



Project Memorandum

February 20, 2002

Title:	SB508 transmit frequency stability test results		
Project:	SB508	Memo Number:	13
Author:	Peter Wan	Revision Level:	1.0

Summary

The SB508 complied with the condition outlined for the transmit frequency stability over temperatures and voltages test required by the FCC Part 22 test.

Revision Log

Revision	Change Description
1.0	Initial Draft

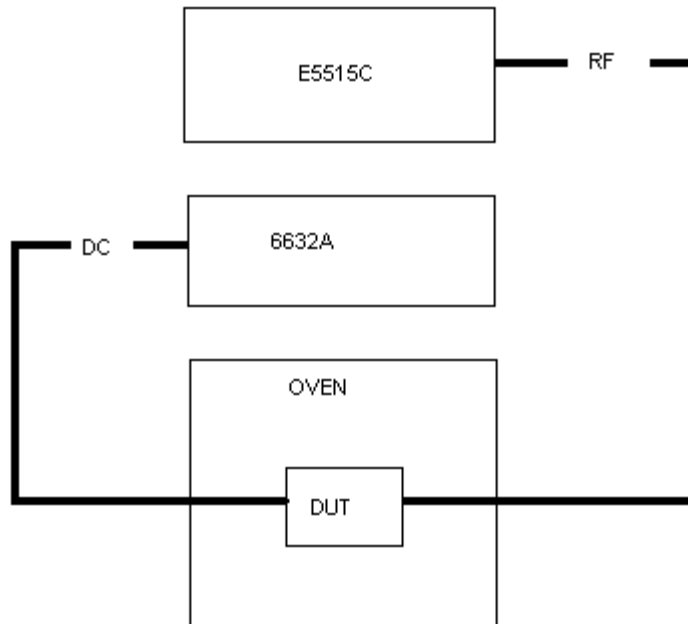
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1. Introduction

Customers using the SB508 CDMA modem are required to apply for FCC Part 22 authorization to operate the modem. One of the test criteria outlined in the FCC Part 22 document is to measure the modem's transmit frequency stability over temperatures and voltages. Due to the limitation of the current SB508 hardware/firmware implementation, this test can only be performed using a CDMA communication test set. After talking to several certified FCC test facilities, they have all indicated that they do not have this piece of test equipment in house and renting one will be costly and time consuming. As a result, these labs have agreed to let Sierra Wireless, Inc to do this test.

2. Test Setup



Test setup block diagram

2.1. Test Equipments

- Agilent E5515C (8960 Series 10) Wireless Communication Test Set
- Agilent 6632A DC Power Supply

Calibration certificate for both equipments are attached at the end.

2.2. Test Procedures

Date of Test: Feb. 12-14, 2002

The device under test was connected to an external DC power supply and the RF output was connected to a CDMA communication test set. The DUT was placed inside the temperature chamber. After temperature stabilized for approximately 60 minutes, the transmitting frequency was recorded.

3. Test Results

Test Result: Complies. Emission attenuation on the band-edges frequencies of the frequency block is not affected by the measured frequency instability.

Carrier Frequency: 836.520 000 MHz

Temperature (°C)	5.4V	5.7V	6.0V	6.3V	6.6V	6.9V	7.2V	7.5V	7.8V	8.1V	8.4V
-30	23.1	13.9	-13.9	1.5	0.0	-9.0	3.3	-16.1	-18.6	-1.0	3.5
-20	-7.2	28.0	3.4	16.1	-1.3	16.7	9.8	-12.7	7.6	18.3	18.6
-10	13.8	5.8	-13.0	14.0	14.9	-17.0	-19.1	1.0	-8.2	-5.0	-2.9
0	-6.1	28.3	5.0	-8.0	-6.9	-9.0	-4.3	-19.3	-18.7	9.8	11.4
10	9.2	-13.5	-5.6	-16.9	-2.5	-3.7	-12.9	-13.0	12.1	11.9	3.4
20	-21.9	-13.4	-2.7	22.8	3.0	-6.8	6.0	-5.3	-13.5	2.7	1.6
30	-12.8	2.7	2.5	2.7	-14.4	-12.4	-1.3	4.9	-15.1	8.1	-11.5
40	-5.7	-12.4	0.8	-2.1	0.5	15.9	-4.3	-1.6	-20.2	-16.9	8.0
50	-0.3	-35.6	-5.4	0.4	14.8	19.4	-3.2	13.4	33.8	10.0	-0.5
60	3.0	-7.3	-7.4	-14.1	12.4	-21.6	6.8	6.8	-7.8	-11.1	30.2

