CFR 47 Part 2, 22, and 24 Test Report

Test Report Number: WR853.001

Terminal device: FCC ID: QMNRM-19 Model: 6255i Type: RM-19 HW: 6101 ECN028074 SW: N110C0005.nep (Detailed information is listed in section 4).

Originator:	Mark Severson
Function:	TCC - Dallas – EMC
Version/Status:	1.0 Approved
Location:	TCC Directories
Date:	June 28, 2005

Change History:

Version	*Date*	*Status*	*Handled By*	*Comments*
0.1	June 23, 2005	Draft	Mark Severson	
0.2	June 28, 2005	Proposal	Mark Severson	
0.3	June 28, 2005	Reviewed	Nerina Walton	
1.0	June 28, 2005	Approved	Nerina Walton	

Testing laboratory:

Test & Certification Center (TCC) Dallas
Nokia Inc
6021 Connection Drive
Irving, Texas 75039
U.S.A.

Tel. 972-894-5000

Client:

Nokia Inc.
San Diego
12278 Scripps Summit Dr.
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CA 92131
USA
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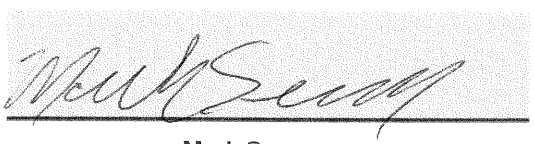
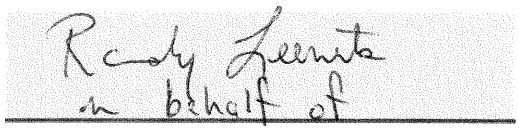
Date and signatures: **June 28, 2005**

For the contents:



Mark Severson
Technical Review



Nerina Walton
Manager Review

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1. GENERAL

1.1 Quality System

The quality system in place for TCC-Dallas conforms to ISO/IEC 17025 and has been audited to the standard by A2LA (American Association of Laboratory Accreditation). TCC - Dallas has also been audited using the ISO 9000 Quality System, as part of Nokia Mobile Phones, Inc., by ABS (American Bureau of Shipping) Quality Evaluations Inc.

TCC-Dallas is a recognized laboratory with the Federal Communications Commission in filing applications for Certification under Parts 15 and 18, Registration Number 100060, and Industry Canada, Registration Number IC 661.

1.2 List of General Information Required for Certification

This list is in accordance with FCC Rules and Regulations, CFR 47, Part 2, and to 22H, 24E, Confidentiality.

1.2.1 Sub-part 2.1033(c)(1)

Name and Address of Applicant:

Nokia Inc.
San Diego
12278 Scripps Summit Dr.
San Diego
CA 92131
USA
Tel. +1858 831 5000
Fax. +1 858 831 6500

Manufacturer:

Nokia Inc.
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1.2.2 Sub-part 2.1033(c)(2)

FCC ID: QMNRM-19

Model No: 6255i

1.2.3 Sub-part 2.1033(c)(3)

Instruction Manual(s): Refer to attached EXHIBITS

1.2.4 Sub-part 2.1033(c)(4)

Type of Emission: 40K0F8W / 40K0F1D / 1M25F9W

1.2.5 Sub-part 2.1033(c)(5)

Frequency Range, MHz: 824.04MHz – 848.97MHz

1851.25MHz – 1908.75MHz

1.2.6 Sub-part 2.1033(c)(6)

Power Rating, Watts: 0.466W AMPS
0.440W CDMA Cellular
0.334W CDMA PCS

☐ Switchable ☒ Variable ☐ N/A

FCC Grant Note: BC- The output power is continuously variable from the value listed in this entry to 5%-10% of the value listed.

1.2.7 Sub-part 2.1033(c)(7)

Maximum Power Rating, Watts: 0.440W

1.2.8 Sub-part 2.1033(c)(8)

Voltages & Currents in all elements in final R.F. Stage, including final transistor or solid-state device:
Collector Current, A = 0.119
Collector Voltage, Vdc = 3.7
Supply Voltage, Vdc = 3.7

1.2.9 Sub-part 2.1033(c)(9)

Tune-up Procedure: Refer to attached EXHIBITS

1.2.10 Sub-part 2.1033(c)(10)

Circuit Diagram/Circuit Description:
Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.
Refer to attached EXHIBITS

1.2.11 Sub-part 2.1033(c)(11)

Label Information: Refer to attached EXHIBITS

1.2.12 Sub-part 2.1033(c)(12)

Photographs: Refer to attached EXHIBITS

1.2.13 Sub-part 2.1033(c)(13)

Digital Modulation Description: N/A

1.2.14 Sub-part 2.1033(c)(14)

Test and Measurement Data: FOLLOWS

1.3 Objective

All tests and measurement data shown was performed to determine whether the selected handset was in compliance as specified in FCC: CFR47 Parts 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, Part 22, and Part 24.

1.4 Test Summary

Test Results: *The test result relates only to those tested devices mentioned in Section 4 of this test report.*

Test Performed	Reference	Section of Report	Complies / Does not comply / Not Tested
RF Power Output (Conducted)	FCC Part 2.1046(a) / 22.913(a) / 24.232(b)(c)	6	Not Tested
RF Power Output (Radiated)	FCC Part 22.913(a) / 24.232(b)	7	Not Tested
Modulation Requirements: TX Audio Frequency Response	FCC Part 2.1047(a)	8	Not Tested
Modulation Requirements: Modulation Limiting	FCC Part 2.1047(b)	9	Not Tested
Modulation Requirements: Measurement of Maximum Deviation	FCC Part 22.915(a)(b)(c)(d)(1)	10	Not Tested
Occupied Bandwidth: Transmitter Conducted Measurements	FCC Part 2.1049(c)(1), 24.238(a)(b)	11	Not Tested
Spurious Emissions at Antenna Terminals	FCC Part 2.1051	12	Not Tested
Emissions in Receiver Critical Band	FCC Part 22.917(f)	13	Not Tested
Field Strength of Spurious Radiation	FCC Part 2.1053	14	Complies
Frequency Stability (Temperature Variation)	FCC Part 2.1055(a)(1)(b), 24.235	15	Complies
Frequency Stability (Voltage Variation)	FCC Part 2.1055(d)(1)(2), 24.235	16	Complies

