



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test report file number : E014R-044

Applicant : MAYCOM CO., LTD.

Address : Maycom B/D, 280-5, Seoksu2-Dong, Manan-Gu, Anyang-City, Kyunggi-Do, 430-042 Korea

Manufacturer : MAYCOM CO., LTD.

Address : Maycom B/D, 280-5, Seoksu2-Dong, Manan-Gu, Anyang-City, Kyunggi-Do, 430-042 Korea

Type of Equipment : Scanning Receiver - SCANNING RECEIVER

FCC ID. : N6MFR-100

Model /Type No. : FR-100

Serial number : N/A

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

Date of Incoming : April 09, 2001

Date of Issue : April 25, 2001

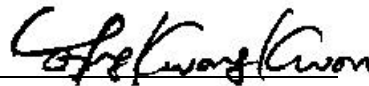
SUMMARY

The equipment complies with the requirements of **FCC CFR 47 PART 15 SUBPART B, Class B.**

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: 
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EMC Dept.
ONETECH Corp.

Reviewed by: 
Y. K. Kwon/ Chief Engineer
EMC Dept.
ONETECH Corp.

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EMC-004 (Rev.0)

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam -City, Kyunggi-Do, 462-121, Korea
(TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC Testing Dept : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-

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Testing & Evaluation Lab.

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1. VERIFICATION OF COMPLIANCE

APPLICANT : MAYCOM CO., LTD.
ADDRESS : Maycom B/D, 280-5, Seoksu2-Dong, Manan-Gu, Anyang-City, Kyunggi-Do, 430-042 Korea
CONTACT PERSON : Hyunsik, Park / Assit. Manager
TELEPHONE NO : 82-31-470-7752
FCC ID : N6MFR-100
MODEL NO/NAME : FR-100
SERIAL NUMBER : N/A
DATE : April 25, 2001

DEVICE TYPE	SCANNING RECEIVER- UNINTENTIONAL RADIATOR
E.U.T. DESCRIPTION	5 BANDS COMMUNICATION RECEIVER
FREQUENCY RANGE	66~174 MHz and 420~470MHz
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	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 CFR 47 PART 15 715.101 and 715.121
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 MAYCOM CO., LTD., Model FR-100 (referred to as the EUT in this report) is a SCANNING RECEIVER. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	PLASTIC
SCANNING FREQUENCY	A BAND: 66~88 MHz, B BAND: 88~108 MHz, C BAND: 108~136MHz D BAND: 136~174 MHz, E BAND: 420~470MHz
FREQUENCY GENEATION	PLL SYNTHESIZER
MODULATION	F3E, A3E
CIRCUIT TYPE	TRIPLE CONVERSION SUPERHETERODYNE
IF FREQUENCY	1 st IF: 252.00 MHz, 2 nd IF: 10.7 MHz, 3 rd IF: 450kHz
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	4 MHz, 10.7 MHz and 262.7 MHz
NUMBER OF LAYERS	RF Board: 4 Layers and CPU Board: 2 Layers
ANTENNA TYPE	Whip Antenna
POWER REQUIREMENT	6V by Battery (AA Alkaline X 3) or AC/DC Adapter
EXTERNAL TERMINALS	Phone Jack and Adapter Input Jack

Model Differences:

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
FR-100	Maycom Co., Ltd.	N6MFR-100	SCANNING RECEIVER	N/A
N/A	N/A	N/A	EARPHONE	EUT
KNU-1250	N/A	N/A	AC/DC ADAPTER	EUT
8648C	H.P.	N/A	SIGNAL GENERATER	EUT

2.4 Test Methodology

The measurement for Radiated Emission, Line Conducted Emission, were performed in accordance with the procedures described in 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
CPU Board	MAYCOM CO., LTD.	N/A	N/A
RF BOARD	MAYCOM CO., LTD.	N/A	N/A

3.2 EUT exercise Software

During the tests, H.P. signal generator model no: 8648C was used to radiate an unmodulated CW signal to EUT at low, middle and high tuning frequency for each bands in order to stabilize the local oscillator of the EUT.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
SCANNING RECEIVER (EUT)	N/A	N	N/A
EARPHONE	N/A	Y	1.2
AC/DC ADAPTER	N	N	1.5

