

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : E069R-040

AGR No. : A067A-155R

Applicant : DETECTOR Electronics Co., Ltd.

Address : 277-2, Yangpyong-Dong 4 Ka, Youngdeungpo-Ku, Seoul, Korea

Manufacturer : DETECTOR Electronics Co., Ltd.

Address : 277-2, Yangpyong-Dong 4 Ka, Youngdeungpo-Ku, Seoul, Korea

Type of Equipment : Remote Keyless Entry System

FCC ID : OP92WRM2

Model Name : T-2WAY-CR

Serial number : N/A

Total page of Report : 15 pages (including this page)


Date of Incoming : September 01, 2006

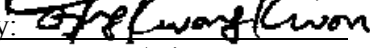
Date of issuing : September 20, 2006

SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART C §15.231**

This test report contains only the result of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

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1. VERIFICATION OF COMPLIANCE

APPLICANT : DETECTOR Electronics Co., Ltd.
ADDRESS : 277-2, Yangpyong-Dong 4 Ka, Youngdeungpo-Ku, Seoul, Korea
CONTACT PERSON : Se-Ryun, Lee / Chief Manager
TELEPHONE NO : +82-2-2632-0527
FCC ID : OP92WRM2
MODEL NAME : T-2WAY-CR
SERIAL NUMBER : N/A
DATE : September 20, 2006

DEVICE TYPE	Intentional Radiator
E.U.T. DESCRIPTION	RF REMOTE KEYLESS ENTRY SYSTEM FOR VEHICLE - Transceiver
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4: 2003
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 §15.231
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 DETECTOR Electronics Co., Ltd., Model T-2WAY-CR (referred to as the EUT in this report) is a transceiver that it controls door locking and unlocking, engine starting and stopping, trunk releasing of a vehicle by wireless remote controller. The associated transceiver is manufactured by DETECTOR Electronics Co., Ltd., Model No: T-2WAY-CT, FCC ID: OP92WCT2. The product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
TX FREQUENCY	433.92 MHz
MODULATION	FM
ANTENNA CONNECTOR TYPE	Fixed Type
ANTENNA GAIN	1.5 dBi
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	47.024 MHz and 10.245 MHz
RATED SUPPLY VOLTAGE	DC 12V
NUMBER OF LAYERS	2 LAYERS

* Remark: This equipment automatically deactivates the transmitter within not more than 1 second after being activated.

2.2 Model Differences:

-. None

2.3 Related Submittal(s) / Grant(s)

-. Original submittal only

2.4 Test System Details

The EUT was tested with the following all equipment used in the tested systems are:

Model No	Manufacturer	Description	Connected to
T-2WAY-CR	DETECTOR Electronics Co., Ltd.	EUT	DC Power Supply
DRP-305DN	DIGITAL ELEC.	DC Power Supply	EUT
E4432B	HP	Signal Generator	N/A

2.5 Test Methodology

The radiated testing was performed according to the procedures in ANSI C63.4: 2003 and performed at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 307-51 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Commission on

August 30, 2005. (Registration Number: 340658)

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
Antenna Unit Board	N/A	N/A	N/A
Control Unit Board	N/A	500M	N/A
Sensor Board	N/A	N/A	N/A

3.2 EUT exercise Software

To get a maximum radiated emission from the EUT at Transmitter mode, the EUT continuously was transmitted during the test by changing the software.

Also, for getting maximum emission from the EUT at Receiver mode, the signal generator set to transmit at 433.92MHz and the EUT receives the signal.

To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

3.3 Equipment Modifications

-. None

3.4 Configuration of Test System

Line Conducted Emission Test:

It is not need to test this requirement, because the power of the EUT supplies from a car battery.

Radiated Emission Test:

Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2003 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3meter open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

Preliminary radiated emissions tests were conducted using the procedure in ANSI C63.4: 2003, 8.3.1.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meters open area test site.

Coherent Test:

During Radiated Emission Tests, H.P. signal generator model no: E4432B was used to radiate an unmodulated CW signal to EUT at 433.92 MHz in order to cohere the individual components of the characteristic broadband emissions from EUT.

Antenna Power Conduction Test:

This equipment was only with a permanently attached antenna, so the radiated emission measurement was performed with the antenna attached.

Occupied Bandwidth Measurement:

This measurement is performed with the antenna located close enough to give a full-scale deflection of the modulated carrier on the spectrum analyzer. The plot is taken at 20 kHz/division frequency span, 10 kHz resolution bandwidth and 10dB/division logarithmic display from an 8568B spectrum analyzer.

