

CFR 47 Part 2, 22, and 24 Test Report

Test Report Number: WR-1047.101

Terminal device:

FCC ID: QMNRM-60 Model: 6235i Type: RM-60 HW: 6001 SW: VS100V1800.nep
(Detailed information is listed in section 4).

Originator: Cindy Trinh
Function: TCC - Dallas – EMC
Version/Status: 1.0 Approved
Location: TCC Directories
Date: 3-May-06

Change History:

Version	Date	Status	Handled By	Comments
0.1	28-Apr-06	Draft	Cindy Trinh	
0.2	28-Apr-06	Proposal	Cindy Trinh	
0.3	3-May-06	Reviewed	Jesse Torres	
1.0	3-May-06	Approved	Jesse Torres	

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

Date and signatures:

3-May-06

For the contents:

Cindy Trinh
Test Engineer

Jesse Torres
Technical Review

TABLE OF CONTENTS

1. GENERAL	3
1.1. QUALITY SYSTEM	3
1.2. LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION	3
1.3. OBJECTIVE	6
1.4. TEST SUMMARY	6
2. STANDARDS BASIS	7
3. LIST OF ABBREVIATIONS, ACRONYMS AND TERMS	8
3.1. ABBREVIATIONS	8
3.2. ACRONYMS	8
3.3. TERMS	8
4. EQUIPMENT-UNDER-TEST (EUT)	9
4.1. DESCRIPTION OF TESTED DEVICE(S):	9
4.2. PHOTOGRAPH OF TESTED DEVICE(S):	9
5. TEST EQUIPMENT LIST	10
6. RF POWER OUTPUT (RADIATED)	11
6.1. SETUP	11
6.2. PASS/FAIL CRITERIA	11
6.3. DETAILED TEST RESULTS	12
7. FIELD STRENGTH OF SPURIOUS RADIATION	13
7.1. SETUP	13
7.2. TEST METHOD AND LIMIT	13
7.3. PASS/FAIL CRITERIA	14
7.4. DETAILED TEST RESULTS	15

© No part of this report shall be reproduced out of the context of the report without the written approval of Nokia Mobile Phones, Inc., Dallas Product Creation, TCC – Dallas.

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

FCC ID: QMNRM-60
Test Report: WR-1047.101
3-May-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.
San Diego
CA 92131
USA
Tel. +1858 831 5000
Fax. +1 858 831 6500

Manufacturer:

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

Sub-part 2.1033(c)(2)

FCC ID: QMNRM-60

Model No: 6235i

Sub-part 2.1033(c)(3)

Instruction Manual(s): Refer to attached EXHIBITS

Sub-part 2.1033(c)(4)

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

TCC

Company Confidential

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

FCC ID: QMNRM-60
Test Report: WR-1047.101
3-May-06



Accredited Laboratory
Certificate Number: 1819-01

4 (15)

Ver 1.0

Sub-part 2.1033(c)(5)

Frequency Range, MHz: 824.04-848.97 MHz

1851.25-1908.75 MHz

Sub-part 2.1033(c)(6)

Power Rating, Watts: 0.224 W AMPS Cellular

0.234 W CDMA Cellular

0.389 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: 0.389 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 = 0.105

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) / 24.232(b) FCC part 2.1053	AMPS, CDMA 800/1900	24-Apr-06	Functional	Phone	FCC ID: QMNRM-60 Type: RM-60 HW: 6001 SW: VS100V1800.nep ESN: 0306009511024
N/A	N/A	N/A	N/A	Battery	Type: BL-6C 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: ACP-12U