* 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
SCANNING RECEIVER (EUT)	N/A	N/A	N/A	N/A
EARPHONE	N	N/A	N	N/A
AC/DC ADAPTER	N	N/A	N	N/A

3.5 Equipment Modifications

To achieve compliance to FCC part 15 rules, the following change(s) was made by ONETECH Corp. during compliance testing:

“There was no Modified items during EMI test”



4. 4. REFERENCED RULES SECTIONS AND TEST PROCEDURE

4.1 Section 15.121(a):

Receivers can not altered or tuning by the user for the ability to receive transmissions in the cellular telephone bands (824~849 MHz and 869~894 MHz), because the specification of the EUT CAN NOT SUPPORT tuning for above frequency band. According to the specification of the EUT, the EUT can not access and analyze the cellular telephone band and cannot be re-enabled by any user-accessible procedure, including diode, resistor or jumper changes, nor by connection of any external device such as a personal computer, nor by installation of any special enabling semiconductor device.

Also, the receiver cannot capable of converting digital cellular transmissions to analog voice audio.

4.2 Section 15.121(b): Cellular Image and Spurious Rejection in Scanning Receiver

The 12 dB SINAD measurement method in the cellular telephone band used for frequencies that the receiver tunes and the signal rejection ratio gained by the measurement.

4.3 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.

4.4 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.

**5. PRELIMINARY TEST****5.1 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)
Standby Mode	
Receiving Mode	X

5.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated.

Operation Mode	The Worse operating condition (Please check one only)
Standby Mode	
Receiving Mode	X

6. FINAL RESULT OF MEASUREMENT

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

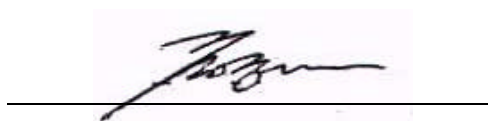
6.1 Conducted Emission Test

Humidity Level : 57 % Temperature : 23
 Limits apply to : FCC CFR 47, PART 15, SUBPART B
 Type of Test : SCANNING RECEIVER
 Result : PASSED BY -3.83 dB at 0.72 MHz

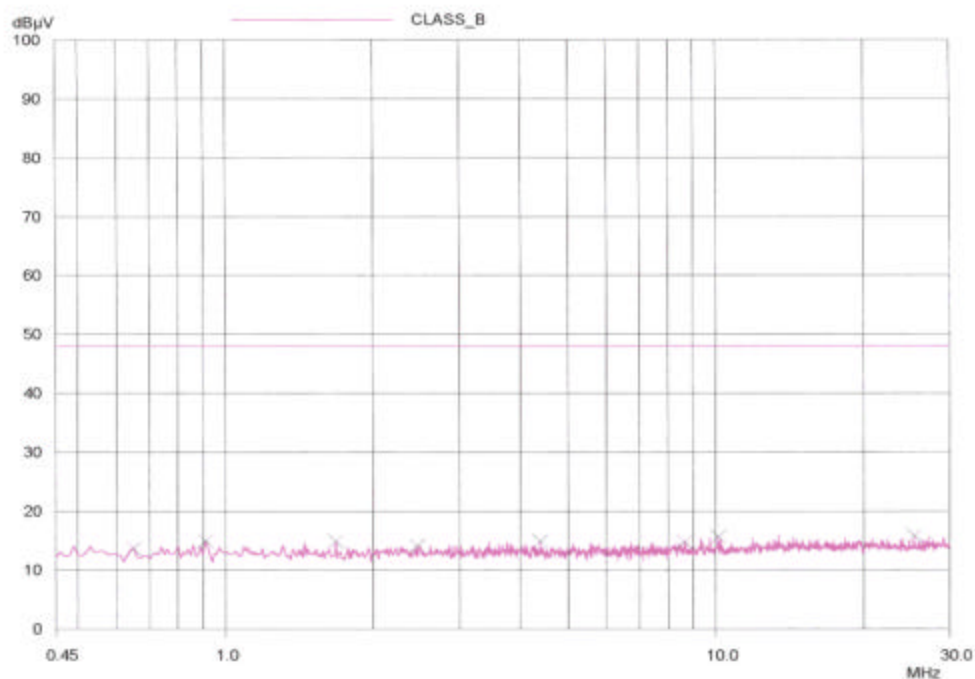
EUT : SCANNING RECEIVER Date: April 13, 2001
 Operating Condition : Continuously transmitting received spectrum signal
 Detector : CISPR QuasiPeak (6 dB Bandwidth: 9 kHz)