3.5 Antenna Requirement

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Construction:

The transmitter antenna for the EUT is built-in on the PCB in the EUT, no consideration of replacement by the user.

4. PRELIMINARY TEST**4.1 AC Power line Conducted Emissions Tests**

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
It is not need to test this requirement, because the power of the EUT is supplied from a DC battery.	

4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
TX mode	X

5. FINAL RESULT OF MEASUREMENT

5.1 Field Strength of the Carrier Test

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

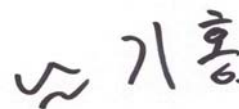
Humidity Level : 43 % Temperature: 23°C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)
 Type of Test : Transmitter
 Result : PASSED BY -5.82 dB at 433.92 MHz under average detector

EUT : Remote Keyless Entry System Date: September 06, 2006
 Operating Condition : TX mode
 Distance : 3 Meter

Radiated Emissions			Ant	Correction Factors		Total	FCC	
Carrier Freq. (MHz)	Amplitude (dBuV)	Detector Mode	Pol.	Antenna (dB/m)	Cable (dB)	Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
433.92	54.50	Peak	H	17.74	4.47	76.71	80.83	-24.12
433.92	47.90	Peak	V	17.74	4.47	70.11	80.83	-30.72

*Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

“H”: Horizontal Polarization, “V”: Vertical Polarization



Tested by: Ki-Hong, Nam / Test

Engineer

5.2 Spurious Emission Test

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

Humidity Level : 43 % Temperature: 23°C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)
 Type of Test : Transmitter
 Result : PASSED BY -2.80 dB at 1301.76 MHz under average mode

EUT : Remote Keyless Entry System Date: September 06, 2006
 Operating Condition : TX mode
 Distance : 3 Meter

Radiated Emissions			Ant	Correction Factors		Total	FCC	
Freq. (MHz)	Amplitude (dBuV)	Detect Mode	Pol.	Antenna (dBuV/m)	Cable (dB)	Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
867.84	26.69	Peak	H	23.35	7.10	57.14	60.83	-23.69
867.84	24.17	Peak	V	23.35	7.10	54.62	60.83	-26.21
1301.76	23.30	Peak	H	25.03	9.08	57.41	80.83	-23.42
1301.76	24.50	Peak	V	25.03	9.08	58.61	80.83	-22.22
Other spurious frequencies were not found up to 4400 MHz.								

*Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

“H”: Horizontal Polarization, “V”: Vertical Polarization

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5.3 Radiated Emission Test for Receiver Mode

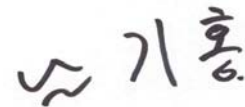
The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 43 % Temperature : 23°C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B
 Type of Test : Un-Intentional Radiator
 Result : PASSED BY -8.08 dB at 141.06 MHz

EUT : REMOTE KEYLESS ENTRY SYSTEM Date: September 06, 2006
 Operating Condition : RX mode
 Distance : 3 Meter

Radiated Emissions			Ant	Correction Factors		Total	FCC	
Freq. (MHz)	Amplitude (dBuV)	Detect Mode	Pol.	Antenna (dBuV/m)	Cable (dB)	Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
49.38	15.50	Peak	V	11.36	1.52	28.38	40.00	-11.62
63.92	19.75	Peak	V	6.65	1.48	27.88	40.00	-12.12
94.50	21.30	Peak	H	9.05	1.88	32.23	43.52	-11.29
141.06	18.77	Peak	H	14.28	2.39	35.44	43.52	-8.08
187.50	13.82	Peak	H	15.78	2.80	32.40	43.52	-11.12
329.43	14.50	Peak	H	15.51	4.04	34.05	46.02	-11.97

*Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.



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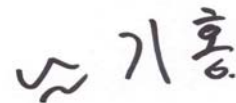
5.4 Bandwidth of the operating frequency

Humidity Level : 43 % Temperature: 23°C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231 (c)
 Type of Test : Transmitter
 Result : PASSED

EUT : Remote Keyless Entry System Date: September 06, 2006
 Operating Condition : TX mode
 Minimum Resolution
 Bandwidth : 10 kHz

