



# EMC

## TEST REPORT

REPORT NO. : F87080361

MODEL NO. : 3C16751

DATE OF TEST : Aug. 03 ~ 06, 1998

MULTIPLE LISTING FOR: ACCTON

MODEL: EH3016-32

PREPARED FOR : ACCTON TECHNOLOGY CORPORATION

ADDRESS : NO. 1, CREATION RD. III, S.B.I.P.

HSINCHU, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



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## 1. CERTIFICATION

Issue Date: Aug. 13, 1998

Product : SwitchHUB  
Trade Name : 3COM  
Model No. : 3C16751  
Applicant : ACCTON TECHNOLOGY CORPORATION  
Standard : FCC Part 15, Subpart B, Class B  
ANSI C63.4-1992  
CISPR 22: 1993 +A1+A2

We hereby certify that one sample of the designation has been tested in our facility on Aug. 03 ~ 06, 1998. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in this report is in compliance with the Class B limits of conducted and radiated emission of applicable standards

PREPARED BY: Rita Yi, DATE: 8/13/98  
( Rita Yi )

TESTED BY: James Chen, DATE: 8/13/98  
( James Chen )

APPROVED BY: Stephen Chen, DATE: 8/13/98  
( Stephen W.F. Chen )

ADVANCE DATA TECHNOLOGY CORPORATION

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## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Product	:	SwitchHUB
Model No.	:	3C16751
Power Supply	:	Switching
Power Cord	:	Nonshielded (1.8m)
Data Cable	:	Shielded cable (STP)

Note: The EUT is a dual-speed (10/100Mbps) hub with sixteen 10/100BASE-TX ports. It allows you to set up a network with both Ethernet (10Mbps) and Fast Ethernet (100Mbps) workstations and other devices. The port senses the speed of the connected equipment and operates at the appropriate speed.

The EUT has two model names which are identical to each other in all aspects except for the following:

Model: 3C16751, brand: 3COM  
Model: EH3016-32, brand: ACCTON

From the above models, model: 3C16751 was selected as representative model for the test, and its data is recorded in this report.

The EUT is supplied with a power adapter, made by BTC model: ADP-305 with nonshielded power cord.

The rating of the power adapter is Input: 100V~240Vac, 47~63 Hz, 1A, Output: 5V, 6A. There is a manufacturer-implemented ferrite core on the DC power cable (1.2m) connected to the EUT.

For more detailed features, please refer to ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT and User's Manual.