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2. STANDARDS BASIS

Testing has been carried out in accordance with:

REF.	Code of the standard	Name of the standard
1	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.
2	FCC: CFR 47 Part 2	Code of Federal Regulations (CFR) Title 47, Part 2 – Frequency Allocations and Radio Treaty Matters; General Rules and Regulations: Subpart J – Equipment Authorization Procedures
3	FCC: CFR 47 Part 22	Code of Federal Regulations (CFR) Title 47, Part 22 – Public Mobile Services: Subpart H – Cellular Radiotelephone Service
4	FCC: CFR 47 Part 24	Code of Federal Regulations (CFR) Title 47, Part 24 – Personal Communications Services: Subpart E – Broadband PCS
5	RSS-128	800 MHz Dual-Mode TDMA Cellular Telephones
6	RSS-132	800 MHz Cellular Telephones Employing New Technologies
7	RSS-133	2 GHz Personal Communications Services, Industry Canada
8	RSS-212	Test Facilities and Test Methods for Radio Equipment, Industry Canada (Provisional)
9	RSP-100	Radio Equipment Certification Procedure

Note: Unless otherwise stated, (by reference to a version number and a publication date), the latest version of the above documents applies.

Deviations:

Not Applicable.

3. LIST OF ABBREVIATIONS, ACRONYMS AND TERMS

3.1 Abbreviations

dB - decibel

dBc - decibels from carrier

dBm - decibels per milliwatt (absolute measurement)

GHz - gigahertz or 1000000000 hertz

kHz - kilohertz or 1000 hertz

MHz - megahertz or 1000000 hertz

3.2 Acronyms

AMPS - Advanced Mobile Phone System

BSS - Base Station Simulator

CDMA - Code Division Multiple Access

EDRP - Effective Dipole Radiated Power

EIRP - Effective Isotropic Radiated Power

EMC - Electromagnetic Compatibility

EMI - Electromagnetic Interference

ERP - Effective Radiated Power

EUT - Equipment under Test

GSM - Global System for Mobile communications

PCS - Personal Communications Services

RF - Radio Frequency

TDMA - Time Division Multiple Access

3.3 Terms

Base Station Simulator (BSS) - simulates all the necessary signals that a phone would experience while on a live network. There are many types of base station simulators catering for all current protocols, i.e., GSM, AMPS, TDMA, and CDMA.

Cellular - refers to a frequency in the 800MHz band.

PCS - refers to a frequency in the 1900MHz band.

4. EQUIPMENT-UNDER-TEST (EUT)

The results in this report relate only to the items listed below:

4.1 Description of Tested Device(s):

Test Performed	Mode of Operation	Date of Receipt	Condition of Sample	Item	Identifying Information
FCC Part 2.1053	AMPS / CDMA 800/1900	June 23, 2005	Good	Phone	FCC ID: QMNRM-19 Type: RM-19 HW: 6101 (Epcos TX SAW Filter) SW: N110C0005.nep IMEI: 033/00692330 ECN028074
FCC Part 2.1055(d)(1)(2), 24.235	AMPS / CDMA 800/1900	June 23, 2005	Good	Phone	FCC ID: QMNRM-19 Type: RM-19 HW: 6101 (Epcos TX SAW Filter) SW: N110C0005.nep IMEI: 033/00692318 ECN028074
FCC Part 2.1053	AMPS / CDMA 800/1900	June 23, 2005	Good	Battery	Type: BL6-C Other: 3.7vdc
FCC Part 2.1053	AMPS / CDMA 800/1900	June 23, 2005	Good	Charger	Type: AC-1U Other: 120vac 60Hz
FCC Part 2.1053	AMPS / CDMA 800/1900	June 23, 2005	Good	Headset	Type: HS-9
FCC Part 2.1053	AMPS / CDMA 800/1900	June 23, 2005	Good	MMC Card	Type: 64MB Reduced Size Dual Voltage Memory Card (MU-1) RS DV MMC 64MB PN: MC12U064DACA-QC
FCC Part 2.1055(d)(1)(2), 24.235	AMPS / CDMA 800/1900	June 23, 2005	Good	Flash Adapter	Type: SF-25R rev 1.0

4.2 Photograph of Tested Device(s):

Refer to attached EXHIBITS

5. TEST EQUIPMENT LIST

The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items listed can be obtained from the Engineering Services Group within NMP, Product Creation - Dallas. Where relevant, measuring equipment is subjected to in-service checks between testing. TCC - Dallas shall notify clients promptly, in writing, of identification of defective measuring equipment that casts doubt on the validity of results given in this report.

Section of Report	NMP#	Test Equipment	Mfr. #	Model #	Calibration Due Date	Calibration Interval
14	2666	Base Station	Rhode & Schwarz	CMU200	5/25/2006	12mos
14	0367	EMI Receiver	Hewlett Packard	8546 / 85460A	8/13/2005	12mos
14	2668	Biconilog Antenna	EMCO	3142	8/10/2005	12mos
14	2846	Turntable and Tower Controller	Sunol	FM2022 & 2846	N/A	N/A
14	0064	Horn Antenna	EMCO	3115	4/27/06	12mos
14	2679	EMI Analyzer	Agilent	E7405A	6/01/2006	12mos
15, 16	2601	Base Station	Rhode & Schwarz	CMU200	8/26/2005	12mos
15, 16	0627	DC Power Supply	Hewlett Packard	E3631A	N/A	N/A
15, 16	0479	Multi-Meter	Fluke	87III	10/11/2005	12mos
15, 16	0837	Temperature Chamber	Tenney Environmental	N/A	1/20/2006	12mos

6. RF POWER OUTPUT (CONDUCTED)

Specification: FCC Part 2.1046(a), 22.913(a), 24.232(b)(c)

6.1 Setup

Testing was performed with the EUT connected to a 6dB splitter and then to the RF Power Meter to measure the conducted RF power output. The base station simulator was connected to the other port of the splitter to establish a call.

