



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test report file number : E01DR-066

Applicant : AJIN-VISION CO., LTD.
Address : 242-5, Yumchang-Dong, Kangsu-Gu, Seoul, 157-040, Korea

Manufacturer : AJIN-VISION CO., LTD.
Address : 242-5, Yumchang-Dong, Kangsu-Gu, Seoul, 157-040, Korea

Type of Equipment : Caption Decoder (TV Interface Device)

FCC ID. : M6U-PRTCTV-001

Model / Type No. : PROTECTV DECODER

Serial number : N/A

Total page of Report : 16 pages (including this page)

Date of Incoming : December 14, 2001

Date of issue : December 24, 2001

SUMMARY

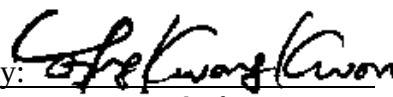
The equipment complies with the requirement of **FCC CFR 47 PART 15 SUBPART B (15.101)**.

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Prepared by: 

G. W. Lee/ Assist. Chief Engineer
EMC & Telecom Div.
ONETECH Corp.

Reviewed by: 

Y. K. Kwon/ Chief Engineer
EMC & Telecom Div.
ONETECH Corp.

CONTENTS

	Page
<u>1. VERIFICATION OF COMPLIANCE</u>	3
<u>2. GENERAL INFORMATION</u>	4
<u>2.1 PRODUCT DESCRIPTION</u>	4
<u>2.2 RELATED SUBMITTAL(S) / GRANT(S)</u>	4
<u>2.3 TEST SYSTEM DETAILS</u>	5
<u>2.4 TEST METHODOLOGY</u>	5
<u>2.5 TEST FACILITY</u>	5
<u>3. SYSTEM TEST CONFIGURATION</u>	5
<u>3.1 JUSTIFICATION</u>	5
<u>3.2 EUT EXERCISE SOFTWARE</u>	6
<u>3.3 CABLE DESCRIPTION</u>	6
<u>3.4 NOISE SUPPRESSION PARTS ON CABLE</u>	6
<u>3.5 EQUIPMENT MODIFICATIONS</u>	6
<u>3.6 CONFIGURATION OF TEST SYSTEM</u>	7
<u>3.6.1 Line Conducted Test</u>	7
<u>3.6.2 Radiated Emission Test</u>	7
<u>3.6.3 Output Signal Level Test</u>	7
<u>3.6.4 Output Terminal Conducted Spurious Emission test</u>	7
<u>3.6.5 Transfer Switch Isolation Test</u>	8
<u>4. PRELIMINARY TEST</u>	8
<u>4.1 AC POWER LINE CONDUCTED EMISSION TEST</u>	8
<u>4.2 RADIATED EMISSIONS TESTS</u>	8
<u>5. FINAL RESULT OF MEASUREMENT</u>	9
<u>5.1 CONDUCTED EMISSION TEST</u>	9
<u>5.2 RADIATED EMISSION TEST</u>	11
<u>5.3 OUTPUT TERMINAL SIGNAL LEVEL TEST</u>	12
<u>5.4 OUTPUT TERMINAL CONDUCTED SPURIOUS EMISSIONS TEST</u>	13
<u>5.5 TRANSFER SWITCH ISOLATION TEST</u>	14
<u>6. FIELD STRENGTH CALCULATION</u>	15
<u>7. LIST OF TEST EQUIPMENT</u>	16



1. VERIFICATION OF COMPLIANCE

APPLICANT : AJIN-VISION CO., LTD.
ADDRESS : 242-5, Yumchang-Dong, Kangsu-Gu, Seoul, 157-040, Korea
CONTACT PERSON : Mr. Choro, Cho / Assistant Manager
TELEPHONE NO : +82-2-3665-1144
FCC ID : M6U-PRTCTV-001
MODEL NO/NAME : PROTECTV DECODER
SERIAL NUMBER : N/A
DATE : December 24, 2001

DEVICE TYPE	TV INTERFACE DEVICE - UNINTENTIONAL RADIATOR
E.U.T. DESCRIPTION	Caption Decoder
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	MP-3, ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 §15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. GENERAL INFORMATION

