

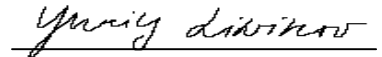
EMC TEST REPORT

COMPANY: ID America/Ban-Koe Companies

PRODUCT: TBC-120, Barcode Reader

REPORT No: J20019875.011

APPROVED BY: Yuriy Litvinov



TEST ENGINEER: Uri Spector



DATE: July 14, 2000

TOTAL PAGES: 14



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1.0 JOB DESCRIPTION

Equipment: TBC-120 Barcode Reader; consisted of the Reader and the Communication Cradle

Equipment Serial No: Reader-00026982
Communication Cradle-00057571

Voltage/Phase: 9 VDC via power adapter by Axiome type: FW6199

Customer: Ms. Brenda O'Connell
ID America/Ban-Koe Companies
9100 35W South
Bloomington, MN 55423

Test Standard: **CFR 47:1999**, §15.107 and §15.109 Class A

Date Sample Submitted: July 14, 2000

Test Work Started: July 14, 2000

Test Work Completed: July 14, 2000

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2.0 TEST SUMMARY

Referring to the performance criteria and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards.

TEST STANDARD	TEST	COMMENTS
Subpart B – 15.107	Conducted Emissions	Pass
Subpart B – 15.109	Radiated Emissions	Pass

Where comments other than “pass” are entered in the “comments” column, further details may be found in the TEST RESULTS section.

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2.1 Limits for Conducted and Radiated Disturbances for FCC parts 15.107 and 15.109

FREQUENCY OF EMISSION MHz	CLASS A (dB μ V)	CLASS B (dB μ V)
0.45 to 1.705	60	48
1.705 to 30	70	48

NOTE: The lower limit applies at the band edges.

FREQUENCY OF EMISSION MHz	CLASS A at 10 m (dB μ V/m)	CLASS B at 3 m (dB μ V/m)
30 to 88	39	40
88 to 216	44	44
216-960	46	46
Above 960	50	54

NOTE: In the emission tables above, the tighter limit applies at the band edges.

2.2 Emissions Test Results (see Appendix I)

No modifications were installed on the unit during the emissions testing.

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3.0 TEST EQUIPMENT

Receivers/Spectrum Analyzers

DESCRIPTION	SERIAL NO.	LAST CAL DATE	CAL DUE	TICK IF USED
HP85462A Receiver RF Section	3325A00106	05/00	05/01	X
HP85460A RF Filter Section	3330A00109	05/00	05/01	X
HP85462A Receiver RF Section	3549A00306	11/99	11/00	
HP85460A RF Filter Section	3448A00276	11/99	11/00	

Antennas

DESCRIPTION	SERIAL NO.	LAST CAL DATE	CAL DUE	TICK IF USED
Schaffner-Chase Bicono-Log Antenna	2468	09/99	09/00	
Schaffner-Chase Bicono-Log Antenna	2630	03/00	03/01	X
CDI Biconical Antenna B100	616	04/00	04/01	
CDI Biconical Antenna B200	614	04/00	04/01	
CDI Biconical Antenna B300	615	04/00	04/01	
CDI Biconical Antenna B100	632	04/00	04/01	
CDI Biconical Antenna B200	623	04/00	04/01	
CDI Biconical Antenna B300	607	04/00	04/01	
EMCO Horn Antenna 3115	9507-4513	09/99	09/00	

Artificial Mains Networks/Absorbing Clamps

DESCRIPTION	SERIAL NO.	LAST CAL DATE	CAL DUE	TICK IF USED
CDI LISN-2	316	11/99	11/00	X
Farnell 1EXLSN930A	136	03/00	03/01	



4.0 TEST CONFIGURATION (see Appendix II)

4.1 Support Equipment/Services

N/A

4.2 Sample Set-Up

EUT was powered via AC adapter 120 VAC, 60 Hz by Axiome type: FW6199, and was set up as a tabletop unit. During emissions testing the Barcode Reader was attached to the Communication Cradle. Also, RS 232 Communication cable was connected to the Communication Cradle.

Cables

RS 232 communication cable, shielded, 1.5 meters long, DB9 connector

4.3 Mode of Operation

Continuous “STANDBY” mode. This setup and mode of operation was found to be the worst case mode to produce the maximum radiated emissions.



5.0 TEST PROCEDURES

5.1 Emissions Testing

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. For each scan, the procedure for maximizing emissions in Appendices D and E were followed.

The test facility is a specially designed and constructed building measuring 30 meters by 50 meters. Two test sites are used (Distances: 3 meters, 10 meters, 30 meters) for CISPR testing.