6.2 Pass/Fail Criteria

Not Applicable

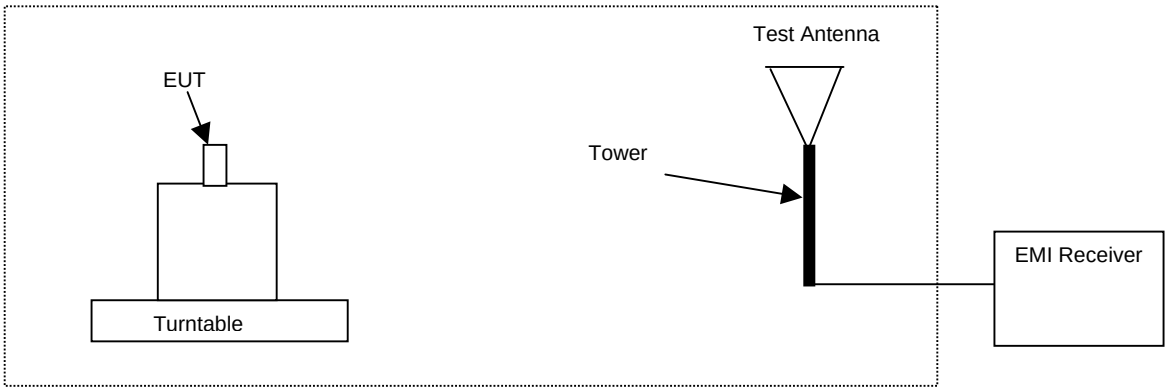
6.3 Detailed Test Results

Test Not Performed

7. RF POWER OUTPUT (RADIATED)

Specification: FCC Part 22.913(a), 24.232(b)(c)

7.1 Setup



7.2 Pass/Fail Criteria

Band	FCC Limit (dBm)
Cellular	38.5 (EDRP)
PCS	33.0 (EIRP)

7.3 Detailed Test Results

Test Not Performed

7.4 Measurement Uncertainty

The measurement uncertainty for this test is +/- 2.4dB for 800 to 2000 MHz.

8. TX AUDIO FREQUENCY RESPONSE

Specification: FCC Part 2.1047(a)

8.1 Setup

The audio signal generator was connected to the audio input circuit/microphone of the EUT.

The audio signal input was adjusted to obtain 20% modulation at 1kHz, and this point was taken as the 0dB reference level.

With input levels held constant and below limiting at all frequencies, the audio generator was varied from 100Hz to 50kHz.

The response in dB relative to 1kHz was then measured, using the HP 8901B modulation analyzer.

8.2 Pass/Fail Criteria

Emissions mask.

8.3 Detailed Test Results

Test Not Performed

9. MODULATION LIMITING

Specification: FCC Part 2.1047(b)

9.1 Setup

The audio signal generator was connected to the audio input circuit/microphone of the EUT.

The modulation response was measured for each of three tones (one of which was the frequency of maximum response), and the input voltage was varied and was observed on the HP 8901B modulation analyzer.

The audio input level was varied from 30% modulation (+/-3.6kHz deviation) to at least 20dB higher than the saturation point.

Measurements were performed for both negative and positive modulation and the respective results were recorded.

9.2 Pass/Fail Criteria

No pass/fail criteria

9.3 Detailed Test Results

Test Not Performed

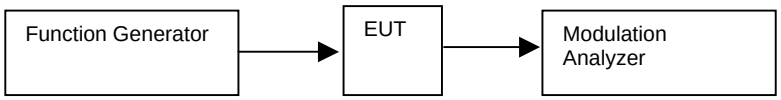
10. MODULATION REQUIREMENTS (MEASUREMENT OF MAXIMUM DEVIATION)

Specification: FCC Part 22.915(a)(b)(c)(d)(1)

10.1 Setup

The function generator and/or internally generated signals modulated the EUT.

Maximum deviation measurements were recorded for the various configurations.



10.2 Pass/Fail Criteria

Modulation	Low Limit (kHz)	High Limit (kHz)
Voice	10.8	13.2
Wideband Data	7.2	8.8
SAT	1.8	2.2
ST	7.2	8.8

10.3 Detailed Test Results

Test Not Performed

11. OCCUPIED BANDWIDTH (TRANSMITTER CONDUCTED MEASUREMENTS)

Specification: FCC Part 2.1049(c)(1), 24.238(a)(b)

11.1 Setup

Testing was performed with the EUT connected to a 6dB attenuator, 6dB splitter, filter bank and then to the EMI receiver. The base station simulator was connected to the other port of the splitter to establish a call.

11.2 Pass/Fail Criteria

Occupied Bandwidth, Out of Band

Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular 800, Low Channel	< 824	-13
Cellular 800, High Channel	> 849	-13
PCS 1900, Low Channel	< 1850	-13
PCS 1900, High Channel	> 1910	-13

Occupied Bandwidth, In Band

No pass/fail, these plots are used to determine the emission designators.

11.3 Detailed Test Results

Test Not Performed

11.4 Measurement Uncertainty

The measurement uncertainty for this test is +/- 3.7dB for 100kHz - 1000MHz and +/- 5.3dB for 1 - 20GHz.

12. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Specification: FCC Part 2.1051

12.1 Setup

Testing was performed with the EUT connected to a 6dB attenuator, 6dB splitter, filter bank and then to the EMI receiver. The base station simulator was connected to the other port of the splitter to establish a call. Filters were introduced to reduce or eliminate spurious emission, which could be generated internally in the EMI receiver.

12.2 Pass/Fail Criteria

Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular / PCS	30 – 20000 *	-13

* Frequency to be investigated up to the 10th harmonic of the highest clock or frequency used.

12.3 Detailed Test Results

Test Not Performed

12.4 Measurement Uncertainty

The measurement uncertainty for this test is +/- 3.7dB for 100kHz - 1000MHz and +/- 5.3dB for 1 - 20GHz.

13. EMISSIONS IN RECEIVER CRITICAL BAND

Specification: FCC Part 22.917(f)

13.1 Setup

Testing was performed with the EUT connected to a 6dB attenuator, 6dB splitter, filter bank and then to the EMI receiver. The base station simulator was connected to the other port of the splitter to establish a call. Filters were introduced to reduce or eliminate spurious emission, which could be generated internally in the EMI receiver.

