



CFR 47 Part 2, 22, and 24 Test Report

Test Report Number: 03-EM-0255.002

Terminal device: FCC ID: OW3NEM-2, Model: 3300b, Type: NEM-2 HW: 0600 SW: 4.27
(Detailed information is listed in section 4).

Originator: Jesse Torres / Chi Nguyen
Function: TCC - Dallas – EMC
Version/Status: 1.0 Approved
Location: TCC Directories
Date: October 31, 2003

Change History:

Version	Date	Status	Handled By	Comments
0.1	20-Oct-03	Draft	Jesse Torres / Chi Nguyen	
0.2	24 Oct 03	Proposal	Mark Severson	
0.3	31 Oct 03	Reviewed	Nerina Walton	
1.0	31 Oct 03	Approved	Alan Ewing	

Testing laboratory:

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Date and signatures:

October 31, 2003

For the contents:

Nerina Walton

Nerina Walton, EMC Engineer
Technical Review

Alan Ewing

Alan Ewing, General Manager
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). The appendix of this report contains the scope of accreditation for A2LA. 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 Germany (GmbH), Product Creation Center, Rensingstrasse 15, D-44807 Bochum, GERMANY

Manufacturer: Nokia Finland, Joensuunkatu 7, 24100 Salo, FINLAND

1.2.2 Sub-part 2.1033(c)(2)

FCC ID: OW3NEM-2

Model No.: 3300b

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: 256KGXW

1.2.5 Sub-part 2.1033(c)(5)

Frequency Range, MHz: 824.2 to 848.8
1850.2 to 1909.8

1.2.6 Sub-part 2.1033(c)(6)

Power Rating, Watts: 902mW - EDRP Cellular GSM / 1175mW - EIRP PCS GSM

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: 1.175

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 = 0.309

Collector Voltage, Vdc = 3.8

Supply Voltage, Vdc = 3.8

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
RF Power Output (Radiated)	FCC Part 22.913(a) / 24.232(b)	6	Not Tested
Occupied Bandwidth: Transmitter Conducted Measurements	FCC Part 2.1049(c)(1), 24.238(a)(b)	7	Not Tested
Spurious Emissions at Antenna Terminals	FCC Part 2.1051	8	Not Tested
Field Strength of Spurious Radiation	FCC Part 2.1053	9	Complies
Frequency Stability (Temperature Variation)	FCC Part 2.1055(a)(1)(b), 24.235	10	Not Tested
Frequency Stability (Voltage Variation)	FCC Part 2.1055(d)(1)(2), 24.235	11	Not Tested



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-132	800 MHz Cellular Telephones Employing New Technologies
6	RSS-133	2 GHz Personal Communications Services, Industry Canada
7	RSS-212	Test Facilities and Test Methods for Radio Equipment, Industry Canada (Provisional)
8	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
<i>FCC Part 2_1053</i>	GSM 850/1900	Oct-20-03	Good	Phone	FCC ID: Type: NEM-2 HW: 0600 SW: 4.27 IMEI: 001004001358051
<i>FCC Part 22.913(a), 24.232(b)(c); 2_1053</i>	GSM 850/1900	Oct-20-03	Good	Battery	Type: BLD-3 Other: 3.7 V

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.

Test/ Section of Report	NMP#	Test Equipment	Mfr. #	Model #	Calibration Due Date	Calibration Interval
9	01472	Biconilog Antenna	ETS	3142B	Jan-28-04	1 Year
9	02664	EMI Receiver	Agilent	8546A / 85460A	Mar-4-04	1 Year
9	02858	Horn Antenna	EMCO	3115	Aug-15-04	1 Year
9	00064	Horn Antenna	EMCO	3115	Apr-2-04	1 Year
9	02846	Turntable and Tower Controller	Sunol	Turntable FM2022, Controller 2846	N/A	N/A
9	02679	Spectrum Analyzer	Agilent	E7405A	May-3-04	1 Year
9	02671	Signal Generator	Agilent	83630B	Oct-28-03	1 Year
9	02625	Base Station	R&S	CMU200	Nov-12-03	1 Year
9	00001	RF Preamplifier	Agilent	HP8449B	Aug-4-05	2 Years
9	02283	Spectrum Analyzer	Agilent	8593EM	Apr-6-03	1 Year

