



IC RSS-131, ISSUE 2, JULY 2003

FCC PART 27

TEST AND MEASUREMENT REPORT

For

Cellphone-Mate, Inc.

48820 Kato Road, Suite 300B,

Fremont, CA 94539, USA

FCC ID: RSNAWS-75UNDER IC: 7784A-AWS75

Report Type: Original Report		Product Type: AWS Bi-Directional Amplifier
Test Engineer:	Quinn Jiang	Diffes
Report Number:	R1102234-27	
Report Date:	2011-03-18	
Reviewed By:	Victor Zhang RF Lead Engine	eer bor My
Prepared By: (84)	Bay Area Comp 1274 Anvilwoo Sunnyvale, CA Tel: (408) 732-9 Fax: (408) 732-9	liance Laboratories Corp. d Avenue, 94089, USA 9162 9164

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP*, NIST, or any agency of the Federal Government. * This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*"

TABLE OF CONTENTS

1	GE	NERAL INFORMATION	5
	1.1	PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	5
	1.2	MECHANICAL DESCRIPTION	5
	1.3	Objective	5
	1.4	RELATED SUBMITTAL(S)/GRANT(S)	6
	1.5	TEST METHODOLOGY	6
	1.6	MEASUREMENT UNCERTAINTY	6
2	1.7 SV	TEST FACILITY	0 7
-	21		····· / 7
	$\frac{2.1}{2.2}$	EUT EXERCISE SOFTWARE	···· / 7
	2.3	EOUPMENT MODIFICATIONS	7
	2.4	LOCAL SUPPORT EQUIPMENT AND SOFTWARE LIST AND DETAILS	7
	2.5	INTERFACE PORTS AND CABLES	7
	2.6	INTERNAL CONFIGURATIONS OF EUT	7
3	SU	MMARY OF TEST RESULTS	8
4	FC	C §2.1046, §27.50 & IC RSS-131 §6.2 – RF OUTPUT POWER	9
	4.1	APPLICABLE STANDARD	9
	4.2	Test Procedure	9
	4.3	Test Environmental Conditions	9
	4.4	TEST EQUIPMENT LIST AND DETAILS	9
	4.5	IEST SETUP BLOCK DIAGRAM	10
_	4.0	TEST RESULTS	10
5	IC	KSS – 131 §3.2(D) & §6.1 – AMPLIFIER GAIN AND BANDWIDTH	12
	5.1	APPLICABLE STANDARDS	12
	5.2 5.3	TEST FRUUDONMENTAL CONDITIONS	12
	5.5 5.4	TEST ENVIRONMENTAL CONDITIONS	12
	5.5	TEST RESULTS	12
6	IC		
		RSS-131 §6.3 – NON-LINEARITY	14
	Appl	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD	14 14
	Appl 6.1	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD TEST PROCEDURE	14 14 14
	APPL 6.1 6.2	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD Test Procedure Test Environmental Conditions	14 14 14 14
	APPL 6.1 6.2 6.3	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD TEST PROCEDURE TEST ENVIRONMENTAL CONDITIONS TEST EQUIPMENT LIST AND DETAILS	14 14 14 14 14
	APPL 6.1 6.2 6.3 6.4	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD TEST PROCEDURE TEST ENVIRONMENTAL CONDITIONS TEST EQUIPMENT LIST AND DETAILS TEST RESULTS	14 14 14 14 14 14
7	APPL 6.1 6.2 6.3 6.4 FC	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD TEST PROCEDURE TEST ENVIRONMENTAL CONDITIONS TEST EQUIPMENT LIST AND DETAILS TEST RESULTS C §2.1047 - MODULATION CHARACTERISTIC	14 14 14 14 14 14 14 18
7	APPL 6.1 6.2 6.3 6.4 FC 7.1	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD TEST PROCEDURE TEST ENVIRONMENTAL CONDITIONS TEST EQUIPMENT LIST AND DETAILS TEST RESULTS C §2.1047 - MODULATION CHARACTERISTIC	14 14 14 14 14 14 18 18
7	APPL 6.1 6.2 6.3 6.4 FC 7.1 7.2	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD TEST PROCEDURE TEST ENVIRONMENTAL CONDITIONS TEST EQUIPMENT LIST AND DETAILS TEST RESULTS C §2.1047 - MODULATION CHARACTERISTIC APPLICABLE STANDARD TEST RESULT	14 14 14 14 14 14 18 18 18
7 8	APPL 6.1 6.2 6.3 6.4 FC 7.1 7.2 FC	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD TEST PROCEDURE TEST ENVIRONMENTAL CONDITIONS TEST EQUIPMENT LIST AND DETAILS TEST RESULTS C §2.1047 - MODULATION CHARACTERISTIC APPLICABLE STANDARD TEST RESULT C §2.1049 & §27.53 – OCCUPIED BANDWIDTH	14 14 14 14 14 14 18 18 18 19
7 8	APPL 6.1 6.2 6.3 6.4 FC 7.1 7.2 FC 8.1	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD TEST PROCEDURE TEST ENVIRONMENTAL CONDITIONS TEST EQUIPMENT LIST AND DETAILS TEST RESULTS C §2.1047 - MODULATION CHARACTERISTIC Applicable Standard TEST RESULT C §2.1049 & §27.53 – OCCUPIED BANDWIDTH Applicable Standard	14 14 14 14 14 18 18 18 19 19
7 8	APPL 6.1 6.2 6.3 6.4 FC 7.1 7.2 FC 8.1 8.2 8 2	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD TEST PROCEDURE TEST ENVIRONMENTAL CONDITIONS TEST EQUIPMENT LIST AND DETAILS TEST RESULTS C §2.1047 - MODULATION CHARACTERISTIC APPLICABLE STANDARD TEST RESULT C §2.1049 & §27.53 – OCCUPIED BANDWIDTH APPLICABLE STANDARD TEST PROCEDURE TEST FORCEDURE	14 14 14 14 14 18 18 18 18 19 19 19
7 8	APPL 6.1 6.2 6.3 6.4 FC 7.1 7.2 FC 8.1 8.2 8.3 8.4	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD TEST PROCEDURE TEST ENVIRONMENTAL CONDITIONS TEST EQUIPMENT LIST AND DETAILS TEST RESULTS C §2.1047 - MODULATION CHARACTERISTIC APPLICABLE STANDARD TEST RESULT C §2.1049 & §27.53 – OCCUPIED BANDWIDTH APPLICABLE STANDARD TEST PROCEDURE TEST ENVIRONMENTAL CONDITIONS TEST ENVIRONMENTAL CONDITIONS TEST FOULTMENT LIST AND DETAILS	14 14 14 14 14 18 18 18 19 19 19 19 19
7 8	APPL 6.1 6.2 6.3 6.4 FC 7.1 7.2 FC 8.1 8.2 8.3 8.4 8.5	RSS-131 §6.3 – NON-LINEARITY ICABLE STANDARD TEST PROCEDURE TEST PROCEDURE TEST EQUIPMENT LIST AND DETAILS TEST RESULTS C §2.1047 - MODULATION CHARACTERISTIC APPLICABLE STANDARD TEST RESULT C §2.1049 & §27.53 – OCCUPIED BANDWIDTH APPLICABLE STANDARD TEST PROCEDURE TEST PROCEDURE TEST ENVIRONMENTAL CONDITIONS TEST EQUIPMENT LIST AND DETAILS TEST RESULTS	14 14 14 14 14 18 18 18 19 19 19 19 19 19 19 19 19 19

