Test Report

For

Applicant	:	**AboCom Systems, Inc.**
Equipment Type	:	**IP Sharing + Fast EtherSwitch For Cable/xDSL Modem**
Model	:	**CAS2040**
FCC ID	:	**MQ4CAS2040**

Report No. : 007H024FI

Test Report Certification

QuieTek Corporation

No.75-1, Wang-Yeh Valley, Yung-Hsing, Chiung-Lin,
Hsin-Chu County, Taiwan, R.O.C.
Tel : 886-3-592-8858, Fax: 886-3-592-8859
E-Mail : quietek@ms24.hinet.net

Accredited by NIST(NVLAP), VCCI, BSMI, DNV, TUV

Applicant	: AboCom Systems, Inc.
Address	: 1F, No.21, R&D Road II, Science-Based Industrial Park, Hsin-Chu , Taiwan, R.O.C.
Equipment Type	: IP Sharing + Fast EtherSwitch For Cable/xDSL Modem
Model	: CAS2040
FCC ID.	: MQ4CAS2040
Measurement Standard	: CISPR 22/1985
Measurement Procedure	: ANSI C63.4 /1992
Operation Voltage	: 120VAC/60Hz
Classification	: Class B
Test Result	: Complied
Test Date	: July 10, 2000
Report No.	: 007H024FI

Documented by: Zoe Lee	Test Engineer: Jimmy Huang	Approved: Kevin Wang

TABLE OF CONTENTS

1. General Information

1.1 EUT Description

Applicant	:	AboCom Systems, Inc.
Address	:	1F, No.21, R&D Road II, Science-Based Industrial Park, Hsin-Chu , Taiwan, R.O.C.
Equipment Type	:	IP Sharing + Fast EtherSwitch For Cable/xDSL Modem
Model	:	CAS2040
FCC ID	:	MQ4CAS2040
Operation Voltage	:	120VAC/60Hz
Power Adapter	:	DVE, DSA-0151A-05A
		Cable Out: Non-Shielded, 1.8m, 1pc

Remark :

1. The EUT is a IP Sharing + Fast EtherSwitch For Cable/xDSL Modem.
2. QuieTek had verified the construction and function in typical operation, then shown in this test report.

1.2 Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

1.2.1 IP Sharing + Fast EtherSwitch For Cable/xDSL Modem (EUT)

Model Number	:CAS2040
Serial Number	:N/A
FCC ID	:MQ4CAS2040
Manufacturer	:AboCom
Power Adapter	: DVE, DSA-0151A-05 A (U)
	Cable Out: Non-Shielded, 1.8m, 1pc

1.2.2 Host Personal Computer

Model Number	: P2L97
Serial Number	: 92M1Y00768
FCC ID	: DoC
Manufacturer	: ASUS
Power Cord	: Non-Shielded, 1.8m

1.2.3 Host Personal Computer

Model Number	: GA-5AX
Serial Number	: 9942200677
FCC ID	: DoC
Manufacturer	: ASUS
Power Cord	: Non-Shielded, 1.8m

1.2.4 Monitor

Model Number	: CM752ET-311
Serial Number	: T8F006364
FCC ID	: DoC
Manufacturer	: HITACHI
Data Cable	: Shielded, 1.5m
Power Cord	: Shielded, 1.8m

1.2.5 Monitor

Model Number	: CM752ET-311
Serial Number	: T8E004443
FCC ID	: DoC
Manufacturer	: HITACHI
Data Cable	: Shielded, 1.5m
Power Cord	: Shielded, 1.8m

1.2.6 Keyboard

Model Number	: KFKEA4SA
Serial Number	: KFKEA4SA94Q20474
FCC ID	: CMYKFK7835
Manufacturer	: MITSUMI
Data Cable	: Shielded, 1.8m

1.2.7 Keyboard

Model Number	: MCK-701W
Serial Number	: 8081691
FCC ID	: KJXMCK-701W
Manufacturer	: ASUS
Data Cable	: Shielded, 1.8m

