Report No.	C3115620
Specifications Test Method	FCC Part 15, Class B ANSI C63.4 1992
Applicant address	16F, No. 150, Chen I Road, 235 Chung Ho City, Taipei Hsien, Taiwan, R.O.C.
Applicant	Chic Technology Corp.
Items tested Model No.	Wireless Keyboard (Sample # C31620, Tx) CKM-30440 CKM-30210 Softway Highscreen Typhoon 40183 Typhoon 40180 Qware 12732~36 12738~42 ABI 70123
Results	**Compliance** (As detailed within this report)
Date	09/05/2001 (month / day / year) (Sample received) 10/26/2001 (month / day / year) (Test)
Prepared by	Project Engineer
Authorized by	General Manager (Frank Tsai)
Issue date	*November 20, 2001* (month / day / year)
Modifications	**None**
Tested by	Training Research Co., Ltd.
Office at	2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan
Chamber at	2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan

Conditions of issue :

(1) ***This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.***

(2) ***This report must not be used by the client to claim product endorsement by NVLAP or any agency of U.S. Government.***

★ ***FCC ID: IOWCKM30XX***

Contents

Chapter 1 Introduction

Description of EUT

EUT	**:**	Wireless Keyboard		
Model No.		CKM-30440	CKM-30210	Softway
		Qware	Highscreen	Typhoon 40183
		Typhoon 40180	12732~36	12738~42
		ABI 70123		
FCC ID	**:**	IOWCKM30XX		
Frequency Range	**:**	26.96 – 27.28 MHz		
Operating Frequency	**:**	27.145 – 27.195 MHz		
		27.145 MHz (channel 1) / 27.195 MHz (channel 2)		
Power Type	**:**	Powered by three AA size batteries		

Test method

All measurements contained in this report were performed according to the techniques described in Measurement procedure ANSI C63.4 – 1992.

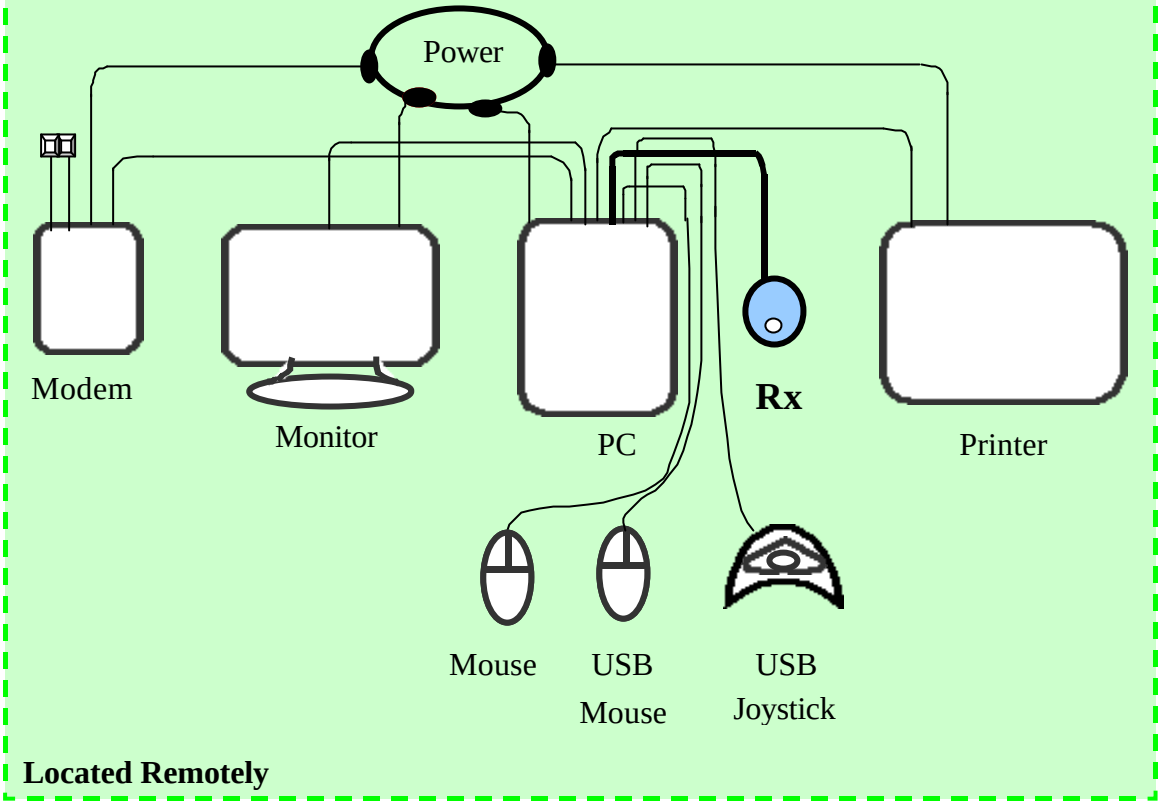
Pretest was found that the emission of operating mode is worse than standby mode. So, The final test is made at the operating mode.

