

IMMUNITY TEST REPORT

REPORT NO.: IM910410R01
MODEL NO.: WLL030M
WLL030
RECEIVED: April 10, 2002
TESTED: May 8, 2002 ~ May 9, 2002

APPLICANT: ASKEY COMPUTER CORP.
ADDRESS: 10F, NO. 119, CHIENKANG RD., CHUNG-HO,
TAIPEI, TAIWAN R.O.C.

ISSUED BY: Advance Data Technology Corporation
LAB LOCATION: No.47 14th Ling, Chia Pau Tsuen, Linkou
Hsiang, Taipei, Taiwan, R.O.C.

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1 CERTIFICATION

PRODUCT: Mini PCI Combo Card

MODEL NO: WLL030M, WLL030

BRAND NAME: Askey

APPLICANT: ASKEY COMPUTER CORP.

STANDARDS: EN 301 489-1 (07-2000), EN 301 489-17 (09-2000)

EN 61000-4-2:1995

EN 61000-4-3:1995

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility on May 8 ~ May 9, 2002. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's immunity characteristics under the conditions herein specified.

TESTED BY: Gary Chang, **DATE:** May 13, 2002
Gary Chang

CHECKED BY: Rennie Wang, **DATE:** MAY 13, 2002
Rennie Wang

APPROVED BY: Alan Lane, **DATE:** May 13, 2002
Dr. Alan Lane
Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

EMISSION			
Standard	Test Type	Result	Remarks
EN 55022:1998, Class B	Conducted Test	NA	NOT APPLICABLE
	Radiated Test	NA	NOT APPLICABLE
EN 61000-3-2:1995 +A1:1998+A2:1998, Class A	Harmonic current emissions	NA	NOT APPLICABLE
EN 61000-3-3:1995	Voltage fluctuations & flicker	NA	NOT APPLICABLE

IMMUNITY			
Standard	Test Type	Result	Remarks
EN 61000-4-2:1995	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion B
EN 61000-4-3:1996	Radiated, radio- frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-4:1995	Electrical fast transient / burst immunity test.	NA	NOT APPLICABLE
EN 61000-4-5:1995	Surge immunity test	NA	NOT APPLICABLE
EN 61000-4-6:1996	Immunity to conducted disturbances, induced by radio- frequency fields	NA	NOT APPLICABLE
EN 61000-4-11:1994	Voltage dips, short interruptions and voltage variations immunity tests	NA	NOT APPLICABLE

Note: Please refer to Item 3.3 for more detailed description.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Mini PCI Combo Card
MODEL NO.	WLL030M, WLL030
POWER SUPPLY	3.3VDC from host equipment
MODULATION TYPE	DSSS
TRANSFER RATE	1/2/5.5/11Mbps
OPERATING FREQUENCY	2.412GHz ~ 2.472GHz
NUMBER OF CHANNEL	13
CHANNEL SPACING	5 MHz
RATED RF OUTPUT POWER LEVEL	9.54dBm
ANTENNA TYPE	Inverted F Antenna
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. This product can be also programmed to operate in the frequency range allowed in France.
2. Model WLL030M and WLL030 are identical except for model number and the model WLL030 is designed without modem part.
3. This EUT was tested with the NB adapter which model number is SA80-3105, brand is ASTEC.
4. This EUT was tested with the Platform which model number is ACY25D01001, brand is COMPAL.
5. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF TEST MODE

The EUT was tested under following conditions:

CONDITION	CONFIGURATION	REMARKS
1	Transmission	
2	Standby	

3.3 GENERAL DESCRIPTION OF APPLIED STANDARD

The EUT is a kind of computer peripheral with wireless data transmission function. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

EN 301 489-1 (07-2000), EN 301 489-17 (09-2000)

EN 61000-4-2:1995

EN 61000-4-3:1995

Standards EN55022, EN61000-3-2, EN61000-3-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-11 are not applicable in this case due to the EUT uses DC power from PC.

All tests have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNIT

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PRINTER	HP	C2145A	SG5N1601K	B94C2145X
2	MODEM	GVC	F-1114V/R6	853E100	DK4F1114VR6
3	Access Point	SMC	SMC2655W	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
2	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.

NOTE: All power cords of the above support units are non shielded (1.8m).

