

MEASUREMENT/TECHNICAL REPORT

FCC Part 15 Section 15-209

Honeywell

FCC ID: HS9-RTU-L19

September, 13th, 2005

This report concerns (check one): Original grant ☒ 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 ☒

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.

Report prepared by: Giuseppe MECCHIA



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1 GENERAL INFORMATION

1.1 Product Description

The RTU-L19 is a mono antenna proximity reader for access control and time & attendance applications.

The module is based on a 10MHz FT3120E4S40 Neuron Chip + FTX1 transformer & one MD-15W Ademco 125kHz reader Module (firmware version 8); the module also provides:

- 2 balanced input lines
- 1 Relay out 5A 42V for electro lock
- 1 Relay out 1A 42V for lamp
- 1 buzzer
- 1 led Tricolor (green / red / yellow)
- 1 reed contact (service LED)
- 1 anti-removal & anti-opening contact

- Working temperature: -20 to +60 °C

- IP = 55

- HID Card distance reading: 4,0cm

- The MD-15W module can read the following HID cards (FSK modulation) :

- HID Standard 26 Bit Format H10301
- HID Standard 37 Bit Format H10302
- HID 37 Bit Clock and Data Format H10320 without parity check
- HID 37 Bit Clock and Data Format H10320 for with parity check
- HID 40 Bit
- HID Corporate 1000 (example of 35 bits card)
- HID 35 bit Bank of China

- The MD-15W module can read the Unique cards (ASK modulation) with the following restriction:

32 bit that includes the partitioning of the bit.

EM4002 compatibility cards 40 bit: the reader implements the least 32 bits, add the parity and ignore the rest of data (MSB out first)

The MD15W OEM proxy reader is provided with internal antenna.

The RTU-L19 terminal has a couple of multi-color LED and a buzzer to signal messages to the user.

The RTU-L19 terminal communicates with the controller (CTU-A04) via an Echelon LonWorks™ network at a speed of 78 Kbps. The RTU-L19 terminal is powered by a DC 12V (+/-2V) power supply (provided by RTU-Q01).

Note1: LonWorks™ is a registered trademark of Echelon™ Corporation

Note2: A specific sales name is assigned to RTUL19: TKL019

From an FCC point of view the EUT in an intentional radiator (125kHz tranceiver) mounted inside a class B verified equipment. According to customer request this approval will cover the complete unit and therefore the FCC ID code will be place directly on case of the terminal.

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-L19 (1) s/n EMC-2005-298	HS9-RTU-L19	Access control Terminal	Unshielded power cord Unshielded signal cables
RTU-Q01 S/n EMC-2001-286	Verified	Power supply	Unshielded power cord Unshielded signal cables
CTU-A04 S/n 1520096CA	Verified	Controller	Unshielded power cord Unshielded signal cables

(1) EUT submitted for grant.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the ANSI C63.4-2003 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 14, 2003 submitted to your office, and accepted in a letter dated May 16, 2003 (registration Number: 90860)

By a decision of the Joint Committee of the EU-US Mutual Recognition Agreement, TÜV ITALIA has been listed under the Sectoral Annex on Electromagnetic Compatibility as Conformity Assessment Body (CAB)

This decision is effective from 20 September 2002.

1.6 Test equipment list:

Description	Model	serial No.	Cal due date
Test receiver	Rohde & Sch. ESH3	s/n 881364/012	03/06
Spectrum Analyzer	HP 8568B	s/n 2601A02134	04/06
Preamplifier	Agilent 8447D	s/n 2944A10219	03/06
LISN	Schwarzb.NNLK 8121	s/n 8121-219	03/06
Loop antenna	Rohde & Schwarz HFH2-Z2	s/n 881058/6	09/06
Biconical Antenna	Tensor 4104	s/n 2222	06/06
Log-Periodic Antenna	Electro Metrix LPA-25	s/n 1117	06/06

2 PRODUCT LABELING

Figure 2.1 FCC ID Label

See attached file: Label.pdf

FCC-ID = HS9-RTU-L19

Dimension 29 x 4,9 mm

Material: 3M Adhesive white Polyester with black indelible ink



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 power supply, and a controller and operated according to normal use. (see Figure 3.1).

The EUT has been tested in both vertical and horizontal position simulating real operating placement:

- vertical on walls and doors and
- horizontal on turnstiles and pedestal surfaces.

Worst case for transmitter emissions has been determined to be the vertical position.

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

3.2 EUT Exercise Software

The MD15W proxy reader continuously sends bursts at 125kHz to the antenna and acquires back (from the same antenna coil) any modulation on the transmitted carrier. If a card with a RF-TAG is placed near the RTU-L19 antenna, the 125kHz wave on the coil energises the TAG. The TAG then modulate the 125kHz with an encoded frame that include the identification code. That frame is then decoded by the MD15W reader module that sends the information via a weigand 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-L19 in order to switch on the relay that opens the door. Meanwhile, a specific message is sent to the RTU-L19 in order to provide a specific message (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.