1.2.8 Mouse

Model Number	: M-S34
Serial Number	: LZB75078428
FCC ID	: DZL211029
Manufacturer	: HP
Data Cable	: Shielded, 1.8m

1.2.9 Mouse

Model Number	: MUS2U
Serial Number	: N/A
FCC ID	: DoC
Manufacturer	: TREMON
Data Cable	: Shielded, 1.8m

1.2.10 LAN Card

Model Number	: DFE-500TX
Serial Number	: 0080C8 958320
FCC ID	: KA2APC500X3
Manufacturer	: D-LINK

1.2.11 LAN Card

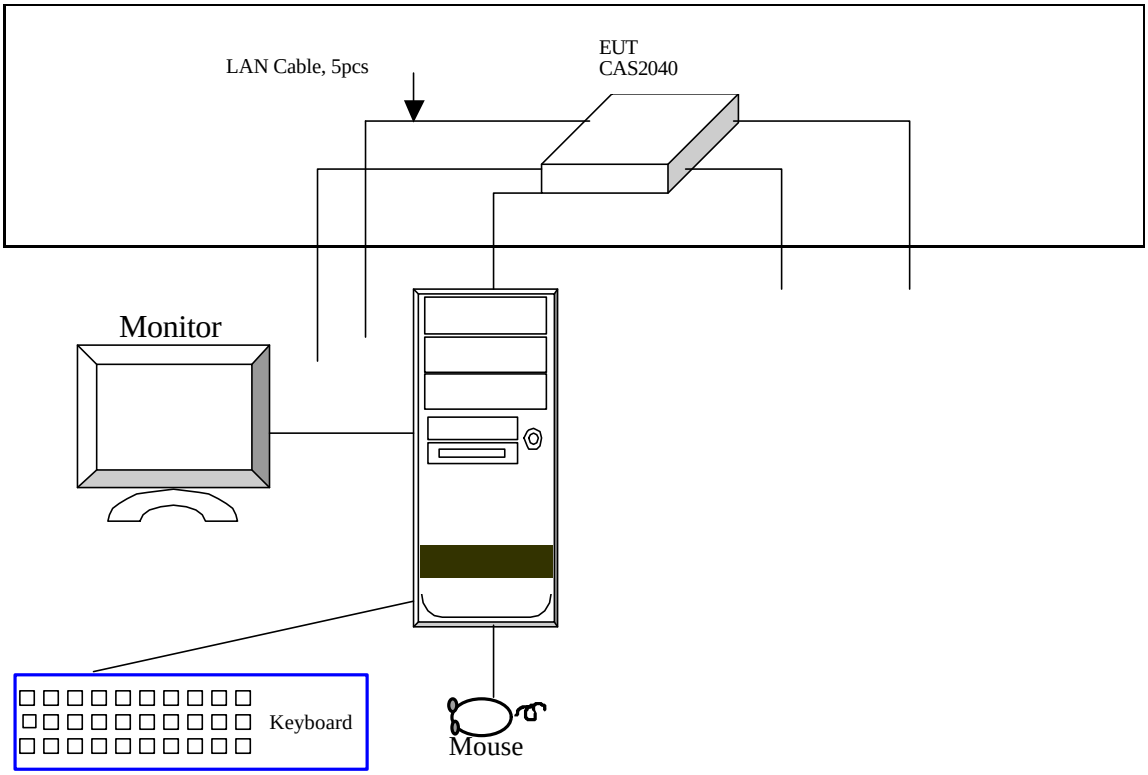
Model Number	: DFE-500TX
Serial Number	: 0080C8 95904C
FCC ID	: KA2APC500X3
Manufacturer	: D-LINK

1.2.12 Lan Cable: Non-Shielded, 3m, 4pcs

1.2.13 Lan Cable: Non-Shielded, 10m, 1pc

1.3 EUT Configuration

EMI:



1.4 EUT Exercise Software

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

1.4.1 Setup the EUT and simulators as shown on 3.2

1.4.2 Turn on the power of all equipment.

1.4.3 PC reads data from disk.

1.4.4 PC sends “H” pattern to printer, the printer will print “H” pattern on paper.

1.4.5 PC reads and writes data into and from modem.

1.4.6 PC will read data from floppy disk and then writes the data into floppy disk , same operation for hard disk.

1.4.7 PC will communicate with the partner PC through the internal Fax/modem module (Lan Module).

1.4.8 Repeat the above procedure 1.4.4 to 1.4.8

1.5 Test performed

Conducted emissions were invested over the frequency range from **0.15MHz to 30MHz** using a receiver bandwidth of 9kHz.

Radiated emissions were invested over the frequency range from **30MHz to 1000MHz** using a receiver bandwidth of 120kHz. Radiated testing was performed at an antenna to EUT distance of 10 meters.

1.6 Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: November 3, 1998 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2

September 30, 1998 Accreditation on NVLAP
NVLAP Lab Code: 200347-0

February 23, 1999 Accreditation on DNV
Statement No. : 413-99-LAB11

December 8, 1998 Registration on VCCI
Registration No. for No.2 Shielded Room C-858
Registration No. for No.1 Open Area Test Site R-823
Registration No. for No.2 Open Area Test Site R-835

January 04, 1999 Accreditation on TUV Rheinland
Certificate No.: I9865712-9901

Name of firm : QuieTek Corporation

Site location : No.75-1, Wang-Yeh Valley, Yung-Hsing Tsuen,
Chiung-Lin, Hsin-Chu County, Taiwan, R.O.C.

2. Conducted Emission

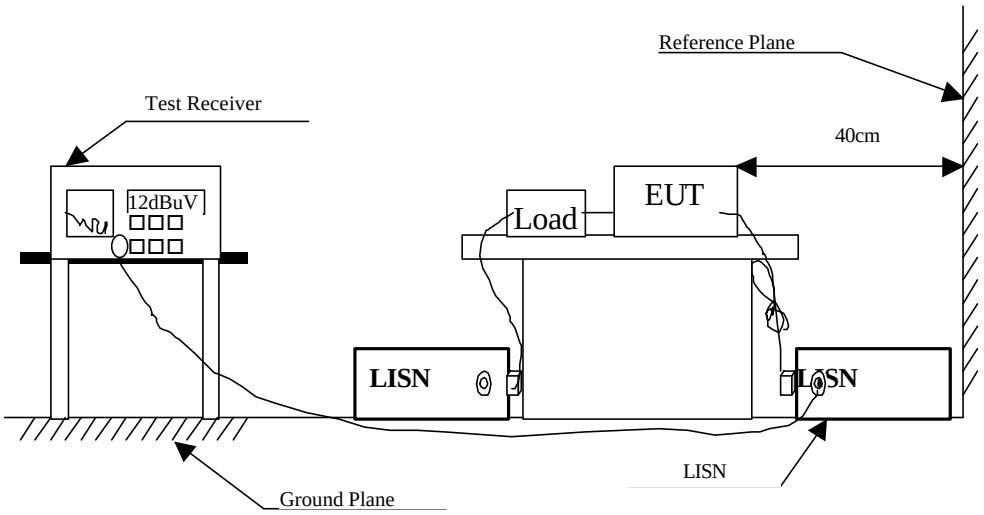
2.1 Test Equipment List

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2000	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2000	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2000	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	N0.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2 Test Setup



2.3 Limits

CISPR 22 Limits (dBuV)					FCC Part 15 Subpart B (dBuV)				
Frequency MHz	Class A		Class B		Frequency MHz	Class A		Class B	
	QP	AV	QP	AV		uV	dBuV	uV	dBuV
0.15 - 0.50	79	66	66-56	56-46	0.45-1.705	1000	60.0	250	48.0
0.50-5.0	73	60	56	46	1.705-30	3000	69.5	250	48.0
5.0 - 30	73	60	60	50					

Remarks : In the above table, the tighter limit applies at the band edges.