FCC Part 27/IC RSS-131 Test Report

9.1	APPLICABLE STANDARD	39
9.2	Test Procedure	39
9.3	TEST EQUIPMENT LIST AND DETAILS	39
9.4	TEST ENVIRONMENTAL CONDITIONS	40
9.5		40
10 FC	C §2.1051, §27.53 & IC RSS-131 §6.4 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS	41
10.1	APPLICABLE STANDARD	41
10.2	TEST PROCEDURE	41
10.3	TEST ENVIRONMENTAL CONDITIONS	41
10.4	TEST EQUIPMENT LIST AND DETAILS	41
10.5		42
II FC	C §27.53 & IC RSS-131 §6.4 – BAND EDGE	57
11.1	APPLICABLE STANDARD	57
11.2	TEST PROCEDURE	57
11.5	TEST ENVIRONMENTAL CONDITIONS	57
11.4	TEST EQUIPMENT LIST AND DETAILS	57
10 EC	TEST RESULTS	
12 FC	C §2.1055, §27.54 & IC K55-131 §6.5 – FREQUENCY STABILITY	62
12.1	APPLICABLE STANDARD	62
12.2	TEST RESULTS	62
13 FC	C §27.52, §2.1091 & IC RSS-102 - RF EXPOSURE INFORMATION	63
13.1	APPLICABLE STANDARD	63
13.2	MPE PREDICTION	64
14 EX	HIBIT A - FCC ID AND IC LABELING REQUIREMENTS	65
14.1	FCC ID AND IC LABEL REQUIREMENTS	65
14.2	FCC ID AND IC LABEL CONTENTS	66
14.3	FCC AND IC LABEL LOCATION ON EUT	66
15 EX	HIBIT B - TEST SETUP PHOTOGRAPHS	67
15.1	RADIATED EMISSIONS 30 MHz to 1 GHz - FRONT VIEW	67
15.2	RADIATED EMISSIONS 30 MHZ TO 1GHZ- REAR VIEW	67
15.3	RADIATED EMISSIONS ABOVE 1 GHz - FRONT VIEW	68
15.4	RADIATED EMISSIONS ABOVE 1 GHZ- REAR VIEW	68
16 EX	HIBIT C- EUT PHOTOS	69
16.1	EUT TOP VIEW	69
16.2	EUT BOTTOM VIEW	69
16.3	EUT FRONT VIEW	70
16.4	EUT REAR VIEW	70
16.5	EUT SIDE 1 VIEW	71
16.6	EUT SIDE 2 VIEW	71
16.7	EUT CASE OPEN AND PCB TOP VIEW	72
16.8	EUT DCD DEAD VIEW	12
10.9	ΕUT ΛΟ/ΝΟ ΑΡΑΡΤΕΡ	13 72
10.10	J EU I AC/DC ADAF1EK	75

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1102234-27	Original Report	2011-03-18

1 General Information

1.1 Product Description for Equipment under Test (EUT)

The *Cellphone-Mate Inc*. product, *CM2100 62dB*, *FCC ID: RSNAWSL-75UNDER* and *IC: 7784A-AWS75* or the "EUT" as referred to in this report, is a Universal in-Building Amplifier with N type female antenna connectors that operates in the AWS bands.

