# KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

HEAD OFFICE 6-8-7, NISHITENMA KITA-KU, OSAKA, 530-0047 JAPAN



Corporate Juridical Person

# TEST REPORT

## Report No.A-024-03-A

Date: 14 July 2003

IKOMA TESTING LABORATORY

12128, TAKAYAMA-CHO

IKOMA-CITY, NARA, 630-0101 JAPAN

This test report is to certify that the tested device properly complies with the requirements of:

FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators.

All the tests necessary to show compliance to the requirements were performed and these results met the specifications of requirement. The results of this report should not be construed to imply compliance of equipment other than that, which was tested. Unless the laboratory permission, this report should not be copied in part.

#### 1. Applicant

Company Name	:	Welcat Inc.
Mailing Address	:	IWATA Bldg. 1-17-12, Shin-Yokohama, Kouhoku-ku, Yokohama, Kanagawa-ken, 222-0033 Japan

## 2. Identification of Tested Device

Kind of Equipment Author	izat	ion : 🛛: DoC	: Certification	: V	erification
FCC ID	:	Not Applicable			
Device Name	:	Wireless Hand-held T	erminal		
Trade Name	:	_			
Model Number	:	CTR-800-11W			
Serial Number	:	17 🗌 : Prototyp	e 🛛 🛛 : Pre-produ	ction	: Production
Date of Manufacture	:	June 2003			

#### 3. Test Items and Procedure

□: AC Power Line Conducted Emission Measurement ⊠: Radiated Emission Measurement

Above all tests were performed under: ANSI C63.4 – 1992 ⊠: without deviation, □: with deviation (details are found inside of this report)

#### 4. Date of Test

Receipt of Test Sample	: 30 June 2003
Condition of Test Sample	: $\boxtimes$ : Damage is not found on the set.
	: Damage is found on the set. (Details are described in this report
Test Completed on	: 30 June 2003

Seiichi Izumi General Manager / Ikoma Testing Laboratory

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## 0. LABORATORY ACCREDITATION AND MEASUREMENT UNCERTAINTY

## 0.1. Laboratory Accreditation

KEC is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for the specific scope of accreditation under Lab Code: 200207-0.

When the test report concerns with the NVLAP accreditation test, the first page of the test report is signed by NVLAP Approved Signatory accompanied by the NVLAP logo.

The report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

## 0.2. Measurement Uncertainty

The result of a measurement is only an approximation or estimate of the value of a specific quantity. And thus the measurand is complete only when a statement of uncertainty is given. KEC quotes Measurement Uncertainty (U) of  $\pm 4.9$  dB for Radiated Emissions and of  $\pm 2.2$  dB for AC Power Line Conducted Emissions.

## 1. CERTIFICATION OF THE COMPLIANCE

## 1.1. Certification of the Compliance

This test report is to certify that the tested device properly complies with the requirements of FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators.

KEC evaluation criteria for compliance:
The Product complies, if
the measured results are below the specification limit by a margin more than or equal
1/2 U (2.5 dB) for Radiated Emissions and
U (2.2 dB) for AC Power Line Conducted Emissions.

## 2. GENERAL INFORMATION

## 2.1. Product Description

Model No. CTR-800-11W (referred as EUT in this report) is a Wireless Hand-held Terminal.

: DSSS
: 2412 – 2462 MHz
: 2412 – 2462 MHz
: Built in antenna (Gain 2.14 dBi (typ.)), Impedance 50Ω (Unballanced)

## (2) Used Oscillating Frequency

- $\boldsymbol{\cdot}$  SS Base band processor
- Micro computer clock
- Reel time clock

: 44.0 MHz : 11.0592 MHz : 32.768 kHz

(4) Rated Power Supply

: DC 3.7V, 500mA (with Li-ion battery) (Li-ion battery Model No. HBC-51, trade name Welcat.)