2.1 Product Description

The AJIN-VISION CO., LTD., Model PROTECTV DECODER (referred to as the EUT in this report) is a Caption Decoder to decode and monitor the hidden closed-caption text which is made available for the hearing impaired. Each word is checked against a dictionary of offensive words. When an offensive word is detected, the EUT automatically mutes the sound, and turns the sound back on when the phrase is completed. All scripted programs (video, DVDs, TV series and TV movies) are filtered, but live programming (news, sporting events, talk show, soap operas) is not filtered. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal and Plastic
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	Main Board: 20MHz
POWER REQUIREMENT	DC9V, 200mA from AC/DC adapter
NUMBER OF LAYERS	Main Board: 2Layers
RF MODULATOR Type NO. / MFR	RMVN1345HC / Samsung Electro-Mechanics Co., Ltd.
PRESET CHANNEL	3 Channel (61.25MHz)
EXTERNAL TERMINALS	RF Output and RCA In/Out Connector

Model Differences:

-. The difference(s) compared to the EUT is as follows: none

2.2 Related Submittal(s) / Grant(s)

Original submittal only

2.3 Test System Details

The model numbers for all the equipments which were used in the tested system is:

Model	Manufacturer	FCC ID	Description	Connected to
PROTECTV DECODER	AJIN VISION CO. LTD	M6U-PRTCTV-001	Caption Decoder (EUT)	-
A20920N	SINO-AMERICAN	N/A	AC/DC Adaptor	EUT
CTV-1010XK	KEC	N/A	TELEVISION	EUT
SDT-70SK	Salt Digital	N/A	TELEVISION	EUT
SJ-12100D	SEONGJIN ELECTRONICS	N/A	AC/DC Adaptor	TV (Salt Digital)
NCL3300	Nicom Technology	N/A	VCR	EUT
3033B	Protek	N/A	DC Power Supply	VCR

2.4 Test Methodology

The measurement for Radiated Emission, Line Conducted Emission, Output signal levels and Output Terminal Conducted Spurious Emission were performed in accordance with the procedures described in MP-3 and ANSI C63.4/1992. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.5 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on January 12, 1999. (Registration Number: 92819)

3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	DUKSEONG-SA	GLOBAL DECODER	N/A
RF Modulator Board	Samsung Electro-Mechanics Co., Ltd.	RMVN13450HC	N/A
Power Board	SINO-AMERICAN	N/A	N/A

3.2 EUT exercise Software

According to the requirements in Subpart B of Part 15, the measurement is made at each function of the EUT being connected with appropriate peripherals.

This model PROTECTV DECODER has video/audio input/output terminals in RCA-type plugs and RF output terminal. Therefore, every measurement was investigated in the video tape play mode and the coaxial cable for the RF output terminal was connected to the TV.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
Caption Decoder (EUT)	N	-	-
TELEVISION (Salt Digital)	N	Y	1.2 (P), 1.2(D)
DC Power Supply	N	N	1.5(P), 1.2(P)
AC/DC Adaptor (EUT)	N	N/A	1.2(P)
AC/DC Adaptor (SEONGJIN)	N	N/A	1.2(P)
TELEVISION (KEC)	N	Y	1.5(P), 1.2(D)
VCR	N	N	1.2 (P), 1.2(D)

* The marked “(D)” means the Data Cable and “(P)” means the Power Cable.

3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
Caption Decoder (EUT)	N	N/A	Y	BOTH END
TELEVISION (Salt Digital)	N	N/A	Y	BOTH END
DC Power Supply	N	N/A	N	N/A
AC/DC Adaptor (EUT)	N	N/A	Y	EUT END
AC/DC Adaptor (SEONGJIN)	N	N/A	N	TV(Salt Digital) END
TELEVISION (KEC)	N	N/A	Y	BOTH END
VCR	N	N/A	Y	BOTH END

3.5 Equipment Modifications

“There was no Modified items during EMI test”

3.6 Configuration of Test System

3.6.1 Line Conducted Test

EUT was connected to LISN, all supporting equipment were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

3.6.2 Radiated Emission Test

Preliminary radiated emission test were conducted using the procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating conditions. Final radiated emission test were conducted at 3meter open area test site.

3.6.3 Output Signal Level Test

The output voltage of video carrier frequency at the RF-output terminal of the EUT was measured at 3 channel connecting directly to a spectrum analyzer with 50ohm input impedance via 75-to-50ohm matching pad. Indicated voltage on screen of measuring instrument was converted to the voltage of 75ohm system.