General Specifications:

- Operating Frequency: Downlink: 2110-2155 MHz
 - Uplink: 1710-1755 MHz
- Emission Designator: F9W
- Modulation: WCDMA, HSPA
- Power Source: Input: 120V/60Hz; Output: DC 6V

1.2 Mechanical Description

The EUT dimension is approximately 143mm (L) x 120 mm (W) x 30 mm (H) and weighs approximately 680g.

The test data gathered are from typical production sample, serial number: 002-000-0237A, provided by the Manufacture.

1.3 Objective

This type approval report is prepared on behalf of *Cellphone-Mate Inc*. in accordance with Part 2, Subpart J, Part 27, Subpart E, of the Federal Communication Commissions rules and RSS-131 of the Canadian Department of Industry Rules.

The objective is to determine compliance with

FCC rules:

- RF output power
- Modulation Characteristic
- Occupied bandwidth
- Spurious Emission at Antenna Terminals
- Transmitter Radiated Spurious Emissions
- frequency stability
- Band edges
- RF Exposure

RSS-131 Issue 2 rules:

- Amplifier Gain and Bandwidth
- Mean Output Power
- Non-Linearity
- Spurious Emission at Antenna Terminals
- Transmitter Radiated Spurious Emissions
- RF Exposure

1.4 Related Submittal(s)/Grant(s)

No Related Submittals

1.5 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the FCC Part 2, Subpart J as well as Part 27 - Miscellaneous Wireless Communications Services and IC RSS-131, issue 2, July 2003.

Applicable Standards: TIA/EIA-603-C, ANSI C63.4-2003.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values ranging from +2.0 dB for Conducted Emissions tests and +4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

Detailed instrumentation measurement uncertainties can be found in BACL Corp. report QAP-018.

1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test sites at BACL have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and

December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: R-2463 and C-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at <u>http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm</u>

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to EIA/TIA-603-C.

The final qualification test was performed with the EUT operating at normal mode.

2.2 EUT Exercise Software

Signal was sent through EUT using a signal generator; device was set to normal operating mode.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Local Support Equipment and Software List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Signal Generator	SMIQ03	849192/0085
HP	Signal Generator	8648C	3426A00417

2.5 Interface Ports and Cables

Cable Description	Length (m)	То	From
RF Cable	< 1	Signal Generator	EUT
RF Cable	< 1	Spectrum Analyzer	EUT

2.6 Internal Configurations of EUT

Manufacturer	Description	Model	Serial Number
Cellphone-Mate, Inc.	PCB Assembly	CM2100 V1.0	002-000-0237A

3 Summary of Test Results

FCC & IC Rules	Description of Tests	Results
FCC §2.1046, §27.50 (i) IC RSS-131 §6.2	RF Output Power	Compliant
IC RSS-131 §6.1	Amplifier Gain and Bandwidth	Compliant
IC RSS-131 §6.3	Non-Linearity	Compliant
FCC §2.1047	Modulation Characteristics	N/A
FCC §2.1049, §27.53 (c)	Occupied Bandwidth	Compliant
FCC §2.1053, §27.53 (c) IC RSS-131 §6.4	Radiated Spurious Emissions	Compliant
FCC §2.1051, §27.53 (c) IC RSS-131 §6.4	Spurious Emissions at Antenna Terminals	Compliant
FCC §27.53 (c) IC RSS-131 §6.4	Band Edge	Compliant
FCC §27.54 IC RSS-131 §6.5	Frequency Stability	N/A
FCC §27.52, §2.1091 IC RSS-102	RF Exposure Information	Compliant

N/A: Not applicable

4 FCC §2.1046, §27.50 & IC RSS-131 §6.2 – RF Output Power

4.1 Applicable Standard

According to FCC §27.50, the maximum effective radiated power (ERP) of fixed and base station must not exceed 1000 Watts.

According to IC RSS-131 §3.2 (d), and §6.2. The manufacturer's output power rating Prated MUST NOT be greater than Pmean for all types of enhancers.

4.2 Test Procedure

Conducted:

The RF output of the transmitter was connected to the signal generator and the spectrum analyzer through sufficient attenuation.

4.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

4.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
НР	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

4.5 Test Setup Block Diagram



4.6 Test Results

Modulation: WCDMA

Band	Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
2110 2155 MIL	Low	2112.4	8.83	7.638
2110-2155 MHZ Downlink	Middle	2132.4	9.99	9.977
Downink	High	2152.6	9.19	8.295
1710 1755 MU	Low	1712.4	19.61	91.41
1/10-1/55 MHz Uplink	Middle	1732.4	24.33	271.02
Оршк	High	1752.6	21.26	133.65

Modulation: HSDPA

Band	Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
2110 2155 MIL	Low	2112.4	8.46	7.01
2110-2155 MHZ Downlink	Middle	2132.4	9.51	8.93
Downink	High	2152.6	8.79	7.56
1710-1755 MHz	Low	1712.4	19.16	82.41
	Middle	1732.4	23.12	205.11
Оршк	High	1752.6	20.05	101.15

Modulation: HSUPA

Band	Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
2110 2155 MIL	Low	2112.4	8.37	6.87
Downlink	Middle	2132.4	9.48	8.87
	High	2152.6	8.72	7.45
1710-1755 MHz Unlink	Low	1712.4	19.16	82.41
	Middle	1732.4	23.1	204.17
Оршк	High	1752.6	20	100.00

5 IC RSS – 131 §3.2(d) & §6.1 – Amplifier Gain and Bandwidth

5.1 Applicable Standards

According to IC RSS-131 §3.2 (d), and §6.1.

