CFR 47 Part 2, 22, and 24 Test Report

Test Report Number: 03-EM-0278.002

Terminal device: FCC ID: GMLRH-25, Model 6560, HW: 5000f, SW: 0.30
(Detailed information is listed in section 4).

Originator:	Mark Severson
Function:	TCC - Dallas - EMC
Version/Status:	1.0, Approved
Location:	TCC Directories
Date:	October 02, 2003

Change History:

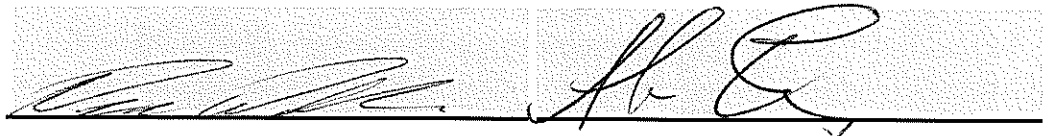
Version	*Date*	*Status*	*Handled By*	*Comments*
0.1	30 Sept 03	Draft	Mark Severson	
0.2	30 Sept 03	Reviewed	M.Mobley	
1.0	02 Oct 03	Approved	A. Ewing	

Testing laboratory:
Test & Certification Center (TCC) Dallas
Nokia Mobile Phones, Inc
6021 Connection Drive
Irving, Texas 75039
U.S.A.
Tel. 972-894-5000
Fax. 972-894-4988

Client:
Nokia Mobile Phones
FCC ID: GMLRH-25, Model 6560
6021 Connection Drive
Irving, Texas 75039
U.S.A.
Tel. 972-894-5000
Fax. 972-894-4988

Date and signatures: **October 02, 2003**

For the contents:



Nerina Walton, EMC Engineer
Technical Review

Alan C. 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 Mobile Phones
6021 Connection Drive
Irving, Texas, 75039, USA

Manufacturer: Nokia Brazil Manaus AM
Rod. Torquato Tapajós, 7200 KM 12 - Tarumã
Postal code: 69048-660
Manaus, Amazonas, Brazil

Nokia Mexico, S.A. DE C.V.
Ave. Ind. Rio Bravo s/n, Parque Ind. del Nte.
Cd. Reynosa, Tam. CP, 88730

1.2.2 Sub-part 2.1033(c)(2)

FCC ID: FCC ID: **GMLRH-25**

Model No: Model 6560

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: 40K0F1D, 40K0F8W, 30K0DXW

1.2.5 Sub-part 2.1033(c)(5)

Frequency Range, MHz: 824.04 to 848.97
1850.04 to 1909.92

1.2.6 Sub-part 2.1033(c)(6)

Power Rating, Watts: 0.200 EDRP AMPS
0.479 ERDP Cellular Band - TDMA
0.794 EIRP PCS - TDMA

☐ 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: 0.794 W

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 = 200mA
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), 2.1041, 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	10	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	ANSI/TIA/EIA 603-A	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
6	RSS-132	800 MHz Cellular Telephones Employing New Technologies
7	RSS-133	2 GHz Personal Communications Services, Industry Canada
8	RSS-212	Test Facilities and Test Methods for Radio Equipment, Industry Canada (Provisional)
9	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)

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

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
2.1053	AMPS/TDMA 800/1900	17-Dec-02	Good	Phone	Type: RH-25 Hw Id: 5000f ESN 07201999633 Code: 0511841 PSN: EYA008999
2.1053	AMPS/TDMA 800/1900	17-Dec-02	Good	Battery	Type: BLD-3 Other: 3.7v Li-ion

