Nemko USA, Inc.
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CERTIFICATION TEST REPORT

FCC, PART 2.1053

FCC, PART 22 SUBPART H

FCC, PART 24 SUBPART E

For The Tracking Device
Model: inGeo

FCC ID: J9CINGEO1

PREPARED FOR:

Qualcomm Incorporated
5775 Morehouse Drive
San Diego, CA 92121

Prepared on: March 25, 2008

Report Number: 2008 0310798 FCC
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Total Pages: 19

DOCUMENT HISTORY

REVISION	DATE	COMMENTS
-	March 25, 2008	Prepared By: A. Laudani
-	March 25, 2008	Initial Release: F. Fleury

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to Chapter 10 (Test Reports) Requirements of ANSI C63.4 (2003) "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

- The unit described in this report was received at Nemko USA, Inc.'s facilities on March 19, 2008.
- Testing was performed on the unit described in this report on March 19, 2007 to March 19, 2008
- The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- This report does not imply the endorsement of the Federal Communications Commission (FCC), Industry Canada, NVLAP or any other government agency.

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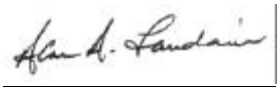
CERTIFICATION

Nemko USA, Inc., an independent Electromagnetic Compatibility (EMC) Test Laboratory, produced this Test Report and performed the Radio Frequency Interference (RFI) testing and data evaluation contained herein.

Nemko USA, Inc.'s measurement facility is currently registered with the United States Federal Communications Commission (FCC) in accordance with the provisions of 47 United States Code (CFR) Part 2, Subpart I, Section 2.948(a). A current description of Nemko USA, Inc.'s measurement facility is on file with the FCC. Nemko USA Inc. has additionally satisfied the FCC that it complies with the requirements set forth in 47 CFR Part 2, Subpart I, Section 2.948(d) regarding the accreditation of EMC laboratories.

The RFI testing, test data collection and test data evaluation were accomplished in accordance with the ANSI C63.4–2003 Standard, and in accordance with the applicable sections of the FCC rules (47 CFR Parts 2 and 15). The testing was also accomplished in accordance with Industry Canada's ICES-003 standard for unintentional radiating device per EMCAB-3, Issue 3 (May 1998). The administrative summary of this test report provides a description of the test sample.

I hereby certify that the test data, test data evaluation, and equipment configurations used to compile this test report are a true and accurate representation of the test sample's radio frequency interference characteristics as of the test date(s), and, for the design of the test sample.



Alan Laudani
EMC Engineer

1. ADMINISTRATIVE DATA AND TEST SUMMARY

1.1. Administrative Data

CLIENT:	Qualcomm Incorporated 5775 Morehouse Drive San Diego, CA 92121
CONTACT: E-Mail:	Robert Scodellaro rscodell@qualcomm.com
DATE (S) OF TEST:	March 19, 2007 to March 19, 2008
EQUIPMENT UNDER TEST (EUT):	Tracking Device
MODEL:	inGeo
SERIAL:	00701446156
CONDITION UPON RECEIPT:	Suitable for Test
TEST SPECIFICATION:	FCC, PART 2.1053, FCC, PART 22 SUBPART H, FCC, PART 24 SUBPART E

1.2. Test Summary

The column headed "Required" indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

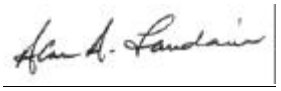
N No: not applicable / not relevant
Y Yes: Mandatory i.e. the apparatus shall conform to these test.
N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

Test Type	***In Accordance with Document***	***Frequency Range Investigated***	***EUT Complies***
Radiated Spurious Emissions	FCC, Part 22, Subpart H, Part 24, Subpart E	824 – 19990 MHz	PASS

The inGeo complied with FCC Part 22 and Part 24 when tested in the system configuration defined herein.

Refer to the test results section for further details.



Alan Laudani
EMC Engineer

2. SYSTEM CONFIGURATION

2.1. Description and Method of Exercising the EUT

The inGeo is a Tracking Device. Its function is to report its location by GPS input to telecommunications cell band output. The EUT was exercised by placing the device into "a call" with a test box. Low, mid, and high channels of each band were measured for Radiated Emissions. This report proclaims the device compliant for radiated emissions and will be added to the other required tests by Qualcomm Incorporated.

The EUT's performance during test was evaluated against the performance criterion specified by applicable test standards. Performance results are detailed in the test results section of this report.