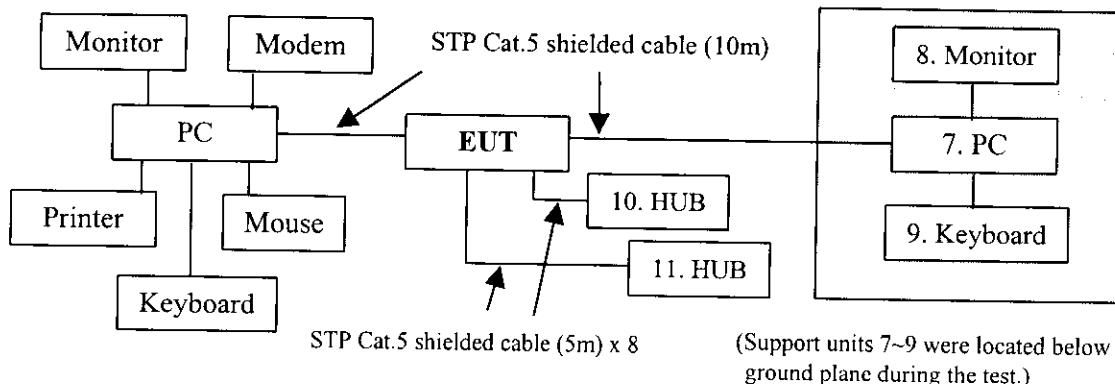
## 2.2 DESCRIPTION OF SUPPORT UNITS

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

No	Product	Brand	Model No.	FCC ID	I/O Cable
1.	PERSONAL COMPUTER	HP	Net Server 5/133LC	B94HPLX105	Nonshielded Power (1.8m)
2.	COLOR MONITOR	ADI	PD-695	BR8PD-695	Shielded Signal (1.5m) Nonshielded Power (1.8m)
3.	KEYBOARD	FORWARD	FDA-104GA	F24ZDA-104G	Shielded Signal (1.4m)
4.	MOUSE	DEXIN	A2P800A	NIYA2P800A	Shielded Signal (1.5m)
5.	MODEM	ACEEX	1414	IFAXDM1414	Shielded Signal (1.2m) Nonshielded Power (2.4m)
6.	PRINTER	HP	C2642A	B94C2642X	Shielded Signal (1.1m) Nonshielded Power (2.4m)
7.	PERSONAL COMPUTER	HP	Net Server 5/133LC	B94HPLX121	Nonshielded Power (1.8m)
8.	COLOR MONITOR	COMPAQ	V410	BJMC4A	Shielded Signal (1.5m) Nonshielded Power (1.8m)
9.	KEYBOARD	FORWARD	FDA-104GA	F24ZDA-104G	Shielded Signal (1.4m)
10.	HUB	COMPAQ	HED3518LCTE S-TX (4230)	N/A	N/A
11.	HUB	COMPAQ	HED3518LCTE S-TX (4230)	N/A	N/A

Note: 1. Support unit 1 acted as SERVER PC and communicated with support unit 7-9 which acted as HOST PC and systems of communication partner. They communicated with each other via EUT at 100Mbps speed with two STP (Shielded Twisted Pair) cables (10m). The HOST PC was kept in the control room.

2. Other ports of the EUT were connected to support unit 10,11 via a STP cable (5M) individually and support unit 10,11, were located under the test table in a stack.



## 2.3 TEST METHODOLOGY AND CONFIGURATION

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4:1992. Radiated testing was performed at an antenna to EUT distance of 10 m on an open area test site. Please refer to the photos of test configuration in Item 5.



### 3. TEST INSTRUMENTS

#### 3.1 TEST INSTRUMENTS (EMISSION)

##### RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8594E	3710A04861	Sept. 22, 1998
CHASE RF Pre Amplifier	CPA92320	1001	June 01, 1999
ROHDE & SCHWARZ Test Receiver	ESVS 10	846285/012	Dec. 12, 1998
CHASE Broadband Antenna	CBL6112A	2343	June 24, 1999
ROHDE & SCHWARZ Precision Dipole	HZ-12 (30~300MHz)	846932/0003	June 06, 2000
ROHDE & SCHWARZ Precision Dipole	HZ-13 (300~1000MHz)	846556/0007	June 17, 2000
HP Signal Generator	8657A	3225A05037	Sep. 24, 1998
EMCO Antenna Tower	2075-2	9712-2124	N/A
EMCO Turn Table	2081-1.53	9712-2030	N/A
EMCO Controller	2090	9712-1283	N/A
CORCOM AC Filter	MRI2030	107/108	N/A
ANRITSU RF Switch	MP59B	M50867	N/A
BELDEN RF Signal Cable	9913 RG-8/U	N/A	N/A
Open Field Test Site	Site A	ADT-RA	July 08, 1999

Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated

as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months.

And the calibrations are traceable to NML/ROC and NIST/USA.

##### CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESCS 30	847124/029	Dec. 18, 1998
ROHDE & SCHWARZ LISN	ESHS-Z5	848773/004	Nov. 25, 1998
KYORITSU LISN	KNW-407	8/1395/12	Oct. 31, 1998
ROHDE & SCHWARZ Clamp	MDS 21	847905/015	Oct. 14, 1998
Shielded Room	Con A	ADT-CA	N/A

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per

NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months.

And the calibrations are traceable to NML/ROC and NIST/USA.



### 3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION

#### LIMIT OF RADIATED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

#### LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
Above 1000	300	49.5	500	54.0

Note: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### LIMIT OF CONDUCTED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



## 4. TEST RESULTS (EMISSION)

### 4.1 RADIO DISTURBANCE

Frequency Range : 0.15 - 30 MHz (Conducted Emission)  
30 - 1000 MHz (Radiated Emission)  
Input Voltage : 120 Vac, 60 Hz  
Temperature : 25 °C  
Humidity : 51 %  
Atmospheric Pressure : 980 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -10.4 dB at 3.640 MHz Minimum passing margin of radiated emission: -5.8 dB at 50.37 MHz

### 4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. SERVER PC and HOST PC run a test program to enable all functions of EUT.
3. SERVER PC transmitted messages to and received messages from the HOST PC via EUT.
4. Repeat steps 3-4.



