

## CFR 47 Part 2, 22, and 24 Test Report

Test Report Number: WR-1124.101

**Terminal device:**FCC ID: QMNRM-155 Model: 2365i Type: RM-155 HW: B3.0 SW: PR100\_05w21\_46.nbp  
(Detailed information is listed in section 4).

Originator: Cindy Trinh  
Function: TCC - Dallas – EMC  
Version/Status: 1.0 Approved  
Location: TCC Directories  
Date: 6-Jun-06

**Change History:**

<b>Version</b>	<b>Date</b>	<b>Status</b>	<b>Handled By</b>	<b>Comments</b>
0.1	5-Jun-06	Draft	Cindy Trinh	
0.2	5-Jun-06	Proposal	Cindy Trinh	
0.3	6-Jun-06	Reviewed	Hai To	
1.0	6-Jun-06	Approved	Hai To	

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6-Jun-06

For the contents:

  
Cindy Trinh  
Test Engineer  
Hai To  
Technical Review

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Test & Certification Center (TCC) - Dallas  
DTX15927-EN-2.0

FCC ID: QMNRM-155  
Test Report: WR-1124.101  
6-Jun-06

Accredited Laboratory  
Certificate Number: 1819-01

Ver 1.0

## 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.

Sub-part 2.1033(c)(1)

Name and Address of Applicant:

Nokia Inc.  
San Diego  
12278 Scripps Summit Dr.  
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Manufacturer:

Nokia Inc.  
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12278 Scripps Summit Dr.  
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Sub-part 2.1033(c)(2)

FCC ID: QMNRM-155

Model No: 2365i

Sub-part 2.1033(c)(3)

Instruction Manual(s): Refer to attached EXHIBITS

Sub-part 2.1033(c)(4)

Type of Emission: 1M25F9W, 1M00FXD, 1M00GXD



Company Confidential

Test & Certification Center (TCC) - Dallas  
DTX15927-EN-2.0

FCC ID: QMNRM-155  
Test Report: WR-1124.101  
6-Jun-06



Accredited Laboratory  
Certificate Number: 1819-01

4 (15)

Ver 1.0

Sub-part 2.1033(c)(5)

Frequency Range, MHz: 824.70-848.31 MHz

1851.25-1908.75 MHz

2402.00-2480.00 MHz

Sub-part 2.1033(c)(6)

Power Rating, Watts: 0.251 W CDMA Cellular

0.513 W 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.



Sub-part 2.1033(c)(7)

Maximum Power Rating, Watts: 0.513 W

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 = 0.139

Collector Voltage, Vdc = 3.7

Supply Voltage, Vdc = 3.7

Sub-part 2.1033(c)(9)

Tune-up Procedure: Refer to attached EXHIBITS

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

Sub-part 2.1033(c)(11)

Label Information: Refer to attached EXHIBITS

Sub-part 2.1033(c)(12)

Photographs: Refer to attached EXHIBITS

Sub-part 2.1033(c)(13)

Digital Modulation Description: N/A

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 22.913(a) / 24.232(b)	6	Complies
Field Strength of Spurious Radiation	FCC Part 2.1053	7	Complies

## 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.



## 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 22.913 (a) FCC part 24.232(b) FCC part 2.1053	CDMA 800/1900	31-May-06	Functional	Phone	FCC ID: QMNRM-155 Type: RM-155 HW: B3.0 SW: PR100_05w21_46.nbp ESN: 02601180561
N/A	N/A	N/A	N/A	Battery	Type: BL-5B Other: 3.7 Vdc
N/A	N/A	N/A	N/A	Headset	Type: HS-9
N/A	N/A	N/A	N/A	Charger	Type: AC-3U

### 4.2. Photograph of Tested Device(s):

Refer to attached EXHIBITS



## 5. TEST EQUIPMENT LIST

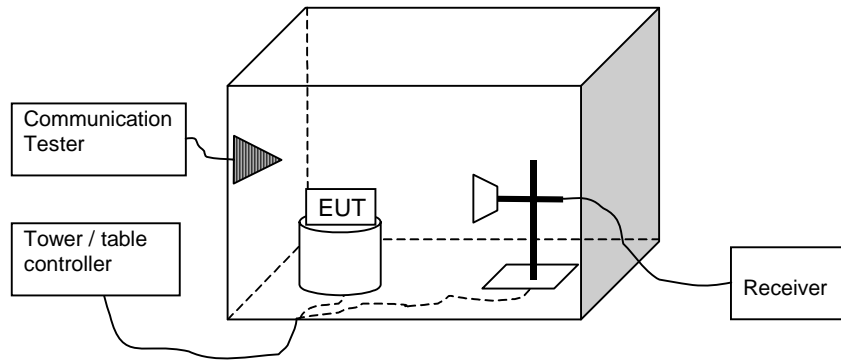
The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items listed can be obtained from the Engineering Services Group within NMP, Product Creation - Dallas. Where relevant, measuring equipment is subjected to in-service checks between testing. TCC - Dallas 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
6,7	04073	EMI Receiver	Rhode & Schwarz	ESIB 26	03-Aug-06	12 months
6,7	02625	Base Station	Rhode & Schwarz	CMU-200	30-Aug-06	12 months
6,7	02871	Biconilog Antenna	EMC Automation	3003C	08-July-06	12 months
6,7	04076	Horn Antenna	ETS	3117	18-Aug-06	12 months
6,7	02836	Turntable and Tower Controller	Sunol	FM2022 & 2846	N/A	N/A