All test sites include a metal ground plane constructed of 22-gauge sheet metal. Each site contains a 2.5 meter diameter turntable for floor standing equipment, and a wooden table measuring 1.5 x 1.5 x 0.8 meters for table top equipment to facilitate testing, also it has heat and air conditioning systems to control environmental test conditions.

Measurements from 30 MHz to 1000 MHz are taken with biconical and log-periodic antennas. A horn antenna is used above 1000 MHz. The mast to support the antennas is capable of a 1 to 4 meter height range, which meets CISPR requirements. The antenna mast is non-conductive and remotely controllable.

Since radiated emissions, and to a lesser extent, conducted emissions, are a function of cable placement, the cable placement is varied to encompass all configurations that an end user would encounter to determine the configuration resulting in maximum emissions. At least one cable for each I/O port type is attached to the EUT. If peripherals or modules are available, at least one of each available type is installed and noted in the report. Generally, only one of each type is used unless good engineering judgment dictates that the use of more will affect emission levels. Excess cable lengths are arranged into a 30 x 40-cm bundle. Cables requiring non-standard lead dress are recorded in the report.

For conducted emissions testing, the equipment is moved to an insulating platform over the ground plane, and the EUT is powered from a LISN. Both sides of the AC line are measured and the results are compared to the applicable limits. Measurements are taken using CISPR quasi-peak and average detectors when the peak readings approach or exceed the average limit. Only quasi-peak readings are taken when the EUT's emissions meet the average limit as measured with the quasi-peak detector.

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APPENDIX I

EMISSIONS TEST DATA

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Radiated Emissions

Company:

Model:

Test Engineer:

Standard:

Test Site:

Note:

Date: 7/14/00

ID America/Ban-Koe Companies

Manufactured by Axiome Alpha SA, Switzerland

TBC-120 Barcode Reader

Norman Shpilsher

FCC Part 15, Class A

3 m Anechoic Chamber

The EUT was tested in standby mode and was attached to the communication cradle.

Table # 1

Antenna			Direction (degrees)	Frequency MHz	QP at 3m dB μ V	Limit dB μ V/m	Margin dB	Comments
Polarity	Hts(m)	Factor(dB/m)						
H	2.8	19.9	119	31.94	26.1	49	-22.9	
H	3.3	11.6	102	47.03	21.0	49	-28.0	
V	1.2	7.9	119	72.26	21.4	49	-27.6	
V	1.3	8.2	359	74.74	28.0	49	-21.0	
V	1.0	11.1	0	93.85	22.4	54	-31.6	
V	2.8	13.1	337	110.53	30.1	54	-23.9	
H	2.9	13.9	289	120.35	40.7	54	-13.3	
H	2.2	13.6	287	132.64	33.4	54	-20.6	
H	2.2	13.5	286	135.10	37.4	54	-16.6	
H	1.1	11.8	58	203.92	26.7	54	-27.3	
H	1.4	12.4	53	213.70	30.9	54	-23.1	
H	1.0	14.3	64	243.17	31.4	56	-24.6	
H	1.0	16.2	323	311.96	27.7	56	-28.3	
V	1.4	18.6	359	400.90	29.3	56	-26.7	
V	1.4	24.2	359	816.14	24.9	56	-31.1	

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Conducted Emissions **Date:** 7/14/00

Company: ID America/Ban-Koe Companies
Manufactured by Axiome Alpha SA, Switzerland

