ONETECH Corp.

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TEL: +82-2-587-9037 FAX: +82-2-587-9039 / Head office & Safety Dept.
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ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

REMOTE CONTROL SECURITY TRANSCEIVER
CERTIFICATION TO FCC PART 15 REQUIREMENT

PRODUCT	VEHICLE SECURITY ARARM SYSTEM		
FCC ID	OARM447675		
MODEL NO.	B447675	SERIAL NO.	N/A
APPLICANT & ADDRESS	PRECISION ENGINEERING IND., INC. 11627 CANTARA STREET NORTH HOLLYHOOD, CA 91605 U.S.A.		

REPORT NO.	E991R-011	ISSUE DATE	January 6, 1999
PREPARED BY :	ONETECH CORPORATION 2 F. KUNHAN B/D, 1557-11, SEOCHO-DONG, SEOCHO-KU, SEOUL 137-070 KOREA (TEL)02-587-9037, (FAX)02-587-9039		

LIST OF EXHIBITS

FCC ID : OARM447675

MODEL : B447675

EXHIBIT 1. IDENTIFICATION LABEL

2. AGENT AUTHORIZATION

3. MODIFICATION LIST

4. TECHNICAL INFORMATION:
ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

5. PHOTO REPORT

6. USER'S MANUAL & SCHEMATIC (BLOCK DIAGRAM)

PREPARED BY: ONETECH CORPORATION
2 F. KUNHAN B/D, 1557-11, SEOCHO-DONG, SEOCHO-KU,
SEOUL 137-070 KOREA (TEL)02-587-9037(FAX)02-587-9039

EXHIBIT 1. IDENTIFICATION LABEL:

PROPOSED FCC LABEL (Part15 sec. 15.19)

The label included following statement will be attached on bottom side of product.

FCC ID : OARM447675

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operations.

Made in Korea

"Please find an ID Label for EUT at ID Label/Location Info in Exhibit Type"

EXHIBIT 2. AGENT AUTHORIZATION:

"Please find an Agent Authorization Letter at Attestation Statements in Exhibit Type"

EXHIBIT 3. MODIFICATION LIST:

"There was no modified items during EMI test"

EXHIBIT 4. TECHNICAL INFORMATION:

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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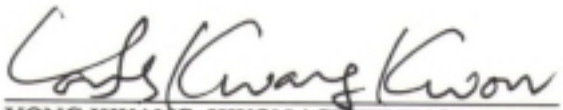
1. VERIFICATION OF COMPLIANCE

APPLICANT : PRECISION ENGINEERING IND., INC.
11627 CANTARA STREET NORTH HOLLYWOOD, CA 91605.
CONTACT PERSON : JOHN JOUNGHOON KIM / MANAGER
TELEPHONE NO : (818) 767-8593
FCC ID : OARM447675 MODEL NO/NAME: B447675
SERIAL NUMBER : N/A
DATE : January 6, 1999

DEVICE TYPE	INTENTIONAL RADIATOR (REMOTE CONTROL SECURITY TRANSCIVER)
E.U.T. DESCRIPTION	VEHICLE SECURITY ARARM SYSTEM
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)	PART 15 SUBPART C §15.231
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	NO
FINAL TESTS WERE CONDUCTED ON	3 METER OPEN TEST SITE

The above equipment was tested by ONETECH CORPORATION 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.



YONG KWANG, KWON / CHIEF ENGINEER
EMC TESTING DEPARTMENT
ONETECH Testing & Eval. Lab.
SEOUL KOREA

2. GENERAL INFORMATION

2.1 Product Description

The PRECISION ENGINEERING IND., INC Model B447675 (referred to as the EUT in this report) is a remote control security transceiver, which is attached in a car for using vehicle security alarm system. The product specification information described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
TX/RX FREQUENCY RANGE	447.675 MHz
MODULATION	FM
RECEIVER TYPE	SUPERHETERODYNE RECEIVER
ANTENNA TYPE	ROD ANTENNA(Permanently Attached)
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	447.675 X 2, 10.245 MHz
POWER REQUIREMENTS	12V DC Battery
NUMBER OF LAYERS	2 LAYER