2.2. System Components and Power Cables

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - Tracking Device	Qualcomm Incorporated Model: inGeo Serial #: 00701446156	

2.3. Device Interconnection and I/O Cables

Connection	I/O Cable
No connections	

2.4. Design Modifications for Compliance

The following design modifications were made to the EUT during testing.

No design modifications were made to the EUT during testing.

2.5. Theory of Operation

The inGeo is a small and simple tracking device, based on gpsOne technology and complementary control-server technology for accurate, real-time tracking. It is fully compatible with CDMA2000 1X standard, its design is optimized to minimal cost, minimum size, maximum battery life and superb positioning location performance.

- Small size
- Simplified Operation
- Intelligent Hibernation
- Extended battery life
- Assistance Request Button
- Over the air configuration and monitoring
- Built-in Geofence capabilities

2.6. Technical Specifications of the EUT

Manufacturer:	Qualcomm Incorporated
Operating Frequency:	824.30 to 848.31 MHz; 1851.25 to 1908.75 MHz
Rated Power:	24 dBm conducted
Modulation:	CDMA
Antenna Connector:	None
Power Source:	AC adapter to 4.1 DC

3. DESCRIPTION OF TEST SITE AND ENVIRONMENT

3.1. Description of Test Site

The test site is located at 11696 Sorrento Valley Road, Suite F, San Diego, CA 92121. The site is physically located 18 miles Northwest of downtown San Diego. The general area is a valley 1.5 miles east of the Pacific Ocean. This particular part of the valley tends to minimize ambient levels, i.e. radio and TV broadcast stations and land mobile communications. The three and ten-meter Open Area Test Site (OATS) is located behind the office/lab building. It conforms to the normalized site attenuation limits and construction specifications as set in the EN 55022 (1987), CISPR 16 and 22 (1985) and ANSI C63.4-2001 documents. The OATS normalized site attenuation characteristics are verified for compliance every year, and registered with the Federal Communications Commission under Registration Number 90579 and Industry Canada under 2040B-1 and 2040B-2.

3.2. Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	11 – 13 ^{o}C
Humidity range	:	80 - 94%
Power supply range	:	NA

4. DESCRIPTION OF TESTING METHODS

4.1. Introduction

As required in 47 CFR, Parts 2 and 15, the methods employed to test the radiated and conducted emissions (as applicable) of the EUT are those contained within the American National Standards Institute (ANSI) document ANSI C63.4–2003, titled "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." All applicable FCC Rule Sections that provide further guidance for performance of such testing are also observed.

For General Test Configuration please refer to Figure 1 on the following page.

Digital devices sold in Canada are required to comply with the Interference Causing Equipment Standard for Digital Apparatus, ICES-003. These test methods and limits are specified in the Canadian Standards Association's (CSA) Standard C108.8-M1983 (1-1-94 version) and are "essentially equivalent" with FCC, Part 15 and CISPR 22 (EN55022) rules for unintentional radiators per EMCAB-3, Issue 3 (May 1998). No further testing is required for compliance to ICES-003.

4.2. Configuration and Methods of Measurements for Radiated Emissions

Section 8 of ANSI C63.4 determines the general configuration and procedures for measuring the radiated emissions of equipment under test. Initially, the primary emission frequencies are identified inside the test lab by positioning a broadband receive antenna one meter from the EUT to locate frequencies of significant radiation. Next, the EUT and associated system are placed on a turntable on a ten meter open area test site (registered with the FCC in accord with its Rules and ANSI C63.4) and the receive antenna is located at a distance of ten meters from the EUT.

The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. All significant radiated emissions are recorded when maximum radiation on each frequency is observed, in accordance with part 8 of ANSI C63.4–2003 and Section 15.33 of the FCC Rules. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to horizontal and vertical polarities, and the turntable is also rotated to determine the worst emitting configuration. The numerical results of the test are included herein to demonstrate compliance.

The numerical results that are applied to the emissions limits are arrived at by the following method:
Example: A=RR+CL+AF
A = Amplitude dBµV/m
RR = Receiver Reading dBuV
CL = cable loss dB
AF = antenna factor dB/m

Example Frequency = 110MHz
18.5 dBuV (spectrum analyzer reading)
+3.0 dB (cable loss @ frequency)
21.5 dBuV
+15.4 dB/m (antenna factor @ frequency)
36.9 dBµV/m Final adjusted value

The final adjusted value is then compared to the appropriate emission limit to determine compliance.

5. Test Results

5.1. Radiated Emissions –Transmit Mode

Sample calculation.