Table of transmit frequency errors (Hz)



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Agilent Technologies Limited
EPSC Queensferry
South Queensferry
West Lothian, Scotland EH30 9TG

Phone 0131 331 1000
Fax 0131 331 3000
Web: www.agilent.com

Certificate of Calibration

ISO 9002: 1994

Certificate No: E5515CGB41070182

Model No: E5515C
Serial No: GB41070182
Description: WIRELESS COM.TST.SET
Options Installed: 003
Date Calibrated: 19/May/2001
Temperature: (23 +/- 5)°C
Procedure Used: Procedure 1,2,5
Received Condition:
Shipped Condition: This product meets published specifications.

Date Received:
Cal Humidity: < 70% RH

This calibration certificate certifies that the instrument identified above was calibrated under a quality system in compliance with requirements in ISO 9002 (1994), using applicable Agilent Technologies procedures.

REMARKS OR SPECIAL REQUIREMENTS:

These calibration procedures and test points are those recommended in a procedure developed by Agilent Technologies. Performance verification during manufacturing may use measurement points that differ from an equivalent set described in published Agilent performance verification procedures.

TRACEABILITY INFORMATION:

Agilent Technologies measurement standards are traceable to national standards, intrinsic standards, consensus standards, or by ratio type measurements. The national standards used by this lab are administered by NIST and NPL (National Physical Laboratory).

Documentation relative to specific traceability paths is on file and can be viewed at the calibration facility listed at the top of this page. This report shall not be reproduced, except in full, without prior written approval of the calibration facility.

Calibration Equipment Used:

Model Number	Model Description	Trace Number	Cal Due Date
8665B	GEN SIG 6GHZ	19245	31/May/2002
89441A	RF SECTION-VECTOR ANAL	22260	31/May/2002
8563E	SPECTRUM ANALYSER	22882	31/Aug/2001

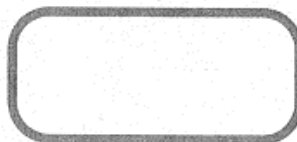
Manufacturing Part Number
5963-6004



Calibration Label



Report Issued: 23/May/2001



Stuart Graham
Product Section Manager
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Agilent Technologies Limited
 EPSG Queensferry Phone 0131 331 1000
 South Queensferry Fax 0131 331 3000
 West Lothian, Scotland EH30 9TG Web: www.agilent.com

ISO 9002: 1994
 Certificate No: E5515CGB41070182

Calibration Equipment Used:

Model Number	Model Description	Trace Number	Cal Due Date
LW420A	ARBITRARY WAVEFORM GENERATOR	23467	31/May/2002
3458A	MULTIMETER	24077	31/Dec/2001
8903B	ANAL AUDIO 20HZ-100KHZ	24078	31/Dec/2001
8904A	MULTIFUNCTION SYNTHESIZER	24079	31/Dec/2001
DC300A	AUDIO POWER AMPLIFIER	24080	31/Dec/2001
89441A	RF SECTION-VECTOR ANAL	24132	31/May/2002
E4419B	POWER METER	24349	30/Aug/2001
8665B	GEN SIG 6GHZ	24350	30/Aug/2001
GRF5022	RF PWR AMP 1-2GHZ	24351	31/Oct/2001
GRF5008	RF POWER AMP 2-4 GHZ	24352	31/Oct/2001
3458A	MULTIMETER	24353	30/Aug/2001
8481D	POWER SENSOR	24354	30/Aug/2001
8481A	POWER SENSOR	24355	30/Aug/2001
GRF5064	RF PWR AMP 1-1000MHZ	24356	31/Oct/2001
35670A	DYNAMIC SIGNAL ANALYZER	24357	30/Nov/2001
438A	MTR POWER DUAL	24358	31/Jan/2002