2.2 Related Submittal(s) / Grant(s)

ORIGINAL SUBMITTAL ONLY

This application is simultaneously filed with Precision Engineering Ind., Inc Remote/Security Control Transceiver **FCC ID: OARR447675.**

2.3 Test System Details

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

The Model numbers for all equipment connected to the tested system are:

Device		Model No	Manufacturer	FCC ID	Description
CONTROL MODULE	Shock Sensor Plug	N/A	N/A	N/A	Shock Sensor
	Siren Output	N/A	N/A	N/A	Siren
	Red Plug	N/A	N/A	N/A	L.E.D.
	Valet Switch	N/A	N/A	N/A	Switch
	Power	Globel400L	Rocket	N/A	Battery
	Transceiver	B447675	Precision Engineering	OARM447675	BASE attached in a car
TRANSCEIVER		R447675	Precision Engineering	OARR447675	Hand-held REMOTE

2.4 Test Methodology

Both Radiated emission testing and Bandwidth of operating frequency were performed according to the procedures in ANSI C63.4/1992. Radiated testing was performed at an antenna to EUT distance of 3 meters.

2.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Detailed description of test facility was submitted to the Commission on January 24, 1996(31040/SIT, 1200F2).

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the following components inside the EUT were installed.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
MAIN BOARD	PRECISION ENGINEERING IND., INC.	DKRT-B	N/A

3.2 Equipment Modifications

To achieve compliance to FCC part 15 rule, the following change(s) were made by PRECISION ENGINEERING IND., INC. during compliance testing: **"There was no Modified items during EMI test"**

3.3 Operating Conditions.

The EUT and accessories were operated at the rated operating voltage and typical conditions-mechanical, electrical- for which are designed, but some output cables of control module, for example, Door Trigger, Ignition 12V , Starter Kill , Dome Light, Parking Lights and so on were not connected. The interconnecting cables of control module, which is connected to peripheral and other cables, were extended about 1m length.

3.4 Cable Description and Noise Suppression Parts on Cable

Device		I/O Cable Shield	Length(m)	Ferrite Bead(Y/N)	Location
CONTROL MODULE	Shock Sensor Plug	Non-shielded	1.2	N	N/A
	Siren Output	Non-shielded	1.2	N	N/A
	Red Plug	Non-shielded	1.2	N	N/A
	Valet Switch	Non-shielded	1.2	N	N/A
	Power	Non-shielded	1.2	N	N/A
	Transceiver	Non-shielded	1.2	N	N/A
TRANSCEIVER		N/A	N/A	N	N/A

4. REFERENCED RULES SECTIONS AND TEST PROCEDURE

4.1 Section 15.203: Antenna Requirement

The PRECISION ENGINEERING IND., INC transceiver complies with the requirement of section 15.203, because the antenna is permanently secured and made of Rod Antenna.

4.2 Section 15.231(a)(2): Regarding Release Transmission within 5 seconds

The PRECISION ENGINEERING IND., INC transceiver complies with the requirement of section 15.231(a)(2), because the CONTROL MODULE, MODEL NO: CM447675 uses software, which is automatically deactivate the transmitter within 4.5 seconds of being released.

4.3 Measurement of Tested EUT.

Line Conducted Emission Test:

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

Radiated Emission Test

Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4/1992 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.

Field Strength of the Carrier Test:

The field strength of the carrier frequency shall be tested at open field test site with normal supply voltage. In addition, the variation of the fundamental transmitted by the device is shown for variation in supply voltage to 80% and 115% of the normal supply voltage. For battery operated equipment, tests shall be performed using a new battery.

Spurious Emission Test:

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

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 50 kHz/division frequency span, 10kHz-resolution bandwidth and 5dB/division logarithmic display from an 8568B spectrum analyzer. The Occupied Bandwidth is determined at the point 20dB down from the modulated carrier.