13.2 Pass/Fail Criteria

Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular	869 - 894	-80

13.3 Detailed Test Results

Test Not Performed

13.4 Measurement Uncertainty

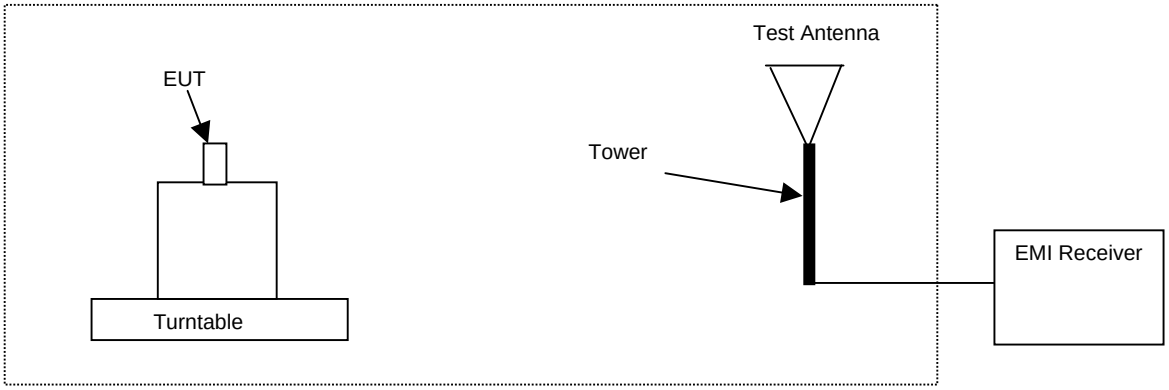
The measurement uncertainty for this test is +/- 3.7dB for 100kHz - 1000MHz.

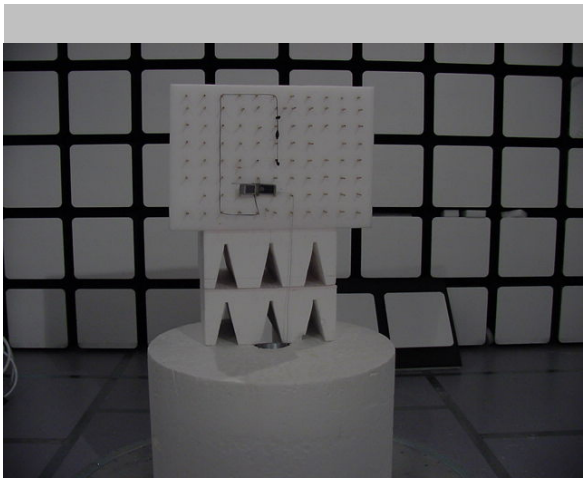
14. FIELD STRENGTH OF SPURIOUS RADIATION

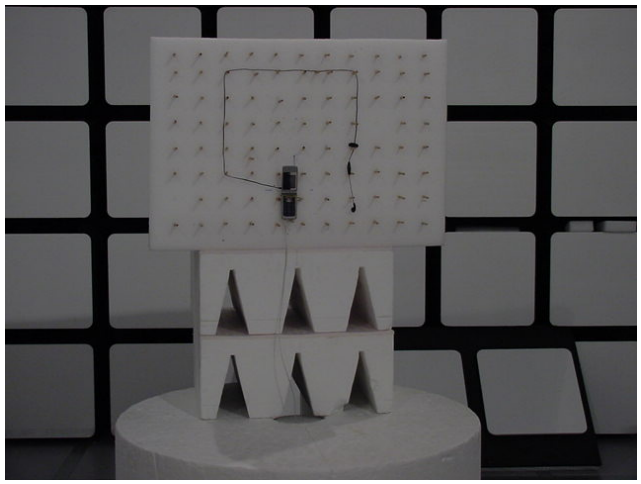
Specification: FCC Part 2.1053

14.1 Setup

Test equipment set-up.







14.2 Pass/Fail Criteria

Band	Frequency Range (MHz)	FCC Limit (dBm)
Cellular / PCS	30 – 20000*	-13

- Frequency to be investigated up to the 10th harmonic of the highest clock or frequency used.

Substitution method according to ANSI/TIA/EIA 603-1 was used for final measurements.

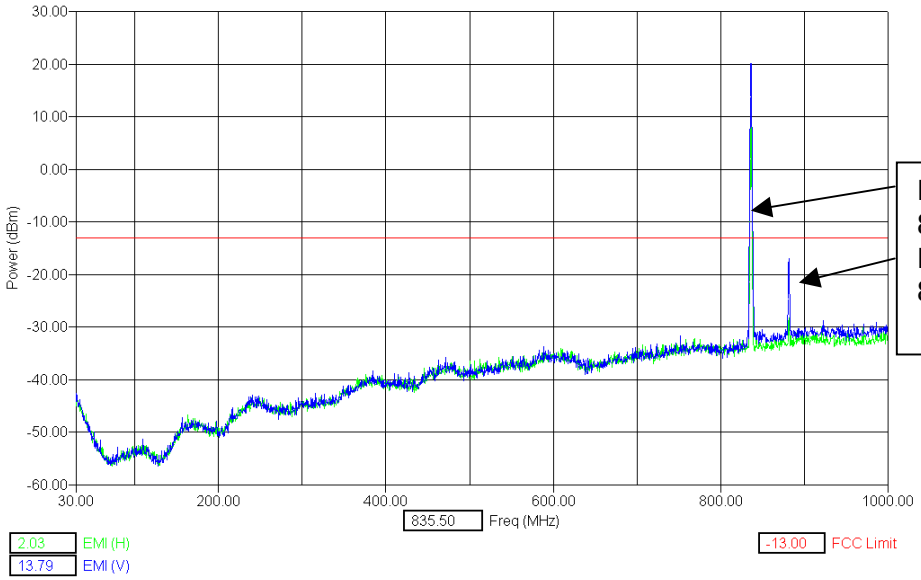
14.3 Detailed Test Results

Test Technician / Engineer	Mark Severson
Date of Measurement	June 24, 2005
Temperature	22 °C
Humidity	55 %RH
Test Result	Complies with FCC Part 2.1053

Note: 30MHz to 1GHz were performed with 1MHz RBW/VBW; 1GHz to 3GHz were performed with 1MHz RBW/VBW; 3GHz to 6GHz were performed with 3MHz RBW/VBW; 6GHz to 18GHz were performed with 1MHz RBW/VBW.