4 IMMUNITY TEST

4.1 GENERAL DESCRIPTION

Product Standard	EN 301 489-1 (07-2000), EN 301 489-17 (09-2000)	
Basic Standard, Specification, and Performance Criterion required	EN 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A

4.2 GENERAL PERFORMANCE CRITERIA DESCRIPTION

The Requirement of Performance Criteria		
1	Performance criteria for continuous phenomena applied to transmitters (CT)	Criterion A of the applicable class shall apply
2	Performance criteria for transient phenomena applied to transmitters (TT)	Criterion B of the applicable class shall apply
3	Performance criteria for continuous phenomena applied to receivers (CR)	Criterion A of the applicable class shall apply
4	Performance criteria for transient phenomena applied to receivers (TR)	Criterion B of the applicable class shall apply

The phenomena allowed during and after test in each criterion are clearly stated in the following table

Performance criteria		
Criteria	During test	After test
A	Shall operate as intended. May show degradation of performance (see note1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 2). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 1). No unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2).

NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

4.3 EUT OPERATING CONDITION

1. Connected the EUT to a computer system placed on a testing table.
2. The computer system ran a test program to enable all functions of EUT.
3. Prepared the same setup as step1 and placed it outside of testing area to act as communication partner for EUT.
4. Sent data to EUT by command "PING" from the communication partner.

Note: For standby mode test, connected a coupling antenna to a spectrum analyzer and placed the antenna near the EUT to monitor any unintentional response occurring from the EUT during the test.

4.4 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

4.4.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge - 8 kV (Direct) Contact Discharge – 4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Minimum 20 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

4.4.2 TEST INSTRUMENT

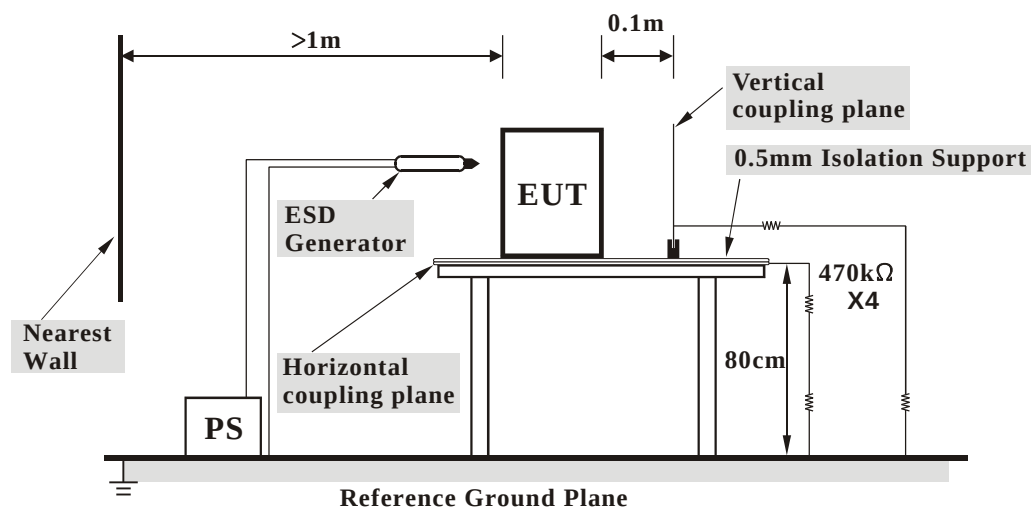
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
KeyTek, ESD Simulator	MZ-15/EC	9902287	Feb. 26, 2003

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST PROCEDURE

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- g. At least ten single discharges (in the most sensitive polarity) were applied to the **Horizontal Coupling Plane** at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP**.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **Vertical Coupling Plane** in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

4.4.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **Ground Reference Plane**. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **Horizontal Coupling Plane** (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of EN 61000-4-2:1995, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

4.4.5 TEST RESULT

EUT	Mini PCI Combo Card	MODEL NO.	WLL030M
MODE	Transmission	INPUT POWER (SYSTEM)	230Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	25 deg.C, 60 % RH 1005 hPa	TESTED BY: Gary Chang	

TEST RESULTS OF DIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2, 4, 8	+/-	1	NA	NOTE 1	A
2, 4	+/-	2, 3	NOTE 2	NA	B

Description of test point:

1. Junction of Case 2. Screws 3. All I/O port

TEST RESULTS OF INDIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	1 ~ 4	NOTE 1	NOTE 1	A

Description of test point:

1. Front side 2. Rear side 3. Right side 4. Left side

NOTE :

- There was no change compared with initial operation during and after the test.
No unintentional response was found during the test.
- The function stopped during the test, but self recoverable after the test.