2.4 Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 /1992 on conducted measurement.
The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

2.5 Test Results

The conducted emission from the EUT is measured and shown in attachment 1 of test report. The acceptance criterion was met and the EUT passed the test.

3. Radiated Emission

3.1 Test Equipment

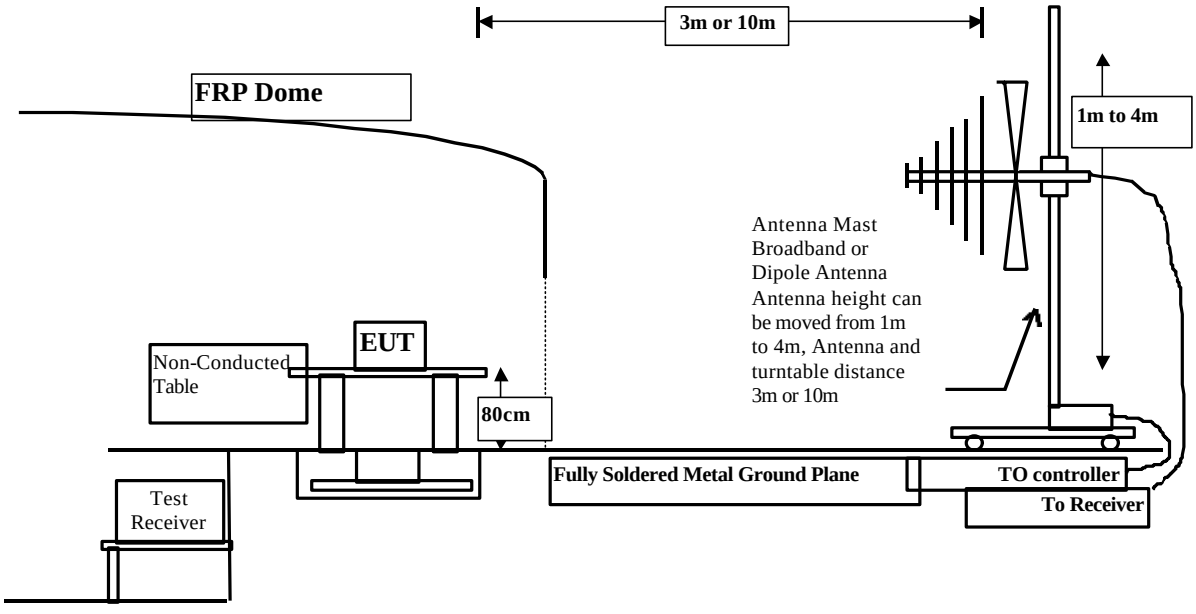
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 2000
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2000
		Pre-Amplifier	HP	8447D/3307A01812	May, 2000
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 1999
	X	Horn Antenna	EM	EM6917 / 103325	May, 2000
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2000
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2000
		Pre-Amplifier	HP	8447D/3307A01814	May, 2000
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 1999
	X	Horn Antenna	EM	EM6917 / 103325	May, 2000

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.

2.. Mark "X" test instruments are used to measure the final test results.

3.2 Test Setup



3.3 Limits

CISPR 22 Limits					FCC Part 15 Subpart B				
Frequency MHz	Class A		Class B		Frequency	Class A		Class B	
	Distance (m)	dBuV/m	Distance (m)	dBuV/m		uV/m	dBuV/m	uV/m	dBuV/m
30 – 230	10	40	10	30	30 – 88	90	39	100	40.0
230 – 1000	10	47	10	37	88 – 216	150	43.5	150	43.5
					216 –960	210	46.5	200	46.0
					960 - 2000	300	49.5	500	54.0

Remark: 1. The tighter limit shall apply at the edge between two frequency bands.