AMPS, Channel 384

Phone Vertical



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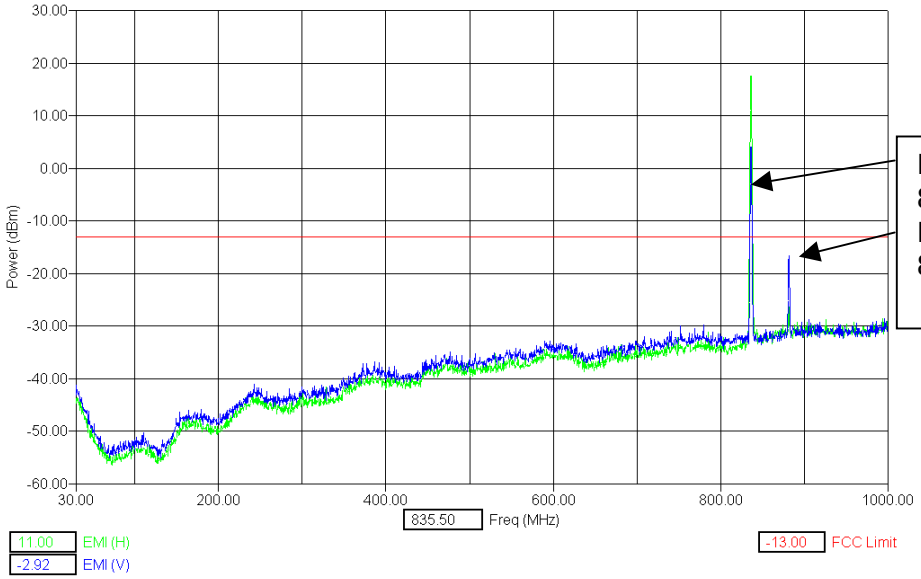
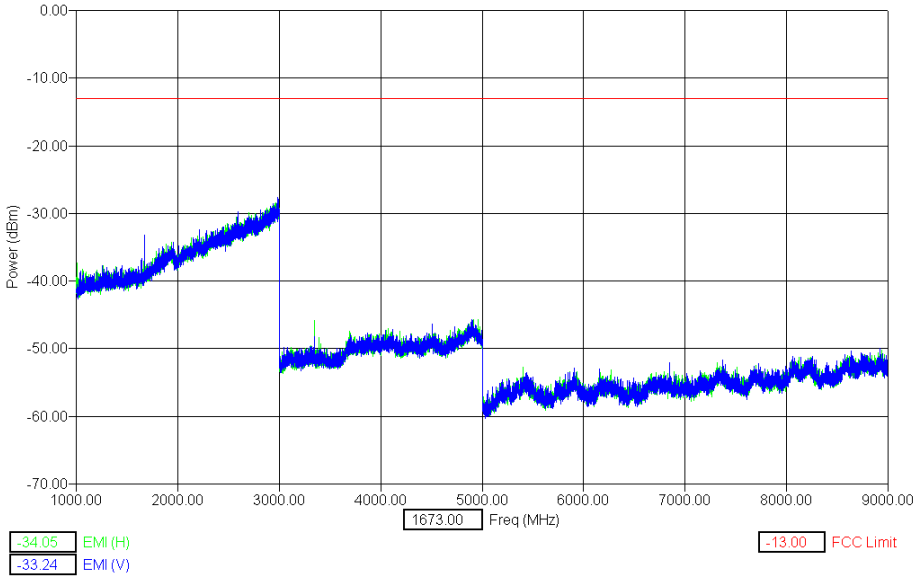


AMPS, Channel 384

Phone Vertical



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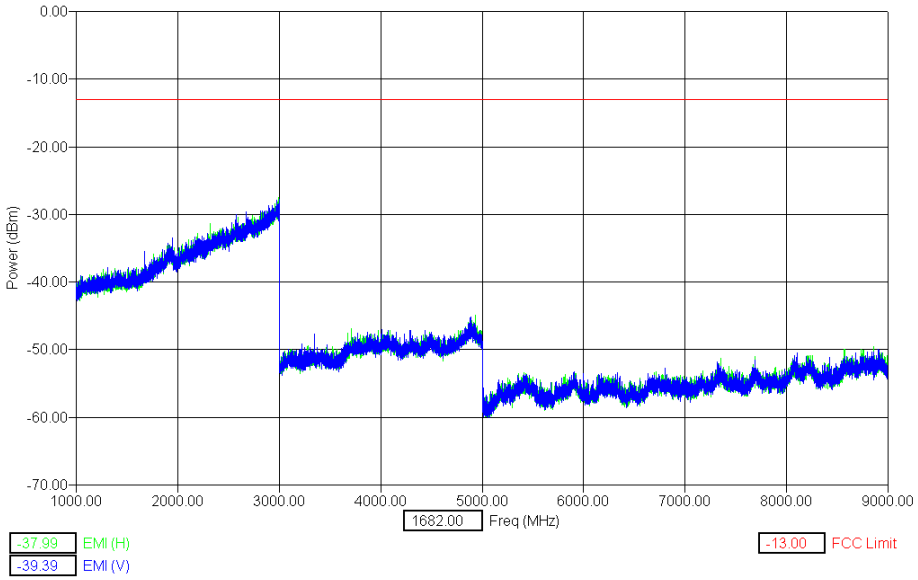