Power Line Conducted Emission			FCC CLASS B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
0.54	14.48	NEUTRAL	48.00	-33.52
1.14	14.73	NEUTRAL	48.00	-33.27
2.56	15.49	HOT	48.00	-32.51
5.54	15.19	HOT	48.00	-32.81
10.23	15.68	HOT	48.00	-32.32
14.98	15.70	NEUTRAL	48.00	-32.30

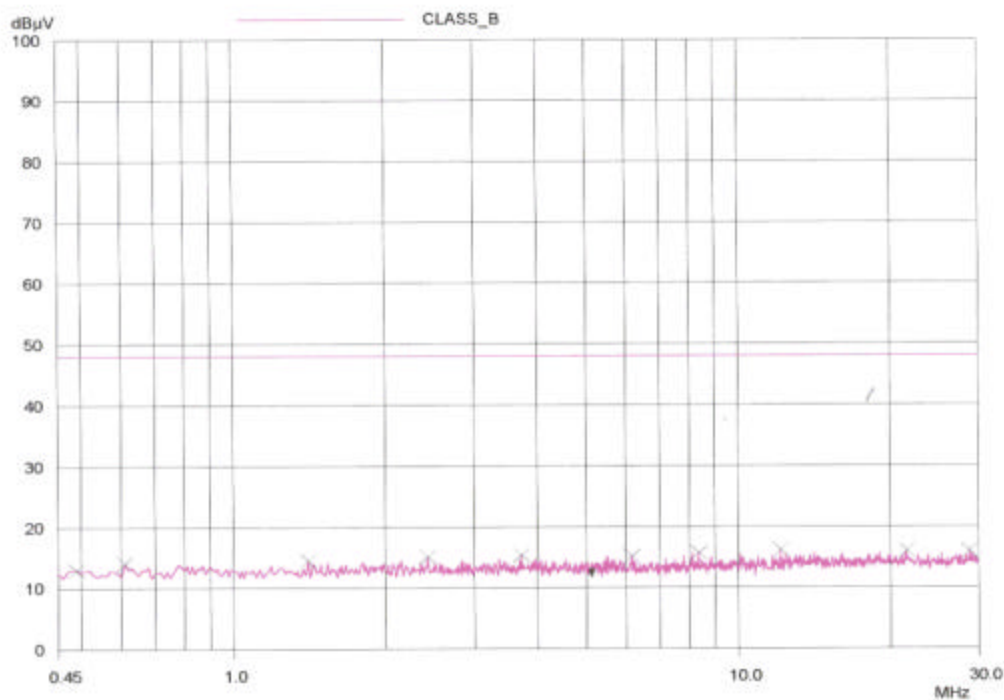
Line Conducted Emission Tabulated Data



Tested by: Young-Min Choi / Project Engineer



HOT LINE



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NEUTRAL LINE



6.2 Radiated Emission Test

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

Humidity Level : 51% Temperature : 23
Limits apply to : FCC CFR 47, PART 15, SUBPART B Date: April 17, 2001
Type of Test : SCANNING RECEIVER
Result : PASSED

EUT : SCANNING RECEIVER
Operating Condition : Continuously receiving spectrum signal
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Distance : 3 Meter
Tunning Band : A Band (66~88 MHz)