## 2.2. Description for Equipment Authorization

(1) Category	: 🗌 Class A 🖾 Class B
(2) Reference Rule and Specification	<ul> <li>FCC Rule Part 15</li> <li>☑ Section 15.107 (a), 15.109 (a) and (c)</li> <li>☑ Section 15.107 (b), 15.109 (b) and (c)</li> </ul>
(3) Type of device	<ul> <li>Personal Computer &amp; Peripherals</li> <li>Other Digital Device</li> </ul>
(4) Kind of Equipment Authorization	: $\square$ DoC $\square$ Certification $\square$ Verification
(5) Highest Frequency used in the Device	: 2412 - 2462 MHz (receiving frequency)
(6) Upper Frequency of Radiated Emissio	on Measurement Range : ☐ 1000 MHz ☐ 2000 MHz ☐ 5000 MHz ⊠ Tenth harmonics of the highest fundamental frequency

## 2.3. Test Facility

All tests described in this report were performed by:						
Name:	KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER (KEC) IKOMA TESTING LABORATORY					
	Open Area Test Site Anechoic Chamber Shielded Room	<ul> <li>No.1</li> <li>No.1</li> <li>No.1</li> </ul>	□ No.3 □ No.3 □ No.2	□ No.4 □ No.4 □ No.5		
Address:	12128, Takayama-cho Iko	oma-city, Na	ara, 630-010	01 Japan		
These test facilities have been filed with the FCC under the criteria of ANSI C63.4-1992. The KEC has been accredited by the NVLAP (Lab. Code: 200207-0) based on ISO/IEC17025. Also the laboratory has been authorized by TUV Product Service (GER) and TUV Rheinland (GER) based on their criteria for testing laboratory (ISO/IEC17025).						

## 3. TESTED SYSTEM

## 3.1. TEST MODE

The compliance tests were performed test mode.

Op-mode 1 : Receiving (Tx standby)

#### 3.2. Operation of EUT System

Receiving mode (Op-mode 1)

- 1. Turn on the EUT with key in "trigger key" (more than 5 times).
- 2. Displaying the menu and select "I:RF Technical Test".
- 3. Choice the test mode
  - a. Tx / Rx mode : Receiving mode b. Select frequency : ch.1 : 2412 MHz, ch.6 : 2437 MHz and ch.11 : 2462 MHz

Then, the EUT was set in the continuous receiving operation.

## [Note]

The test program is prepared by manufacture.

## 3.3. Characterization and condition of EUT System

 $\boxtimes$ : normal,  $\square$ : not normal (that is

)

## 4. RADIATED EMISSION MEASUREMENT

## 4.1. Test Procedure

(1)	Configure the EUT System in ac	cordance with ANSI C63.4-1992 section 8 and 13.				
	$\boxtimes$ : without deviation. $\square$ : with	deviation (details are found below)				
	See also the block diagram and t	he photographs of EUT System configuration in this report				
(2)	If the EUT system is connected	to a public power network, all power cords for the EUT				
(/	System are connected the recepta	acle on the turntable.				
(3)	Warm up the EUT System					
(4)	Activate the EUT System and run the prepared software for the test if necessary					
(5)	To find out the emissions of the	he FUT System preliminary radiated measurement are				
(0)	nerformed at a closer distance t	han that specified for final radiated measurement using				
	the spectrum analyzer (*1) and the	han that specified for final radiated measurement using				
	In the frequency above 1 GHz	it is performed using the spectrum analyzer (*2) and the				
	horn antenna	it is performed using the spectrum analyzer (2) and the				
(6)	To find out an EUT System c	ondition which produces the maximum emission the				
(0)	configuration of EUT System 1	the position of the cables and the operation mode are				
	changed under normal usage of t	he EUT				
(7)	The spectrums are scanned from	30 MHz to the upper frequency of measurement range.				
(•)	and collect the six highest emis	sions minimum on the spectrum analyzer relative to the				
	limits in the whole range.					
(8)	In final compliance test, the	six highest emissions minimum, recorded above, are				
(0)	measured at the specified dista	nce using the broad band antenna or the tuned dipole				
	antenna and the test receiver (*3)	).				
	In the frequency above 1 GHz, t	he measurements are performed by the horn antenna and				
	the test rece	eiver (*4).				
	$\boxtimes$ the spectrum	n analyzer (*5) with pre-amplifier.				
	[Note]					
(*1)	Spectrum Analyzer Set Up Cond	itions				
	Frequency range	: 30 - 1000 MHz				
	Resolution bandwidth	: 100 kHz				
	Detector function	: Peak mode				
(*2)	Spectrum Analyzer Set Up Cond	itions				
	Frequency range	: 1 GHz - Upper frequency of measurement range				
	Resolution bandwidth	: 1 MHz				
	Video bandwidth	: 1 MHz				
	Attenuator	: 10 dB				
	Detector function	: Peak mode				
(*3)	Test Receiver Set Up Conditions					
	Detector function	: Quasi-Peak or Peak				
	IF bandwidth	: 120 kHz				
(*4)	Test Receiver Set Up Conditions					
	Detector function	: Average				
	IF bandwidth	: 1 MHz				
(*5)	Spectrum Analyzer Set Up Cond	itions				
	Frequency range	: 1 GHz - Upper frequency of measurement range				
	Resolution bandwidth	: 1 MHz				
	Video bandwidth	: 1 MHz (peak detector), 10Hz (Average detector)				
	Attenuator	: 10 dB				