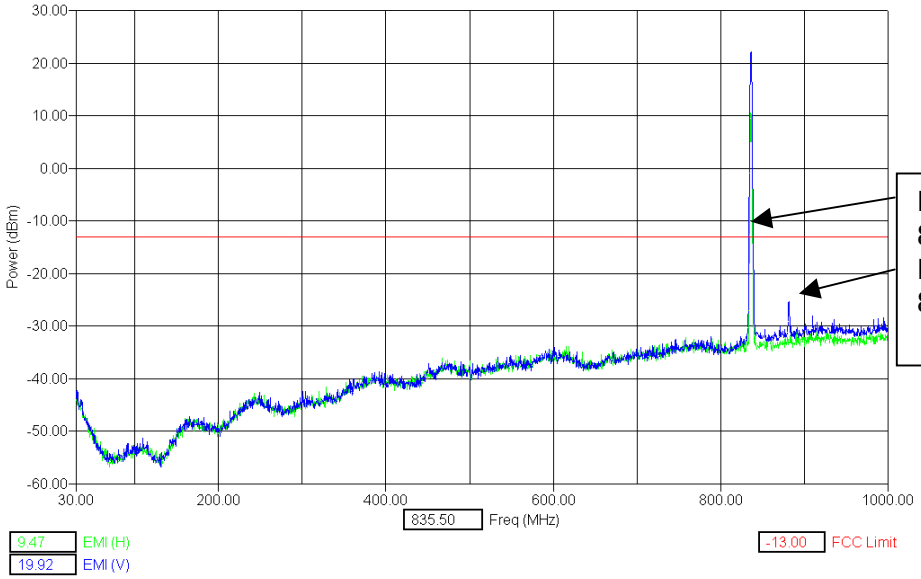
AMPS, Channel 384

EDRP for Channel 384: 26.7 dBm

Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
1673.0	-34.1	-60.8	-13.0	H
1673.0	-33.2	-59.9	-13.0	V
2509.6	-33.0	-59.7	-13.0	H
2509.6	-33.3	-60.0	-13.0	V
3346.1	-45.9	-72.6	-13.0	H
3346.1	-48.2	-74.9	-13.0	V
4182.6	-50.7	-77.4	-13.0	H
4182.6	-49.9	-76.6	-13.0	V
5019.1	-59.1	-85.8	-13.0	H
5019.1	-58.9	-85.6	-13.0	V
5855.6	-55.6	-82.3	-13.0	H
5855.6	-56.3	-83.0	-13.0	V
6692.2	-54.9	-81.6	-13.0	H
6692.2	-55.0	-81.7	-13.0	V
7528.7	-55.4	-82.1	-13.0	H
7528.7	-54.1	-80.8	-13.0	V
8365.2	-54.5	-81.2	-13.0	H
8365.2	-54.9	-81.6	-13.0	V

CDMA 800, Channel 384

Phone Vertical



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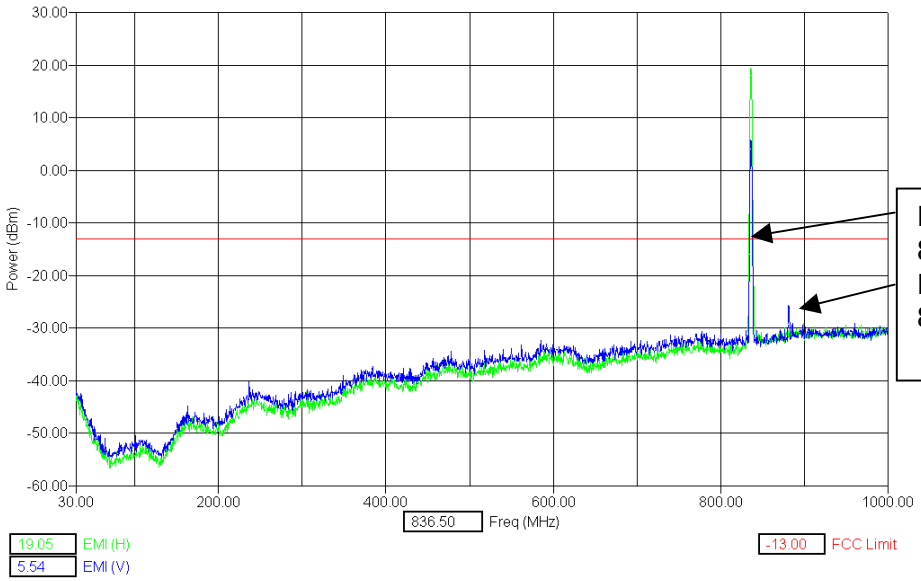
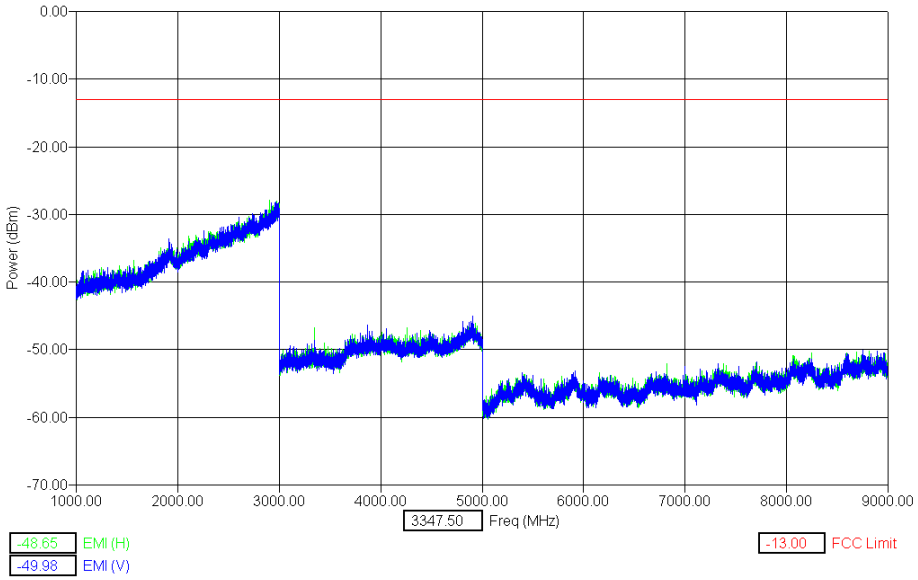


