



# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

Test report file number : E014R-002

Applicant : KTEC CO., LTD.

Address : 186-3, Wonjong-Dong, Ojung-Gu, Buchon-Si, Kyunggi-Do, 421-200, Korea

Manufacturer : KTEC CO., LTD.

Address : 186-3, Wonjong-Dong, Ojung-Gu, Buchon-Si, Kyunggi-Do, 421-200, Korea

Type of Equipment : Digital Cordless Wheel Mouse

FCC ID : PKVKT-2001T

Model / Type No. : KTM-2001T

Serial number : N/A

Total page of Report : 9 pages (including this page)

Date of Incoming : March 15, 2001

Date of issuing : March 04, 2001

## SUMMARY

The equipment complies with the regulation; FCC PART 15 SUBPART C §15.209.

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by:

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**1. VERIFICATION OF COMPLIANCE**

APPLICANT : KTEC CO., LTD.  
ADDRESS : 186-3, Wonjong-Dong, Ojung-Gu, Buchon-Si, Kyunggi-Do, 421-200, Korea  
CONTACT PERSON : Mr. Yong-Seb, Lim / Engineer  
TELEPHONE NO : +82-32-675-0861  
FCC ID : PKVKT-2001T  
MODEL NO/NAME : KTM-2001T  
SERIAL NUMBER : N/A  
DATE : March 04, 2001

DEVICE TYPE	Digital Cordless Wheel Mouse - INTENTIONAL RADIATOR
E.U.T. DESCRIPTION	Digital Cordless Wheel Mouse - TRANSMITTER
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C 15.209
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



## 2. GENERAL INFORMATION

### 2.1 Product Description

The KTEC CO., LTD., Model KTM-2001T (referred to as the EUT in this report) is a RF Cordless Wheel Mouse for a personal computer that transmits the signal to the receiver, M/N: KTM-2001R, FCC ID; PKVKTM-2001R which was connected to the mouse port of a personal computer. The product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
TX FREQUENCY	315.00 MHz
MODULATION	FSK
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	9.8438MHz
TRANSMISSION DISTANCE	APPROX 1M
RESOLUTION	400 DPI
ANTENNA TYPE	Built-in on the PCB in the EUT
OUTPUT POWER	Below 200uV/m at 3M
RATED SUPPLY VOLTAGE	DC 3V (AAA size Alkaline Batteries X 2)
NUMBER OF LAYERS	2 LAYERS

#### Model Differences:

- No other model differences have been mentioned

### 2.2 Related Submittal(s) / Grant(s)

- None



## 2.3 Test System Details

The EUT was tested with the following all equipment used in the tested systems are: None

## 2.4 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4/1992. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

## 2.5 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on January 12, 1999. (Registration Number: 92819)

# 3. SYSTEM TEST CONFIGURATION

## 3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
MAIN BOARD	KTEC CO., LTD.	KTM-2001T	N/A

## 3.2 EUT exercise Software

To get a maximum radiated emission and activate continuous transmission from the EUT, the software was changes as follows.

The EUT transmits signal after sensing ‘ON’ signal on one of 3 Encoder X, Y or Z. So the manufacturer changed the software in order to detect “ON” signal on one of 3 Encoder X, Y or Z continuously.

## 3.3 Equipment Modifications

To achieve compliance to limit levels, the following change(s) was made by ONETECH Corp during compliance testing:

1.Changed a resistance from 2.2 kohms to 13 kohms at R11 of the main board.



### 3.4 Configuration of Test System

**Line Conducted Test:** It needs not to test this requirement, because the EUT supplies from a DC battery.

**Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4/1992 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3meter open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

### 3.5 Antenna Requirement

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

#### **Antenna Construction:**

The transmitter antenna of the EUT is built-in on the PCB in the EUT, no consideration of replacement by the user.

## 4. PRELIMINARY TEST

### 4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
N/A	N/A

It is not need to test this requirement, because the power of the EUT is supplied from a DC battery.

### 4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
TX mode	X



## 5. FINAL RESULT OF MEASURMENT

### 5.1 Radiated Emissions Tests

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 38 % Temperature : 19 •  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209(a)  
 Type of Test : Intentional Radiator  
 Result : PASSED BY -5.20 dB

EUT	: Digital Cordless Wheel Mouse	Date: March 31, 2001
Operating Condition	: TX mode	
Distance	: 3 Meter	

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Carrier Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
56.25	9.56	Peak	V	10.51	0.98	21.05	40.00	-18.95
145.25	9.25	Peak	V	13.05	1.33	23.63	43.50	-19.87
195.26	6.45	Peak	V	16.52	1.54	24.51	43.50	-18.99
286.45	11.45	Peak	V	14.63	1.94	28.02	46.00	-17.98
315.00	23.50	Peak	H	15.21	2.09	40.80	46.00	-5.20
456.23	8.25	Peak	H	17.10	2.56	27.91	46.00	-18.09
630.00	9.80	Peak	V	19.62	3.02	32.44	46.00	-13.56
Other harmonic frequencies were not found up to 3000 MHz.								

\*Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Tested by: Seung-Hyun, Nam / Test Engineer



## 6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

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= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)



## 7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUe CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	SEP/00	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APRIL/00	12MONTH	
3.	Spectrum analyzer	HP	8568B	3026A0226	SEP/00	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	SEP/00	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	SEP/00	12MONTH	■
6.	Dipole Antenna	EMCO	3121C	9107-745	JUN/00	12MONTH	
7.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	MAR/01	12MONTH	■
8.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	MAR/01	12MONTH	■
10.	Horn Antenna	EMCO	3115	9509-4563	MAR/01	12MONTH	
11.	LISN	EMCO	3825/2	9109-1867 9109-1869	JUN/00	12MONTH	
12.	RF Amplifier	HP	8447F	3113A04554	JUN/00	N/A	
13.	Spectrum Analyzer	HP	8561E	3350A00546	SEP/00	12MONTH	■
14.	Spectrum Analyzer	HP	8591A	3131A02312	APR/00	12MONTH	
15.	Computer System Hard disk drive	HP	98581C 9153C	98543A CMC762Z9153	N/A N/A	N/A N/A	■ ■
16.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
17.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
18.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
19.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■