The passband gain shall not exceed the nominal gain by more than 1.0 dB. The 20 dB bandwidth shall not exceed the nominal bandwidth that is stated by the manufacturer. Outside of the 20 dB bandwidth, the gain shall not exceed the gain at the 20 dB point.

5.2 Test Procedure

Adjust the internal gain control of the equipment under test to the nominal gain for which equipment certification is sought. With the aid of a signal generator and spectrum analyzer, measure the 20 dB bandwidth of the amplifier (i.e. at the point where the gain has fallen by 20 dB). Measure the gain-versus-frequency response of the amplifier from the mid band frequency f0 of the passband up to at least f0 + 250% of the 20 dB bandwidth.

5.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

5.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
HP	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

5.5 Test Results



Downlink

Note: The 20 dB Bandwidth is 2174.0 MHz - 2090.9 MHz = 83.1 MHz



Uplink

Note: The 20 dB Bandwidth is 1766.5 MHz - 1693.9 MHz = 72.6 MHz

6 IC RSS-131 §6.3 – Non-Linearity

Applicable Standard

As per RSS-131 §6.3.1:

For a multi-channel enhancer, any intermodulation product level must be attenuated, relative to P, by at least:

43 + 10 Log10P, or 70 dB, whichever is less stringent,

where P is the total RF output power of the test tones in watts.

6.1 Test Procedure

The RF output of the transmitter was connected to the input of the network analyzer through sufficient attenuation. Set the resolution bandwidth of the spectrum analyzer from 1% to 3% of the 99% emission bandwidth and set the video bandwidth to 3 times the resolution bandwidth. Record both the amplifier input and output signals.

6.2 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

6.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
HP	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

6.4 Test Results

Please refer to the plots hereinafter.

2110-2155 MHz Downlink



WCDMA/HSPA AWS Band Downlink, Low Channel: 2112.4 MHz

WCDMA/HSPA AWS Band Downlink, Middle Channel: 2132.4 MHz

🔆 Ag	jilent										Marker
Ref 38 #Avg	dBm Mark	er	Atten	30 dB				Mkr4	2.142 -25.2	40 GHz 7 dBm	Select Marker 1 2 3 <u>4</u>
Log 10 dB/ Offst	2.14 -25.	2400 27 d	1000 Bm	GHz-		23 \$					Normal
18 dB DI					1 \$		4				Delta
-13.0 dBm PAvg									L		Delta Pair (Tracking Ref) Ref ≜
Center #Res B	2.132 3W 100	40 GHz kHz	2	#VE	3W 300	kHz		#Sweep	Span 7 5 s (60	75 MHz^ 1 pts)	Span Pair Span <u>Center</u>
1 2 3 4	er T	race (1) (1) (1) (1)	Frec Frec Frec Frec Frec		2.127 2.132 2.137 2.142	40 GH 40 GH 40 GH 40 GH 40 GH	z z z z		Hmpint -29.38 10.01 10.05 -25.27	ude dBm dBm dBm dBm	Off
											More 1 of 2
Copyr	ight 20	000-20	106 Ag	ilent T	echnol	ogies					



WCDMA/HSPA AWS Band Downlink, High Channel: 2152.6 MHz

1710-1755 MHz Uplink



WCDMA/HSPA AWS Band Uplink, Low Channel: 1712.4 MHz



WCDMA/HSPA AWS Band Uplink, Middle Channel: 1732.4 MHz

WCDMA/HSPA AWS Band Uplink, High Channel: 1752.6 MHz



7 FCC §2.1047 - Modulation Characteristic

7.1 Applicable Standard

According to FCC § 2.1047(d) and Part 27, there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

7.2 Test Result

N/A

8 FCC §2.1049 & §27.53 – Occupied Bandwidth

8.1 Applicable Standard

Requirements: FCC §2.1049 and §27.53.

8.2 Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 100 kHz and the 26 dB & 99% bandwidth was recorded.

8.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

8.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
HP	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

8.5 Test Results

Modulation- WCDMA						
David		Channel	Frequency	99% Emission	Bandwidth	
Band M	Modulation		(MHz)	Input (MHz)	Output (MHz)	
2110 2155	Downlink	Low	2112.4	4.956	4.977	
2110-2155 MHz		Middle	2132.4	4.951	5.134	
WIIIZ		High	2152.6	4.943	5.084	
1710-1755 MHz	Uplink	Low	1712.4	4.932	5.028	
		Middle	1732.4	4.937	5.182	
1,1112		High	1752.6	4.945	5.018	

Modulation- HSDPA						
Dend	Madalation		Frequency	99% Emission Bandwidth		
Band Modulatio		Channel	(MHz)	Input (MHz)	Output (MHz)	
	Downlink	Low	2112.4	4.968	5.01	
2110-2155 MHz		Middle	2132.4	4.961	5.05	
IVII IZ		High	2152.6	4.949	5.049	
1710-1755 MHz		Low	1712.4	4972	5.050	
	Uplink	Middle	1732.4	4.977	5.099	
11112		High	1752.6	4.972	5.022	

Modulation- HSUPA						
Dond		Channel	Frequency	99% Emission	Bandwidth	
Band Mode	Modulation		(MHz)	Input (MHz)	Output (MHz)	
	Downlink	Low	2112.4	4.968	5.01	
2110-2155 MHz		Middle	2132.4	4.961	5.05	
WIT12		High	2152.6	4.949	5.049	
1710-1755 MHz		Low	1712.4	4972	5.050	
	Uplink	Middle	1732.4	4.977	5.099	
		High	1752.6	4.972	5.022	

Please refer to the following plots for details.