4.2 Photograph of Tested Device(s):

Refer to attached EXHIBITS

5. TEST EQUIPMENT LIST

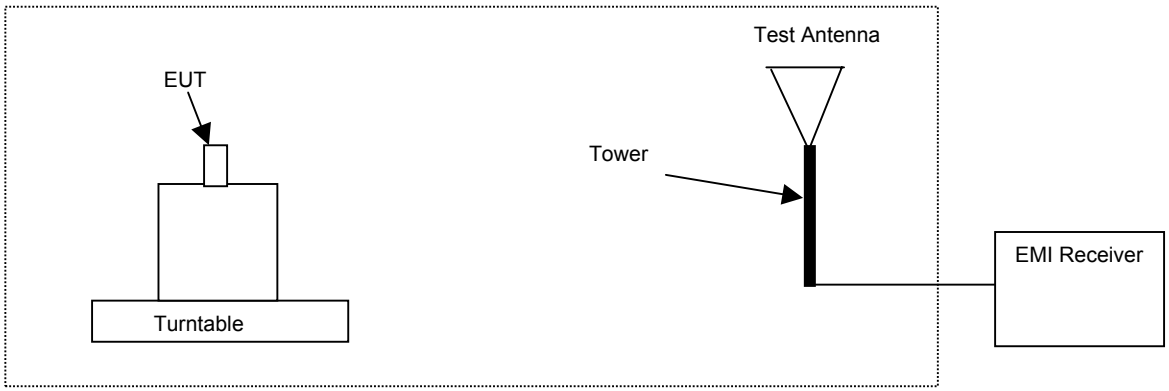
The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items listed can be obtained from the Engineering Services Group within NMP, Product Creation - Dallas. Where relevant, measuring equipment is subjected to in-service checks between testing. TCC - Dallas 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 #
9	N/A	3GHz High Pass Filter	Trilithic Inc.	4HC2900/18000-1.1-KK
9	N/A	2GHz High Pass Filter	Trilithic Inc.	3HC1900/18000-1-KK
9	N/A	1GHz High Pass Filter	Wainwright.	WHK949-9SS
9	NMP02664/ NMP02665	EMI Receiver	Agilent	8546A / 85460A
9	NMP02886	Biconilog Antenna	ETS	3142B
9	NMP00368 NMP00367	EMI Receiver	Agilent	8546A / 85460A
9	NMP00064	Horn Antenna	EMCO	3115
9	NMP02858	Horn Antenna	EMCO	3115
9	NMP02846	Turntable and Tower Controller	Sunol	FM2022
9	NMP02679	Spectrum Analyzer	Agilent	E7405A
9	NMP02671	Signal Generator	Agilent	83630B
9	NMP00001	RF preamplifier	Agilent	HP8449B
9	NMP02283	Spectrum Analyzer	Agilent	8593EM
9	NMP14923	Base Station Emulator	Anritsu	Anritsu MT8802A
9	NMP02854	Tunable Dipole	Schwarzbeck	D69250

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.

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.

7.2 Pass/Fail Criteria

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

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.

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.

8.2 Pass/Fail Criteria

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

* Frequency to be investigated up to the 10^{th} harmonic of the highest clock or frequency used.

8.3 Detailed Test Results

TEST NOT PERFORMED

8.4 Measurement Uncertainty

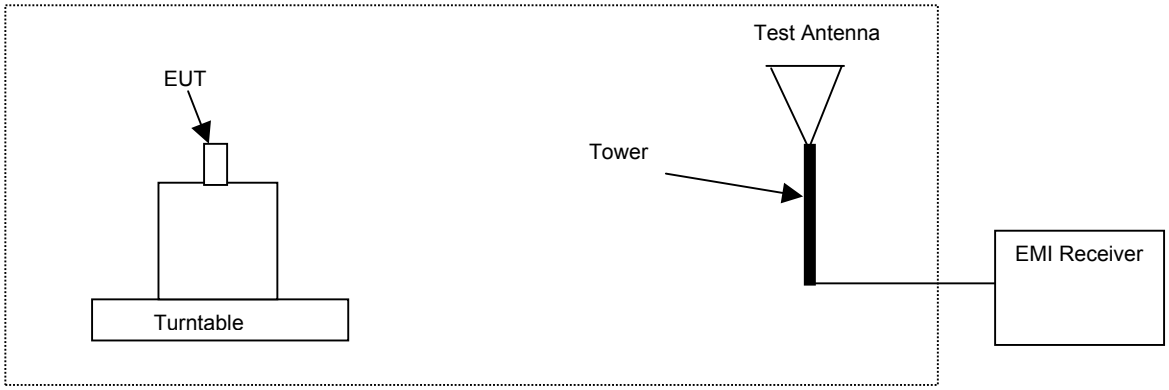
The measurement uncertainty for this test is +/- 3.7dB for 100kHz - 1000MHz and +/- 5.3dB for 1 - 20GHz.