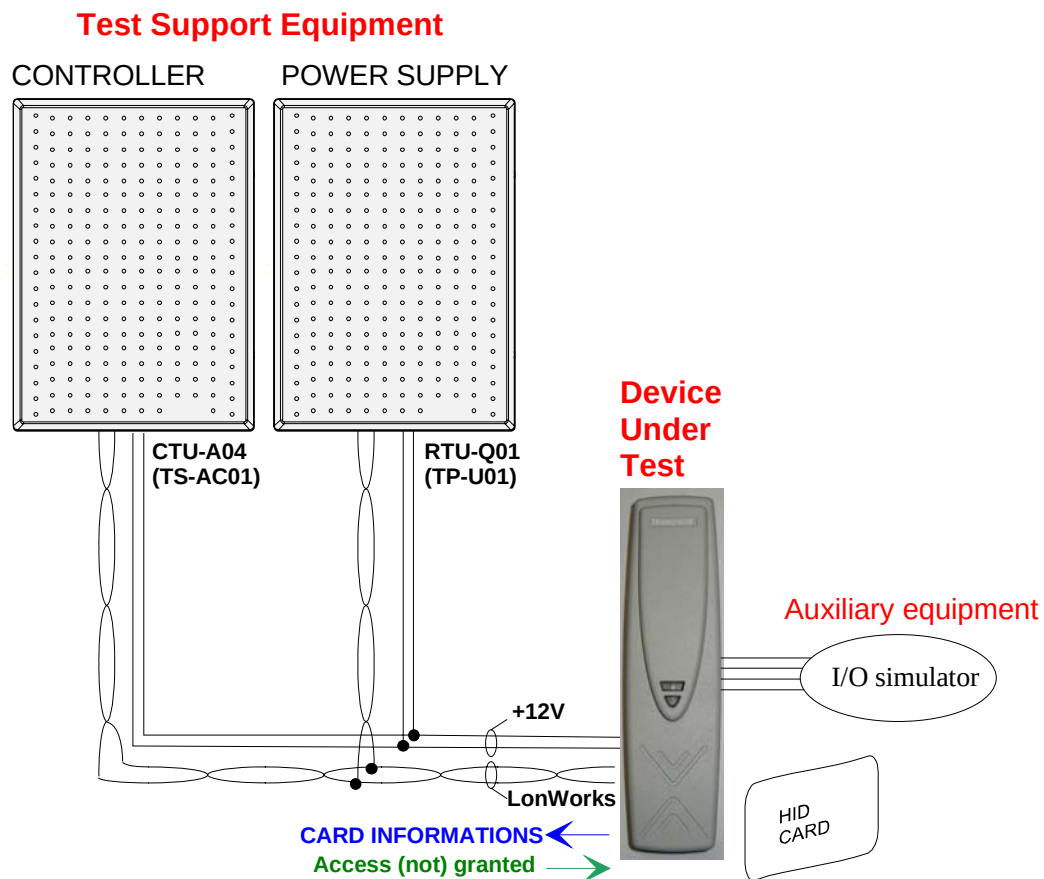
As shown in Figure 3.1 all interface cables used for compliance testing are unshielded as readily available on the market.

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



Note:

Both the power supply, the I/O and the LonWorks™ cables are not shielded. The LonWorks™ cable is a twisted pair. LonWorks™ is a registered trademark of Echelon™ Corporation

4 BLOCK DIAGRAM(S) OF THE EUT

4.1 Block Diagram Description

The **Main Board (RTU-Prox HID)** of EUT is provided with:

Crystals and oscillators:

10 MHz CPU

RF suppression devices:

VDC EMI Filters:

FL3: Wurth WE-SL2 744221

Signal EMI Filter

FL1: Wurth WE-SL2 744221

FL2: Wurth WE-SL2 744221

EMI Shield:

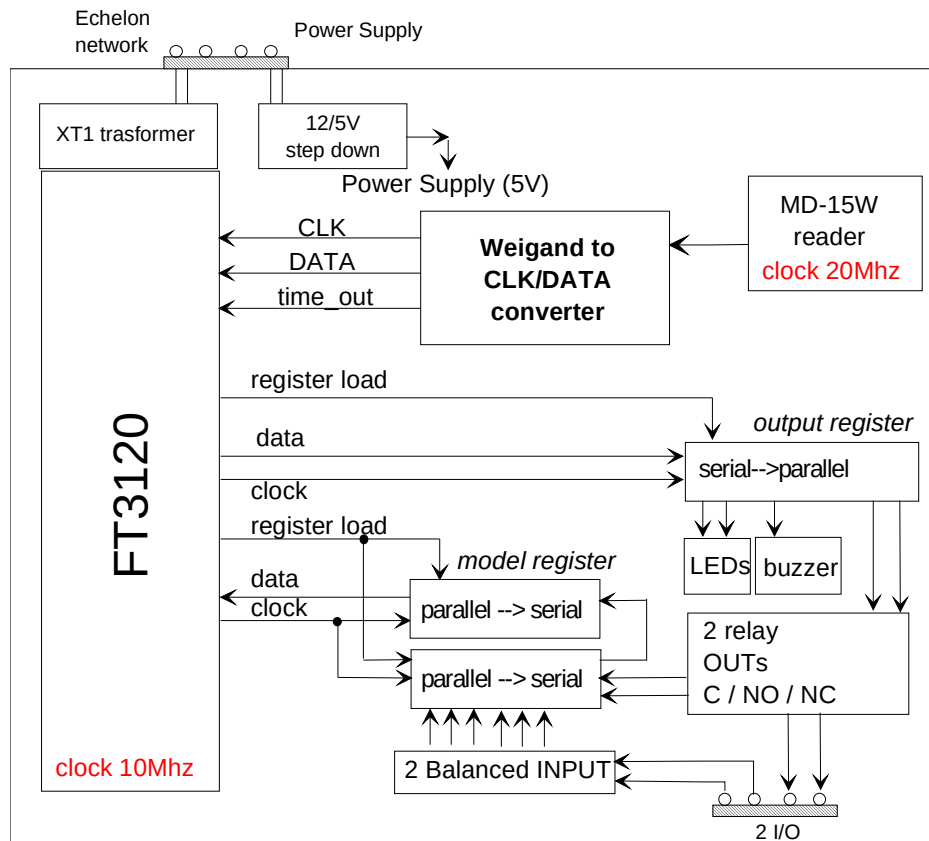
None

The **MD15W component** is provided with:

Crystals and oscillators:

20 MHz

Fig. 4.1 - Block Diagram of the EUT



5 CONDUCTED AND RADIATED MEASUREMENT PHOTOS

See attached files : TestSetup_photos



6 CONDUCTED EMISSION DATA

6.1 Tests of the worst case configuration.

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

	Frequency (MHz)	Measured* (dB μ V)	QP limit (dB μ V)	AV Limit (dB μ V)
Neutral	0.155	41	65.6	55.6
	5.91	26	60	50
	10	36	60	50
	12.7	29	60	50
	17.4	27	60	50
	20	37	60	50
Line	0.155	42	65.6	55.6
	5.91	25	60	50
	10	37	60	50
	12.7	28	60	50
	17.4	28	60	50
	20	37	60	50

* All readings are quasi-peak

Test Personnel:

Tester Signature  Date September 09, 2005

Typed/Printed Name Giuseppe MECCHIA



7 RADIATED EMISSION DATA

- frequency range 125 kHz – 1 GHz
- (from the lowest frequency generated 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 strength calculation is given in paragraph 7.2.

Judgement: Passed by 69.8 dB

Fundamental and harmonics (limits according to section 15.209).

Frequency (kHz)	Receiver* Corrected Reading (dB μ V/m)	3 Meter Limit (dB μ V/m)
125.9	73.8	143.6
251.8	32.8	137.5
377.7	38.7	134.1
503.6	28.6	92.6

Frequency (kHz)	Receiver* Corrected Reading (dB μ V/m)	10 Meter Limit (dB μ V/m)
125.9	44.3	114.1

* 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 of 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 rotated 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 and 300 meters. The limit was then calculated using approximately a 60dB/decade falloff rate (exactly 29.5dB from 3 to 10 meters) to show the correct limit at a distance of 30 meters. These 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 4.1 dB

Frequency (MHz)	Polarity (V/H)	Receiver* Reading (dB μ V)	Correction Factor (dB/m)	Corrected Reading (dB μ V/m)	3 Meter Limit (dB μ V/m)
31.7	V	14	13	27	40
49.3	V	19.7	11.3	31	40
128.4	V	10	14	24	40
150	V	18.3	15.5	33.8	43.5
195	H	17.7	19.7	37.4	43.5
243.2	V	21.9	15.7	37.6	46
640	V	16.4	25.5	41.9	46

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

Test Personnel:

Tester Signature



Date September 07, 2005

Typed/Printed Name Giuseppe MECCHIA



Italia

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 14 dB μ V is obtained. The Antenna and Cable Factor of 13 is added, giving a field strength of 27 dB μ V/m. The 27 dB μ V/m value was mathematically converted to its corresponding level in μ V/m.

$$FS = 14 + 13 = 27 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V/m})/20] = 22.4 \mu\text{V/m}$$

8 PHOTOS OF TESTED EUT

Fig. 8.1 Front view

Fig. 8.2 Rear view

Fig. 8.3 Unit partially disassembled

Fig. 8.4 RTU-Prox HID board - side 1

Fig. 8.5 RTU-Prox HID board - side 2

Fig. 8.6 FTT10 support board – side 1

Fig. 8.7 FTT10 support board – side 2

See attached files: internal_photos and external_photos



User Manual

See attached file : user_manual