## 6. RF POWER OUTPUT (RADIATED)

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

### 6.1. Setup



### 6.2. Test method

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	1-Jun-06
Temperature	23 to 24 °C
Humidity	45 to 56 %RH
Test Result	Complies with FCC Part 22.913(a) and 24.232(b)

Note: measurements were performed with RBW=3 MHz and VBW=3 MHz

### CDMA 800

Channel / $f_c$ [MHz]	ERP [dBm]	ERP [W]	$P_{MEAS}$ [dBm]	$A_{TOT}$ [dB]	Polarisation	Result
1013	24.00	0.251	-12.70	36.70	HORIZONTAL	Passed
384	23.40	0.219	-12.40	35.80	HORIZONTAL	Passed
777	22.50	0.178	-13.40	35.90	VERTICAL	Passed

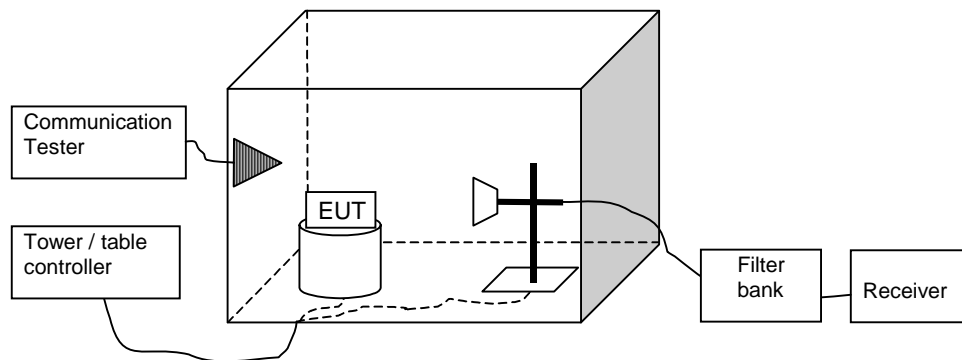
### CDMA 1900

Channel / $f_c$ [MHz]	EIRP [dBm]	EIRP [W]	$P_{MEAS}$ [dBm]	$A_{TOT}$ [dB]	Polarisation	Result
25	25.00	0.316	-22.60	47.60	VERTICAL	Passed
600	24.20	0.263	-23.90	48.10	VERTICAL	Passed
1175	27.10	0.513	-19.90	47.00	HORIZONTAL	Passed

## 7. FIELD STRENGTH OF SPURIOUS RADIATION

**Specification: FCC Part 2.1053**

### 7.1. Setup



### 7.2. Test method and limit

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

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed in the Semi-Anechoic Chamber with conducting metal floor, if the Preliminary Measurement results are closer than 20 dB to the permissible value.

The EUT is placed at nonconductive plate at the turntable center.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

The emissions less than 20 dB below the permissible value are reported.

The substitution method is used. Substitution values at each frequencies 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:

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

Where  $P_{\text{MEAS}}$  is receiver reading in dBm and  $A_{\text{TOT}}$  is total correction factor including cable loss, preamplifier gain and substitution correction ( $A_{\text{TOT}} = L_{\text{CABLES}} - G_{\text{PREAMP}} + A_{\text{SUBST}}$ ).

### 7.3. Pass/Fail Criteria

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

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

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

## 7.4. Detailed Test Results

Test Technician / Engineer	Cindy Trinh
Date of Measurement	1-Jun-06
Temperature	23 to 24 °C
Humidity	45 to 56 %RH
Test Result	Complies with FCC Part 2.1053

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

### CDMA 800, Channel 384

Frequency [MHz]	P [dBm]	P [μW]	P <sub>MEAS</sub> [dBm]	A <sub>TOT</sub> [dB]	Polarisation	Result
1672.85	-45.40	0.02884	-63.70	18.30	HORIZONTAL	Passed
2510.32	-38.00	0.15849	-56.50	18.50	HORIZONTAL	Passed
3347.19	-33.50	0.44668	-48.60	15.10	VERTICAL	Passed

### CDMA 1900, Channel 600

Frequency [MHz]	P [dBm]	P [μW]	P <sub>MEAS</sub> [dBm]	A <sub>TOT</sub> [dB]	Polarisation	Result
3760.52	-29.30	1.17490	-47.60	18.30	VERTICAL	Passed
5639.28	-31.20	0.75858	-51.90	20.70	VERTICAL	Passed
7519.54	-38.90	0.12882	-62.40	23.50	VERTICAL	Passed