Data conversion method is as follows.

$$V_{75}[\text{uV}] = 10^{(V_r + CF)/20}[\text{uV}]$$

here, V_{75} : Voltage at the RF-out terminal of 75ohm in uV,

V_r : Voltage read at analyzer with 50ohm input-impedance in dBuV,

CF : Conversion Factor of the matching pad in dB.

3.6.4 Output Terminal Conducted Spurious Emission test

Any other spectrum at RF-output terminal appearing on frequencies removed by more than 4.6 MHz below or 7.4 MHz above the video carrier frequency of EUT was searched at 3 channel.

Data conversion method is as follows.

$$V_{75}[\text{uV}] = 10^{(V_r + CF + AT)/20}[\text{uV}]$$

here, V_{75} : Voltage at the RF-out terminal of 75ohm in uV,

V_r : Voltage read at analyzer with 50ohm input-impedance in dBuV,

CF : Conversion Factor of the matching pad in dB,

AT : Attenuation of attenuator in dB.

3.6.5 Transfer Switch Isolation Test

As a transfer switch was equipped with EUT as an antenna-in, measurement of isolation were made at RF-input terminal with rated input impedance.

The maximum voltage of video carrier frequency of the EUT at the antenna input (RF-in) terminal of the switch was measured for both channels.

Data conversion method is as follows.

$$V_{75}[\mu V] = 10^{(V_r + CF - PG + AT)/20}[\mu V]$$

here, V_{75} : Voltage at the RF-out terminal of 75ohm in μV ,
 V_r : Voltage read at analyzer with 50ohm input-impedance in dBuV,
CF : Conversion Factor of the matching pad in dB,
PG : Gain of pre-amplifier in dB,
AT: Attenuation of attenuator in dB.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
CH. 3 (Video Tape Play)	X

4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated.

Operation Mode	The Worse operating condition (Please check one only)
CH. 3 (Video Tape Play)	X

5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

5.1 Conducted Emission Test

Humidity Level : 47%

Temperature : 18 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B (Section 15.107)

Type of Test : TV INTERFACE DEVICE

Result : PASSED BY -9.06 dB at 0.52 MHz

EUT : Caption Decoder

Date: December 17, 2001

Operating Condition : CH. 3 (Video Tape Play)

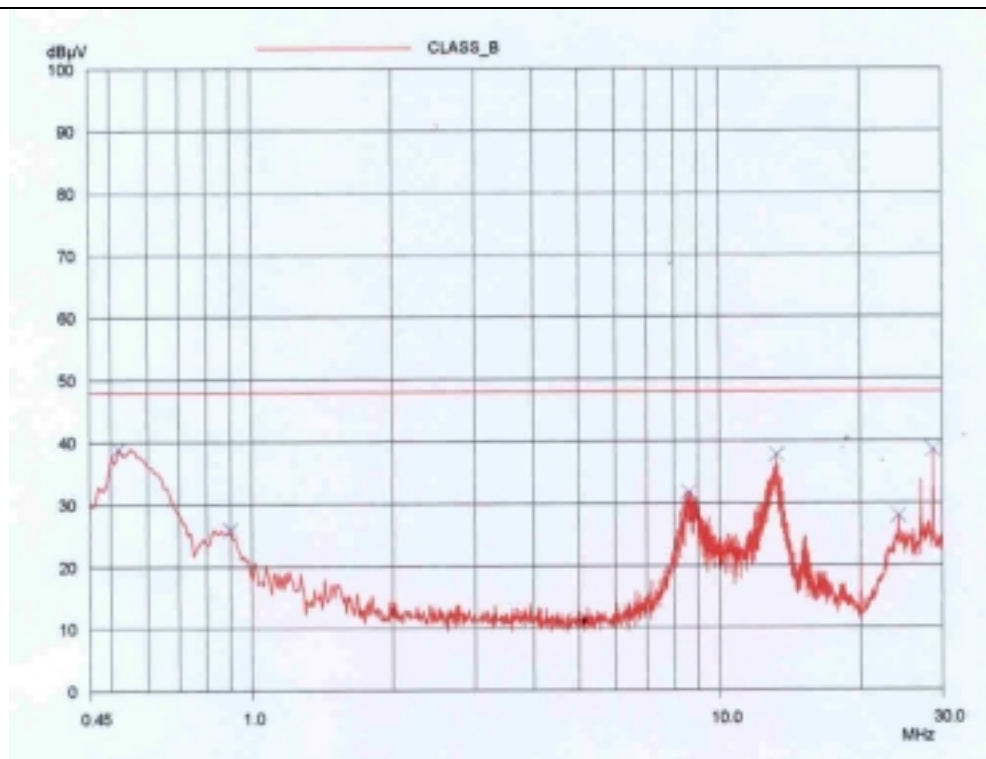
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Power Line Conducted Emission			FCC CLASS B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
0.52	38.94	HOT	48.00	-9.06
0.90	25.94	HOT	48.00	-22.06
8.58	31.84	HOT	48.00	-16.16
13.23	37.87	HOT	48.00	-10.13
24.15	27.99	HOT	48.00	-20.01
28.64	38.64	HOT	48.00	-9.36

