MEASUREMENT/TECHNICAL REPORT

FCC Part 15 Sections 15-207 and 15-209

Honeywell

FCC ID: HS9-RTU-B12

March 06th , 2003

This report concerns (check one): Original grant __X__ Class II change____

Equipment type: ACCESS CONTROL TERMINAL (ex.: computer, printer, modem, etc.)

Deferred grant request per 47 CFR 0.457(d)(1)(ii)? yes _____ no __X__

If yes, defer until: _____
date

Company Name agrees to notify the Commission by _____
date
of the intended date of announcement of the product so that the grant can be issued on that date.

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1 GENERAL INFORMATION

1.1 Product Description

The RTU-B12 is a mono antenna proximity reader for access control and time & attendance applications. It can be mounted on vertical (walls, doors) and horizontal (turnstiles, pedestals) surfaces in a stand alone configuration or bounded with a display module (RTU-C01 or RTU-C02) and/or a keyboard module (RTU-T01). Specific names are assigned to each group (see note2).

1.2 Related Submittal(s)/Grant(s)

None

1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Model & Serial No.	FCC ID	Description	Cable Descriptions
RTU-B12(1) s/n EMC03-017	**HS9-RTU-B12**	**Prox Reader Module**	**Unshielded power and signal cable**
CTU A04 S/n AE0051	Verified	Controller	Unshielded power cord Unshielded signal cables
RTU Q01 S/n EMC-2001-296	Verified	Power supply	Unshielded power cords

(1) EUT submitted for grant.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the ANSI C63.4-1992 test procedures . Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

TÜV ITALIA test site No. 3 – semi-anechoic chamber

The semi-anechoic chamber test site and conducted measurement facility used to collect the radiated data are located at Via Montalenghe 12, Scarmagno, Italy. This site has been fully described in a report dated May 12, 2000 submitted to your office, and accepted in a letter dated May 30, 2000 (registration Number: 90860)

1.6 Test equipment list:

Description	Model	serial No.	Cal due date
Test receiver	Rohde & Sch.ESH3	s/n 881364/012	10/03
Spectrum analyzer	HP 8568B+QP adapter	s/n 2601A02134	04/03
LISN	Schwarzb.NNLA 8120	s/n 8120471A	02/04
Loop antenna	Rohde & Sch.HFH2-Z2	s/n 881058/6	09/03
Biconical antenna	Tensor 4104	s/n 2222	03/04
Log-periodic antenna	Electro-metrix LPA-25	s/n 1117	03/04

2 PRODUCT LABELING

Figure 2.1 FCC ID Label

See attached file: Label.pdf

Figure 2.2 Location of the Label on EUT

See attached file: label_location.jpg

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The EUT was configured for testing in a typical fashion (as a customer would normally use it).
In order to simulate a real application , the EUT has been connected to a CTU-A04 controller in a typical configuration and operated according to normal use. (see Figure 3.1).

The EUT has been tested in vertical position simulating real operating placement attached to a wall

Conducted emission testing was performed on the power mains cord of the RTU-Q01 power supply.

3.2 EUT Exercise Software

The Philips proxy reader MFCM200/FAA continuously sends bursts at 13,56MHz to the antenna and acquires back (form the same antenna coil) any modulation on the transmitted carrier. If a card with a RF-TAG is placed near the RTU-B12 antenna, the 13,56KHz wave on the coil energises the TAG. The TAG then modulate the 13,56MHz with an encoded frame that include the identification code. That frame is then decoded by the Philips reader module that sends the information via a parallel interface.
The informations are then sent to the controller (CTU-A04) via the LonWorks™ network message. When the controller receives that message, it verifies the access rights of the user. If the cardholder has the correct access rights, it sends a message to the RTU-B12 (i.e. Green=”Access granted”, Red long=”Access forbidden”, Red short=”Invalid card”, etc) and turn on the LEDs (green/red) and buzzer accordingly.

Note: LonWorks™ is a registered trademark of Echelon™ Corporation

3.3 Special Accessories

None.

As shown in Figure 3.1 all interface cables used for compliance testing are unshielded as readily available on the market.

3.4 Equipment Modifications

To achieve compliance to Class B levels, no changes were made during compliance testing.

3.5 Configuration of the Tested System

Figure 3.1 Configuration of the Tested System

4 BLOCK DIAGRAM(S) OF THE EUT

4.1 Block Diagram Description

The **CPU** of the EUT is provided with:

Crystals and oscillators (CPU clock):

X1: 10MHz ± 5 ppm

RF suppression devices:

VDC EMI Filters:

FL2 M2022-A Coilcraft

Signal EMI Filters:

FL2 M2022-A Coilcraft

FCC EMI FILTER board

VDC EMI Filters:

F1 Filter Schaffner RN102-1-02

Signal EMI Filters:

F2 Filter Schaffner RN102-1-02

Transceiver Philips

Crystal 13.56 MHz

EUT Shield:

None

Fig. 4.1 - Block Diagram of the EUT

See exhibit.

