Bluetooth Test Report

Test Report Number: WR-1074.101

Terminal device: FCC ID: GMLRM-88A Model: E62-1 Type: RM-88 Build: 4.0 SW: 5.4002
(Detailed information is listed in section 4).

Originator:	Cindy Trinh
Function:	TCC - Dallas – EMC
Version/Status:	1.0 Approved
Location:	TCC Directories
Date:	March 9, 2006

Change History:

Version	*Date*	*Status*	*Handled By*	*Comments*
0.1	8-Mar-06	Draft	Cindy Trinh	
0.2	8-Mar-06	Proposal	Cindy Trinh	
0.3	9-Mar-06	Review	Mark Severson	
1.0	9-Mar-06	Approved	Mark Severson	

Testing laboratory:

Test & Certification Center (TCC) Dallas
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Tel. 972-894-5000
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Client:

Nokia Inc
6021 Connection Drive
Irving, Texas 75039
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Tel. 972-894-5000

Date and signatures: **March 9, 2006**

For the contents:

Cindy Trinh
Digitally signed by Cindy Trinh
DN: cn=Cindy Trinh, c=US, o=Nokia, ou=TCC Dallas
Date: 2006.03.09 12:46:07 -06'00'

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 Objective

All tests and measurement data shown was performed to determine whether the selected handset was in compliance as specified in FCC: CFR47 Parts 15.207 and 15.247.

1.3 Test Summary

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

Test Performed	CFR 47	RSS-210	Section of Report	Complies / Does not comply / Not Tested
Radiated Emissions	15.247 (c)	6.2.2 (o), e1	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 15	Code of Federal Regulations (CFR) Title 47, Part 15 – Radio Frequency Devices: Subpart B – Unintentional Radiators and Subpart C – Intentional Radiators
3	CISPR 22 / EN55022	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.
4	ICES-003	Digital Apparatus, Industry Canada
5	RSS-210	Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands)
6	RSS-212	Test Facilities and Test Methods for Radio Equipment, Industry Canada (Provisional)
7	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

dBm - decibels per milliwatt (absolute measurement)

dBµV - decibel per microvolt

dBµV/m - decibel of microvolt per meter

GHz - gigahertz or 1000000000 hertz

kHz - kilohertz or 1000 hertz

MHz - megahertz or 1000000 hertz

ms - millisecond or 0.001 second

µs - microsecond or 0.000001 second

3.2 Acronyms

BT - Bluetooth

EMC - Electromagnetic Compatibility

EMI - Electromagnetic Interference

EUT - Equipment under Test

PRBS - Pseudo Random Bit Sequence

RF - Radio Frequency

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.

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 15.247(c)	BT	7-Mar-06	Functional	Phone	IMEI:011004001923938 FCC ID: GMLRM-88A Type: RM-88 Build: 4.0 SW: 5.4002
FCC Part 15.247(c)	BT	7-Mar-06	N/A	Battery	Type: BP-5L Other: 3.7 Vdc
FCC Part 15.247(c)	BT	7-Mar-06	N/A	Charger	Type: AC-4U
FCC Part 15.247(c)	BT	7-Mar-06	N/A	Headset	Type: HS-40

5. TEST EQUIPMENT LIST

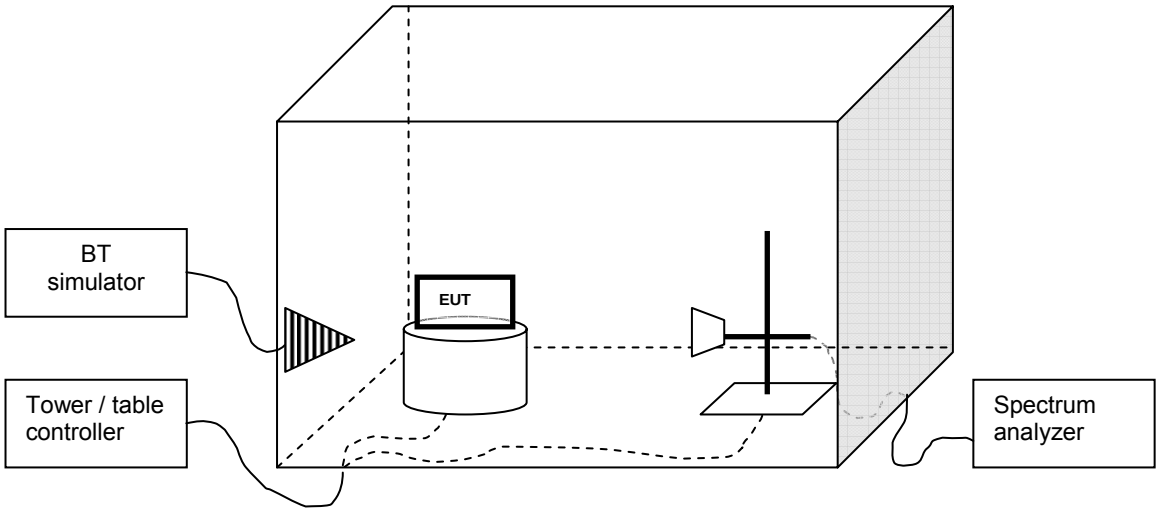
The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items listed can be obtained from the Engineering Services Group within NMP, Product Creation - Dallas. Where relevant, measuring equipment is subjected to in-service checks between testing. TCC - Dallas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

6. EUT TEST SETUPS

For each test the EUT was exercised to find out the worst case of operation modes and device configuration.