While testing, the EUT set in Ch1 (27.145MHz) and continuously transmitting mode, which transmitted the maximum emission.

The test placement as the photographs showed is the worst case emission placed. (If the emission is close to the ambient, the resolution BW and view resolution will be reduced and the data will be recorded by detection of maximum hold peak mode.)

The testing configuration of test setup is showing in the next page.

Configuration of test setup



EUT (Tx)

Connections of Support Equipment

PC:

*Serial port --- an external modem
*Printer port --- a printer
*Monitor port --- a monitor
*Keyboard port --- **Receiver**
*Mouse port --- a mouse
*USB A port --- a USB mouse
*USB B port --- a USB joystick
(Each port on PC is connected with suitable device)

Receiver:

PS/2 (keyboard) connector:
--- via a 150cm long, shielded, no ferrite bead, data cable to the PS/2 (keyboard) port of personal computer
PS/2 (mouse) connector:
--- the mouse connector of receiver is disablement

Connections of EUT

Transmitter:

Put three AA size, 1.5V batteries into the battery cell of EUT, powers the subject device. The EUT does not be connected with any product.

List of Support Equipment

Conducted (Radiated) test:

PC	**:**	**HP Brio 85xx 6/350**
Model No.	:	D6928A
Serial No.	:	SG91801432
FCC ID	:	N/A (Doc Approved)
檢磁	:	3872H013
Power type	:	100 ~ 230VAC / 50 ~ 60Hz, 5A, Switching
Power cord	:	Non-shielded, 2.33m long, Plastic, No ferrite core
Monitor	**:**	**HP 15’ Color Monitor**
Model No.	:	D2827A
Serial No.	:	KR91161719
FCC ID	:	C5F7NFCMC1518X
檢磁	:	3872B039
Power type	:	110 ~ 240 VAC / 50 ~ 60 Hz, Switching
Power cord	:	Shielded, 1.83m long, No ferrite core
Data cable	:	Shielded, 1.46m long, with two ferrite cores
Mouse	**:**	**HP**
Model No.	:	M-S34
Serial No.	:	LZB90714122
FCC ID	:	DZL211029
檢磁	:	4862A011
Power type	:	By PC
Power cord	:	Non-shielded, 1.88m long, No ferrite core

Modem	**:**	**ACEEX**
Model No.	:	XDM41414
Serial No.	:	964111217
FCC ID	:	IFAXDM1414
Power type	:	Linear
Power cord	:	Non-shielded, 1.9m long, No ferrite cord
Data cable	:	RS232, Shielded, 1.2m long, No ferrite core
		RJ11C x 2, 7’ long non-shielded, No ferrite core

Printer	**:**	**HP**
Model No.	:	C2184A
Serial No.	:	SG55T1P1KY
FCC ID	:	N/A, Doc Approved
Power type	:	Linear
Power cord	:	Non-shielded, 1.90m long, No ferrite core
Data cable	:	Shielded, 1.8m long, No ferrite core

USB Mouse	**:**	**Logitech**
Model No.	:	M-BA47
Serial No.	:	LZE92250027
FCC ID	:	N/A, Doc Approved
檢磁	:	4872A220
Power type	:	Powered by PC
Power Cable	:	Shielded, 1.5m long, Plastic hoods, No ferrite bead

USB Joystick	**:**	**Padix**
Model No.	:	QF-305U
Serial No.	:	8100848
FCC ID	:	N/A, Doc Approval
Power type	:	Powered by PC
Power Cable	:	Shielded, 1.5m long, No ferrite bead data cable

Chapter 2 Conducted Emission Test

Test Condition and Setup

All the equipment is placed and setup according to the ANSI C63.4 – 1992.

