MEASUREMENT/TECHNICAL REPORT

FCC Part 15 Sections 15-207 and 15-209

Honeywell

FCC ID: HS9-CTU-K05

October 07th, 2002

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.

Report prepared by: Giuseppe MECCHIA

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1 GENERAL INFORMATION

1.1 Product Description

The CTU-K05 Prox Reader Module, with the CTUK05 controller, composes a terminal, designed for access control and time & attendance applications, that reads HID proximity cards.
The module is based on OEM ASP Motorola reader module directly controls 125/625kHz antenna coil. The module includes 2 green LED, RED LED and a buzzer. The module is interfaced to the controller via reprogrammable sync&data and/or Wiegand lines.

From an FCC point of view the EUT CTU-K05 is an intentional radiator (tranceiver TX=125kHz, RX=625kHz).

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
CTU-K05 Prox Reader Module (1) s/n EMC-02189	**HS9-CTU-K05**	**Prox Reader Module**	**Unshielded power and signal cable**
CTU-K05 Controller S/n EMC-2001-294	Verified	Controller	Unshielded power cord Unshielded signal cables
AL20F S/n none	None	Toroidal transformer	Unshielded power cords
I/O simulator S/n none	None	Input/Output simulator	Unshielded signal cables
Connected through 10BaseT LAN to a remote:			
Dell PPX Latitude C family S/n 99080	D.o.C.	Personal Computer	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 C63.4-1992 test procedures . Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

TÜV ITALIA test site No. 2 – Open field

The open field 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
Test receiver	Rohde & Sch.ESVP	s/n 892372/023	04/03
LISN	Schwarzb.NNLA 8120	s/n 8120471A	02/03
Loop antenna	Rohde & Sch.HFH2-Z2	s/n 881058/6	09/03
Biconical antenna	EMCO 3110	s/n 1735	03/03
Log-periodic antenna	EMCO 3146	s/n 3678	03/03

2 PRODUCT LABELING

Figure 2.1 FCC ID Label

See attached file: Label.doc

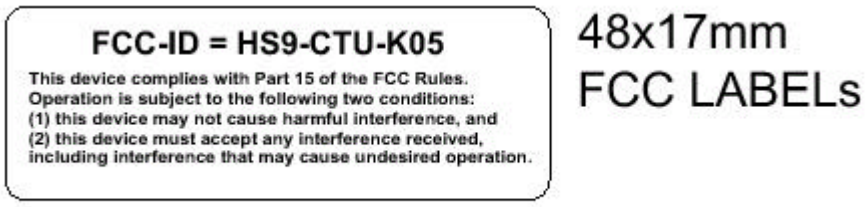


Figure 2.2 Location of the Label on EUT

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 mounted and connected to a RTU-K05 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 toroidal transformer.

3.2 EUT Exercise Software

The complete terminal CTUK05 is normally in an idle condition, waiting for a card. When the cardholder places the Motorola ASP card in front of the antenna reader, the card-ID is read by CTUK05 Module and the card code is sent to the CTUK05 controller for the manage.

3.3 Special Accessories

None.

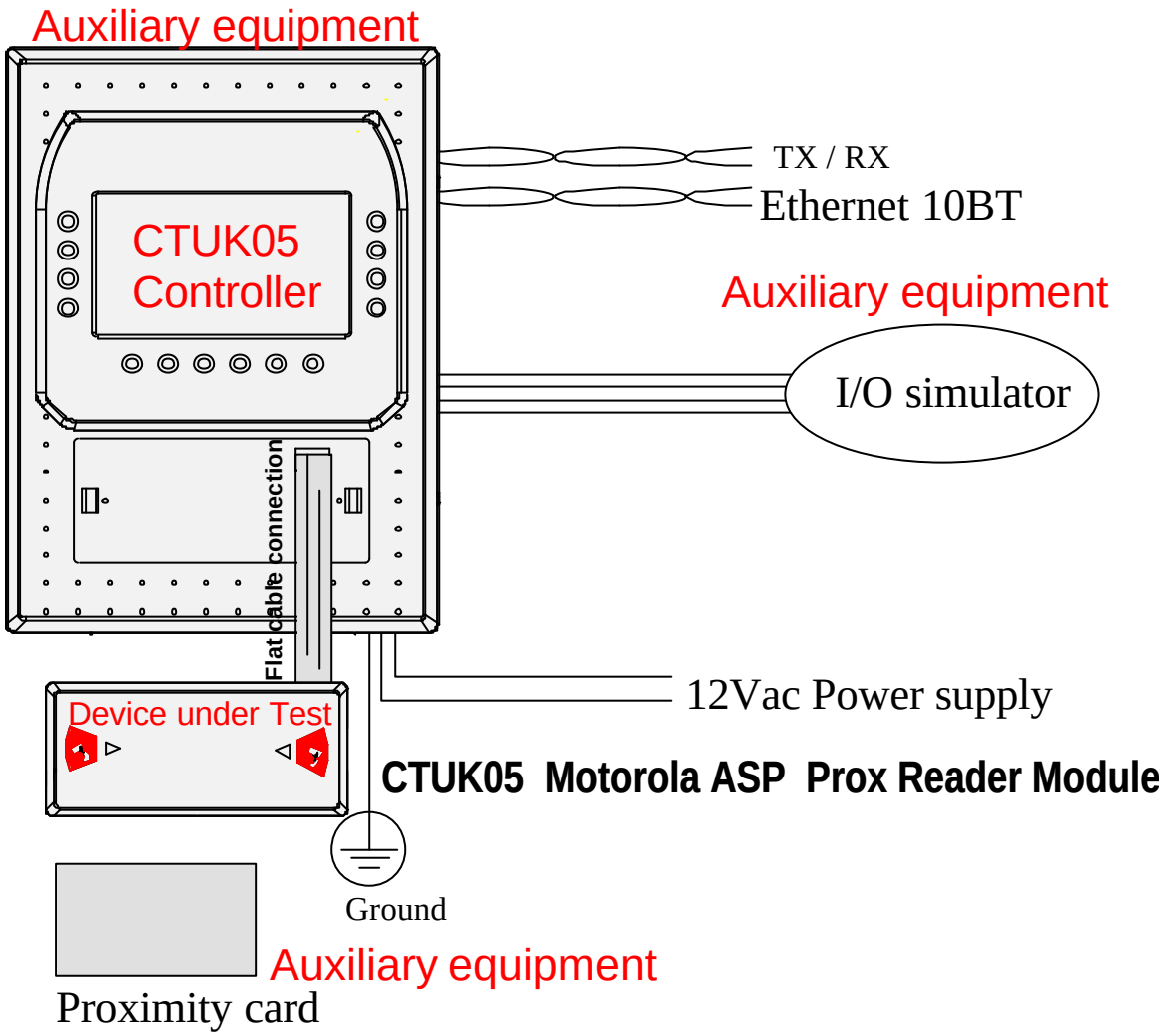
As shown in Figure 3.1 all interface cables used for compliance testing are unshielded as readily available on the market.