5. PRELIMINARY TESTS

5.1 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)
N/A	N/A

5.2 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
Rx Mode	

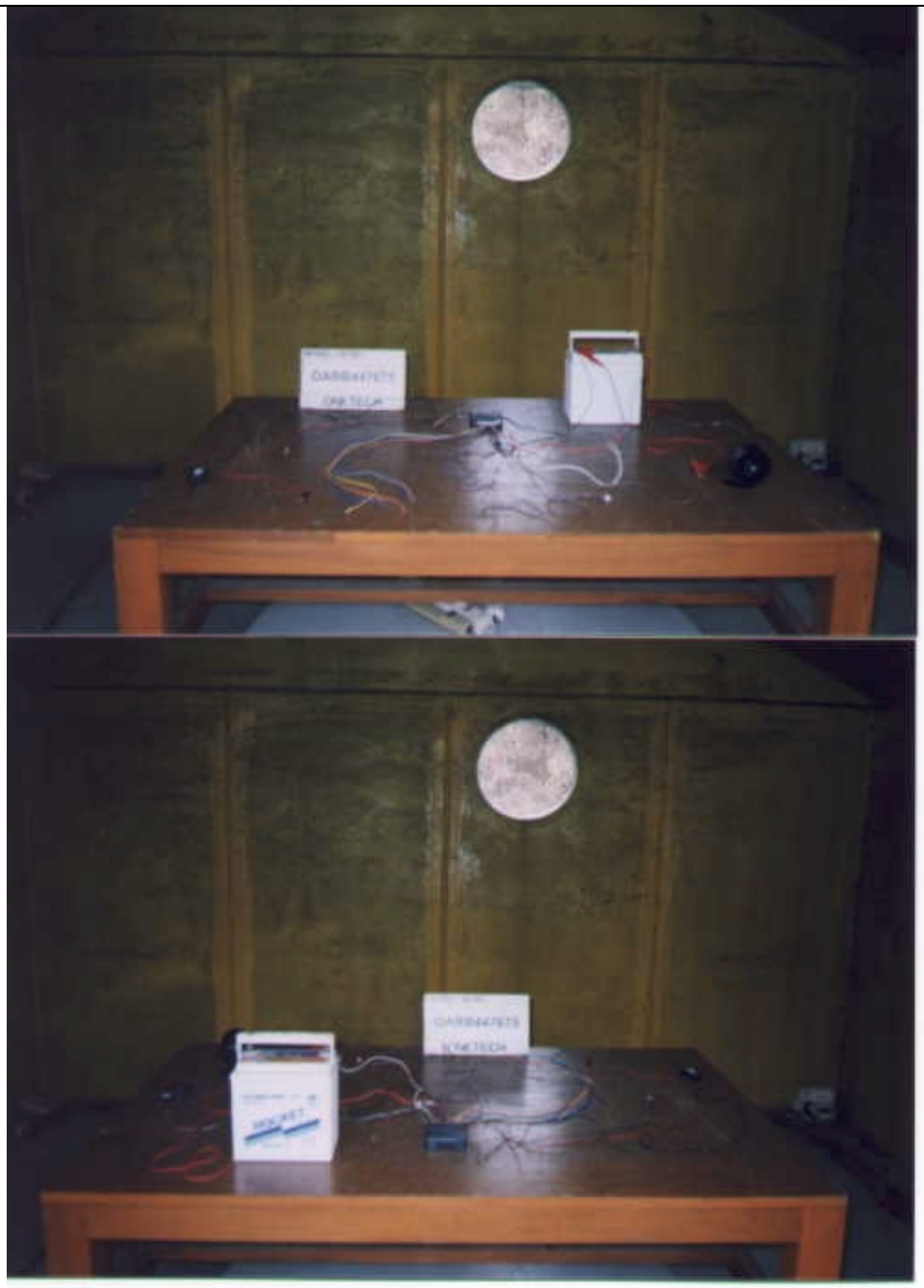
6. CONDUCTED AND RADIATED MEASUREMENT PHOTOS

6.1 Conducted Measurement Photos

Not Applicable

Not Applicable

6.2 Radiated Measurement Photos



7. FINAL RESULT OF MEASUREMENT

Per preliminary tests, the following TX mode of operations were selected which shown the maximum emissions level.