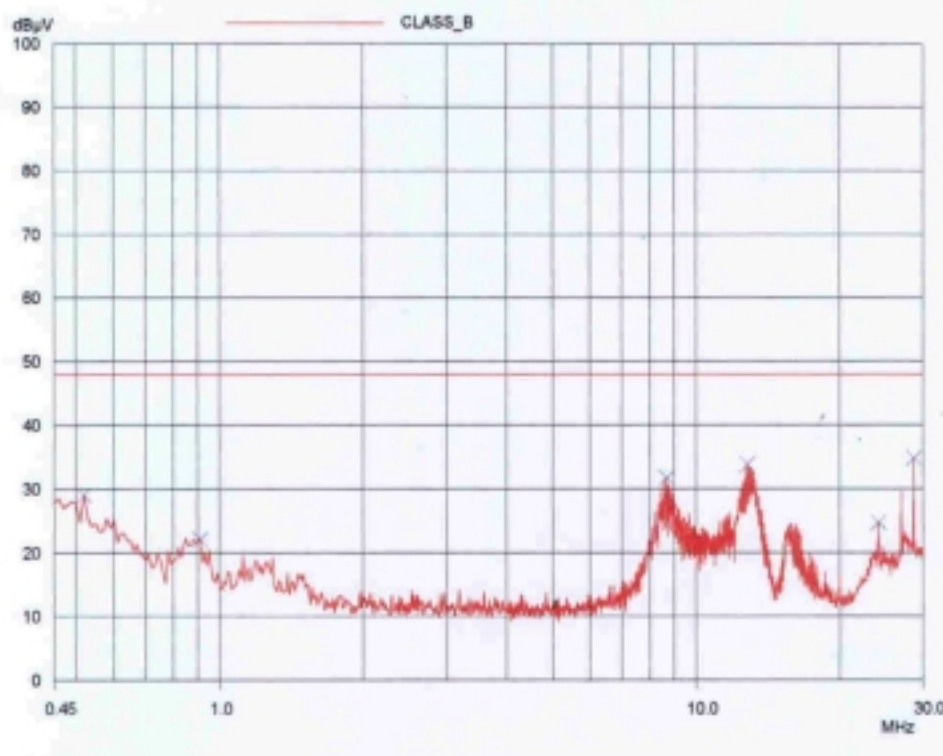
Line Conducted Emission Tabulated Data



Tested by: Young Min, Choi / Project Engineer



HOT LINE



NEUTRAL LINE

5.2 Radiated Emission Test

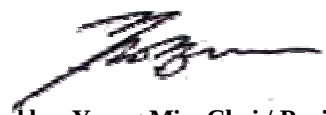
The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 45 % Temperature : 18 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B (Section 15.109)
 Type of Test : TV INTERFACE DEVICE
 Result : PASSED BY -7.19 dB at 48.29 MHz

EUT : Caption Decoder Date: December 17, 2001
 Operating Condition : CH. 3 (Video Tape Play)
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
 Distance : 3 Meter

Radiated Emission		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
40.40	17.70	V	10.47	0.82	28.99	40.00	-11.01
48.29	21.00	V	10.90	0.91	32.81	40.00	-7.19
60.00	17.80	V	9.95	0.98	28.73	40.00	-11.27
63.41	20.10	V	9.17	0.99	30.26	40.00	-9.74
65.00	18.40	V	8.81	1.00	28.21	40.00	-11.79
130.00	12.50	V	13.20	1.26	26.96	43.50	-16.54
132.77	12.90	V	13.11	1.28	27.29	43.50	-16.21