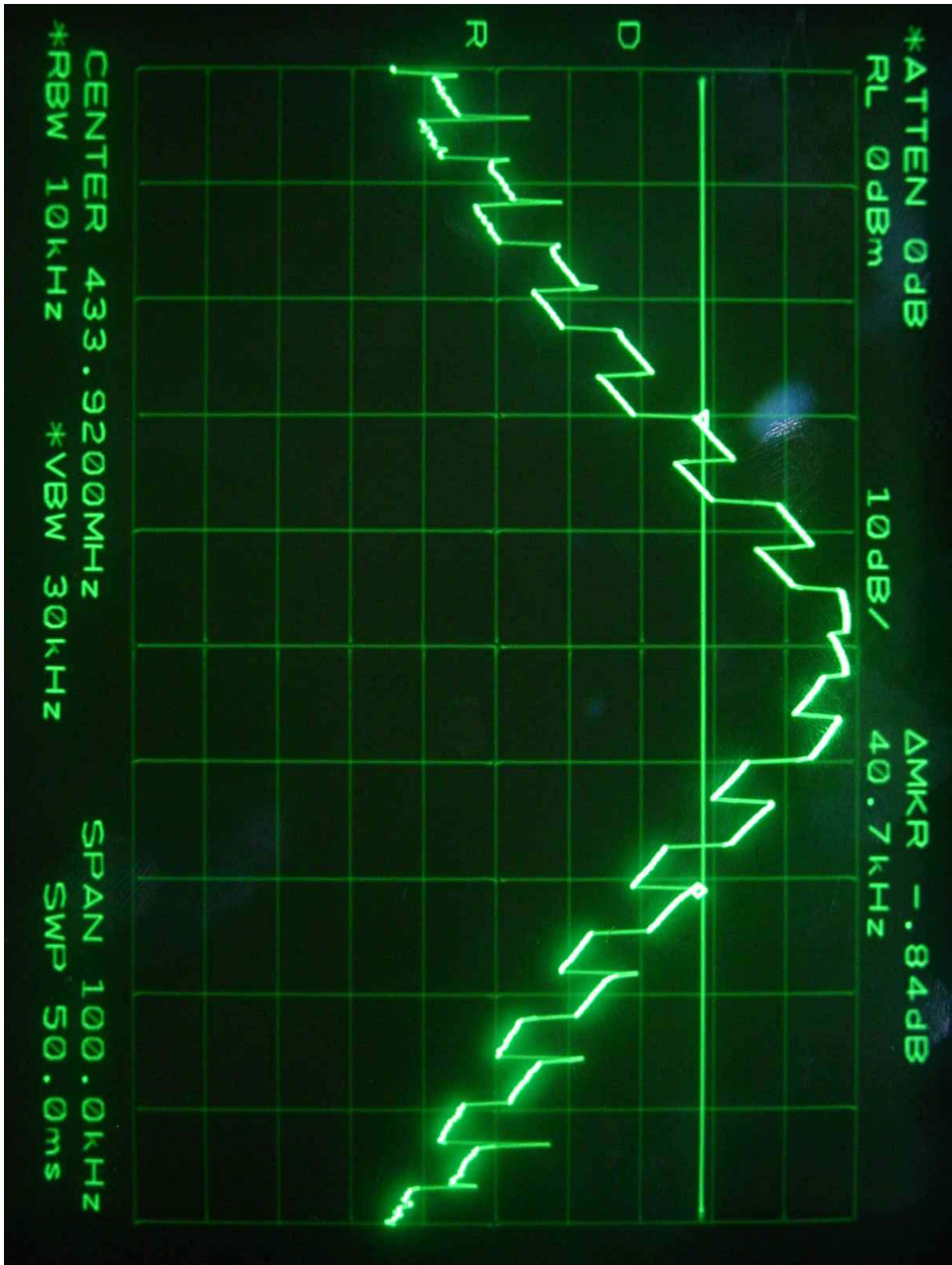
Carrier Freq. (MHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
433.92	40.70	787.5	The point 20dB down from the modulated carrier

Remark: Please refer to Photo Data for test data.



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Photo Data



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FCC-004 (Rev.0)

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon1-dong, Jungwon-gu, Seongnam-si, Gyeonggi-Do, 462-705, Korea
(TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC Testing Dept : 307-51 Daessangryung-Ri, Chowol-myun Gwangju-si, Gyeonggi-do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

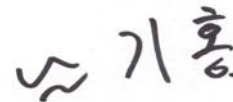
5.5 Transmission Time

Humidity Level : 43 % Temperature: 23°C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231 (a)(2)
 Type of Test : Transmitter
 Result : PASSED

EUT : Remote Keyless Entry System Date: September 06, 2006
 Operating Condition : TX modes after receiving the signal from associated transmitter and the spectrum was in max hold mode.