6.1 EUT test set-up (radiated measurement)



7. RADIATED EMISSIONS

Specification: FCC Part 15.247(c)(1); RSS-210 6.2.2(o), e1

7.1 Setup

Testing was performed in accordance with 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.

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210 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 measurement results are obtained as described below:

$E\ [\mu V/m] = U_{RX} + A_{TOT}$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + AF - G_{PREAMP}$).

7.2 Test Results

Test Operator	Cindy Trinh
Date of Measurement	7-Mar-06 to 8-Mar-06
Temperature	23 to 24 °C
Humidity	24 to 28 %RH
Test Result	Complies

7.3 EUT operation mode

EUT operation mode	Connected, DH5, Static PRBS GFSK, π/4-DQPSK, 8DPSK
EUT channel	0 (2402 MHz), 40 (2442 MHz), 78 (2480 MHz)
EUT TX power level	Nominal

7.4 Pass/Fail Criteria

Band	Frequency Range (MHz)	FCC Class B Limit (dBµV/m at 3m)	Detector
BT	30 – 88	40	QP
BT	88 – 216	43.5	QP
BT	216 – 960	46	QP
BT	960 – 1000	54	QP
BT	> 1000	74.0/ 54.0	PK/ AV

7.5 Results

GFSK modulation

Average (RBW: 1 MHz) Channel 0

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4804.000000	34.50	53.09	23.70	10.80	HORIZONTAL	PASSED
7206.000000	37.70	76.74	22.60	15.10	HORIZONTAL	PASSED

Channel 40

Quasi peak (RBW: 120 kHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
38.095391	11.30	3.67	30.80	-19.50	VERTICAL	PASSED
73.086573	11.20	3.63	32.20	-21.00	VERTICAL	PASSED
111.582565	7.20	2.29	24.50	-17.30	VERTICAL	PASSED

Average (RBW: 1 MHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
2331.268537	38.20	81.28	25.20	13.00	VERTICAL	PASSED
7222.450902	32.00	39.81	16.70	15.30	VERTICAL	PASSED
12370.739479	39.80	97.72	16.50	23.30	VERTICAL	PASSED
17977.461924	38.00	79.43	7.40	30.60	VERTICAL	PASSED

Average (RBW: 1 MHz) Channel 78

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4960.000000	28.10	25.41	17.00	11.10	HORIZONTAL	PASSED
7440.000000	31.60	38.02	16.10	15.50	HORIZONTAL	PASSED

π/4-DQPSK modulation

Average (RBW: 1 MHz) Channel 0

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4804.000000	27.00	22.39	16.20	10.80	HORIZONTAL	PASSED
7206.000000	31.70	38.46	16.60	15.10	HORIZONTAL	PASSED

Channel 40

Quasi peak (RBW: 120 kHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
37.595391	15.40	5.89	34.80	-19.40	VERTICAL	PASSED
73.908016	9.70	3.05	30.60	-20.90	HORIZONTAL	PASSED

Average (RBW: 1 MHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
2319.038076	38.30	82.22	25.50	12.80	VERTICAL	PASSED
2846.626253	40.50	105.93	24.80	15.70	VERTICAL	PASSED
7224.448898	32.00	39.81	16.70	15.30	VERTICAL	PASSED
11948.893788	38.60	85.11	16.40	22.20	VERTICAL	PASSED
12440.373747	39.70	96.61	16.60	23.10	VERTICAL	PASSED
17986.971944	37.90	78.52	7.30	30.60	VERTICAL	PASSED

Average (RBW: 1 MHz) Channel 78

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4960.000000	28.10	25.41	17.00	11.10	HORIZONTAL	PASSED
7440.000000	31.60	38.02	16.10	15.50	HORIZONTAL	PASSED

8DPSK modulation

Average (RBW: 1 MHz) Channel 0

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4804.000000	27.00	22.39	16.20	10.80	HORIZONTAL	PASSED
7206.000000	31.70	38.46	16.60	15.10	HORIZONTAL	PASSED

Channel 40

Quasi peak (RBW: 120 kHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
37.795391	11.90	3.94	31.30	-19.40	VERTICAL	PASSED

Average (RBW: 1 MHz) Channel 40

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
2323.950902	38.30	82.22	25.20	13.10	HORIZONTAL	PASSED
2857.107214	40.50	105.93	24.70	15.80	VERTICAL	PASSED
7219.946894	37.80	77.62	22.50	15.30	VERTICAL	PASSED
12457.407816	43.80	154.88	20.70	23.10	HORIZONTAL	PASSED
12596.184369	41.70	121.62	18.20	23.50	VERTICAL	PASSED
15385.771543	43.50	149.62	17.70	25.80	VERTICAL	PASSED
15774.043086	44.60	169.82	17.90	26.70	HORIZONTAL	PASSED
16141.286573	44.10	160.32	17.20	26.90	HORIZONTAL	PASSED
17981.455912	47.20	229.09	16.60	30.60	VERTICAL	PASSED

Average (RBW: 1 MHz) Channel 78

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4960.000000	34.50	53.09	23.40	11.10	VERTICAL	PASSED
7440.000000	38.00	79.43	22.50	15.50	HORIZONTAL	PASSED