Tunning Frequency (MHz)	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)
66	318.0	8.5	H	15.21	2.11	25.82	46.00	-20.18
	570.0	-	H	18.65	2.85	21.50	46.00	-24.50
	822.0	-	H	21.97	3.75	25.72	46.00	-20.28
77	329.0	8.7	H	15.21	2.17	26.08	46.00	-19.92
	581.0	-	H	18.70	2.88	21.58	46.00	-24.42
	883.0	-	H	22.56	3.90	26.46	46.00	-19.54
88	340.0	10.9	H	15.20	2.23	28.33	46.00	-17.67
	592.0	-	H	18.74	2.89	21.63	46.00	-24.37
	844.0	-	H	22.61	3.83	26.44	46.00	-19.56

Radiated Emission Tabulated Data



Tunning Band : B Band (88~108 MHz)

Tunning Frequency (MHz)	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)
88.3	340.3	10.5	H	15.20	2.23	27.93	46.00	-18.07
	592.3	-	H	18.75	2.89	21.64	46.00	-24.36
	844.3	-	H	22.62	3.83	26.45	46.00	-19.55
98	350.0	14.1	H	15.19	2.28	31.57	46.00	-14.43
	602.0	-	H	18.84	2.91	21.75	46.00	-24.25
	854.0	-	H	22.76	3.85	26.61	46.00	-19.39
108	360.0	13.0	H	15.32	2.32	30.64	46.00	-15.36
	612.0	-	H	19.12	2.95	22.07	46.00	-23.93
	864.0	-	H	22.69	3.87	26.56	46.00	-19.44

Tunning Band : C Band (108~136 MHz)

Tunning Frequency (MHz)	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)
108.3	360.3	12.8	H	15.32	2.33	30.45	46.00	-15.55
	612.3	-	H	19.12	2.95	22.07	46.00	-23.93
	864.3	-	H	22.69	3.87	26.56	46.00	-19.44
122.0	374.0	12.1	H	15.50	2.39	29.99	46.00	-16.01
	626.0	-	H	19.51	3.00	22.51	46.00	-23.49
	878.0	-	H	22.60	3.89	26.49	46.00	-19.51
136.0	388.0	11.9	H	15.67	2.41	29.98	46.00	-16.02
	640.0	-	H	19.90	3.05	22.95	46.00	-23.05
	892.0	-	H	22.50	3.92	26.42	46.00	-19.58



Tunning Band : D Band (136~174 MHz)

Tunning Frequency (MHz)	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)
136.3	388.3	11.6	H	15.67	2.41	29.68	46.00	-16.32
	640.3	-	H	19.91	3.05	22.96	46.00	-23.04
	892.3	-	H	22.50	3.92	26.42	46.00	-19.58
155	407.0	12.1	H	15.98	2.44	30.52	46.00	-15.48
	659.0	-	H	20.33	3.12	23.45	46.00	-22.55
	911.0	-	H	22.66	3.98	26.64	46.00	-19.36
174	426.0	11.6	H	16.40	2.48	30.48	46.00	-15.52
	678.0	-	H	20.64	3.20	23.84	46.00	-22.16
	930.0	-	H	23.04	4.04	27.08	46.00	-18.92

Tunning Band : E Band (420~470 MHz)

Tunning Frequency (MHz)	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)
420	672.0	5.9	H	20.54	3.17	29.61	46.00	-16.39
	924.0	-	H	22.92	4.03	26.95	46.00	-19.05
	1176.0	-	H	-	-	-	54.00	-
445	697.0	5.6	H	20.95	3.29	29.84	46.00	-16.16
	949.0	-	H	23.41	4.10	27.51	46.00	-18.49
	1201.0	-	H	-	-	-	54.00	-
470	722.0	5.7	H	20.87	3.43	30.00	46.00	-16.00
	974.0	-	H	23.58	4.14	27.72	54.00	-26.28
	1226.0	-	H	-	-	-	54.00	-