## 4.2 TEST DATA OF CONDUCTED EMISSION

EUT: **SwitchHUB**MODEL: **3C16751**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL:

Freq. [MHz]	L Level		N Level		Limit		Margin [dB ( $\mu$ V)]			
	[dB ( $\mu$ V)]		[dB ( $\mu$ V)]		[dB ( $\mu$ V)]		L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.150	48.20	-	49.60	-	66.00	50.00	-17.8	-	-16.4	-
0.192	45.10	-	46.00	-	63.95	53.95	-18.9	-	-18.0	-
1.074	37.80	-	41.40	-	56.00	46.00	-18.2	-	-14.6	-
3.640	45.60	-	44.10	-	56.00	46.00	-10.4	-	-11.9	-
11.766	42.20	-	43.20	-	60.00	50.00	-17.8	-	-16.8	-
24.182	39.70	-	38.80	-	60.00	50.00	-20.3	-	-21.2	-

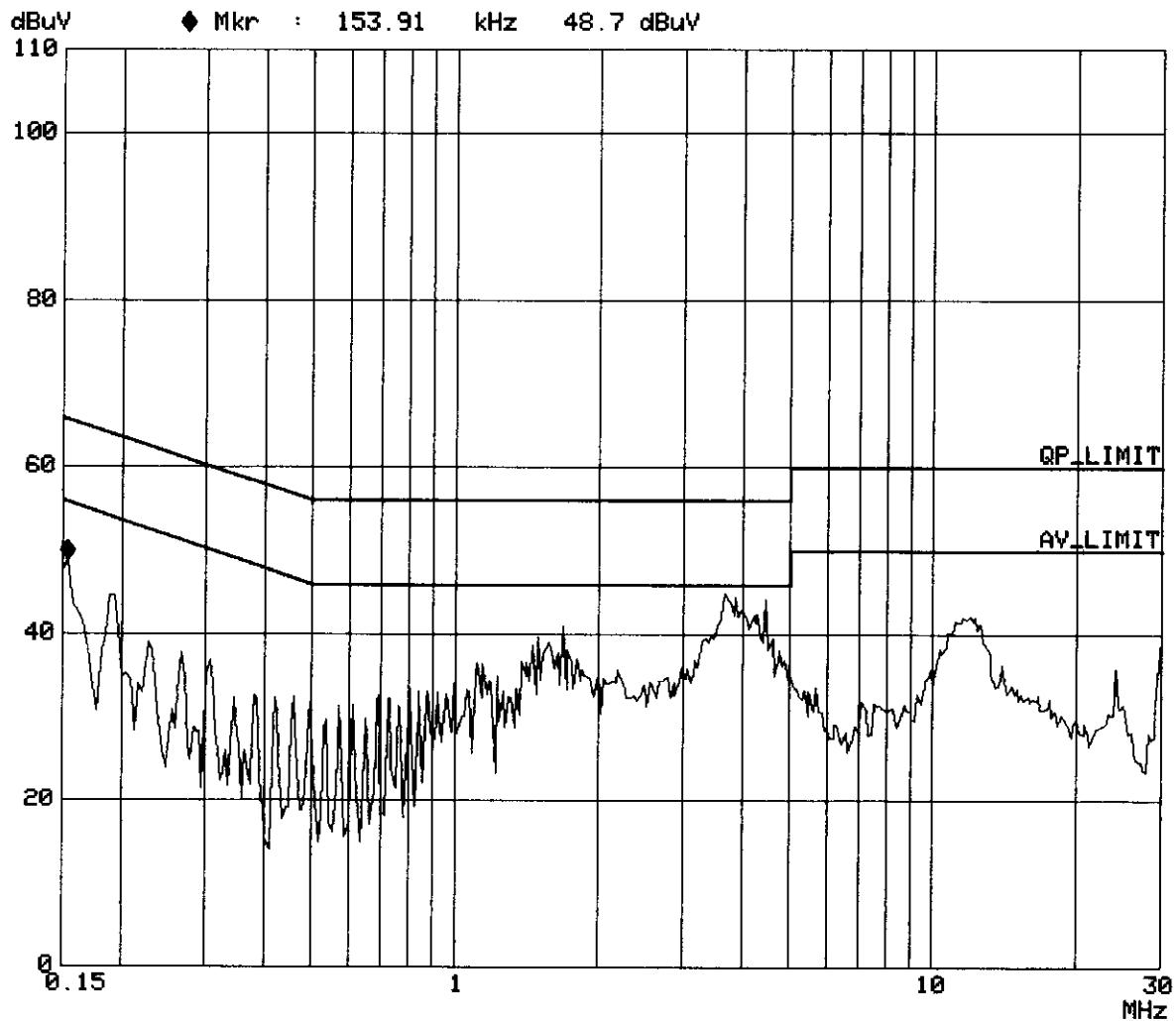
Remarks:

1. "": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
4. The emission level of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value

ADT CORP. SHIELDED ROOM A  
CISPR 22 CLASS B

EUT: 3C16751  
Operator: JAMES CHEN  
Test Spec: LISN :L  
Comment: 110V AC / 60Hz  
SHIELDED CABLE  
File name: EN\_22CB.SPC  
Date: 03. Aug 98 17:10

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Test By: *James Chen*



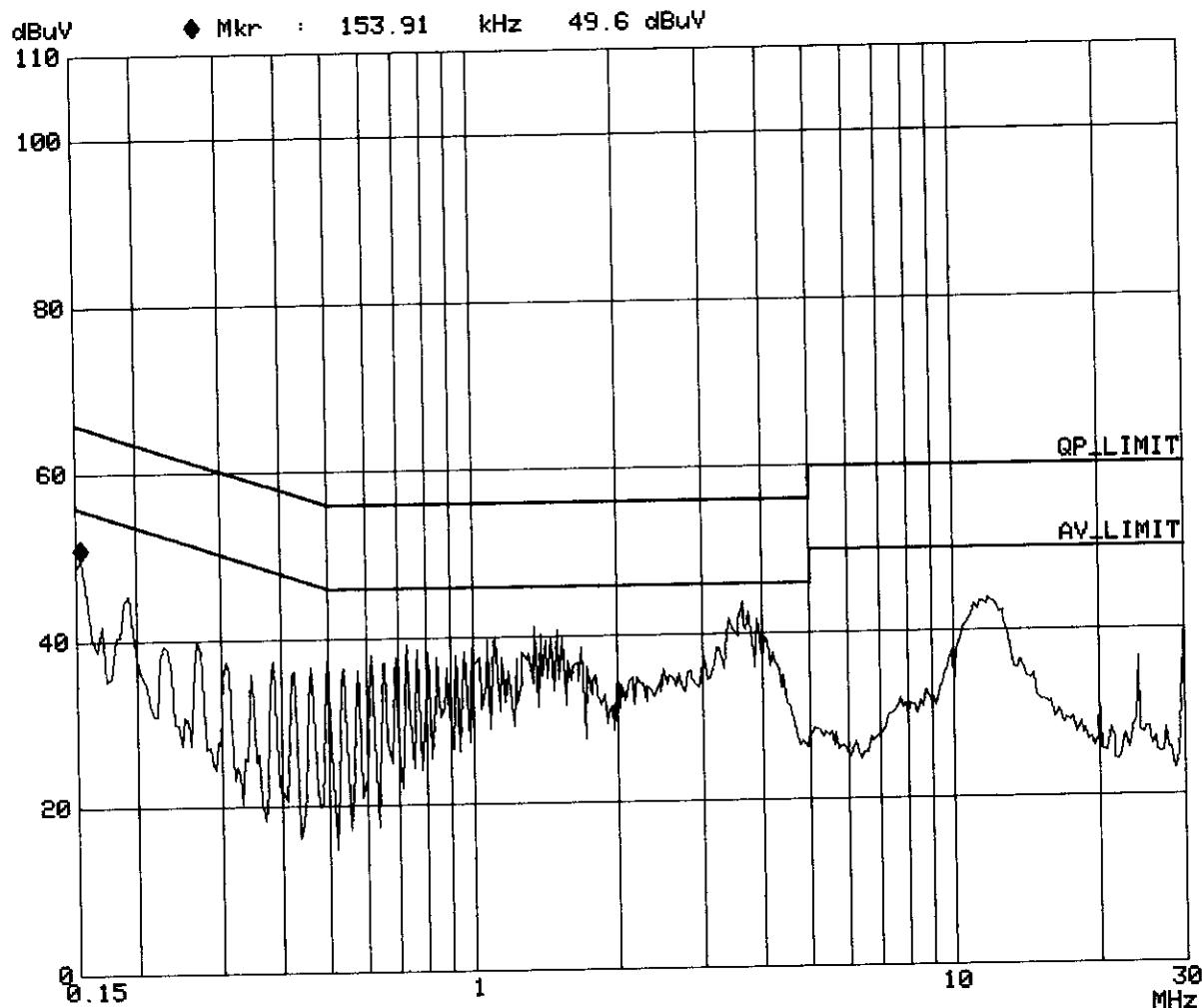
ADT CORP. SHIELDED ROOM A  
CISPR 22 CLASS B