2110-2155 MHz Band, Downlink:

Modulation: WCDMA, Low Channel - 2112.4MHz



Input

Output

Modulation: WCDMA, Middle Channel - 2132.4MHz

* Agilent	Freq/Channel
Ch Freq 2.1324 GHz Trig Free Occupied Bandwidth	Center Freq 2.13240000 GHz
Center 2.132400000 GHz	Start Freq 2.12865000 GHz
Ref -50.96 dBm #Atten 2 dB #Avg	Stop Freq 2.13615000 GHz
10 → ← dB/ → ← 0ffst − − 0.5 − −	CF Step 750.000000 kHz <u>Auto</u> Man
dB Center 2.132 400 GHz Span 7.5 MHz^	FreqOffset 0.00000000 Hz
#Res BW 100 kHz #VBW 300 kHz #Sweep 1 s (601 pts) Occupied Bandwidth 0cc BW % Pwr 99.00 % 4.3448 MHz × dB -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error -367.095 Hz × dB Bandwidth 4.951 MHz*	
Copyright 2000–2006 Agilent Technologies	

Input

Output

Modulation: WCDMA, High Channel - 2152.6MHz

Output

Input

1710-1755 MHz Band, Uplink:

Modulation: WCDMA, Low Channel - 1712.4MHz

Input

Output

Modulation: WCDMA, Middle Channel - 1732.4MHz

Output

Input

Modulation: WCDMA, High Channel - 1752.6MHz

~

Input

2110-2155 MHz Band, Downlink:

Modulation: HSDPA, Low Channel - 2112.4 MHz

* Agilent	Freq/Channel						
Ch Freq 2.1124 GHz Trig Free Occupied Bandwidth	Center Freq 2.11240000 GHz						
Center 2.112400000 GHz	Start Freq 2.10865000 GHz						
Ref -50.5 dBm #Atten 2 dB #Avg Log	Stop Freq 2.11615000 GHz						
dB/ → ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ←	CF Step 750.000000 kHz <u>Auto</u> Man						
QB Span 7.5 MHz Center 2.112 400 GHz Span 7.5 MHz ² #Page BU 100 kHz #VBU 300 kHz #Swaap 1 c (601 ptc)	FreqOffset 0.00000000 Hz						
•кез ви 100 кн2 •кви 300 кн2 •квер 1 s (601 pts) Signal Track Occupied Bandwidth осс ви % Риг 99.00 % Signal Track 4.3506 MHz × dB -26.00 dB 0n Off							
Transmit Freq Error -1.202 kHz x dB Bandwidth 4.968 MHz*							
Copyright 2000–2006 Agilent Technologies							

Input

Output

Modulation: HSDPA, Middle Channel - 2132.4 MHz

Output

Input

Modulation: HSDPA, High Channel - 2152.6 MHz

Output

Input

1710-1755MHz Band, Uplink:

Modulation: HSDPA, Low Channel - 1712.4 MHz

* Agilent	Freq/Channel
Ch Freq 1.7124 GHz Trig Free Occupied Bandwidth	Center Freq 1.71240000 GHz
Center 1.712400000 GHz	Start Freq 1.70865000 GHz
Ref -38.5 dBm #Atten 2 dB #Avg Log	Stop Freq 1.71615000 GHz
dB/ dB/ 0ffst 0.5	CF Step 750.000000 kHz <u>Auto</u> Man
dB Center 1.712 400 GHz Place PU 100 kUp = #UPU 200 kUp = #Succen 1 o (601 ptc)	FreqOffset 0.00000000 Hz
Image: Process DM 100 kH2 I	Signal Track On <u>Off</u>
Transmit Freq Error -3.026 kHz x dB Bandwidth 4.972 MHz*	
Copyright 2000–2006 Agilent Technologies	

Input

Output

Modulation: HSDPA, Middle Channel - 1732.4 MHz

Input

Output

Modulation: HSDPA, High Channel - 1752.6 MHz

* Agilent	Sweep
Ch Freq 1.7526 GHz Trig Free Occupied Bandwidth	Sweep Time 1.000 s Auto <u>Man</u>
Sweep Time 1.000 s	Sweep <u>Single</u> Cont
Ref -38.5 dBm #Atten 2 dB #Avg Log	Auto Sweep Time <u>Norm</u> Accy
dB/ Offst dP	Gate On <u>Off</u>
Center 1.752 600 GHz Span 7.5 MHz [*] #Res BW 100 kHz #VBW 300 kHz #Sween 1 s (601 nts)	Gate Setup∙
Occupied Bandwidth Occ BW % Pwr 99.00 % 4.3729 MHz × dB -26.00 dB	Points 601
Transmit Freq Error -2.790 kHz x dB Bandwidth 4.972 MHz*	

Input

Output

2110-2155 MHz Band, Downlink:

Modulation: HSUPA, Low Channel - 2112.4 MHz

Input

Output

Modulation: HSUPA, Middle Channel - 2132.4 MHz

* Agilent	Freq/Channel						
Ch Freq 2.1324 GHz Trig Free Occupied Bandwidth	Center Freq 2.13240000 GHz						
Center 2.132400000 GHz	Start Freq 2.12865000 GHz						
Ref -50.5 dBm #Atten 2 dB #Avg Log	Stop Freq 2.13615000 GHz						
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	CF Step 750.000000 kHz <u>Auto</u> Man						
dB Center 2.132 400 GHz Span 7.5 MHz^	FreqOffset 0.00000000 Hz						
*Res BW 100 KHz *VBW 300 KHz *Sweep 1 s (601 pts) Signal Track Occupied Bandwidth Occ BW % Pwr 99.00 % On Off 4.3494 MHz × dB -26.00 dB On Off							
Transmit Freq Error -384.668 Hz x dB Bandwidth 4.961 MHz*							
Copyright 2000–2006 Agilent Technologies							

Input

Output

Modulation: HSUPA, High Channel - 2152.6 MHz

* Agilent	Freq/Channel					
Ch Freq 2.1526 GHz Trig Free Occupied Bandwidth	Center Freq 2.15260000 GHz					
Center 2.152600000 GHz	Start Freq 2.14885000 GHz					
Ref -50.5 dBm #Atten 2 dB #Avg Log	Stop Freq 2.15635000 GHz					
10 dB/ 0ffst → ← 0ffst − −	CF Step 750.000000 kHz <u>Auto</u> Man					
dB Center 2.152 600 GHz Span 7.5 MHz ²	Freq Offset 0.00000000 Hz					
*Res BW 100 KHz *VBW 300 KHz *Sweep 1 s (601 pts) Signal Track Occupied Bandwidth Occ BW % Pwr 99.00 % On Off 4.3454 MHz × dB -26.00 dB On Off						
Transmit Freq Error -707.130 Hz x dB Bandwidth 4.949 MHz*						
Copyright 2000–2006 Agilent Technologies						

Input

Output

1710-1755 MHz Band, Uplink:

Modulation: HSUPA, Low Channel - 1712.4 MHz

Input

Modulation: HSUPA, Middle Channel - 1732.4 MHz

* Agilent	Freq/Channel
Ch Freq 1.7324 GHz Trig Free Occupied Bandwidth	Center Freq 1.73240000 GHz
Center 1.732400000 GHz	Start Freq 1.72865000 GHz
Ref -38.5 dBm #Atten 2 dB #Avg Log	Stop Freq 1.73615000 GHz
10 dB/ 0ffst 0.5	CF Step 750.000000 kHz <u>Auto</u> Man
dB Center 1.732 400 GHz Span 7.5 MHz ²	FreqOffset 0.00000000 Hz
#Res BW 100 kHz = #VBW 300 kHz = #Sweep 1 s (601 pts) Occupied Bandwidth Occ BW % Pwr 99.00 %	Signal Track
4.3730 MHz × dB -26.00 dB	
Transmit Freq Error -2.762 kHz × dB Bandwidth 4.977 MHz*	
Copyright 2000–2006 Agilent Technologies	

Input

Output

Modulation: HSUPA, High Channel - 1752.6 MHz

* Agilent	Sweep
Ch Freq 1.7526 GHz Trig Free Occupied Bandwidth	Sweep Time 1.000 s Auto <u>Man</u>
Sweep Time 1.000 s	Sweep <u>Single</u> Cont
Ref -38.5 dBm +Atten 2 dB +Avg Log	Auto Sweep Time Norm Accy
dB/ Offst 0.5	On <u>Off</u>
QB Span 7.5 MHz ² Center 1.752 600 GHz Span 7.5 MHz ² #Pees BU 100 kHz #VBU 300 kHz #Super 1 s (601 pts)	Gate Setup•
Occupied Bandwidth Осс ВМ % Рыг 99.00 % 4.3729 MHz × dB -26.00 dB	Points 601
Transmit Freq Error –2.790 kHz x dB Bandwidth 4.972 MHz*	

Input

Output

9 FCC §2.1053, §27.53 & IC RSS-131 §6.4 - Spurious Radiated Emissions

9.1 Applicable Standard

Requirements: FCC §2.1053, §27.53.

IC RSS-131 §6.4 Spurious emissions of zone enhancers and translators shall be suppressed as much as possible. Spurious emissions shall be attenuated below the rated power of the enhancer by at least: 43 +10 Log10 (Prated in watts), or 70 dB, whichever is less stringent.

9.2 Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in $dB = 10 \log (TX \text{ Power in Watts}/0.001) - \text{the absolute level}$ Spurious attenuation limit in $dB = 43 + 10 \log_{10}$ (power out in Watts)

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09	
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31	
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2010-03-24	
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2010-06-16	
Hewlett Packard	Pre amplifier	8447D	2944A06639	2010-06-18	
A.R.A Inc	Horn antenna	DRG-1181A	1132	2010-11-29	
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2010-05-10	

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

9.4 Test Environmental Conditions

Temperature:	22-24°C				
Relative Humidity:	50-55 %				
ATM Pressure:	101-102kPa				

The testing was performed by Quinn Jiang from 2011-03-07 to 2011-03-08 in Chamber 3.