7.1 Conducted Emissions Tests

Humidity Level : % Temperature : □

Limits apply to : FCC CFR 47, PART 15, SUBPART C

Result : PASSED BY dB

Operating Condition : Date:

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

Power Line Conducted Emissions			FCC Limit	
Frequency (MHz)	Amplitude (dBuV)	conductor	Limit (dBuV)	Margin (dB)
It is not need to test this requirement, because the EUT supplies from a DC battery.				

Line Conducted Emissions Tabulated Data

7.2 Field Strength of the Carrier Test

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

To get the highest levels of above testing, the test was performed using a new battery.

Humidity Level : 54 % Temperature : 12□

Limits apply to : FCC CFR 47, PART 15, SUBPART C

Result : PASSED BY –6.1 dB at Quasi-Peak mode

Operating Condition : TX mode Date: December 12, 1998

Distance : 3 Meter

Radiated Emissions		Detection Mode	Ant	Correction Factors		Total	FCC Limit	
Carrier Freq. (MHz)	Ampl. (dBuV)		Pol.	Ant. (dB/m)	Cable (dB)	Ampl (dBuV/m)	Limit (dBuV/m)	Margin (dB)
447.7	52.6	Quasi-Peak	H	16.45	6.17	75.22	81.27	-6.05

*Remark: FCC Limit: 3,750 ~ 12,500uV/m to 260 ~ 470 MHz (linear interpolations)

Limit calculation at 447.675 MHz = (12,500 – 3,750)/(470 – 260) X (**447.675** – 260) + 3,750 = 11,569.8 uV/m

20Log 11,569.8 = 81.266 dBuV/m

Measuring by : Gea Won, Lee / Project Engineer

7.3 Spurious Emission Test

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

To get the highest levels of above testing, the test was performed using a new battery.

Humidity Level : 54 % Temperature : 12□

Limits apply to : FCC CFR 47, PART 15, SUBPART C

Result : PASSED BY –17.4 dB at Peak mode

Operating Condition : TX mode Date: December 12, 1998

Distance : 3 Meter

Radiated Emissions		Detection Mode	Ext. Pre-Amp. (dBuV)	Ant	Correction Factors		Total	FCC Limit	
Freq. (MHz)	Ampl (dBuV)			Pol.	Ant. (dB/m)	Cable (dB)	Ampl (dBuV/m)	Limit (dBuV/m)	Margin (dB)
895.5	13.2	Peak	0	H	22.98	7.68	43.86	61.3	-17.44
1343.0	31.6	Average	25.0	H	26.42	9.1	42.12	61.3	-19.18
1791.0	*	Average	25.0	H	-	-	-	61.3	-
Other spurious frequencies were not found up to 5000 MHz.									

*Remark: FCC Limit: 375 ~ 1,250uV/m to 260 ~ 470MHz (linear interpolations)

Limit calculation at 447.675 MHz = (1,250 – 375)/(470 – 260) X (**447.675** – 260) + 375 = 1,156.98 uV/m

20Log 1,156.98 = 61.3 dBuV/m

The marked "*" means less than 5.0 dBuV.