EUT: 3C16751  
Operator: JAMES CHEN  
Test Spec: LISN :N  
Comment: 110V AC / 60Hz  
SHIELDED CABLE  
File name: EN\_22CB.SPC  
Date: 03. Aug 98 17:17

Report No.: F87080361

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Test By: *James Chen*





#### 4.3 TEST DATA OF RADIATED EMISSION

## EUT: SwitchHUB

MODEL: 3C16751

ANTENNA: CHASE BILOG CBL6112A

### POLARITY: Horizontal

## DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

#### TEST PERSONNEL:

James Chen

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
64.98	6.4	7.4	13.8	30.0	-16.2
149.20	11.8	6.6	18.4	30.0	-11.6
200.15	10.7	9.4	20.1	30.0	-9.9
223.11	10.1	11.7	21.8	30.0	-8.2
575.01	21.3	8.6	29.9	37.0	-7.1
625.01	21.8	8.1	29.9	37.0	-7.1
675.00	21.7	8.9	30.6	37.0	-6.4



## TEST DATA OF RADIATED EMISSION

## EUT: SwitchHUB

MODEL: 3C16751

ANTENNA: CHASE BILOG CBL6112A

POLARITY: Vertical

## DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

**TEST PERSONNEL:**



Frequency (MHz)	Correction Factor (dB/m)	Reading Data dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
50.37	9.4	14.8	24.2	30.0	-5.8
75.56	7.1	15.3	22.4	30.0	-7.6
125.02	12.4	7.8	20.2	30.0	-9.8
174.84	11.5	10.8	22.3	30.0	-7.7
200.24	11.5	10.0	21.5	30.0	-8.5
225.05	11.5	8.7	20.2	30.0	-9.8
836.38	22.9	6.3	29.2	37.0	-7.8

## REMARKS:

1. Emission level (dBuV/m) = Correction Factor(dB/m) + Meter Reading (dBuV).
2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value



## 6. ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT

### Specifications:

#### Environmental

* Ambient Operation Temperature	0 to 40 degrees Celsius
* Storage temperature	-10 to +70 degrees Celsius
* Humidity	0% to 90% non-condensing

<b>Reliability</b>	* The reliability calculations and HALT testing required is detailed in the document 800d-006.
	* This document will be provided as a separate document to this product specification
	* Reliability MTBF Target
	> 60,000 hours @ 25°C
	> 25,000 hours @ 50°C
	(Mil HDBK 217F Notice 1)

<b>Mechanical</b>	* Dimensions	Height: 54.6 mm (1U)
		Width: 220mm
	Depth: 185.4mm	
	* Weight	TBD kg.

#### Switch Performance

* 4k maximum addresses	
* Learning rate 0 addresses/second max.	
* Ageing period default 21 hours.	
* Filtering	163,680 frames/second
* Forwarding	10Mbps ->100Mbps 14,880 frames/second
	100Mbps ->10Mbps 14,800 frames/second
* Latency (store & forward only)	<=40uS