9.5 Test Results

Modulation: WCDMA

Indic	ated	Test Antenna		Test Antenna Substituted							
Frequency (MHz)	S.A. Amp. (dBuV)	Azimuth (degree)	Height (m)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			2110-21	55MHz, D	ownlink, Inp	ut Signal	– 2132.4MH	Iz			
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
1710-1755MHz, Uplink, Input Signal – 1732.4MHz											
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Modulation: HSPA Worst Mode: HSDPA

Indic	Indicated Test Antenna		Antenna	Substituted							
Frequency (MHz)	S.A. Amp. (dBuV)	Azimuth (degree)	Height (m)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			2110-21	55MHz, D	ownlink, Inp	ut Signal	– 2132.4MH	Iz			
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
	1710-1755MHz, Uplink, Input Signal – 1732.4MHz										
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Note: All emissions were on the noise floor level and/or 20dB below the margin.

10 FCC §2.1051, §27.53 & IC RSS-131 §6.4 - Spurious Emissions at Antenna Terminals

10.1 Applicable Standard

Per CFR 47, FCC § 2.1051. FCC § 27.53

The spectrum shall be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

Per RSS-131 §6.4

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 $43 + 10 \log(P) dB$

Spurious emissions of zone enhancers and translators shall be suppressed as much as possible. Spurious emissions shall be attenuated below the rated power of the enhancer by at least: 43 + 10 Log10(Prated in watts), or 70 dB, whichever is less stringent.

10.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

10.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

10.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
HP	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

10.5 Test Results

Please refer to the following plots.

2110-2155 MHz Band, Downlink:

Modulation: WCDMA, Low Channel - 2112.4 MHz

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

Report Number: R1102234-27

FCC Part 27/IC RSS-131 Test Report

Modulation: WCDMA, Middle Channel - 2132.4 MHz

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

Modulation: WCDMA, High Channel - 2152.6 MHz

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

1710-1755 MHz Band, Uplink:

Modulation: WCDMA, Low Channel - 1712.4 MHz

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

Modulation: WCDMA, Middle Channel - 1732.4 MHz

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

Modulation: WCDMA, High Channel - 1752.6 MHz

* Agilent							Marker			
Ref 26 dBm ^{#Peak} Mar	ker	Atten	30 dB				Mk	r1 367 -52.6	7.9 MHz 69 dBm	Select Marker <u>1</u> 234
Log 10 36 dB/ Offst	7.9000 2.69 d	000 M 18m _	1Hz							Normal
11 dB DI										Delta
-13.0 dBm LgAv										Delta Pair (Tracking Ref) Ref <u>≜</u>
W1 S2 S3 FS AA			1							Span Pair Span <u>Center</u>
£(f): ሌሌሎ FTun Swp	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	duging particular and	her al SPallate	and a second	alistikasi a	orran analysi	yhtholybraneter	n.)ynowsyd (n-	(gelgesligsfrækup	Off
Start 30.0 M #Res BW 100	lHz) kHz		#VE	W 300	kHz	#\$	Stop Weep 10) 1.000 0 s (60	0 GHz^ 1 pts)	More 1 of 2
Copyright :	Copyright 2000–2006 Agilent Technologies									

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

2110-2155 MHz Band, Downlink:

Modulation: HSPA Worst Case HSDPA, Low Channel - 2112.4 MHz

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

Modulation: HSPA Worst Case HSDPA, Middle Channel - 2132.4 MHz

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

Modulation: HSPA Worst Case HSDPA, High Channel - 2152.6 MHz

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

1710-1755 MHz Band, Uplink:

Modulation: HSPA Worst Case HSDPA, Low Channel - 1712.4 MHz

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

Modulation: HSPA Worst Case HSDPA, Middle Channel - 1732.4 MHz

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

Modulation: HSPA Worst Case HSDPA, High Channel - 1752.6 MHz

Plot 1: 30 MHz to 1 GHz

Plot 2: Above 1 GHz

Inter-modulation:

2110-2155 MHz Downlink

🔆 Ag	jilent										Mar	ker
Ref 38 #Avg	B dBm Mark	′er	Atten	30 dB				Mkr4	2.122 -24.6	40 GHz 2 dBm	Select	Marker 3 <u>4</u>
Log 10 dB/ Offst	-2.12 24	2400 .62 d	1000 Bm	GHz-		2 3						Normal
18 dB DI 12.0					1		4					Delta
dBm PAvg			J								De (Trac Ref	lta Pair king Ref) ▲
Center #Res B Mark	·2.112 3W 100 <er t<="" td=""><td>40 GHz kHz race</td><td>z Type</td><td>#VB</td><td>W 300 X</td><td>kHz Axis</td><td></td><td>#Sweep</td><td>Span 3 5 s (60 Amplit</td><td>75 MHz^ 1 pts) ude</td><td>Span Sf</td><td>oan Pair Center</td></er>	40 GHz kHz race	z Type	#VB	W 300 X	kHz Axis		#Sweep	Span 3 5 s (60 Amplit	75 MHz^ 1 pts) ude	Span Sf	oan Pair Center
1 2 3 4		(1) (1) (1) (1)	Fred Fred Fred Fred		2.107 2.112 2.117 2.122	40 GHz 40 GHz 40 GHz 40 GHz			-24.53 8.91 8.95 -24.62	dBm dBm dBm dBm		Off
												More 1 of 2
Copyr	ight 20	000-20	106 Ag	ilent T	echnol	ogies						