Model: TBC-120 Barcode Reader

Test Engineer: Uri Spector

Standard: FCC Part 15, Subpart B, 15.107, Class A

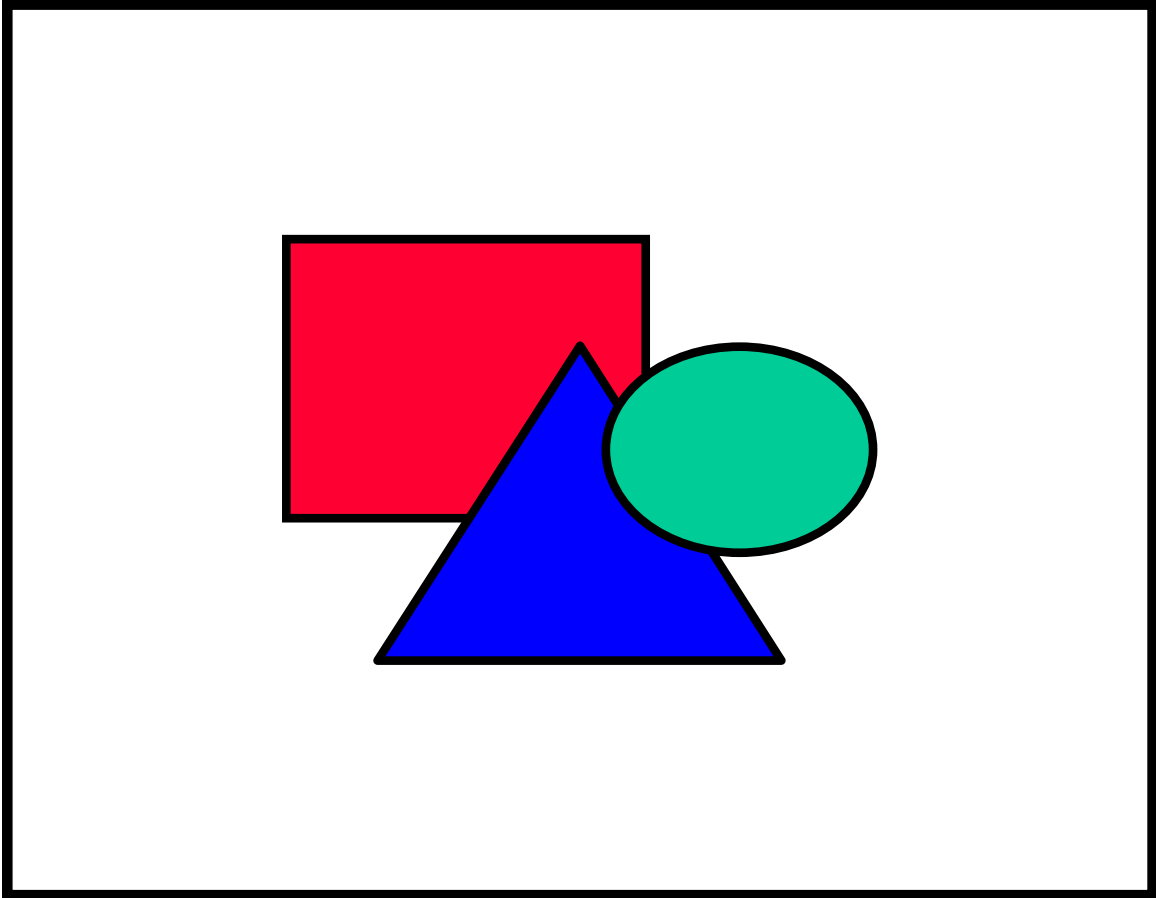
Note: The table shows the worst case radiated emissions
All measurements were taken using a CISPR Quasi-peak detector

Table # 2

Frequency	Line 1	Line 2	Class A QP Limits	Margin
MHz	dB _μ V	dB _μ V	dB _μ V	dB
0.450	10.0	9.2	60.0	-50.0
0.780	9.5	9.9	60.0	-50.1
0.870	9.5	10.2	60.0	-49.8
0.920	9.8	9.7	60.0	-50.2
1.030	6.9	7.2	60.0	-52.8
3.670	5.6	6.3	70.0	-63.7
6.960	8.2	8.9	70.0	-61.1
22.000	10.8	11.2	70.0	-58.8
26.950	11.4	11.8	70.0	-58.2
30.000	14.7	15.0	70.0	-55.0