The EUT is assembled on a wooden table, which is 80 cm high, is placed 40 cm from the back-wall, which is a vertical conducting plane. One LISN is for EUT, the other LISN is for support equipment. They are all placed on the conductive ground. The EUT's LISN connect a line switch box for selecting L1 or L2, then connect to a preamplifier and spectrum.

The spectrum scans from 450KHz to 30MHz. Conducted emission levels are detected at max. peak mode. But if the max. peak mode failed, it will be measured by CISPR's quasi-peak detection mode.

While testing, there is the worst-emission plot printed at peak detection mode, and there are more than 6 highest emissions relative to limit recorded. The plot is kept as the original data, not included in test report.

List of test Instrument

				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF Filter Section	85460A	H P	3448A00217	06/29/01	06/29/02
LISN (EUT)	LISN-01	TRC	9912-03,04	12/09/00	12/09/01
LISN (Support E.)	LISN-01	TRC	9912-05	01/04/01	01/04/02
Switch/Control Unit (< 30MHz)	3488A	HP	N/A	11/20/00	11/20/01
Auto Switch Box (< 30MHz)	ASB-01	TRC	9904-01	11/20/00	11/20/01

The level of confidence of 95%, the uncertainty of measurement of conducted emission is ± 2.4 dB.

Test Result: N/A (Not Applicable)

Chapter 3 Radiated Emission Test

Test Condition and Setup (Harmonic and Spurious Emission)

Pretest: Prior to the final test ,the EUT is placed in an anechoic chamber, and scan from 27MHz to 1GHz. The devices rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit. This is done to ensure the radiation exactly emits form the EUT.

Final test: Final radiation measurements is made on a **3 – meter** anechoic chamber.. The EUT's maximum emission of radiation is placed on a nonconductive table, which is 0.8m height, the top surface is 1.0 x 1.5 meter. All placement is according to ANSI C63.4 - 1992.

The spectrum is examined from 27MHz to 1000MHz measured by HP spectrum.

The whole range Antenna is used to measure frequency from 27 MHz to 1GHz. The final test is used the spectrum analyzer.

Measure more than six top marked frequencies generated form pretest by computer step by step at each frequency. The EUT is rotated 360 degrees, and antenna is raised and lowered from 1 to 4 meters to find the maximum emission levels. The antenna is used with both horizontal and vertical polarization.

Appropriated preamplifier, which is made by TRC is used for improving sensitivity and precautions is taken to avoid overloading. The spectrum analyzer's 6dB bandwidth is set to 120 kHz, and the EUT is measured at quasi-peak mode.

If the emission is close to the frequency band of ambient, the tester will recheck the data and the corrected data will be written in the test data sheet. If the emission is just within the ambient, the data from shield room will be taken as the final data.

List of test Instrument

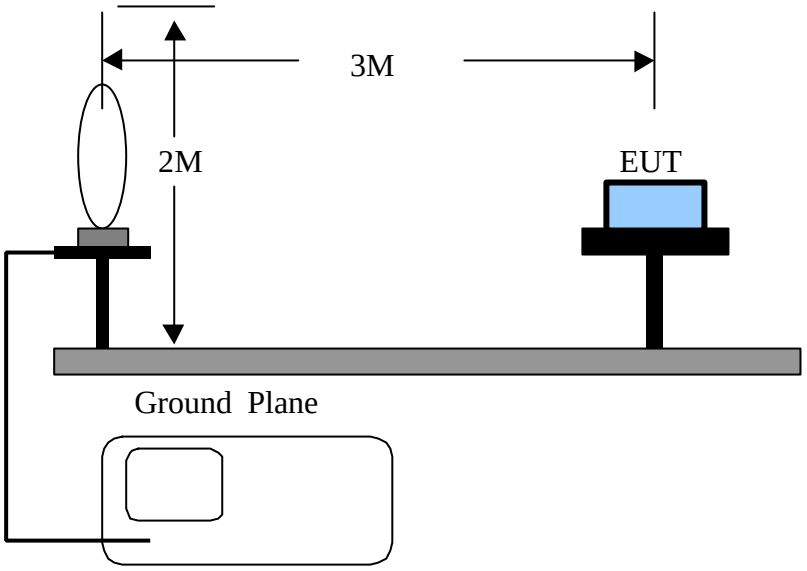
				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF Filter Section	85460A	H P	3448A00217	06/29/01	06/29/02
Bi-log Antenna	CBL6141A	Schaffner	4206	03/09/01	03/09/02
Switch/Control Unit (> 30MHz)	3488A	HP	N/A	11/20/00	11/20/01
Auto Switch Box (> 30MHz)	ASB-01	TRC	9904-01	11/20/00	11/20/01
Spectrum Analyzer	8564E	HP	US36433002	08/01/01	08/01/02
Microwave Preamplifier	83051A	HP	3232A00347	08/01/01	08/01/02
Horn Antenna	3115	EMCO	9704 – 5178	08/01/01	08/01/02
Anechoic Chamber (cable calibrated together)				05/20/01	05/20/02