Example Frequency = 553.75 MHz

6.2 dBµV (spectrum analyzer reading)

+9.2 dB (cable loss @ frequency)

+35.1 dB/m (antenna factor @ frequency)

-43.3dB (PreAmp Gain @ frequency)

-95.26 dB conversion from dBµV/m to dBm

-33.1 dBm Final adjusted value

-95.26 conversion factor:

$(0\ dB\mu V/m * 3m/5.5)^2 = -95.26\ dBm$

Additional Observations:

- The Spectrum was searched from 30MHz to the 10th Harmonic, 20,000 MHz.
- The EUT was investigated on three orthogonal axes, the highest emissions were reported.

Radiated Emissions Data

Job # : 10798-EMC
NEX #: 1004049
Date : 3-19-08
Time : 1355
Staff : AAL
Page 1 of 1

Client Name : Qualcomm
EUT Name : Tracking Device
EUT Model # : Shivta
EUT Serial # :
EUT Config. : Transmit

EUT Voltage : 120
EUT Frequency : 60
Phase: 1
NOATS RN 90579 X
SOATS
Distance < 1000 MHz: 3 m

Specification : Part 22
Loop Ant. #: NA
Bicon Ant.#: NA
Log Ant.#: NA
DRG Ant. #1 529
DRG Ant. #2 625
Cable LF#: NA
Cable HF#: 40ft
Preamp LF#: NA

Temp. (°C) : 11
Humidity (%) : 94
Spec An.#: 835
Spec An. Display #: NA
QP #: NA
PreSelect#: NA
Preamp HF# 919

Peak RBW: 1 MHz
Video Bandwidth 3 MHz

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBm)	Spec. limit (dBm)	CR/SL Diff. (dB)	Pass Fail	Comment
824.70											
1649.4	76.5	72.3	P		1.4	76.5	-34.3	-13.0	-21.3	Pass	
2474.1	68.1	66.8	P		1.2	68.1	-38.4	-13.0	-25.4	Pass	
3298.8	53.7	54.4	P		1.0	54.4	-47.8	-13.0	-34.8	Pass	
848.30											
1696.60	75.2	74.3	P		1.2	75.2	-35.6	-13.0	-22.6	Pass	
2544.90	63.5	60.1	P		1.2	63.5	-41.7	-13.0	-28.7	Pass	
3393.20	51.7	51.0	P		1.0	51.7	-50.3	-13.0	-37.3	Pass	
835.49											
1670.98	76.2	67.1	P		1.0	76.2	-34.6	-13.0	-21.6	Pass	
2506.47	60.5	60.1	P		1.0	60.5	-44.7	-13.0	-31.7	Pass	
3341.96	51.8	50.0	P		1.0	51.8	-50.2	-13.0	-37.2	Pass	

Radiated Emissions Data

Job # :	10798-EMC	Date :	3-19-08	Page	1 of 1
NEX #:	1004049	Time :	0930		
		Staff :	AAL		
Client Name :	Qualcomm			EUT Voltage :	120
EUT Name :	Tracking Device			EUT Frequency :	60
EUT Model # :	Shivta			Phase:	1
EUT Serial # :				NOATS RN 90579	X
EUT Config. :	Transmit			SOATS	
				Distance < 1000 MHz:	3 m

Specification :	Part 24		
Loop Ant. #:	NA		
Bicon Ant.#:	NA	Temp. (°C) :	13
Log Ant.#:	NA	Humidity (%) :	75
DRG Ant. #1	529	Spec An.#:	835
DRG Ant. #2	625	Spec An. Display #:	NA
Cable LF#:	NA	QP #:	NA
Cable HF#:	40ft	PreSelect#:	NA
Preamp LF#:	NA	Preamp HF#	919