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.

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

9.3 Detailed Test Results

Test Technician / Engineer	Chi Nguyen / Jesse Torres	
Date of Measurement	26-Sep-03	
Temperature / Humidity	23 to 25 °C	32 to 37 %RH
Test Result	Complies	

Cellular Band, AMPS, Channel 384

AMPS

	Fre	H	V	dBc(H)	dBc(V)	FCC Limit
		dBm	dBm			dBm
	1673.04	-35.38	-39.00	-60.38	-64.00	-13.00
	2509.56	-35.02	-33.92	-60.02	-58.92	-13.00
	3346.08	-31.69	-31.05	-56.69	-56.05	-13.00
	4182.60	-27.93	-28.21	-52.93	-53.21	-13.00
	5019.12	-25.15	-25.68	-50.15	-50.68	-13.00
	5855.64	-22.68	-22.61	-47.68	-47.61	-13.00
	6692.16	-42.17	-43.59	-67.17	-68.59	-13.00
	7528.68	-39.69	-40.75	-64.69	-65.75	-13.00
	8365.20	-38.30	-39.43	-63.30	-64.43	-13.00

TDMA 800 Channel 384

TDMA800

	Freq	H	V	dBc(H)	dBc(V)	FCC Limit
	MHz	dBm	dBm			dBm
	1673.04	-36.12	-22.99	-63.82	-50.69	-13
	2509.56	-32.37	-33.02	-60.07	-60.72	-13
	3346.08	-31.24	-31.81	-58.94	-59.51	-13
	4182.6	-27.81	-28.28	-55.51	-55.98	-13
	5019.12	-25.17	-25.71	-52.87	-53.41	-13
	5855.64	-22.42	-22.11	-50.12	-49.81	-13
	6692.16	-43.22	-43.05	-70.92	-70.75	-13
	7528.68	-39.49	-40.8	-67.19	-68.5	-13
	8365.2	-39.87	-39.48	-67.57	-67.18	-13

PCS Band, TDMA 1900, Channel 999

PCS

	Fre	H	V	dBc(H)	dBc(V)	FCC Limit
		dBm	dBm			dBm
	3759.90	-24.71	-24.71	-51.01	-51.01	-13
	5639.85	-21.35	-21.6	-47.65	-47.9	-13
	7519.80	-24.44	-23.9	-50.74	-50.2	-13
	9399.75	-25.42	-25.37	-51.72	-51.67	-13
	11279.70	-22.76	-22.85	-49.06	-49.15	-13
	13159.65	-24.49	-24.37	-50.79	-50.67	-13
	15039.60	-42.96	-43.6	-69.26	-69.9	-13
	16919.55	-41.42	-40.12	-67.72	-66.42	-13
	18799.50	-39.64	-40.2	-65.94	-66.5	-13

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 / VOLTAGE VARIATION)

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

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

APPENDIX

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

THE AMERICAN
ASSOCIATION
FOR LABORATORY
ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