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Graph #1

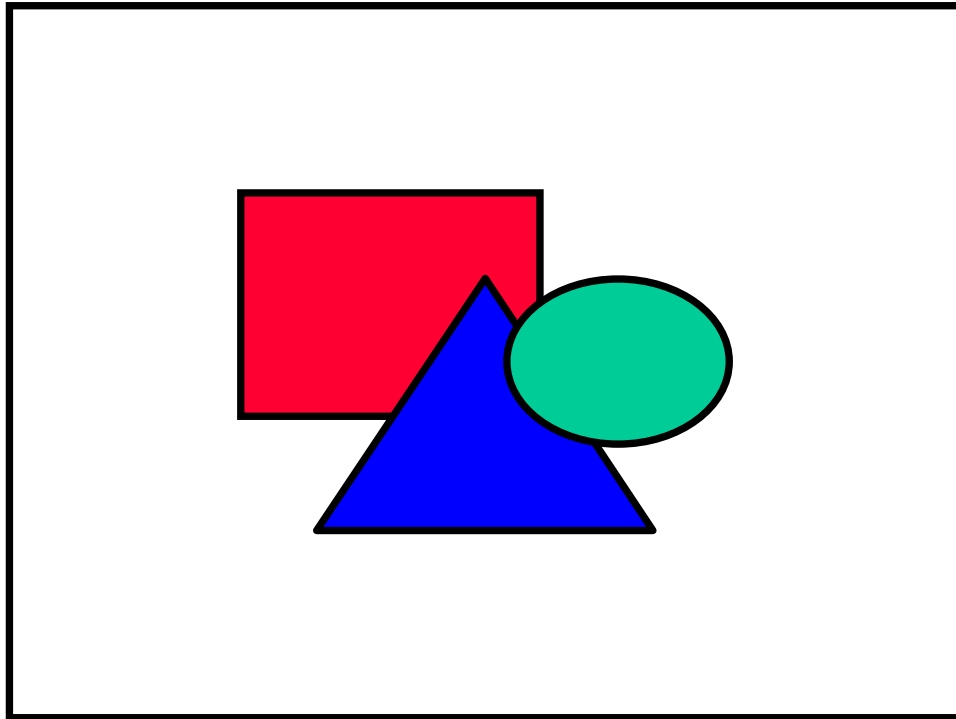


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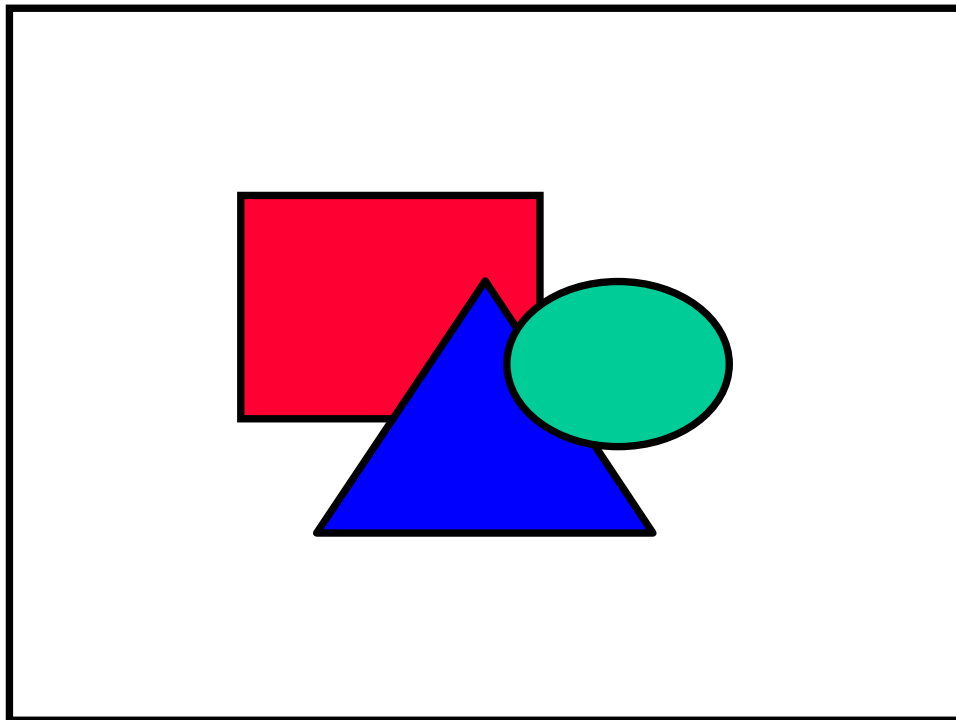
APPENDIX II

CONFIGURATION PHOTOGRAPHS

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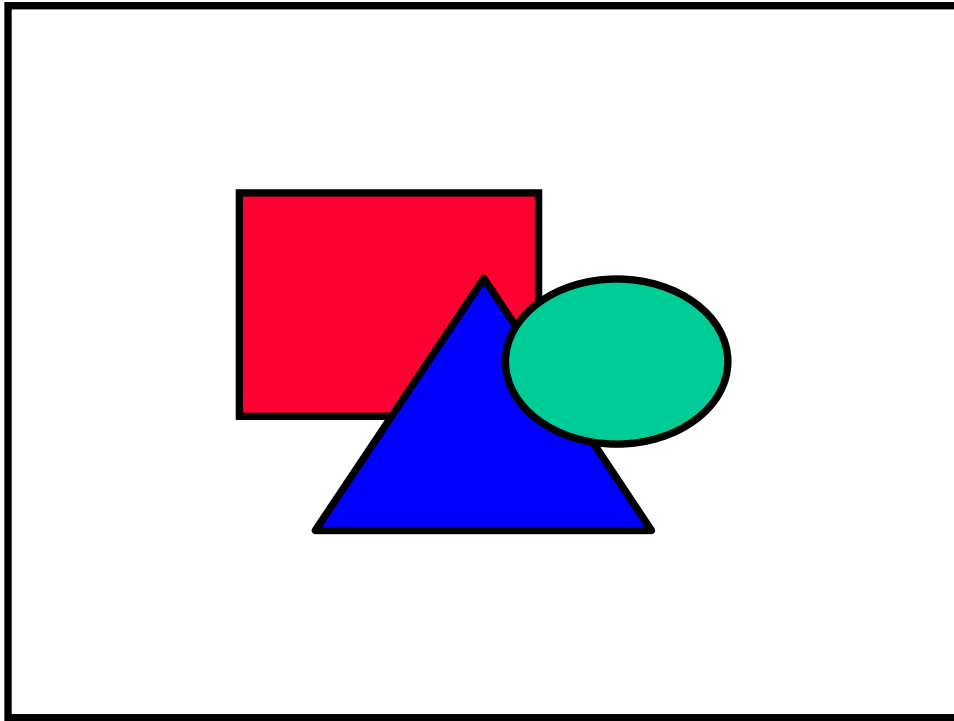