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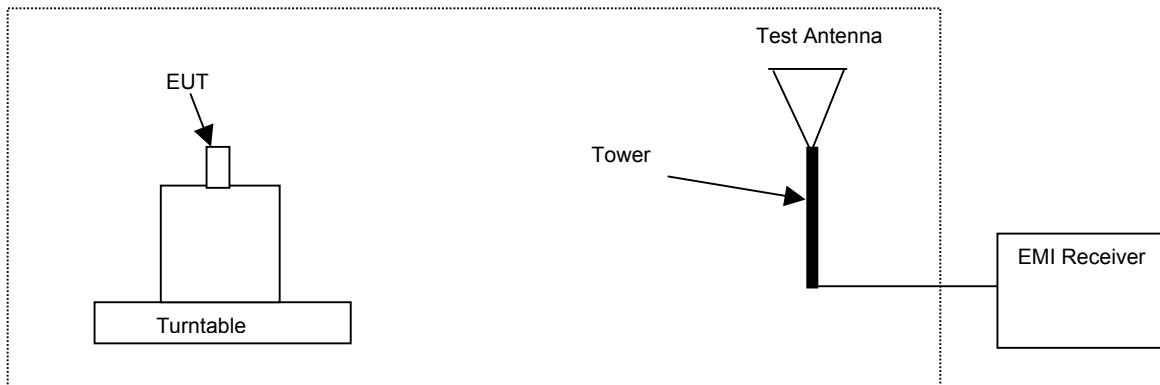
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6. RF POWER OUTPUT (RADIATED)

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 Not Performed

6.4 Measurement Uncertainty

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

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7. OCCUPIED BANDWIDTH (TRANSMITTER CONDUCTED MEASUREMENTS)

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

7.1 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.

Enter Set-Up Photo (scaled to 40%)

7.2 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.

7.3 Detailed Test Results

Test Not Performed

7.4 Measurement Uncertainty

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

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8. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Specification: FCC Part 2.1051

8.1 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.

Enter Set-Up Photo (scaled to 40%)

8.2 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.

8.3 Detailed Test Results

Test Not Performed

8.4 Measurement Uncertainty

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

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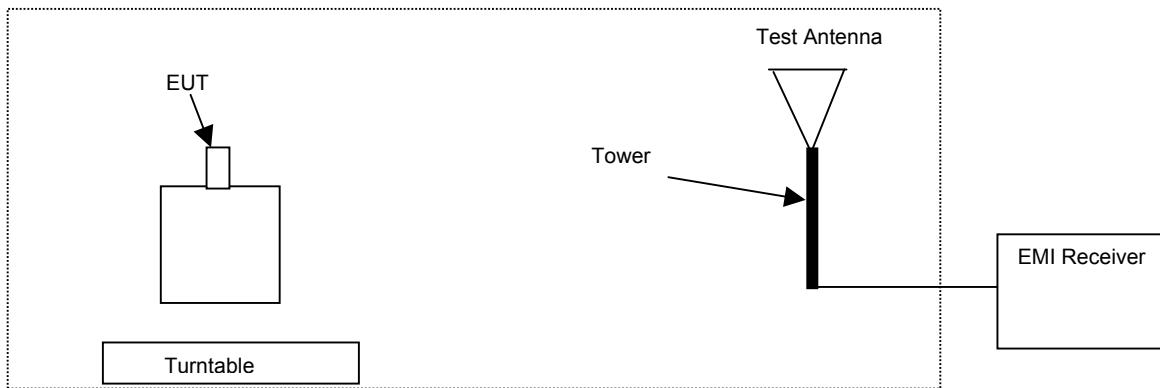
Ver 1.0

9. FIELD STRENGTH OF SPURIOUS RADIATION

Specification: FCC Part 2.1053

9.1 Setup

Test equipment set-up.



9.2 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.

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9.3 Detailed Test Results

Test Technician / Engineer	Jesse Torres / Chi Nguyen
Date of Measurement	20-Oct-03 to 22-Oct-03
Temperature	23 to 25 °C
Humidity	36 to 44 %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.