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 **Board 52275AB** of the EUT is provided with:

Crystals and oscillators (CPU clock):

none

RF suppression devices:

VDC EMI Filters:

C2 22uF 16V
FL1 DS310-55 Y5S 223S MURATA

Input/Output signals EMI Filters:
none

Shield:
None

Fig. 4.1 - Block Diagram of the EUT

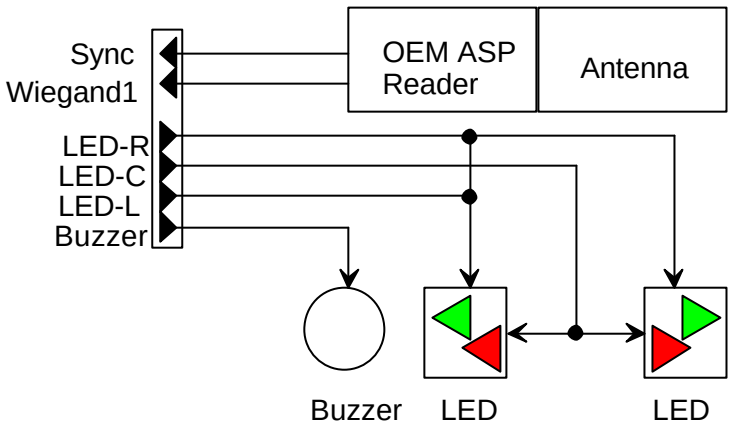


Fig. 4.2 - Block Diagram of Transceiver

Provided by Indala

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	47	66	56
	0.21	36	63.4	53.4
	0.31	22	60	50
	4.75	24	56	46
	5.2	22	60	50
	24.9	21	60	50
line	0.15	47	66	56
	0.21	36	63.4	53.4
	0.31	22	60	50
	4.75	24	56	46
	5.2	22	60	50
	24.9	21	60	50

* All readings are quasi-peak

Test Personnel:

Tester Signature  Date September 03, 2002

Typed/Printed Name Giuseppe MECCHIA .

6 RADIATED EMISSION DATA

(According to section 15.209 of the FCC rules)

- **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 strenght calculation is given in paragraph 7.2.

Judgement: Passed by 46.6 dB

Fundamental and harmonics (limits according to section 15.209).

Frequency (kHz)	Receiver* Corrected Reading (dBµV/m)	3 Meter Limit (dBµV/m)
125	80.8	136.7
250	49	95.6
375	38	92.1
625	34	87.7

Frequency (kHz)	Receiver* Corrected Reading (dBµV/m)	10 Meter Limit (dBµV/m)
125	51.8	107.7

* 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 and 300 meters. The limit was then calculated using approximately a 60dB/decade falloff rate (exactly 29dB from 3 to 10 meters) to show the correct limit at a distance of 30 meters. 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 7 dB

Frequency (MHz)	Polarity (V/H)	Receiver* Reading (dBμV)	Correction Factor (dB/m)	Corrected Reading (dBμV/m)	3 Meter Limit (dBμV/m)
52.7	V	19.7	10.3	30	40
80	V	20.7	10.3	31	40
200	V	16.4	17.6	34	43.5
440	H	16.5	20.5	37	46
500	H	12.3	22.7	35	46
600	H	14.8	24.2	39	46

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

Test Personnel:

Tester Signature - Date September 09, 2002

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 19.7 dBμV is obtained. The Antenna and Cable Factor of 10.3 is added, giving a field strength of 30 dBμV/m. The 30 dBμV/m value was mathematically converted to its corresponding level in μV/m.

FS = 19.7 + 10.3 = 30 dBμV/m

Level in μV/m = Common Antilogarithm [(30 dBμV/m)/20]= 31.6 μV/m

8 PHOTOS OF TESTED EUT

Fig. 8.1 EUT mounted on CTU K05 controller
Fig. 8.2 Details of connection of EUT to CTU K05 controller
Fig. 8.3 Upper view
Fig. 8.4 Lower view
Fig. 8.5 Unit partially disassembled
Fig. 8.6 52275AB CPU board - side 1
Fig. 8.7 52275AB CPU board - side 2
Fig. 8.8 OEM ASP Motorola reader module – side 1 (provided by Indala)
Fig. 8.9 OEM ASP Motorola reader module – side 2 (provided by Indala)

See attached files: internal_photos and external_photos

User Manual

See attached file : user_manual