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. RF Line Voltage (dBuV/m) = 20 log RF Line Voltage (uV/m)

3.4 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 10 meters .
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4 /1992 on radiated measurement.
The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30) is 120 kHz.

3.5 Test Results

The radiated emission from the EUT is measured and shown in attachment 1 of test report.
The acceptance criterion was met and the EUT passed the test.

4. EMI Reduction Method During Compliance Testing

No modification was made during testing.

5. Attachment

Attachment 1: Summary of Test Results	Number of Pages: 9
Attachment 2: EUT Test Photographs	Number of Pages: 4
Attachment 3: EUT detailed photographs	Number of Pages: 6

Attachment 1 : Summary of Test Results

The test results in the emission were performed according to the requirements of measurement standard and process. QuieTek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. The test data of the emission are listed as the attached data.

All the tests were carried out with the EUT in normal operation, which was defined as:

Mode 1: 100Mbps

Mode 2: 10Mbps

The EUT passed all the tests.

The uncertainty is calculated in accordance with NAMAS NIS 81, The total uncertainty for this test is as follows:

- **Emission Test**
  - Uncertainty in the Conducted Emission Test: < ± 2.0 dB
  - Uncertainty in the field strength measured: < ± 4.0 dB

CONDUCTED EMISSION DATA

Date of Test	:	July 4, 2000	EUT	:	CAS2040
Test Mode	:	Mode 1	Detect Mode	:	Quasi-Peak & Average

Frequency	Cable Loss	LISN Factor	Reading Level Line1	Measurement Level Line1	Limits
MHz	dB	dB	dBuV	dBuV	dBuV
0.204	0.02	0.10	40.73	40.85	63.43
0.347	0.04	0.10	36.37	36.51	59.04
0.550	0.07	0.10	35.39	35.56	56.00
2.311	0.15	0.14	37.93	38.22	56.00
*11.893	0.30	0.26	43.83	44.39	60.00
18.241	0.34	0.42	42.61	43.37	60.00

Average:

0.204	0.02	0.10	30.90	31.02	53.45
0.347	0.04	0.10	31.50	31.64	49.03
0.550	0.07	0.10	26.10	26.27	46.00
2.311	0.15	0.14	21.70	21.99	46.00
11.893	0.30	0.26	40.30	40.86	50.00
18.241	0.34	0.42	39.70	40.46	50.00

Remarks :

1. " * " means that this data is the worst emission level.

CONDUCTED EMISSION DATA

Date of Test	:	July 4, 2000	EUT	:	CAS2040
Test Mode	:	Mode 1	Detect Mode	:	Quasi-Peak & Average

Frequency	Cable Loss	LISN Factor	Reading Level Line2	Measurement Level Line2	Limits
MHz	dB	dB	dBuV	dBuV	dBuV
0.346	0.04	0.10	38.83	38.97	59.06
0.547	0.07	0.10	36.05	36.22	56.00
2.275	0.15	0.14	36.17	36.46	56.00
12.747	0.30	0.29	45.17	45.76	60.00
*18.242	0.34	0.42	45.45	46.21	60.00
29.236	0.40	0.59	41.61	42.60	60.00

Average:

0.346	0.04	0.10	34.10	34.24	49.06
0.547	0.07	0.10	26.50	26.67	46.00
2.275	0.15	0.14	23.10	23.39	46.00
12.747	0.30	0.29	41.50	42.09	50.00
18.242	0.34	0.42	41.50	42.26	50.00
29.236	0.40	0.59	36.50	37.49	50.00

Remarks :

1. " * " means that this data is the worst emission level.

