TUV RHEINLAND ADDENDUM TO FC02-002C

FOR THE

WHERENET LOCATION SENSOR, LAP-4200

FCC PART 15 SUBPART C SECTIONS 15.247, 15.207 & 15.209
AND
FCC PART 15 SUBPART B SECTION 15.109 CLASS B

COMPLIANCE

DATE OF ISSUE: APRIL 2, 2002

PREPARED FOR:

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Date of test: November 26 – April 2, 2002

Report No.: FC02-002D

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ADMINISTRATIVE INFORMATION

DATE OF TEST: November 26 – April 2, 2002

DATE OF RECEIPT: November 26, 2001

PURPOSE OF TEST: To demonstrate the compliance of the WhereNet Location Sensor, LAP-4200, with the requirements for FCC Part 15 Subpart C Sections 15.247, 15.207, 15.209 and FCC Part 15 Subpart B Section 15.109 Class B devices. Addendum A revised tables 1, 2, 5, added table 7 and corrected the manufacturer name. Addendum B revised the data in tables 1 and 2, as well as the corresponding data in Appendix C. Addendum C removed all references to testing of the WLAN transmitter. Addendum D revised power output at antenna terminal test results.

TEST METHOD: ANSI C63.4 (1992) and ITU-R 55/1

MANUFACTURER: WhereNet
                                            2858 De La Cruz Blvd
                                            Santa Clara, CA 95050
REPRESENTATIVE: Ken Chesley

TEST LOCATION: CKC Laboratories, Inc.
                                            480 Los Viboras Road, Hollister, CA 95023
                                            1653 Los Viboras Road, Hollister, CA 95023
                                            5473A Clouds Rest, Mariposa, CA 95338

SUMMARY OF RESULTS

The TUV Rheinland WhereNet Location Sensor, LAP-4200 was tested in accordance with the following standards and specifications:

United States

- ➤ FCC Part 15 Subpart B Section 15.109 Class B
- ➤ FCC Part 15 Subpart C Section 15.247/15.209
- ➤ ANSI C63.4 (1992) method

Canada

RSS-210 using:

- ➤ FCC Part 15 Subpart B Section 15.109 Class B
- ➤ FCC Part 15 Subpart C Section 15.247/15.209
- ➤ ANSI C63.4 (1992) and ITU-R 55/1 methods

Industry of Canada File No. IC 3171-B
Industry of Canada File No. IC 3170-C

The results in this report apply only to the items tested, as identified herein.

MODIFICATIONS REQUIRED FOR COMPLIANCE

No modifications were necessary for compliance.

APPROVALS

QUALITY ASSURANCE:

Dennis Ward, Quality Manager

Christine Nicklas, EMC/Lab Manager

TEST PERSONNEL:

Art Rice, Test Engineer

Chuck Kendall, EMC/Lab Manager

Randy Clark, EMC Engineer

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

WhereNet manufactures a Real Time Location System (RTLS) used to track assets throughout a facility. The Location Sensor (models LAP-4200 and LOS-4100) receives the signals transmitted by the WhereTags, which are attached to the tracked assets. The decoded tag information is then time stamped and routed to a PC for additional processing. The locate algorithm running on the PC calculates the tag position based on the time stamps of multiple Location Sensors throughout the site, and reports that tag position to the database, where it is displayed by the Resource Manager software. There are two separate Location Sensor models:

- LOS-4100 (802.3 Wired Ethernet)

- LAP-4200 (with 802.11b Wireless LAN Access Point, also known as a Locating Access Point)

The difference between the two models is that the LAP-4200 contains an Access Point, while the LOS-4100 does not. These units are identical in appearance; the only way to distinguish them is by the model number on the housing. Note that both units have a wired Ethernet port; the LAP-4200 has a can function as either a client bridge or an access point. Both units also include a low power transmitter which is used to distribute configuration data and timing signals to other Location Sensor units. This transmitter, which has the same transmitter characteristics as a WhereTag, is referred to as the embedded tag circuitry.

Note: Only the production model LAP-4200, which represents the worst case unit, was tested by CKC Laboratories. Inside the LAP-4200 is a previously approved transmitter, FCC ID: H9PLA4131M.

EQUIPMENT UNDER TEST

Antenna Flat Panel
Manuf: WhereNet
Model: AK-120
Serial: None
FCC ID: DoC

WhereNet Location Sensor
Manuf: WhereNet
Model: LAP4-200
Serial: M00460110000
FCC ID: NSQLAP-4200-A

Switching Power Adapter
Manuf: Globtek, Inc.
Model: GT-2-1097-5024
Serial: 013A230260
FCC ID: DoC

Antenna All Weather Omni
Manuf: WhereNet
Model: AK-210-10
Serial: none
FCC ID: DoC

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

AC Adapter for PC
Manuf: Delta
Model: ADP-50GB
Serial: M2819010414
FCC ID: DoC

Ethernet Hub
Manuf: Bay Networks
Model: DS108
Serial: DS18F9B09756
FCC ID: DoC

AC Adapter for Hub
Manuf: Bay Networks
Model: PWR-002-004
Serial: NA
FCC ID: DoC

AC Adapter for WLAN
Manuf: Transceiver Symbol Tech
Model: 50-25000-021
Serial: 002131099
FCC ID: DoC

Switching Power Adapter
Manuf: Globtek, Inc.
Model: GT-2-1097-5024
Serial: 013A230260
FCC ID: DoC

WLAN Transceiver
Manuf: Symbol Technologies
Model: A66233-01
Serial: 00034715C4FF
FCC ID: DoC

Laptop PC
Manuf: Hitachi
Model: 7560
Serial: TE0136700153
FCC ID: DoC

Table 1: 15.247(b)(1) Peak Power Emission: Antenna Terminal Testing

Frequency (MHz)	Reading	BW Correction	Power (dBm)	Power (Watts)	Ave Power (uW)
2441.93	4.3	9.79	14.1	0.026	12

Laptop PC attached to the WhereNet Location Sensor (LAP-4200). LAP is transmitting in the Tag Mode with power set to 840. EUT is connected directly to the spectrum analyzer.
EIRP reported as measured in a 28.6MHz band. BW correction factor calculated as follows.
Actual measurements taken in a 3MHz BW.
10 Log (BW1/BW2) = 9.3* Log (28.6/3) = 9.79dB

FCC 15.247(b)(1) EIRP

Frequency (MHz)	Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Power (Watts)	Ave Power (uW)
2441.93	14.1	5.0	19.1	0.081	40.0
2441.93	14.1	8.0	22.1	0.162	80.0

EIRP calculated using the antenna conducted power and correcting for the antenna gain.
EIRP reported as measured in a 28.6MHz band.
5dBi Gain Antenna is an outdoor all weather omni type
8dBi Gain Antenna is an indoor flat panel directional type

Duty Cycle = 0.000494%