**Agilent Technologies****Agilent Technologies Limited**

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ISO 9002: 1994
Certificate No: E5515CGB41070182

Calibration Equipment Used:

Model Number	Model Description	Trace Number	Cal Due Date
8665B	GEN SIG 6GHZ	24359	30/Nov/2001
8481D	POWER SENSOR	24360	30/Nov/2001
8482A	PWR SENSOR .1-4GHZ	24361	30/Nov/2001
8903B	ANAL AUDIO 20HZ-100KHZ	24381	30/Nov/2001
8901A	ANAL MOD 150K-1.3GHZ	24382	30/Nov/2001
11715A	AM/FM TEST SOURCE	24384	30/Nov/2001
11715A	AM/FM TEST SOURCE	24385	30/Nov/2001
8904A	MULTIFUNCTION SYNTHESIZER	24386	30/Nov/2001
54602B	OSCILLOSCOPE	24387	30/Nov/2001
3458A	MULTIMETER	24388	30/Nov/2001
8563E	SPECTRUM ANALYSER	24519	30/Apr/2002
53131A	COUNTER	24520	30/Apr/2002
8904A	MULTIFUNCTION SYNTHESIZER	24521	30/Apr/2002
E4419B	POWER METER	24522	30/Apr/2002
3458A	MULTIMETER	24523	30/Apr/2002
8665B	GEN SIG 6GHZ	24524	30/Apr/2002

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ISO 9002: 1994
Certificate No: E5515CGB41070182

Calibration Equipment Used:

Model Number	Model Description	Trace Number	Cal Due Date
8664A	SYNTH SIGNAL GEN 3GHZ	24525	30/Apr/2002
8482A	PWR SENSOR .1-4GHZ	24526	30/Apr/2002
8482A	PWR SENSOR .1-4GHZ	24527	30/Apr/2002

**TestEquity Inc.**2450 Turquoise Circle
Thousand Oaks, CA 91320-1200Tel: 800.732.3457, 805.498.9933
Fax: 805.498.3733

Report Number: CE1332010

Certificate of Traceable Calibration

Model Number: 6632A
Description: GPIB dc power supply, 0-20 Vdc, 0-5 A
Serial Number: 3326A07923
Procedure Used: Manufacturer's Procedure (a)
Received Status: Reconditioned, first use
Returned Status: Meets all specifications

Certificate Date: 28-Nov-01
Technician: 2
Temperature: 23 +/- 5° C
Humidity: 30-80% RH

Calibration Equipment Used:


Model Number	Description	Serial Number	Date Due
3456A	DIGITAL MULTIMETER	2201A11513	29-Apr-2002
4360	SHUNT	1867463	09-Aug-2002

Remarks**Customer Use Only**

The Calibration Interval of this instrument is 12 months and begins on the date the instrument is activated into service.

Date Activated: 4 Dec 01Date Due: 4 Dec 02

TestEquity Inc. certifies that at the time of shipment the above listed instrument meets or exceeds all published specifications. It has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology. Accuracies have been derived from accepted values of physical constants, or have been derived by ratio type of self-calibrating techniques. This certificate shall not be reproduced, except in full, without written consent of TestEquity Inc. All calibration activities are performed in accordance with ANSI/NCSL Z540-1:1994 (ISO Guide 25) and ISO 17025.

Measurement Certified By: 

Metrology Technician

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Original

Form 2.03

Prog Rev: 2.12