CONDUCTED EMISSION DATA

Date of Test	:	July 4, 2000	EUT	:	CAS2040
Test Mode	:	Mode 2	Detect Mode	:	Quasi-Peak & Average

Frequency	Cable Loss	LISN Factor	Reading Level Line1	Measurement Level Line1	Limits
MHz	dB	dB	dBuV	dBuV	dBuV
*0.158	0.00	0.10	55.49	55.59	65.58
0.240	0.02	0.10	37.75	37.87	62.11
0.396	0.05	0.10	39.35	39.50	57.93
0.719	0.08	0.10	37.39	37.57	56.00
0.944	0.10	0.10	36.49	36.69	56.00
2.153	0.15	0.13	35.51	35.79	56.00

Average:

0.158	0.00	0.10	44.50	44.60	55.57
0.240	0.02	0.10	32.20	32.32	52.10
0.396	0.05	0.10	34.80	34.95	47.94
0.719	0.08	0.10	26.70	26.88	46.00
0.944	0.10	0.10	23.30	23.50	46.00
2.153	0.15	0.13	17.60	17.88	46.00

Remarks :

1. " * " means that this data is the worst emission level.

CONDUCTED EMISSION DATA

Date of Test	:	July 4, 2000	EUT	:	CAS2040
Test Mode	:	Mode 2	Detect Mode	:	Quasi-Peak & Average

Frequency	Cable Loss	LISN Factor	Reading Level Line2	Measurement Level Line2	Limits
MHz	dB	dB	dBuV	dBuV	dBuV
*0.154	0.00	0.10	54.54	54.64	65.76
0.393	0.05	0.10	37.11	37.26	57.99
0.634	0.08	0.10	35.77	35.95	56.00
0.950	0.10	0.10	35.95	36.15	56.00
2.261	0.15	0.14	34.83	35.12	56.00
3.373	0.18	0.15	31.21	31.54	56.00

Average:

0.154	0.00	0.10	42.50	42.60	55.78
0.393	0.05	0.10	31.60	31.75	48.00
0.634	0.08	0.10	26.30	26.48	46.00
0.950	0.10	0.10	22.20	22.40	46.00
2.261	0.15	0.14	19.60	19.89	46.00
3.373	0.18	0.15	14.50	14.83	46.00

Remarks :

1. " * " means that this data is the worst emission level.

RADIATED EMISSION DATA

Date of Test	:	July 4, 2000	EUT	:	CAS2040
Test Mode	:	Mode 1	Test Site	:	No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit	Ant	Turn
					Horizontal				
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
36.132	1.21	14.59	0.00	7.42	23.22	6.78	30.00	397	202
*69.107	1.52	6.19	0.00	19.57	27.28	2.72	30.00	397	153
74.575	1.58	7.10	0.00	17.93	26.61	3.39	30.00	397	153
110.845	1.93	11.97	0.00	12.96	26.86	3.14	30.00	397	74
141.225	2.22	11.27	0.00	12.10	25.60	4.40	30.00	397	202
143.305	2.24	11.16	0.00	12.57	25.97	4.03	30.00	397	5
225.000	3.03	9.83	0.00	10.25	23.11	6.89	30.00	311	54
250.000	3.27	12.61	0.00	15.19	31.07	5.93	37.00	397	86
275.000	3.51	12.91	0.00	14.25	30.68	6.32	37.00	311	89
300.000	3.76	13.36	0.00	13.93	31.04	5.96	37.00	311	89
375.000	4.14	15.00	0.00	12.37	31.51	5.49	37.00	197	119
400.000	4.28	15.85	0.00	11.48	31.61	5.39	37.00	197	119
700.000	5.83	19.19	0.00	5.66	30.68	6.32	37.00	147	176

Remarks:

1.All Readings below 1GHz are Quasi-Peak, above are average value.

2.“ * ”, means this data is the worst emission level.

