Rev. 03.19.15

WCDMA Band 2 HSDPA

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: REL 99, 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.42	-66.9	H	3.0	-17.6	38.5	1.0	-56.1	-13.0	-42.1	
5.14	-64.4	H	3.0	-11.3	38.7	1.0	-49.0	-13.0	-36.0	
6.85	-65.1	H	3.0	-8.3	38.1	1.0	-45.4	-13.0	-32.4	
8.56	-67.0	H	3.0	-7.9	37.1	1.0	-44.0	-13.0	-31.0	
3.42	-66.6	V	3.0	-17.6	38.5	1.0	-56.1	-13.0	-42.1	
5.14	-64.0	V	3.0	-11.2	38.7	1.0	-48.9	-13.0	-35.9	
6.85	-66.8	V	3.0	-10.2	38.1	1.0	-47.3	-13.0	-34.3	
8.56	-66.2	V	3.0	-7.3	37.1	1.0	-43.3	-13.0	-30.3	
Mid Channel (1732.6MHz)										
3.47	-66.2	H	3.0	-16.8	38.5	1.0	-54.3	-13.0	-41.3	
5.20	-63.5	H	3.0	-10.3	38.7	1.0	-47.9	-13.0	-34.9	
6.93	-65.9	H	3.0	-8.9	38.1	1.0	-46.0	-13.0	-33.0	
8.66	-66.4	H	3.0	-7.2	37.0	1.0	-43.2	-13.0	-30.2	
3.47	-65.2	V	3.0	-16.0	38.5	1.0	-53.5	-13.0	-40.5	
5.20	-64.0	V	3.0	-11.1	38.7	1.0	-48.8	-13.0	-35.8	
6.93	-66.2	V	3.0	-9.4	38.1	1.0	-46.5	-13.0	-33.5	
8.66	-66.1	V	3.0	-7.0	37.0	1.0	-43.0	-13.0	-30.0	
High Channel (1752.6MHz)										
3.51	-66.7	H	3.0	-17.2	38.5	1.0	-54.8	-13.0	-41.8	
5.26	-65.4	H	3.0	-12.0	38.7	1.0	-49.7	-13.0	-36.7	
7.01	-65.9	H	3.0	-8.7	38.1	1.0	-45.8	-13.0	-32.8	
8.76	-66.9	H	3.0	-7.6	36.9	1.0	-43.5	-13.0	-30.5	
3.51	-66.3	V	3.0	-17.0	38.5	1.0	-54.5	-13.0	-41.5	
5.26	-65.9	V	3.0	-12.8	38.7	1.0	-50.5	-13.0	-37.5	
7.01	-65.0	V	3.0	-8.0	38.1	1.0	-45.1	-13.0	-32.1	
8.76	-66.5	V	3.0	-7.3	36.9	1.0	-43.2	-13.0	-30.2	

Rev. 03.19.15

WCDMA Band 4 Rel 99

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 05/02/18
Test Engineer: 10649
Configuration: EUT Only
Mode: HSDPA 1700MHz

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber E	3m Chamber E	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1712.4MHz)										
3.42	-65.2	H	3.0	-16.0	38.5	1.0	-53.5	-13.0	-40.5	
5.14	-63.3	H	3.0	-10.1	38.7	1.0	-47.8	-13.0	-34.8	
6.85	-66.0	H	3.0	-9.1	38.1	1.0	-46.2	-13.0	-33.2	
8.56	-66.2	H	3.0	-7.2	37.1	1.0	-43.2	-13.0	-30.2	
3.42	-66.5	V	3.0	-17.4	38.5	1.0	-55.0	-13.0	-42.0	
5.14	-64.0	V	3.0	-11.2	38.7	1.0	-48.9	-13.0	-35.9	
6.85	-65.2	V	3.0	-8.6	38.1	1.0	-45.7	-13.0	-32.7	
8.56	-66.4	V	3.0	-7.5	37.1	1.0	-43.5	-13.0	-30.5	
Mid Channel (1732.6MHz)										
3.47	-65.7	H	3.0	-16.3	38.5	1.0	-53.8	-13.0	-40.8	
5.20	-65.1	H	3.0	-11.8	38.7	1.0	-49.5	-13.0	-36.5	
6.93	-66.3	H	3.0	-9.3	38.1	1.0	-46.4	-13.0	-33.4	
8.66	-67.6	H	3.0	-8.5	37.0	1.0	-44.5	-13.0	-31.5	
3.47	-66.6	V	3.0	-17.4	38.5	1.0	-54.9	-13.0	-41.9	
5.20	-64.4	V	3.0	-11.4	38.7	1.0	-49.1	-13.0	-36.1	
6.93	-65.5	V	3.0	-8.7	38.1	1.0	-45.8	-13.0	-32.8	
8.66	-66.4	V	3.0	-7.4	37.0	1.0	-43.4	-13.0	-30.4	
High Channel (1752.6MHz)										
3.51	-66.5	H	3.0	-17.0	38.5	1.0	-54.6	-13.0	-41.6	
5.26	-65.4	H	3.0	-12.0	38.7	1.0	-49.7	-13.0	-36.7	
7.01	-66.7	H	3.0	-9.5	38.1	1.0	-46.6	-13.0	-33.6	
8.76	-67.1	H	3.0	-7.7	36.9	1.0	-43.7	-13.0	-30.7	
3.51	-66.2	V	3.0	-16.9	38.5	1.0	-54.4	-13.0	-41.4	
5.26	-65.7	V	3.0	-12.6	38.7	1.0	-50.3	-13.0	-37.3	
7.01	-65.0	V	3.0	-8.1	38.1	1.0	-45.1	-13.0	-32.1	
8.76	-66.5	V	3.0	-6.3	36.9	1.0	-42.3	-13.0	-29.3	

Rev. 03.19.15

WCDMA Band 4 HSDPA

END OF REPORT

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

11. SETUP PHOTOS

Please refer to 12204524-EP1V1 for setup photos

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.