Radiated Emissions Test Configuration

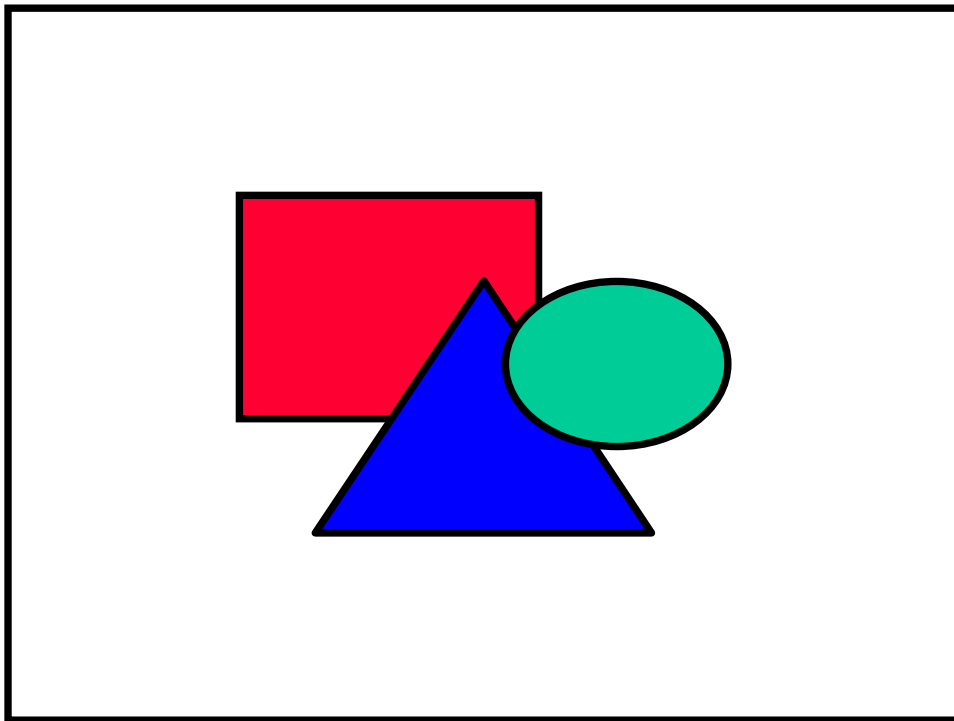


Radiated Emissions Test Configuration

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Conducted Emissions Test Configuration



Conducted Emissions Test Configuration

B

7435 4th Street North, Oakdale, MN 55128

EMC VERIFICATION No. 19875.011- 320

EQUIPMENT UNDER TEST

Type of equipment	Barcode Reader
Brand name	T-BARman
Type/Model	TBC-120
Manufacturer	Axiome Alpha SA, Switzerland
Tested by request of	ID America/Ban-Koe Companies

STANDARD

TEST REPORT No. J20019875.011

CFR 47:1999, §15.107 and §15.109 Class A

SUMMARY OF RESULTS

We confirm that the product tested and our review of the above numbered report without reasonable doubt will fulfill the requirements concerning electromagnetic compatibility according to the above-mentioned standard.

EMC Department

Date of issue: July 14, 2000

NVLAP[®]

Signature: _____ Yuriy Litvinov, EMC Team Leader

See back for Labeling and Manual Requirements

Class A Labeling and Instruction Manual Requirements

Devices subject to Class verification shall bear the following statement in conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

In addition, for a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

If shielded cables or other specialized accessories are necessary for the unit to achieve compliance, a statement similar to the following should be added:

Shielded cables must be used with this unit to ensure compliance with the Class A FCC limits.

Also a Class A digital device meets all requirements of the Canadian Interference-Causing Equipment Regulations.