Radiated Emission Tabulated Data


 Tested by: Young Min, Choi / Project Engineer

5.3 Output Terminal Signal Level Test

The following table shows that the all modes of operation and worst-case emissions were investigated

Humidity Level : 45 %

Temperature : 18 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B (Section 15.115)

EUT : Caption Decoder

Date: December 17, 2001

Detector : SPAN : 10MHz

SWP : 2 sec

RBW : 100kHz

VBW : 300kHz

Output Impedance of RF-Output Terminal: 75ohm

CH	Freq.(MHz)	Reading(dBuV)	M/P Loss(dB)	Signal Level(uV)	Limit(uV)	Margin(dB)
3 (Visual)	61.25	51.80	6.0	766.25	3000	-11.85
3 (Aural)	65.75	35.20	6.0	114.82	671	-15.33

MP = Impedance Matching Pad

*Sample Calculation at 61.25MHz = $10^{[(51.8+6.0)/20]} = 766.25\mu\text{V}$

*Margin [dB] = $20 \log (R/L)$ where, R : Signal Level, [uV] or [uV/m],

L : Corresponding Limit, [uV] or [uV/m].



Tested by: Young Min, Choi / Project Engineer

5.4 Output Terminal Conducted Spurious Emissions Test

The following table shows that frequency range of 30MHz to 1000MHz removed by more than 4.6 MHz below or 7.4 MHz above the video carrier frequency of EUT was investigated at each channel.

Humidity Level : 45 %

Temperature : 18 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B (Section 15.115)

EUT : Caption Decoder

Date: December 17, 2001

Detector : SPAN : 10MHz

SWP : 2 sec

RBW : 100kHz

VBW : 300kHz

Output Impedance of RF-Output Terminal: 75ohm

CH.	Freq. (MHz)	Reading (dBuV)	M/P Loss (dB)	Output Level(uV)	Limit (uV)	Margin (dB)
3	39.95	10.30	6.0	6.53	95	-23.26
	122.24	22.90		27.86		-10.65
	183.80	13.20		9.12		-20.35
	306.20	9.50		5.96		-24.05
	367.60	8.20		5.13		-25.35
	894.40	11.00		7.08		-22.55

* Sample Calculation at 39.95MHz = $10^{[(10.30 + 6.0)/20]} = 6.53\text{uV}$

*Margin [dB] = 20 log (R/L) where, R : Output Level, [uV] or [uV/m],

L : Corresponding Limit, [uV] or [uV/m].



Tested by: Young Min, Choi / Project Engineer



5.5 Transfer Switch Isolation Test

The following table shows that the maximum voltage of video carrier frequency of the EUT at the antenna input (RF-in) terminal of the switch was measured for both channels.

Humidity Level : %

Temperature : °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B (Section 15.115)

EUT : Caption Decoder

Date:

Detector : Span : 1 MHz

SWP : 30 msec

RBW : 10 kHz

VBW : 30 kHz

Output Impedance of RF-Output Terminal: 75ohm

CH.	Freq. (MHz)	Meter Reading (dBuV)	M/P Loss (dB)	Preamp Gain(dB)	Attn. (dB)	Signal Level (uV)	Limit (uV)	Margin (dB)
This test is not applicable, because the EUT has only RF Output terminal.								

6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	OCT/01	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	APR/01	12MONTH	■
3.	Spectrum analyzer	HP	8563E	3846A09673	APR/01	12MONTH	
4.	Spectrum analyzer	HP	8568B	3109A05456	APR/01	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	APR/01	12MONTH	■
6.	Quasi-Peak Adapter	HP	85650A	3107A01542	APR/01	12MONTH	■
7.	Matching Pad	TME	ZT-130	9F 954	N/A	N/A	■
8.	Color Pattern Generator	Philips	PM5418 TDSI	LO642969	APR/01	12MONTH	
9.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	APR/01	12MONTH	■
10.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	APR/01	12MONTH	■
11.	LISN	EMCO	3825/2	9109-1867 9109-1869	JUN/01	12MONTH	■
12.	Computer System	HP	98581C	98543A	N/A	N/A	■
	Hard disk drive		9153C	CMC762Z9153	N/A	N/A	■
13.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
14.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
15.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
16.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■