4.2. Photograph of Tested Device(s):

Refer to attached EXHIBITS



5. TEST EQUIPMENT LIST

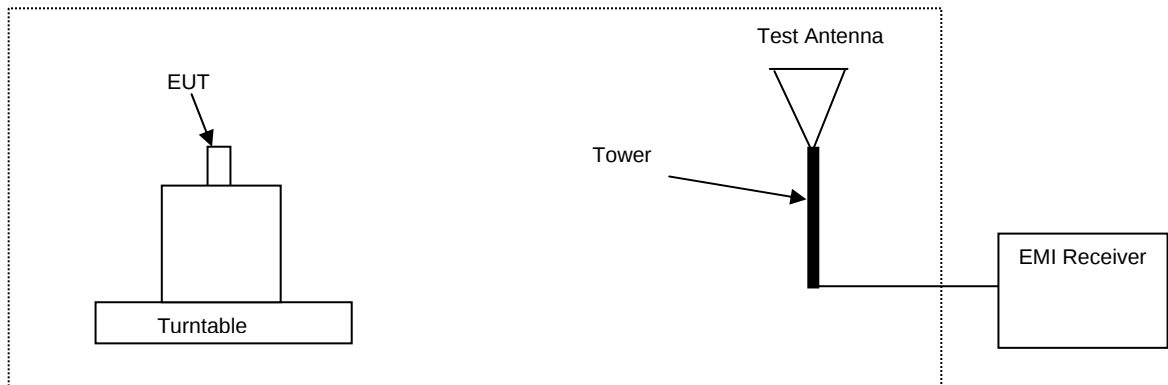
The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items listed can be obtained from the Engineering Services Group within NMP, Product Creation - Dallas. Where relevant, measuring equipment is subjected to in-service checks between testing. TCC - Dallas 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. 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	3-May-06
Temperature	23 to 24 °C
Humidity	40 to 45 %RH
Test Result	Complies with FCC Part 22.913(a) and FCC Part 24.232(b)

Note: measurements were performed with RBW=1 MHz and VBW=3 MHz

AMPS

Channel / f_c [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
991	22.80	0.191	-13.90	36.70	HORIZONTAL	Passed
384	23.50	0.224	-13.40	36.90	VERTICAL	Passed
799	21.30	0.135	-14.60	35.90	VERTICAL	Passed

CDMA 800

Channel / f_c [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
1013	23.70	0.234	-14.50	38.20	VERTICAL	Passed
384	22.80	0.191	-14.10	36.90	VERTICAL	Passed
777	20.80	0.120	-15.10	35.90	VERTICAL	Passed

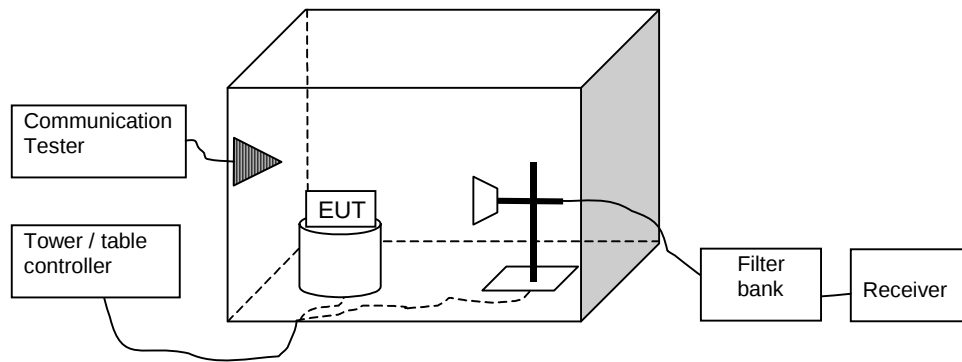
CDMA 1900

Channel / f_c [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
25	23.10	0.204	-22.70	45.80	HORIZONTAL	Passed
600	24.70	0.295	-22.20	46.90	HORIZONTAL	Passed
1175	25.90	0.389	-21.10	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:

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

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

7.3. Pass/Fail Criteria

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

- Frequency to be investigated up to the 10th 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	27-Apr-06
Temperature	23 to 24°C
Humidity	40 to 45 %RH
Test Result	Complies with FCC Part 2.1053

Note: 30MHz to 10GHz were performed with 1MHz RBW/VBW.

AMPS, Channel 384

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
1672.848697	-45.40	0.02884	-64.20	18.80	VERTICAL	PASSED
2509.320641	-41.30	0.07413	-59.90	18.60	VERTICAL	PASSED
3346.185371	-48.80	0.01318	-63.90	15.10	VERTICAL	PASSED

CDMA 800, Channel 384

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
1672.643287	-45.80	0.02630	-64.60	18.80	VERTICAL	PASSED
2508.615230	-31.90	0.64565	-50.50	18.60	VERTICAL	PASSED
3345.689379	-45.50	0.02818	-60.70	15.20	HORIZONTAL	PASSED

CDMA 1900, Channel 600

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
3759.023046	-45.10	0.03090	-63.40	18.30	VERTICAL	PASSED
5625.750501	-49.80	0.01047	-70.90	21.10	HORIZONTAL	PASSED
5639.278557	-41.40	0.07244	-62.10	20.70	VERTICAL	PASSED
7502.510020	-48.80	0.01318	-72.40	23.60	VERTICAL	PASSED
7521.034068	-38.30	0.14791	-61.80	23.50	VERTICAL	PASSED