EDRP Value for Channel 190: 29.5 dBm

Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBc)	Pol.
1673.2	-30.7	-60.2	-42.5	H
1673.2	-33.7	-63.2	-42.5	V
2509.8	-36.1	-65.6	-42.5	H
2509.8	-35.1	-64.6	-42.5	V
3346.4	-36.7	-66.2	-42.5	H
3346.4	-36.7	-66.2	-42.5	V
4183.0	-28.1	-57.6	-42.5	H
4183.0	-27.8	-57.3	-42.5	V
5019.6	-26.0	-55.5	-42.5	H
5019.6	-25.4	-54.9	-42.5	V
5856.2	-22.4	-51.9	-42.5	H
5856.2	-22.4	-51.9	-42.5	V
6692.8	-42.0	-71.5	-42.5	H
6692.8	-43.2	-72.7	-42.5	V
7529.4	-41.0	-70.5	-42.5	H
7529.4	-41.0	-70.4	-42.5	V
8366.0	-40.4	-69.9	-42.5	H
8366.0	-39.3	-68.8	-42.5	V

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EIRP Value for Channel 661: 30.7 dBm

Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBc)	Pol.
3760.0	-38.0	-68.7	-43.7	H
3760.0	-40.8	-71.5	-43.7	V
5640.0	-24.6	-55.3	-43.7	H
5640.0	-23.5	-54.2	-43.7	V
7520.0	-36.5	-67.2	-43.7	H
7520.0	-37.3	-68.0	-43.7	V
9400.0	-32.7	-63.4	-43.7	H
9400.0	-37.0	-67.6	-43.7	V
11280.0	-36.3	-67.0	-43.7	H
11280.0	-35.4	-66.1	-43.7	V
13160.0	-32.3	-62.9	-43.7	H
13160.0	-32.6	-63.2	-43.7	V
15040.0	-30.0	-60.7	-43.7	H
15040.0	-29.9	-60.6	-43.7	V
16920.0	-28.1	-58.8	-43.7	H
16920.0	-28.4	-59.1	-43.7	V

9.4 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.



10. FREQUENCY STABILITY (TEMPERATURE VARIATION)

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

10.1 Setup

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

10.2 Pass/Fail Criteria

Not Applicable

10.3 Detailed Test Results

Test Not Performed



11. FREQUENCY STABILITY (VOLTAGE VARIATION)

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

11.1 Setup

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

11.2 Pass/Fail Criteria

Not Applicable

11.3 Detailed Test Results

Test Not Performed



APPENDIX

TCC-Dallas is accredited by the American Association for Laboratory Accreditation (A2LA) as shown in the scope below:



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 American Association for Laboratory Accreditation	
SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999	
TEST & CERTIFICATION CENTER - DALLAS 6021 Connection Drive Irving, TX 75039 Alan Ewing Phone: 972 894 4744	
ELECTRICAL	
Valid to: November 30, 2003	Certificate Number: 1819-01
In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following Electromagnetic Compatibility (EMC), Specific Absorption Rate (SAR), and tests on wireless communications devices:	
Tests	Test Method
<i>Emissions</i>	
Conducted and Radiated	CFR 47 Part 2, 15, 22, 24 CISPR 22; EN 55022 ICES-003; RSS-128, Section 12 and 133 3GPP TS 51.010-1 Section 12.2 ETSI EN 301 489-1; EN 301 489-7 (using ANSI C63.4 and RSS-212)
Specific Absorption Rate	IEEE 1528 EN 50360; EN 50361 CFR 47 Parts 2 and 24 OET Bulletin 65 and Supplement C RSS-102
<i>Immunity</i>	
Vehicular Immunity	ISO 7637-1; ETSI EN 301 489-1; EN 301 489-7
Electrostatic Discharge (ESD)	EN 61000-4-2; ETSI EN 301 489-1; EN 301 489-7
RF Radiated	EN 61000-4-3; ETSI EN 301 489-1; EN 301 489-7
Electrical Fast Transient/Burst	EN 61000-4-4; ETSI EN 301 489-1; EN 301 489-7
Surge	EN 61000-4-5; ETSI EN 301 489-1; EN 301 489-7
Conducted	EN 61000-4-6; ETSI EN 301 489-1; EN 301 489-7
Voltage Dips, Short Interruptions and Voltage Variations	EN 61000-4-11; ETSI EN 301 489-1; EN 301 489-7

Pete Maye 

(A2LA Cert. No. 1819.01) Revised 09/18/02
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"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined to be in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, such data would not be covered by this laboratory's A2LA accreditation.