CDMA 800, Channel 384

Phone Vertical



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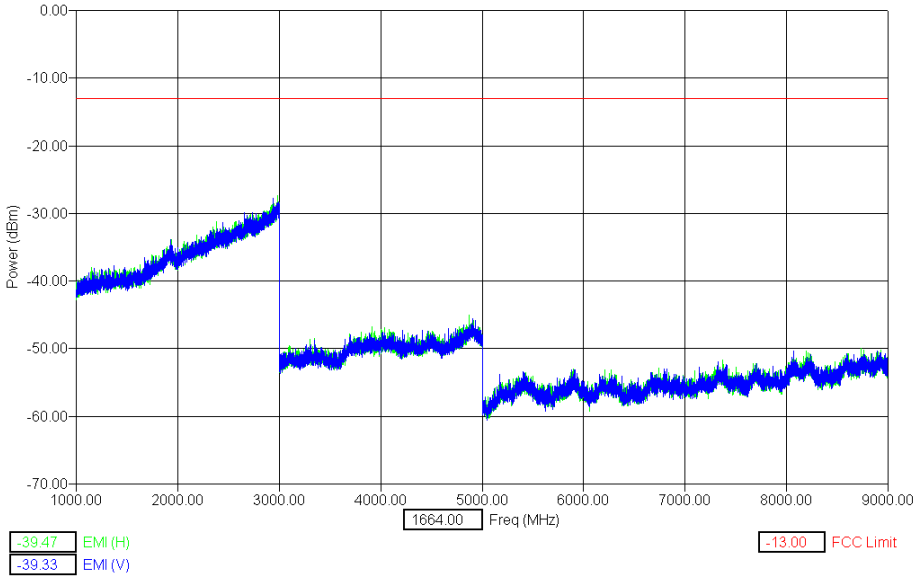


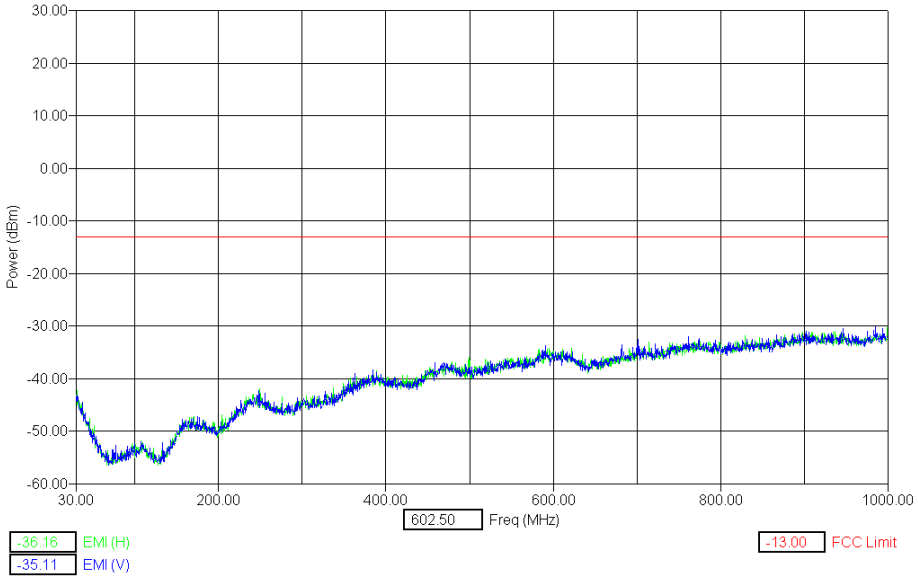
CDMA 800, Channel 384

EDRP for Channel 384: 26.4 dBm

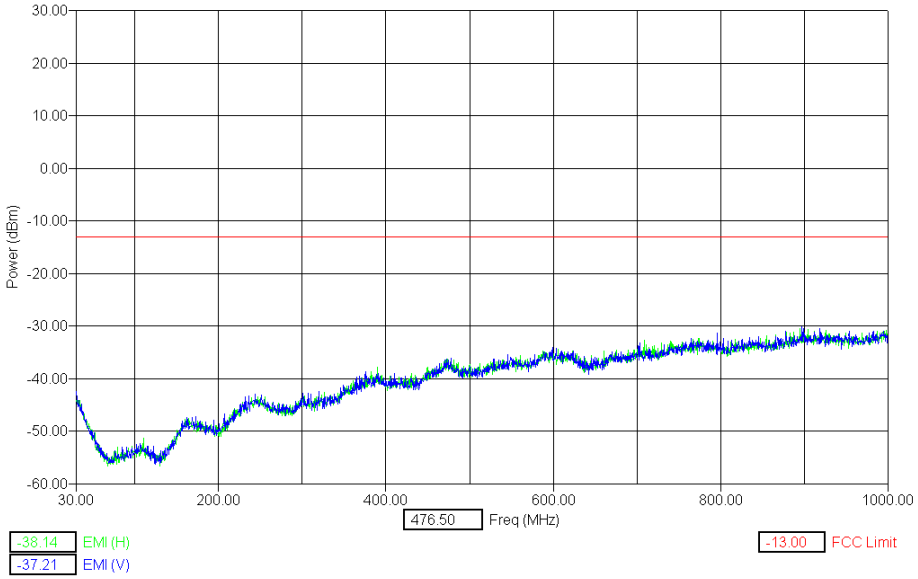
Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
1673.04	-39.2	65.6	-13.0	H
1673.04	-39.4	65.8	-13.0	V
2509.56	-34.2	60.6	-13.0	H
2509.56	-33.2	59.6	-13.0	V
3346.08	-47.7	74.1	-13.0	H
3346.08	-49.8	76.2	-13.0	V
4182.60	-50.5	76.9	-13.0	H
4182.60	-49.3	75.7	-13.0	V
5019.12	-58.6	85.0	-13.0	H
5019.12	-58.4	84.8	-13.0	V
5855.64	-55.8	82.2	-13.0	H
5855.64	-55.5	81.9	-13.0	V
6692.16	-54.6	81.0	-13.0	H
6692.16	-55.7	82.1	-13.0	V
7528.68	-53.1	79.5	-13.0	H
7528.68	-55.0	81.4	-13.0	V
8365.20	-53.9	80.3	-13.0	H
8365.20	-54.2	80.6	-13.0	V