EUT	Mini PCI Combo Card	MODEL NO.	WLL030M
MODE	Standby	INPUT POWER (SYSTEM)	230Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	25 deg.C, 60 % RH 1005 hPa	TESTED BY: Gary Chang	

TEST RESULTS OF DIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2, 4, 8	+/-	1	NA	NOTE 1	A
2, 4	+/-	2, 3	NOTE 2	NA	B

Description of test point:

1. Junction of Case 2. Screws 3. All I/O port

TEST RESULTS OF INDIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	1 ~ 4	NOTE 1	NOTE 1	A

Description of test point:

1. Front side 2. Rear side 3. Right side 4. Left side

NOTE :

- There was no change compared with initial operation during and after the test.
No unintentional response was found during the test.
- The function stopped during the test, but self recoverable after the test.

4.5 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS)

4.5.1 TEST SPECIFICATION

Basic Standard: EN 61000-4-3

Frequency Range: 80 MHz - 1000 MHz

Field Strength: 3 V/m

Modulation: 1kHz Sine Wave, 80%, AM Modulation

Frequency Step: 1 % of momentary frequency

Polarity of Antenna: Horizontal and Vertical

Test Distance: 3 m

Antenna Height: 1.5m

Dwell Time: at least 3 seconds

4.5.2 TEST INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Signal Generator	SMY01	840490/009	Aug. 03, 2002
KALMUS Power Amplifier	LA1000V	091995-1	NA
KALMUS Power Amplifier	757LC	091995-2	NA
HOLADAY Field Probe	HI-4422	89915	Aug. 13, 2002
EMCO BiconiLog Antenna	3141	1001	NA
COMTEST Compact Full Anechoic Chamber (7x3x3 m)	CFAC	ADT-S01	Aug. 17, 2002

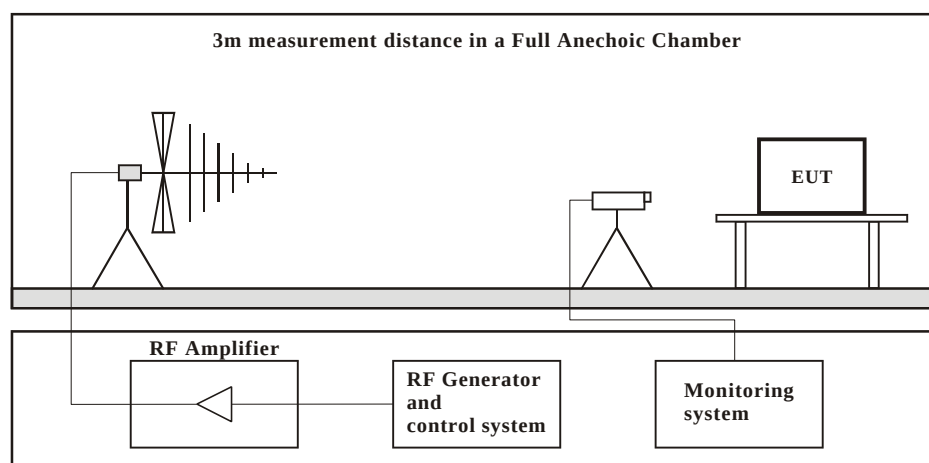
NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 TEST PROCEDURE

The test procedure was in accordance with EN 61000-4-3

- The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sinewave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of momentary frequency.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The field strength level was 3V/m.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.5.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of EN 61000-4-3:1996 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

4.5.5 TEST RESULT

EUT	Mini PCI Combo Card	MODEL NO.	WLL030M
MODE	Transmission	INPUT POWER (SYSTEM)	230Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	27 deg.C, 60 % RH 1005 hPa	TESTED BY: Gary Chang	

Frequency (MHz)	Result	Polarity	Azimuth	Field Strength (V/m)	Observation	Performance Criterion
80 -1000	PASS	V&H	0	3	NOTE	A
80 -1000	PASS	V&H	90	3		
80 -1000	PASS	V&H	180	3		
80 -1000	PASS	V&H	270	3		

NOTE: There was no change compared with the initial operation during and after the test. No unintentional response was found during the test.

EUT	Mini PCI Combo Card	MODEL NO.	WLL030M
MODE	Standby	INPUT POWER (SYSTEM)	230Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	27 deg.C, 60 % RH 1005 hPa	TESTED BY: Gary Chang	

Frequency (MHz)	Result	Polarity	Azimuth	Field Strength (V/m)	Observation	Performance Criterion
80 -1000	PASS	V&H	0	3	NOTE	A
80 -1000	PASS	V&H	90	3		
80 -1000	PASS	V&H	180	3		
80 -1000	PASS	V&H	270	3		

NOTE: There was no change compared with the initial operation during the test. No unintentional response was found during the test.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

ESD TEST



RS TEST



6 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP, UL
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
Canada	INDUSTRY CANADA
R.O.C.	CNLA, BSMI, DGT

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
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The address and road map of all our labs can be found in our web site also.