3.Emission Level = Reading Level + Antenna Factor + Cable loss

RADIATED EMISSION DATA

Date of Test	:	July 4, 2000	EUT	:	CAS2040
Test Mode	:	Mode 1	Test Site	:	No.2 Open Test Site

Freq.	Cable Loss	Factor	Probe	PreAMP	Reading Level	Measurement Vertical	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg	
37.540	1.22	13.91	0.00	11.43	26.57	3.43	30.00	100	203	
47.795	1.32	8.93	0.00	16.38	26.63	3.37	30.00	100	203	
50.423	1.35	7.39	0.00	18.55	27.29	2.71	30.00	100	70	
55.885	1.40	6.65	0.00	16.57	24.62	5.38	30.00	100	93	
69.015	1.52	5.27	0.00	16.87	23.66	6.34	30.00	100	58	
80.210	1.64	7.12	0.00	15.28	24.04	5.96	30.00	100	203	
111.577	1.93	11.72	0.00	14.32	27.97	2.03	30.00	100	163	
*141.227	2.22	11.00	0.00	15.27	28.49	1.51	30.00	100	125	
143.242	2.24	10.86	0.00	14.00	27.10	2.90	30.00	100	125	
149.958	2.31	10.43	0.00	13.04	25.78	4.22	30.00	100	54	
151.548	2.32	10.58	0.00	13.51	26.41	3.59	30.00	100	202	
225.000	3.03	9.68	0.00	13.52	26.22	3.78	30.00	100	75	
250.000	3.27	12.26	0.00	15.04	30.57	6.43	37.00	100	157	
600.000	5.31	18.42	0.00	5.79	29.53	7.47	37.00	290	48	

Remarks:

1.All Readings below 1GHz are Quasi-Peak, above are average value.

2.“ * ”, means this data is the worst emission level.

3.Emission Level = Reading Level + Antenna Factor + Cable loss

RADIATED EMISSION DATA

Date of Test	:	July 4, 2000	EUT	:	CAS2040
Test Mode	:	Mode 2	Test Site	:	No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Horizontal	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
74.575	1.58	7.10	0.00	15.63	24.31	5.69	30.00	400	139
76.527	1.60	7.22	0.00	16.00	24.81	5.19	30.00	400	131
110.783	1.93	11.97	0.00	8.88	22.78	7.22	30.00	400	100
143.242	2.24	11.16	0.00	11.36	24.76	5.24	30.00	400	39
160.000	2.40	10.32	0.00	12.79	25.51	4.49	30.00	400	124
500.000	4.79	17.34	0.00	7.45	29.58	7.42	37.00	181	202
550.000	5.06	19.16	0.00	8.00	32.22	4.78	37.00	166	203
*600.000	5.31	18.85	0.00	9.34	33.50	3.50	37.00	166	176
650.000	5.58	19.15	0.00	7.74	32.47	4.53	37.00	151	187

Remarks:

1.All Readings below 1GHz are Quasi-Peak, above are average value.

2.“ * ”, means this data is the worst emission level.

3.Emission Level = Reading Level + Antenna Factor + Cable loss

RADIATED EMISSION DATA

Date of Test	:	July 4, 2000	EUT	:	CAS2040
Test Mode	:	Mode 2	Test Site	:	No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Vertical	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
*37.537	1.22	13.91	0.00	13.35	28.48	1.52	30.00	99	203
49.050	1.34	7.80	0.00	8.52	17.66	12.34	30.00	99	203
74.543	1.58	6.83	0.00	19.38	27.79	2.21	30.00	99	203
110.785	1.93	11.62	0.00	11.25	24.79	5.21	30.00	99	83
141.227	2.22	11.00	0.00	12.14	25.36	4.64	30.00	99	128
143.242	2.24	10.86	0.00	8.29	21.39	8.61	30.00	99	58
160.000	2.40	10.28	0.00	9.90	22.58	7.42	30.00	99	161
220.000	2.98	9.29	0.00	6.49	18.76	11.24	30.00	99	194
300.000	3.76	13.56	0.00	9.83	27.14	9.86	37.00	99	187
600.000	5.31	18.42	0.00	3.84	27.58	9.42	37.00	243	49

Remarks:

1.All Readings below 1GHz are Quasi-Peak, above are average value.

2.“ * ”, means this data is the worst emission level.

3.Emission Level = Reading Level + Antenna Factor + Cable loss