## 4.2. Test Results

30 - 1000 MHz   Measurement Distance ⊠: 3m   □: 1						m 🗌: 10m
Measured	Antenna	Meter I	Reading	<b>Maximum Field</b>	Limit	Margin for
Frequency	Factor	Horizontal	Vertical	Strength		Limit
		Polarization	Polarization			
$(\mathbf{MH}_{7})$	$(\mathbf{JD})$		$(\mathbf{d}\mathbf{D} \mathbf{V})$	$(d\mathbf{D} \cup \mathbf{V}/\mathbf{m})$	$(d\mathbf{D} \cdot \mathbf{V}/\mathbf{m})$	(dD)
(MINZ)	( aB/m )	( <b>a b</b> $\mu$ <b>v</b> )	( u d $\mu$ v )	(ubµv/m)	$(\mathbf{u}\mathbf{b}\boldsymbol{\mu}\mathbf{v}/\mathbf{m})$	(UD)
352.00	( <b>dB/m</b> ) 18.6	<b>( αΒ μ V )</b> 5.4	( <b>ив</b> µ <b>v</b> ) 1.0	<b>( αΒ μ v/m )</b> 24.0	<b>( uB μ v/m )</b> 46.0	22.0
352.00 381.54	( dB/m ) 18.6 19.1	( dB μ V ) 5.4 3.0	1.0 0.8	24.0 22.1	46.0 46.0	22.0 23.9

Above 1 GHz

Measurement Distance 🛛: 3m 🗌: 10m

Measured	Antenna	Meter Reading		Maximum	Limit	Margin
Frequency	Factor	Horizontal	Vertical	Field	(Average)	for
		Polarization	Polarization	Strength		Limits
[ MHz ]	[ dB/m ]	[dBuV]	[dBuV]	[dBuV/m]	[dBuV/m]	[ dB ]
[ Peak Detector	Measurement ]					
(Fundamental)	)					
2412.00	-10.1	<40.0	<40.0	<29.9	54.0	>24.1
2437.00	-10.1	<40.0	<40.0	<29.9	54.0	>24.1
2462.00	-10.1	<40.0	<40.0	<29.9	54.0	>24.1
( 2nd Harmonic	cs)					
4824.00	-2.2	50.0	54.5	52.3	54.0	1.7
4874.00	-2.2	50.8	54.6	52.4	54.0	1.6
4924.00	-2.2	50.2	54.5	52.3	54.0	1.7
( 3rd Harmonic	s )					
7236.00	-1.2	<43.0	<43.0	<41.8	54.0	>12.2
7311.00	-1.1	<43.0	<43.0	<41.9	54.0	>12.1
7386.00	-1.0	<43.0	<43.0	<42.0	54.0	>12.0
( 4th Harmonic	s )					
9648.00	2.5	46.8	47.4	49.9	54.0	4.1
9748.00	2.6	46.8	47.4	50.0	54.0	4.0
9848.00	2.7	48.7	47.6	51.4	54.0	2.6
( 5th Harmonic	s )					
12060.00	6.4	<42.0	<42.0	<48.4	54.0	>5.6
12185.00	6.6	<42.0	<42.0	<48.6	54.0	>5.4
12310.00	6.8	<42.0	<42.0	<48.8	54.0	>5.2
[ Average Dete	ctor Measureme	ent]				
(2nd Harmonic	s)					
4824.00	-2.2	47.4	52.5	50.3	54.0	3.7
4874.00	-2.2	48.3	53.4	51.2	54.0	2.8
4924.00	-2.2	48.0	53.1	50.9	54.0	3.1
(4th Harmonic	s )					
9648.00	2.5	40.1	41.5	44.0	54.0	10.0
9748.00	2.6	40.1	41.5	44.1	54.0	9.9
9848.00	2.7	40.2	41.8	44.5	54.0	9.5