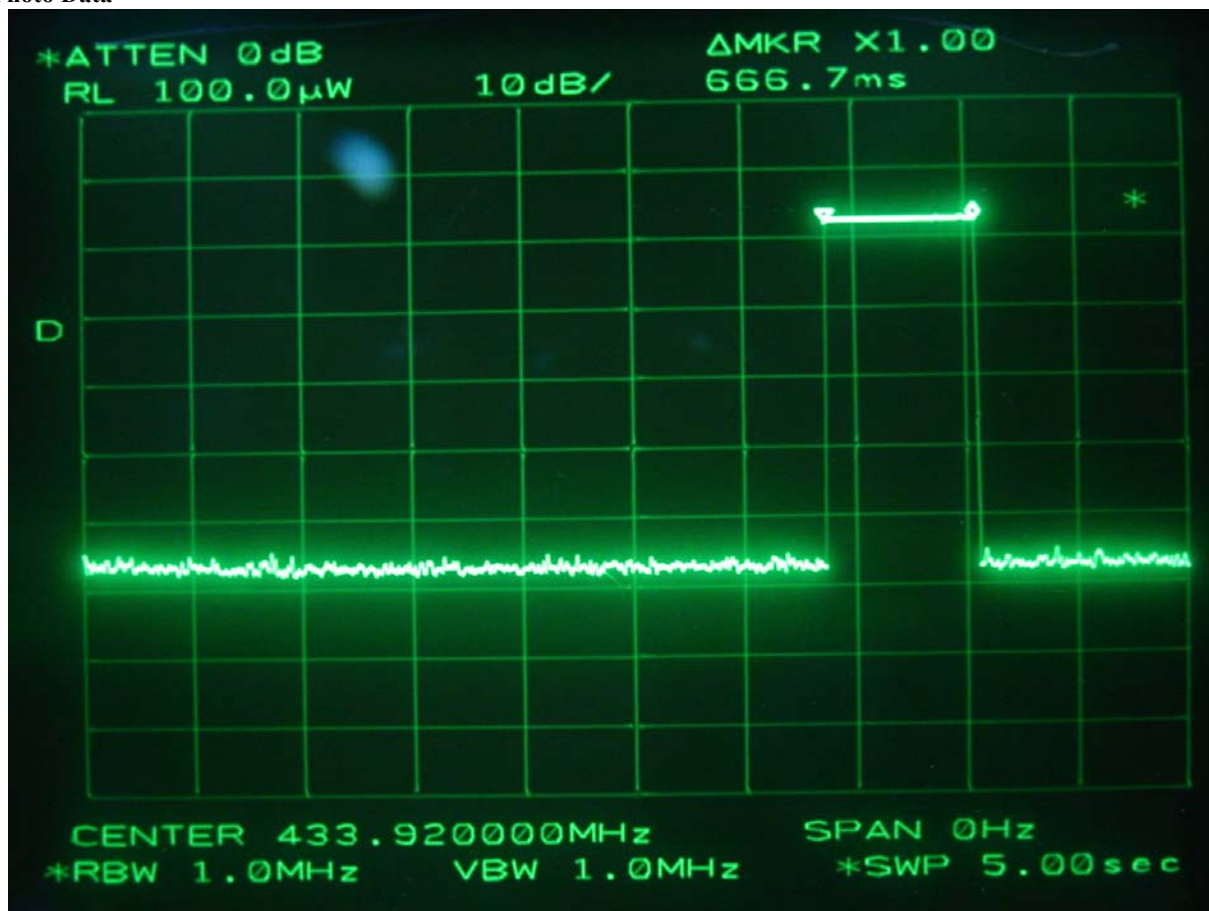
Carrier Freq. (MHz)	Measured Time (ms)	Limit (ms)	Result
433.92	666.7	5000	Pass

Remark: Please refer to Photo Data for test data.



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Photo Data



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	ESVS10	827864/005	DEC/05	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	MAY/06	12MONTH	■
3.	Spectrum analyzer	R/S	FSP	100017	JUN/06	12MONTH	■
4.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	MAY/06	12MONTH	
5.	Biconical antenna	EMCO	3110	9003-1121	FEB/06	12MONTH	
		Schwarzbeck	VHA9103	91031852	FEB/06		■
6.	Log Periodic antenna	EMCO	3146	9001-2614	FEB/06	12MONTH	
		Schwarzbeck	9108-A(494)	62281001	FEB/06		■
7.	LISN	EMCO	3825/2	9109-1867	JUN/06	12MONTH	
				9109-1869	JUN/06		
		Schwarzbeck	NSLK 8126	8126-404	JUL/06		
8.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
9.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
10.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■