NOKIA MOBILE PHONES
Test & Certification Center - Dallas
Irving, TX

for technical competence in the field of

Electrical Testing

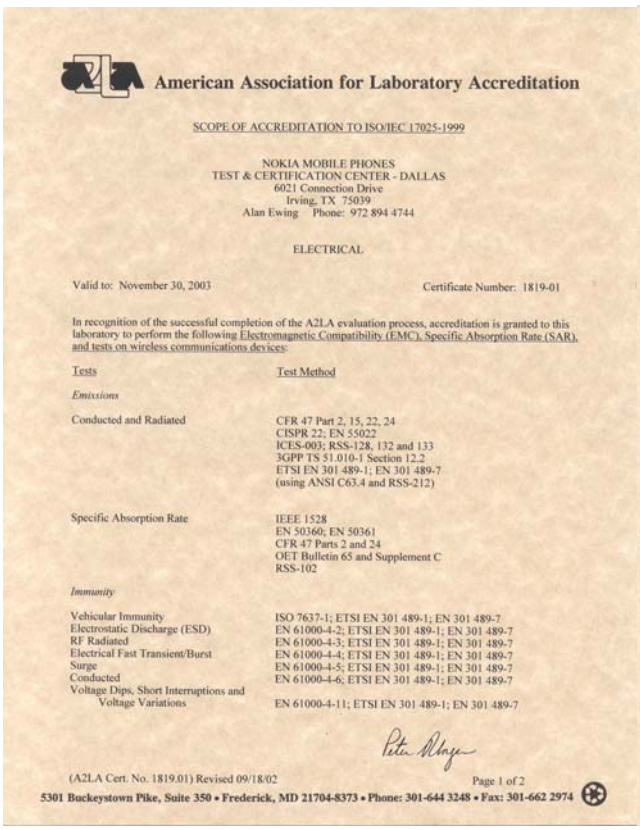
The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002.

Presented this 1st day of October, 2001.

SEAL

President
For the Accreditation Council
Certificate Number 1819.01
Valid to November 30, 2003

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation



American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999

NOKIA MOBILE PHONES
TEST & CERTIFICATION CENTER - DALLAS
6021 Connection Drive
Irving, TX 75039
Alan Ewing Phone: 972 894 4744

ELECTRICAL

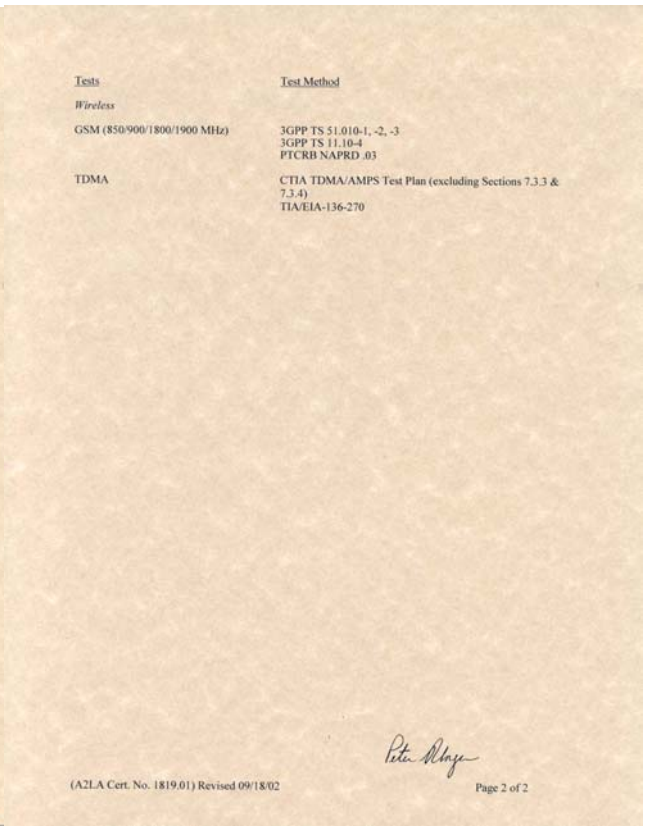
Valid to: November 30, 2003 Certificate Number: 1819-01

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
Emissions	
Conducted and Radiated	CFR 47 Part 2, 15, 22, 24 CISPR 22; EN 55022 ICES-003; RSS-128, 132 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
Immunity	
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

(A2LA Cert. No. 1819.01) Revised 09/18/02 Page 1 of 2

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974



Tests	Test Method
Wireless	
GSM (850/900/1800/1900 MHz)	3GPP TS 51.010-1, -2, -3 3GPP TS 11.10-4 PTCRB NAPRD .03
TDMA	CTIA TDMA/AMPS Test Plan (excluding Sections 7.3.3 & 7.3.4) TIA/EIA-136-270

(A2LA Cert. No. 1819.01) Revised 09/18/02 Page 2 of 2

"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.