WCDMA/HSPA AWS Band Downlink, Low Channel: 2112.4 MHz

WCDMA/HSPA AWS Band Downlink, Middle Channel: 2132.4 MHz

🔆 Ag	jilent										Ma	rker
Ref 38 #Avg	dBm Mark	'er	Atten	30 dB				Mkr4	2.142 -25.2	40 GHz 7 dBm	Selec 1 2	t Marker 3 <u>4</u>
Log 10 dB/ Offst	2.14	2400 .27 d	0000 Bm	GHz-		2						Normal
18 dB DI					1 \$		4					Delta
-13.0 dBm PAvg					 				L		D (Trad Ref	elta Pair :king Ref) ▲
Center #Res B	2.132 3W 100	40 GH: kHz race	Z	#VE	3W 300 **	kHz KHz		#Sweep	Span 7 5 s (60 Ampliti	75 MHz^ 1 pts) ude	S Span	pan Pair <u>Center</u>
1 2 3 4		(1) (1) (1) (1) (1)	Free Free Free Free	- 	2.127 2.132 2.137 2.142	40 GH 40 GH 40 GH 40 GH	z z z		-29.38 10.01 10.05 -25.27	dBm dBm dBm dBm		Off
												More 1 of 2
Copyr	ight 21	000-20	006 Ag	ilent T	echnol	ogies						

WCDMA/HSPA AWS Band Downlink, High Channel: 2152.6 MHz

1710-1755 MHz Downlink

WCDMA/HSPA AWS Band Uplink, Low Channel: 1712.4 MHz

WCDMA/HSPA AWS Band Uplink, Middle Channel: 1732.4 MHz

WCDMA/HSPA AWS Band Uplink, High Channel: 1752.6 MHz

11 FCC §27.53 & IC RSS-131 §6.4 – Band Edge

11.1 Applicable Standard

According to § 27.53, the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P) dB$.

11.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency.

11.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

11.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
HP	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

11.5 Test Results

Please refer to the following plots.

2110-2155 MHz Band, Downlink:

Modulation: WCDMA

Plot 1: Lowest Edge

Plot 2: Highest Edge

Modulation: HSPA Worst Case HSDPA

Plot 1: Lowest Edge

Plot 2: Highest Edge

1710-1755 MHz Band, Uplink:

Modulation: WCDMA

Plot 1: Lowest Edge

Plot 2: Highest Edge

1710-1755 MHz Band, Uplink:

Modulation: HSPA Worst Case HSDPA

Plot 1: Lowest Edge

Plot 2: Highest Edge

12 FCC §2.1055, §27.54 & IC RSS-131 §6.5 – Frequency Stability

12.1 Applicable Standard

According to FCC §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to IC RSS-131 § 6.5, A band translator is essentially a repeater station and should introduce as little frequency error as possible. The frequency stability should therefore meet the objectives of the overall land mobile or cellular service for which it serves. Better frequency stability than the minimum standard cited below will therefore be required in some cases.

The frequency stability shall be within \pm 1.5 parts per million (0.00015%).

12.2 Test Results

Not Applicable, the EUT is an amplifier, not a transmitter. There is no oscillator circuit in the EUT, therefore there is no frequency stability measurement required.

13 FCC §27.52, §2.1091 & IC RSS-102 - RF Exposure Information

13.1 Applicable Standard

According to §1.1310 and §2.1091 (Mobile Devices) RF exposure is calculated.

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)			
Limits for General Population/Uncontrolled Exposure							
0.3-1.34	614	1.63	*(100)	30			
1.34-30	824/f	2.19/f	*(180/f ²)	30			
30-300	27.5	0.073	0.2	30			
300-1500	/	/	f/1500	30			
1500-100,000	/	/	1.0	30			

Limits for General Population/Uncontrolled Exposure

Note: f = frequency in MHz

* = Plane-wave equivalent power density

Before equipment certification is granted, the procedure of RSS-102 must be followed concerning the exposure of humans to RF fields.

According to RSS-102 Issue 2 section 4.1, RF limits used for general public will be applied to the EUT.

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Time Averaging (min)
0.003 - 1	280	2.19	-	6
1-10	280 / f	2.19 / f	-	6
10-30	28	2.19 / f	-	6
30-300	28	0.073	2*	6
300-1500	1.585 f ^{0.5}	$0.0042 \text{ f}^{0.5}$	f / 150	6
1500-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000 \ / \ f^{1.2}$
150000-300000	0.158 f ^{0.5}	4.21 x 10 -4 f ^{0.5}	6.67 x 10 ⁻⁵ f	616000 / f ^{1.2}

Note: *f* is frequency in MHz

* Power density limit is applicable at frequencies greater than 100 MHz

13.2 MPE Prediction

Predication of MPE limit at a given distance, equation from OET Bulletin 65, Edition 97-01

$$S=PG/4\pi R^{2}$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

 \mathbf{R} = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal (dBm):	24.33
Maximum peak output power at antenna input terminal (mW):	<u>271.02</u>
Prediction distance (cm):	<u>25</u>
Prediction frequency (MHz):	2132.4
Antenna Gain, typical (dBi):	<u>14</u>
Maximum Antenna Gain (numeric):	25.11
Power density at predication frequency and distance (mW/cm ²):	0.866
Power density at predication frequency and distance (W/m^2) :	<u>8.66</u>
MPE limit for uncontrolled exposure at predication frequency (mW/cm ²):	<u>1</u>
MPE limit for uncontrolled exposure at predication frequency (W/m^2) :	<u>10</u>

Test Result

For Downlink, the highest power density level at 25 cm is 0.866 mW/cm^2 (8.66 W/m^2), which is below the uncontrolled exposure limit.