Fig. 4.2 - Block Diagram of Transceiver

Provided by Philips

See exhibit.

5 CONDUCTED AND RADIATED MEASUREMENT PHOTOS

See attached files : TestSetup_photos

6 CONDUCTED EMISSION DATA
(According to section 15.207 of the FCC rules)

6.1 Tests of the worst case configuration.

The conducted tests are performed with a receiver in quasi-peak mode.

	Frequency (MHz)	Measured* (dBµV)	QP limit (dBµV)	AV Limit (dBµV)
Neutral	0.15	45	66	56
	0.17	38	64.8	54.8
	0.20	35	63.4	53.4
	10	34	60	50
	13.56	48.5	60	50
	20	32	60	50
Line	0.15	46	66	56
	0.17	39	64.8	54.8
	0.20	36	63.4	53.4
	10	33	60	50
	13.56	48	60	50
	20	33	60	50

* All readings are quasi-peak

Test Personnel:

Tester Signature  Date January 23, 2003

Typed/Printed Name Giuseppe MECCHIA .

7 RADIATED EMISSION DATA
(According to section 15.209 of the FCC rules)

- **frequency range 0.009 MHz – 1 GHz**
- **(from the lowest frequency to 1GHz: it includes a digital device)**

7.1 Tests of the worst case configuration

The following data list the significant emission frequencies, measured levels, correction factors (including cable and antenna corrections), the corrected reading, plus the limit. Field strenght calculation is given in paragraph 7.2.

Judgement: Passed by 4 dB

Fundamental and harmonics (limits according to section 15.209).

Frequency (MHz)	Receiver* Corrected Reading (dBµV/m)	3 Meter Limit (dBµV/m)
13.5610	61.5	65.5
27.1220	23.4	49.5

Frequency (kHz)	Receiver* Corrected Reading (dBµV/m)	10 Meter Limit (dBµV/m)
13.5612	43.5	47.5
27.1224	13.4	39.5

* below 30 MHz readings are quasi-peak with an IF bandwidth of 9 kHz,

Extrapolation data

Measurements were taken at the fundamental frequency of the intentional radiator with the Rohde & Schwarz loop antenna at the distances od 10 and 3 meters. The antenna was placed at a fixed height of 1 meter. **Measurements were taken in the three orthogonal orientation to find the maximum emission, vertical was observed to be worst case.** The turntable was rotate to maximize the emission. The first measurement was taken at 3 meters, then the antenna was moved to 10 meters and the emission was measured. These readings were then plotted to extrapolate the correct reading at a distance of 30 meters. The limit was then calculated using precisely the falloff rate which has been measured to be:

- 18dB/decade at 13.56MHz and
- 10dB/decade at 27.12MHz.

This limits were then plotted on the graph to extrapolate the limits at 10 and 3 meters. Reference measurements standards Part 15 section 15.31(f)(2).

Spurious emissions (limits according to section 15.209).

Judgement: Passed by 3.5 dB

Frequency (MHz)	Polarity (V/H)	Receiver* Reading (dBμV)	Correction Factor (dB/m)	Corrected Reading (dBμV/m)	3 Meter Limit (dBμV/m)
100	V	20.2	12.8	33	43.5
140	V	19.3	14.2	33.5	43.5
160	V	23.7	16.3	40	43.5
170	V	18.6	17.6	36.2	43.5
320	V	17.5	17.7	35.2	46
640	V	16	24.1	40.1	46

* above 30 MHz readings are quasi-peak, with an IF bandwidth of 120 kHz,

Test Personnel:

Tester Signature Date January 23, 2003

Typed/Printed Name Giuseppe MECCHIA .

7.2 Field Strength Calculation

7.2.1 The field strength is calculated by adding the Antenna and Cable Factor to the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF

where

FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 20.2 dBμV is obtained. The Antenna and Cable Factor of 12.8 is added, giving a field strength of 33 dBμV/m. The 33 dBμV/m value was mathematically converted to its corresponding level in μV/m.

FS = 20.2 + 12.8 = 33 dBμV/m

Level in μV/m = Common Antilogarithm [(33 dBμV/m)/20]= 44.7 μV/m

8 PHOTOS OF TESTED EUT

See attached files: internal_photos and external_photos

User Manual

See attached file : user_manual