The level of confidence of 95% , the uncertainty of measurement of radiated emission is ± 4.96 dB .

Radiated Test Placement: (Photographs)

Peak Power Measurement of Fundamental Frequency

Test Setup



HP 8546A Spectrum Analyzer

(Below 30MHz: RBW=10KHz & VBW=10KHz, Detector mode: Average.)

Test Procedure

a. Set the Loop ANT. height 1m. ,Vertical ,and rotate the ANT to find the azimuth of the highest emission and record the reading.

b. Keep the ANT. azimuth and turn the EUT 360 degree and record the highest emission.

c. Raise the ANT to 2 meters and repeat set a and b.

d. Change the ANT Horizontal and repeat a to c.

e. Record the most highest reading in test report.

List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF Filter Section	85460A	H P	3448A00217	06/29/01	06/29/02
Active Loop Antenna	6502	EMCO	2777	07/20/01	07/20/02

Test Result : Pass (Appendix A)

Appendix A

Harmonic and Spurious Emission Test Result: (Horizontal)

Test Conditions:

Testing room : Temperature : 26 ° C Humidity : 71 % RH

Testing site : Temperature : 30 ° C Humidity : 73 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
190.360	19.80	1.00	34	-12.76	32.56	43.50	-10.94
217.597	24.42	1.00	3	-14.98	39.40	46.00	-6.60
244.799	24.59	1.00	51	-15.33	39.92	46.00	-6.08
271.950	23.09	1.00	27	-15.53	38.62	46.00	-7.38
299.141	20.57	1.00	60	-16.47	37.04	46.00	-8.96
352.930	8.70	1.00	16	-18.25	26.95	46.00	-19.05

Note:

1.Margin = Amplitude – limit, *if margin is minus means under limit.*

2.Corrected Amplitude = Reading Amplitude – Correction Factors

3.Correction factor = Antenna factor + (Cable Loss – Amplitude gain)

(For example : 30MHz correction factor = 15.5 + (–15.26) = 0.24 dB/m)

Harmonic and Spurious Emission Test Result: (Vertical)

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
54.400	8.79	1.00	122	-13.21	22.00	40.00	-18.00
86.205	1.57	1.00	55	-10.26	11.83	40.00	-28.17
217.599	14.03	2.43	149	-14.92	28.95	46.00	-17.05
244.798	12.78	1.00	79	-15.31	28.09	46.00	-17.91
272.001	9.44	1.00	150	-15.96	25.40	46.00	-20.60
299.140	8.21	1.00	107	-17.42	25.63	46.00	-20.37

Fundamental Emission Test Result: (CH 1)

Frequency: 27.145 MHz					
Antenna Polarity	**Reading Amplitude**	**Correction Factors**	**Corrected Amplitude**	**Limit**	**Margin**
	dBμV	dB/m	dBμV/m	dBμV/m	dB
Vertical	23.03	-13.00	36.03	80	-43.97

Note:

1. **Horizontal < Vertical**
2. Correction Factors = Antenna factors + Cable loss - Amplifier
3. Corrected Amplitude = Reading Amplitude - Correction Factors
4. Margin = Corrected Amplitude - Limited

Fundamental Emission Test Result: (CH 2)

Frequency: 27.195 MHz					
Antenna Polarity	**Reading Amplitude**	**Correction Factors**	**Corrected Amplitude**	**Limit**	**Margin**
	dBμV	dB/m	dBμV/m	dBμV/m	dB
Horizontal	21.48	-13.00	34.48	80	-45.52