CDMA 1900, Channel 600

Phone Vertical

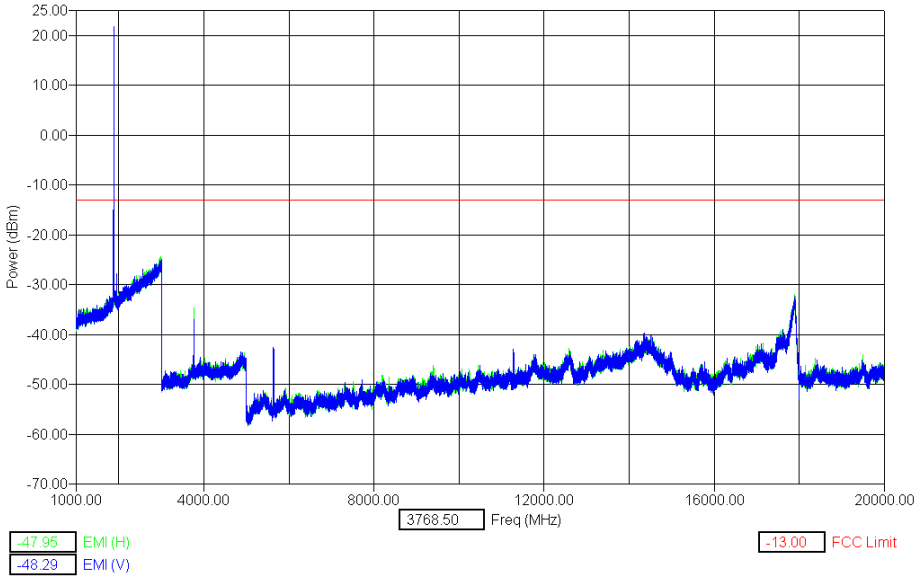


Phone Horizontal

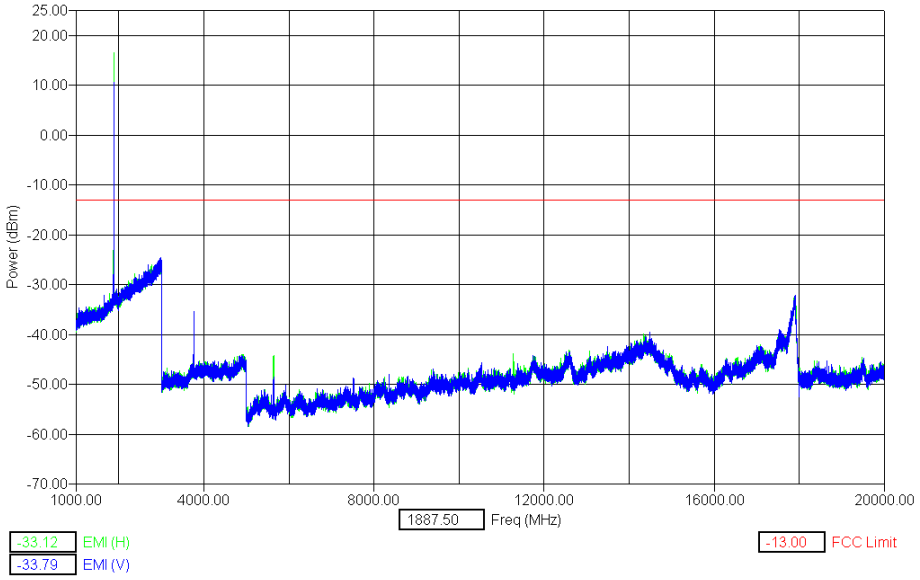


CDMA 1900, Channel 600

Phone Vertical



Phone Horizontal



EIRP for Channel 999: **25.2 dBm**

Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
3760.0	-36.4	-61.6	-13.0	H
3760.0	-37.4	-62.6	-13.0	V
5640.0	-48.4	-73.5	-13.0	H
5640.0	-43.1	-68.3	-13.0	V
7520.0	-50.6	-75.8	-13.0	H
7520.0	-53.7	-78.9	-13.0	V
9400.0	-47.2	-72.4	-13.0	H
9400.0	-48.9	-74.1	-13.0	V
11280.0	-49.9	-75.0	-13.0	H
11280.0	-43.5	-68.6	-13.0	V
13160.0	-48.2	-73.3	-13.0	H
13160.0	-47.2	-72.4	-13.0	V
15040.0	-46.5	-71.7	-13.0	H
15040.0	-47.1	-72.3	-13.0	V
16920.0	-46.1	-71.2	-13.0	H
16920.0	-45.8	-70.9	-13.0	V

14.4 Measurement Uncertainty

The measurement uncertainty for this test is +/- 5.2dB for 30-300MHz; +/- 5.2dB for 300-1000MHz, +/- 5.6dB for 1-6GHz and +/-6.8 for 6-18GHz.

15. FREQUENCY STABILITY (TEMPERATURE VARIATION)

Specification: FCC Part 2.1055(a)(1)(b), 24.235

15.1 Setup

The EUT was connected to the base station simulator to measure the RF power output.

15.2 Pass/Fail Criteria

Not Applicable

15.3 Detailed Test Results

Test Technician / Engineer	Mark Severson
Date of Measurement	June 23, 2005
Temperature	21 °C
Humidity	55 %RH
Test Result	Tested in accordance with 2.1055(a)(1)(b), 24.235 at maximum power setting.

Temp. (°C)	AMPS, Channel 384	CDMA 800, Channel 384	CDMA 1900, Channel 600
	Change (Hz)	Change (Hz)	Change (Hz)
-30	-315	+14	+33
-20	-302	+15	+28
-10	-352	+13	-30
0	-332	+14	+31
10	-398	+13	+28
20	-375	+13	+30
30	-325	+12	-27
40	-351	+12	+32
50	-299	+13	+30

16. FREQUENCY STABILITY (VOLTAGE VARIATION)

Specification: FCC Part 2.1055(d)(1)(2), 24.235

16.1 Setup

The EUT was connected to the base station simulator to measure the RF power output.

16.2 Pass/Fail Criteria

Not Applicable

16.3 Detailed Test Results

Test Technician / Engineer	Mark Severson
Date of Measurement	June 23, 2005
Temperature	21 °C
Humidity	55 %RH
Test Result	Tested in accordance with 2.1055(d)(1)(2), 24.235 at maximum power setting.

AMPS, Call Mode, Channel 384

% of STV	Voltage	Change (Hz)
85	3.15	-162
100 (Nominal)	3.70	-186
115	4.26	-177
Battery End Point	3.04	-154

CDMA 800, Call Mode, Channel 384

% of STV	Voltage	Change (Hz)
85	3.15	11
100 (Nominal)	3.70	10
115	4.26	10
Battery End Point	3.05	12

CDMA 1900, Call Mode, Channel 600

% of STV	Voltage	Change (Hz)
85	3.15	19
100 (Nominal)	3.70	-17
115	4.26	-14
Battery End Point	3.00	-12