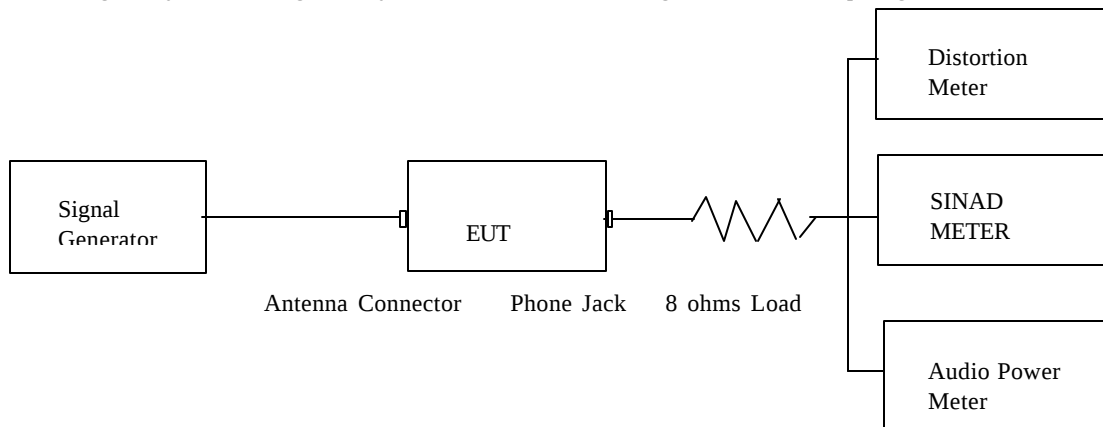
Remark. For the testing of above 1000MHz, the peak detector mode was used, but it was not observed any emissions from the EUT.



Tested by: Young-Min, Choi / Project Engineer

6.3. Cellular Image and Spurious Rejection in Scanning Receiver

The 12 dB SINAD measurement method in the cellular telephone band used for frequencies that the receiver tunes and the signal rejection ratio gained by the measurement according to the below setup diagram.



Tune the receiver to the received frequency and output the receiving frequency from signal generator to obtain its 12 dB SINAD. Then output the interference frequency to obtain its 12 dB SINAD. The signal rejection ratio is the ratio between these two output levels of the signal generator.

The tested cellular telephone frequency is as follows.

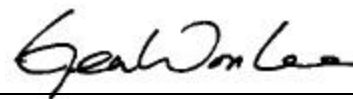
	Bottom	Middle	Top
Mobile Frequency	824.5	836.5	848.5
Base Frequency	869.5	881.5	893.5

Result: We scanned entire tuning range of receiver at each of cellular test frequencies above and signals which were noted as response were checked with the signal generator off and if they still existed as a response were determined as ambient signals and removed from the response list. According to the above procedure, only ambient signals unsquelched the receiver. Since no “received” frequency to cellular bands appeared, the EUT is compliance with 38dB rejection requirement.

Used Equipment:

Equipment Name	Model No	Manufacturer	Serial No	Last Cal
Radio Communication Annalyzer	CMTA 54	Rohde & Schwarz	834.0000.54	Sep. 2001

Remark: Above equipment has a function for Signal Generator, SINAD Meter, Audio Power Mmeter and Distortion Meter.



Tested by: Gae-Won Lee / Asst. Chief Engineer

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7. 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)

8. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test Receiver	R/S	ESVS 10	827864/005	SEP/00	12MONTH	■
2.	Test Receiver	R/S	ESHS 10	834467/007	APR/00	12MONTH	■
3.	Spectrum analyzer	HP	8568B	3026A0226	SEP/99	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	SEP/00	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	SEP/00	12MONTH	■
6.	Dipole Antenna	EMCO	3121C	9107-745	JUN/00	12MONTH	
7.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	MAR/00	12MONTH	■
8.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	MAR/00	12MONTH	■
9.	Conical Log spiral Antenna	EATON	93491-2	340	FEB/00	12MONTH	■
10.	LISN	EMCO	3825/2	9109-1867 9109-1869	JUN/00	12MONTH	■
11.	RF Amplifier	HP	8447F	3113A04554	SEP/00	12MONTH	■
12.	Spectrum Analyzer	HP	8561E	3350A00546	FEB/00	12MONTH	■
13.	Signal Generator	HP	8648C	3847U02731	APR./00	12MONTH	■
14.	Computer System Hard disk drive	HP	98581C 9153C	98543A CMC762Z9153	N/A N/A	N/A N/A	■ ■
15.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
16.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
17.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
18.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■

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