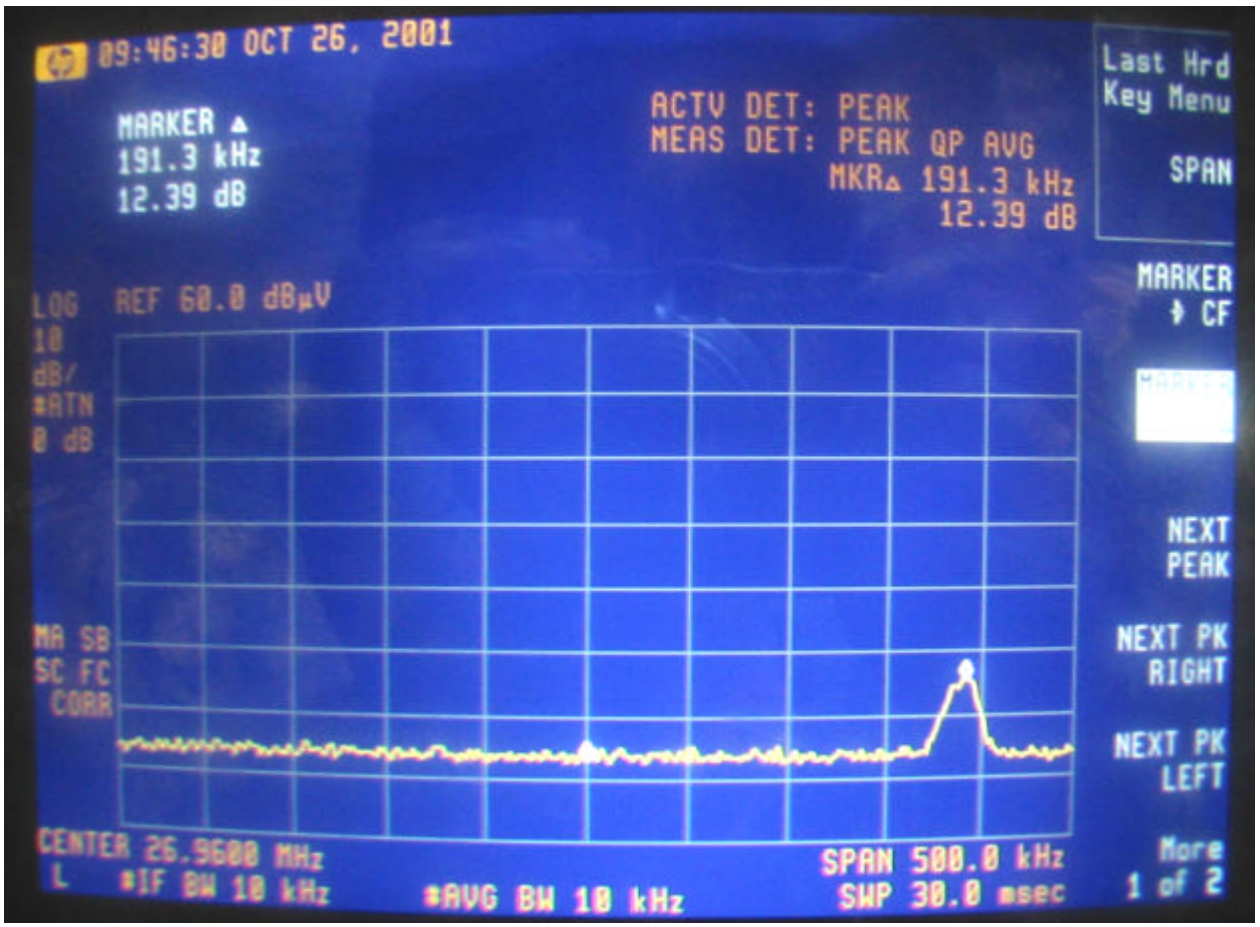
Note:

1. **Horizontal > Vertical**
2. Correction Factors = Antenna factors + Cable loss - Amplifier
3. Corrected Amplitude = Reading Amplitude - Correction Factors
4. Margin = Corrected Amplitude - Limited

Appendix B

Band Edge of Measurement: (Frequency Band: 26.96 ~ 27.28)

Channel 1 (27.145MHz)



Channel 2 (27.195MHz)