Peak	RBW: 1 MHz
	Video Bandwidth 3 MHz

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBm)	Spec. limit (dBm)	CR/SL Diff. (dB)	Pass Fail	Comment
1880.00											
3760.0	58.7	58.9	P		1.0	58.9	-41.9	-13.0	-28.9	Pass	
5640.0	55.1	59.9	P		1.0	59.9	-34.2	-13.0	-21.2	Pass	
7520.0	50.8	46.5	P		1.0	50.8	-38.9	-13.0	-25.9	Pass	
9400.0	50.1	49.1	P		1.0	50.1	-33.2	-13.0	-20.2	Pass	
1908.75											
3817.50	53.2	52.2	P		1.0	53.2	-47.6	-13.0	-34.6	Pass	
5726.25	67.1	52.8	P		1.0	67.1	-26.8	-13.0	-13.8	Pass	
7635.00	48.1	47.8	P		1.0	48.1	-41.4	-13.0	-28.4	Pass	
9543.75	43.8	45.3	P		1.0	45.3	-36.2	-13.0	-23.2	Pass	
1851.25											
3702.50	53.7	56.4	P		1.0	56.4	-44.4	-13.0	-31.4	Pass	
5553.75	55.0	61.2	P		1.0	61.2	-33.1	-13.0	-20.1	Pass	
7405.00	52.0	48.3	P		1.0	52	-38.7	-13.0	-25.7	Pass	
9256.25	45.9	47.0	P		1.0	47	-35.8	-13.0	-22.8	Pass	

5.2. Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
529	Dbl Ridge Horn	EMCO	3115	2505	8/27/2007	8/27/08
625	Dbl Ridge Horn	EMCO	3116	2325	NCR	Verified
835	Spectrum Analyzer	Rohde & Schwarz	RHDFSEK	829058/005	6/20/2007	6/20/08
919	Preamplifier	Spacek Labs MM-Wave Technology	100MHz to 40GHz	3M12 (SLK-35-3) and 3M13 (SLKa-35-4)	3/12/08	3/12/09

APPENDIX A

A. Radiated Emissions Measurement Uncertainties

1. Introduction

ISO/IEC 17025:1999 and ANSI/NCSL Z540-1-1994 require that all measurements contained in a test report be "traceable". "Traceability" is defined in the *International Vocabulary of Basic and General Terms in Metrology* (ISO: 1993) as: "the property of the result of a measurement... whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons, *all having stated uncertainties*".

The purposes of this Appendix are to "state the *Measurement Uncertainties*" of the conducted emissions and radiated emissions measurements contained in Section 5 of this Test Report, and to provide a practical explanation of the meaning of these measurement uncertainties.

2. Statement of the Worst-Case Measurement Uncertainties for the Conducted and Radiated Emissions Measurements Contained in This Test Report

Table 1: Worst-Case Expanded Uncertainty "U" of Measurement for a k=2 Coverage Factor

Radiated Emissions Measurement Detection Systems	Applicable Frequency Range	"U" for a k=2 Coverage Factor
Spectrum Analyzer with QPA & Preamplifier	30 MHz - 200 MHz	+3.9 dB, -4.0 dB
Spectrum Analyzer with QPA & Preamplifier	200 MHz-1000 MHz	+/- 3.5 dB
Spectrum Analyzer with Preamplifier	1 GHz - 18 GHz	+2.5 dB, -2.6 dB
Spectrum Analyzer with Preamplifier	18 GHz - 40 GHz	+/- 3.4 dB

NOTES:

1. Applies to 3 and 10 meter measurement distances
2. Applies to all valid combinations of Transducers (i.e. LISNs, Line Voltage Probes, and Antennas, as appropriate)
3. Excludes the Repeatability of the EUT

3. Practical Explanation of the Meaning of Radiated Emissions Measurement Uncertainties

In general, a "Statement of Measurement Uncertainty" means that with a certain (specified) confidence level, the "true" value of a measurand will be between a (stated) upper bound and a (stated) lower bound.

In the specific case of EMC Measurements in this test report, the measurement uncertainties of the conducted emissions measurements and the radiated emissions measurements have been calculated in accordance with the method detailed in the following documents:

- *ANSI Z540.2 (2002) Guide to the Expression of Uncertainty in Measurement*
- NIS 81:1994, *The Treatment of Uncertainty in EMC Measurements* (NAMAS, 1994)
- NIST Technical Note 1297(1994), *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results* (NIST, 1994)

The calculation method used in these documents requires that the stated uncertainty of the measurements be expressed as *an "expanded uncertainty", U, with a k=2 coverage factor*. The practical interpretation of this method of expressing measurement uncertainty is shown in the following example:

EXAMPLE: Assume that at 39.51 MHz, the (measured) radiated emissions level was equal to +26.5 dBµV/m, and that the +/- 2 standard deviations (i.e. 95% confidence level) measurement uncertainty was +/- 3.4 dB.

