



CFR 47 Part 2, 22, and 24 Test Report

Test Report Number: WR-987.002

Terminal device: FCC ID: QMNRH-89 Model: 2115i Type: RH-89 HW: 7000 SW: R101V1100.nep
(Detailed information is listed in section 4).

Originator: Cindy Trinh
Function: TCC - Dallas – EMC
Version/Status: 1.0 Approved
Location: TCC Directories
Date: January 5, 2006

Change History:

Version	Date	Status	Handled By	Comments
0.1	5-Jan-06	Draft	Cindy Trinh	
0.2	5-Jan-06	Proposal	Cindy Trinh	
0.3	5-Jan-06	Reviewed	Mark Severson	
1.0	5-Jan-06	Approved	Mark Severson	

Testing laboratory:

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Date and signatures:

January 5, 2006

For the contents:

Cindy Trinh
Test Engineer

Mark Severson
Technical 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 661N.

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

FCC ID: QMNRH-89

Model No: 2115i

1.2.3 Sub-part 2.1033(c)(3)

Instruction Manual(s): Refer to attached EXHIBITS



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1.2.4 Sub-part 2.1033(c)(4)

Type of Emission: 1M25F9W

1.2.5 Sub-part 2.1033(c)(5)

Frequency Range, MHz: 1851.25-1908.75 MHz

1.2.6 Sub-part 2.1033(c)(6)

Power Rating, Watts: CDMA PCS: 0.398W

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.

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1.2.7 Sub-part 2.1033(c)(7)

Maximum Power Rating, Watts: 0.398W

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 = 0.108
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), 2.1046, 2.1053, 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 (Radiated)	FCC Part 24.232(b)	6	Complies
Field Strength of Spurious Radiation	FCC Part 2.1053	7	Not Performed



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-129	800 MHz Dual-Mode CDMA Cellular Telephones
7	RSS-132	800 MHz Cellular Telephones Employing New Technologies
8	RSS-133	2 GHz Personal Communications Services, Industry Canada
9	RSS-212	Test Facilities and Test Methods for Radio Equipment, Industry Canada (Provisional)
10	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.

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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 24.232(b)	CDMA 1900 800 CDMA 1900	5-Jan-06DD-MMM-YY	Functional	Phone	FCC ID: QMNRH-89 Type: RH-89 HW: 7000 SW: R101V1100.nep ESN: 04408616693
FCC part 24.232(b)	CDMA 1900 AMPS CDMA 800 CDMA 1900	5-Jan-06DD-MMM-YY	N/A	Battery	Type: BL-6C Other: 3.7 Vdc
FCC part 24.232(b)	CDMA 1900	5-Jan-06DD-MMM-YY	N/A	Headset	Type: HS-5
FCC part 24.232(b)	CDMA 1900	5-Jan-06DD-MMM-YY	N/A	Charger	Type: ACP-12U

4.2. Photograph of Tested Device(s):

Refer to attached EXHIBITS

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5. TEST EQUIPMENT LIST

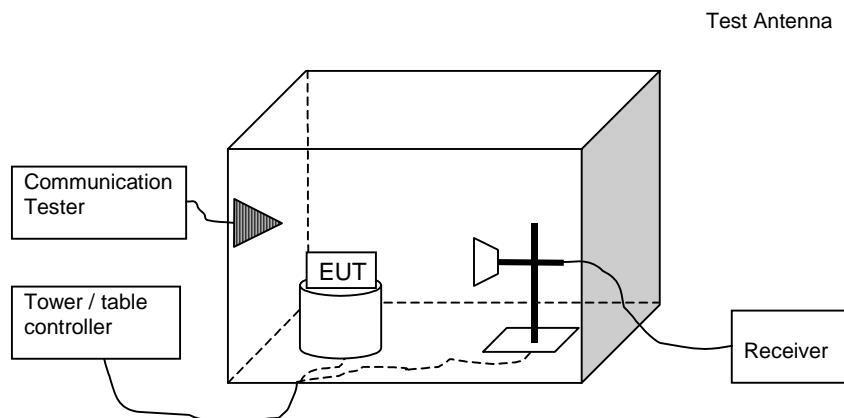
The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items listed can be obtained from the Engineering Services Group within NMP, Product Creation - Dallas. Where relevant, measuring equipment is subjected to in-service checks between testing. TCC - Dallas 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
6	04073	EMI ReceiverEMI	Rhode & Schwarz	ESIB 26	03-Aug-06	12 months
6	02625	Base StationBase	Rhode & Schwarz	CMU-200	30-Aug-06	12 months
6	02871	Biconilog Antenna	EMC Automation	3003C	08-July-06	12 months
6	04076	Horn Antenna	ETS	3117	18-Aug-06	12 months
6	02836	Turntable and Tower Controller	Sunol	FM2022 & 2846	NCR	N/A

6. RF POWER OUTPUT (RADIATED)

Specification: FCC Part 24.232(b)(c)

6.1. Setup



6.2. Test method

See Appendix A The measurement is made according to TIA-603-B-2002 as follows:

The measurement is performed in the Anechoic Chamber with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system. The turntable is rotated 360 degrees and this is repeated for both horizontal and vertical receive antenna polarizations.

The EUT is placed on a nonconductive plate at 170 cm height.

The substitution method is used. Substitution values at each frequency are measured beforehand and saved to the test software.

The substitution corrections are obtained as described below:

$$A_{SUBST} = P_{SUBST_TX} - P_{SUBST_RX} - L_{SUBST_CABLES} + G_{SUBST_TX_ANT}$$

Where A_{SUBST} is the final substitution correction including receive antenna gain. P_{SUBST_TX} is signal generator level, P_{SUBST_RX} is receiver level, L_{SUBST_CABLES} is cable losses including both TX and RX cables and $G_{SUBST_TX_ANT}$ is substitution antenna gain.

The measurement results are obtained as described below:

$$P [dBm] = P_{MEAS} + A_{TOT}$$

Where P_{MEAS} is receiver reading in dBm and A_{TOT} is total correction factor including cable loss and substitution correction ($A_{TOT} = L_{CABLES} + A_{SUBST}$).



Pass/Fail Criteria

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

6.3 Detailed Test Results

Test Technician / Engineer	Cindy Trinh
Date of Measurement	5-Jan-06
Temperature	22 to 23 °C
Humidity	30 to 33 %RH
Test Result	Complies with FCC Part 24.232(b)

CDMA 1900

Channel	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
25	25.20	0.331	-20.60	45.80	HORIZONTAL	PASSED
600	26.00	0.398	-22.10	48.10	VERTICAL	PASSED
1175	24.20	0.263	-21.80	46.00	VERTICAL	PASSED

RBW=3 MHz and VBW=3 MHz

TCC

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7. FIELD STRENGTH OF SPURIOUS RADIATION

Specification: FCC Part 2.1053

Test Not Performed