<ul> <li>[Note]</li> <li>(1) Antenna Factor includes the cable loss.</li> <li>(2) *: Measured data with the tuned dipole antenna.</li> </ul>
[Calculation method] Maximum Field Strength (dBuV/m) = Meter Reading (at maximum level of Horizontal or Vertical) (dBuV) + Antenna Factor (dB/m)

[Environment] Temperature : 23°C

Humidity : 70%

[Tested Date / Tester] 30 June 2003

Signature

Ikuya Minematsu

## Test data in Graph (30 ~ 1000MHz)

## RADIATED EMISSION



## 4.3. Photographs of EUT System Configuration





- Continued -



Horizontal Placed

Equipment	Manufacturer	Model No.	Specifications	KEC Control No.	Test Item (*)	Last Cal.	Next Cal.
Test Receiver	Rohde & Schwarz	ESHS10	Frequency Range 9 kHz - 30 MHz	FS-83	N/A	2003/1	2004/1
		ESVS10	Frequency Range 20 MHz - 1 GHz	FS-66	2	2002/12	2003/12
Spectrum Analyzer	Anritsu	MS8608A	Frequency Range 9 kHz - 7.8 GHz	SA-46	2	2002/7	2003/7
	Agilent Technology	E4403B	Frequecy Range 9 kHz - 3 GHz	SA-48	N/A	2003/4	2004/4
Biconical Antenna	Schwarzbeck	BBA9106	Frequency Range 30 MHz - 300 MHz	AN-180	2	2003/2	2004/2
Log- Periodic Antenna	Schwarzbeck	UHALP9108A	Frequency Range 300 MHz - 1 GHz	AN-215	2	2003/2	2004/2
Tuned Dipole	Kyoritsu	KBA-511AS	Frequency Range 25 MHz - 500 MHz	AN-135	N/A	2003/2	2005/2
Antenna		KBA-611S	Frequency Range 500 MHz - 1 GHz	AN-137	N/A	2003/2	2005/2
Horn Antenna	Raven	91888-2	Frequecy Range 1 GHz - 2 GHz	AN-211	3	2001/8	2003/8
		91889-2	Frequecy Range 2 GHz – 5 GHz	AN-212	3	2001/8	2003/8
	Scientific Atlanta	12-3.9	Frequecy Range 3.95 GHz - 5.85GHz	AN-142	3	2002/8	2004/8
		12-5.8	Frequecy Range 5.85 GHz - 8.2GHz	AN-104	3	2002/8	2004/8
		12-8.2	Frequecy Range 8.2 GHz - 12.4GHz	AN-210	3	2002/8	2004/8
Pre- Amplifier	Hewlett Packard	8449B	Frequency Range 1 GHz - 26.5 GHz	AM-52	3	2003/2	2004/2
LISN for EUT	Kyoritsu	KNW-407	Frequency Range 150 kHz - 30 MHz	FL-107	N/A	2003/5	2004/5
LISN for Peripherals	Kyoritsu	KNW-242	Frequency Range 9 kHz - 30 MHz	FL-110	N/A	2003/5	2004/5

## 5. USED TEST EQUIPMENTS AND CALIBRATION STATUS

[Note] Test Item (\*):

Conducted Emission Measurement

Radiated Emission Measurement (30 MHz – 1 GHz)

3: Radiated Emission Measurement (1 GHz < )

N/A: Not Applicable

1:

2:

The overall program of calibration and verification of equipment is designed and operated so as to ensure that measurements made by KEC are traceable to national standards of measurement or equivalent abroad.