In the example above, the phrase "k = 2 Coverage Factor" simply means that the measurement uncertainty is stated to cover +/-2 standard deviations (i.e. a 95% confidence interval) about the measurand. The measurand is the radiated emissions measurement of +26.5 dBµV/m at 39.51 MHz, and the 95% bounds for the uncertainty are –3.4 dB to + 3.4 dB. One can thus be 95% confident that the "true" value of the radiated emissions measurement is between +23.1 dBµV/m and +29.9 dBµV/m. *In effect, this means that in the above example there is only a 2.5% chance that the "true" radiated emissions value exceeds +29.9 dBµV/m.*

APPENDIX B

B. Nemko USA, Inc. Test Equipment & Facilities Calibration Program

Nemko USA, Inc. operates a comprehensive Periodic Calibration Program in order to ensure the validity of all test data. Nemko USA's Periodic Calibration Program is fully compliant to the requirements of NVLAP Policy Guide PG-1-1988, ANSI/NCSL Z540-1-1994, ISO 10012: 2003, ISO/IEC 17025:1999, and ISO-9000: 2000. Nemko USA, Inc.'s calibrations program therefore meets or exceeds the US national commercial and military requirements [N.B. ANSI/NCSL Z540-1-1994 replaces MIL-STD-45662A].

Specifically, all of Nemko USA's *primary reference standard devices* (e.g. vector voltmeters, multimeters, attenuators and terminations, RF power meters and their detector heads, oscilloscope mainframes and plug-ins, spectrum analyzers, RF preselectors, quasi-peak adapters, interference analyzers, impulse generators, signal generators and pulse/function generators, field-strength meters and their detector heads, etc.) and certain *secondary standard devices* (e.g. RF Preamplifiers used in CISPR 11/22 and FCC Part 15/18 tests) are periodically recalibrated by:

- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Guide 25-accredited as a calibration laboratories by NIST; or,
- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Guide 25-accredited as a calibration laboratory by another accreditation body (such as A2LA) that is mutually recognized by NIST; or,
- A manufacturer of Measurement and Test Equipment (M&TE), if the manufacturer uses NIST-traceable standards and is ISO Guide 25-accredited as calibration laboratory either by NIST or by another accreditation body (such as A2LA) that is mutually recognized by NIST; or
- A manufacturer of M&TE (or by a Nemko USA-approved independent third party metrology laboratory) that is not ISO Guide 25-accredited. (In these cases, Nemko USA conducts an annual audit of the manufacturer or metrology laboratory for the purposes of proving traceabilty to NIST, ensuring that adequate and repeatable calibration procedures are being applied, and verifying conformity with the other requirements of ISO Guide 25).

In all cases, the entity performing the Calibration is required to furnish Nemko USA with a calibration test report and/or certificate of calibration, and a "calibration sticker" on each item of M&TE that is successfully calibrated.

Calibration intervals are normally one year, except when the manufacture advises a shorter interval (e.g. the HP 8568B Spectrum Analyzer is recalibrated every six months) or if US Government directives or client requirements demand a shorter interval. Items of instrumentation/related equipment which fail during routine use, or which suffer visible mechanical damage (during use or while in transit), are sidelined pending repair and recalibration. (Repairs are carried out either in-house [if minor] or by a Nemko USA-approved independent [third party] metrology laboratory, or by the manufacturer of the item of M&TE).

Each antenna used for CISPR 11 and CISPR 22 and FCC Part 15 and Part 18 radiated emissions testing (and for testing to the equivalent European Norms) is calibrated annually by either a NIST (or A2LA) ISO Standard 17025-Accredited third-party Antenna Calibration Laboratory or by the antenna's OEM if the OEM is NIST or A2LA ISO Standard 17025-accredited as an antenna calibration laboratory. The antenna calibrations are performed using the methods specified in Annex G.5 of CISPR 16-1(2003) or ANSI C63.5-2004, including the "Three-Antenna Method". Certain other kinds of antennas (e.g. magnetic-shielded loop antennas) are calibrated annually by either a NIST (or A2LA) ISO Standard 17025-accredited third-party antenna calibration laboratory, or by the antenna's OEM if the OEM is NIST or A2LA ISO Standard 17025-accredited as an antenna calibration laboratory using the procedures specified in the latest version of SAE ARP-958.

In accordance with FCC and other regulations, Nemko USA recalibrates its suite of antennas used for radiated emissions tests on an annual basis. These calibrations are performed as a precursor to the FCC-required annual revalidation of the Normalized Site Attenuation properties of Nemko USA's Open Area Test Site. Nemko USA, Inc. uses the procedures given in both Sub clause 16.6 and Annex G.2 of CISPR 16-1 (2003), and, ANSI C63.4-2003 when performing the normalized site attenuation measurements.