Measuring by : Gea Won, Lee / Project Engineer

7.4 Bandwidth of the operating frequency

Humidity Level : 56 % Temperature : 25 □

Limits apply to : FCC CFR 47, PART 15, SUBPART C

Result : PASSED

Operating Condition : TX mode Date: December 13, 1998

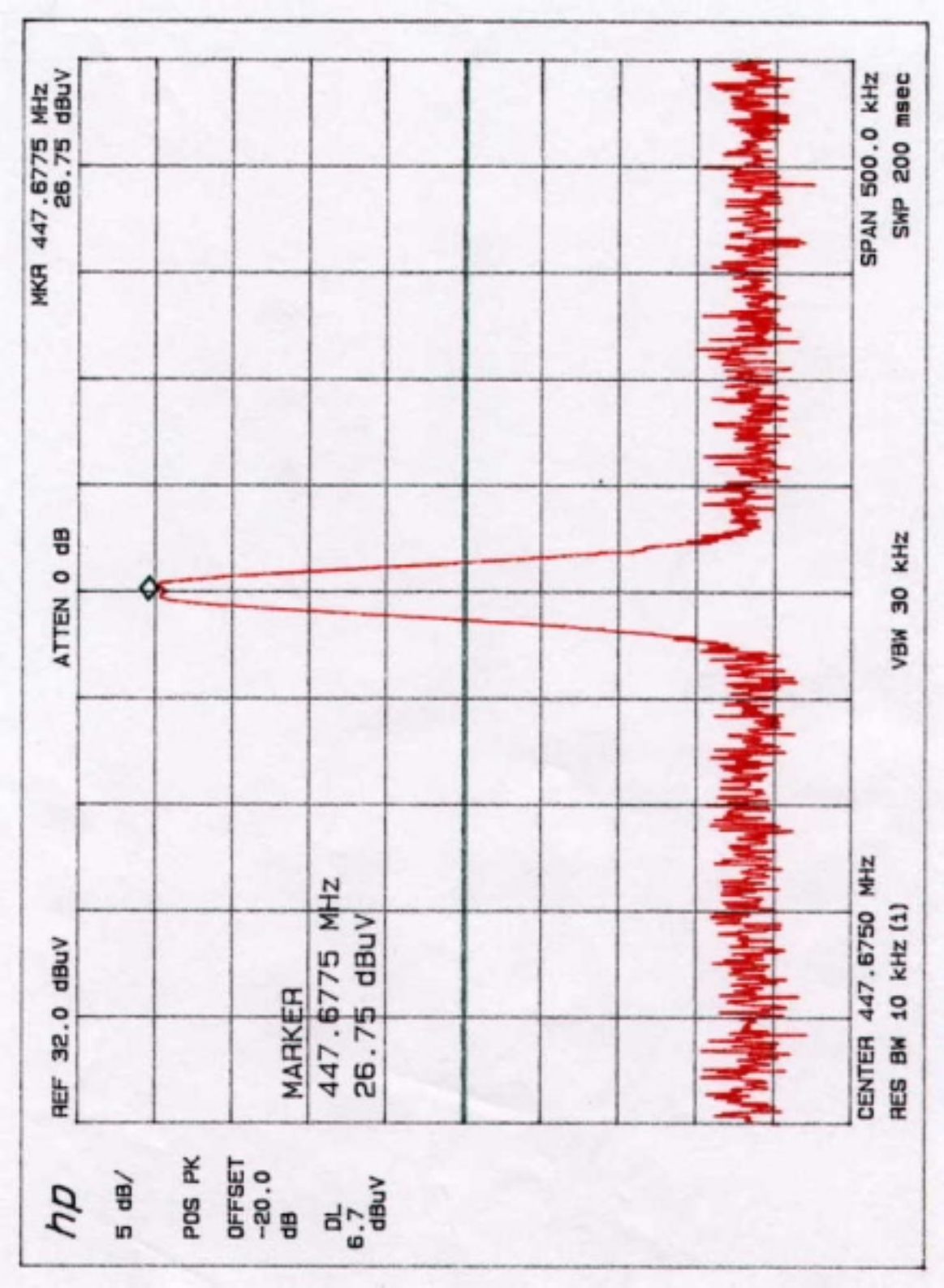
Minimum Resolution Bandwidth : 10 kHz

Carrier Freq. (MHz)	Bandwidth of the emission. (MHz)	Limit (MHz)	Remark
447.675	0.026	1.119	The point 20dB down from the modulated carrier

Remark: FCC Limit for above testing is: 310 MHz X 0.0025 = 780kHz. Please refer to Plot #1 for test data in next page.

Measuring by : Gea Won, Lee / Project Engineer

7.5 Plotting Data for bandwidth of the operating frequency



7.6 Radiated Emission Test

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

To get the highest levels of above testing, the test was performed using a new battery.

Humidity Level : 54 % Temperature : 12□

Limits apply to : FCC CFR 47, PART 15, SUBPART C

Result : PASSED BY –4.9 dB at Quasi-Peak mode

Operating Condition : TX mode, Date: December 12, 1998

Distance : 3 Meter

Radiated Emissions		Detection Mode	Ant Pol.	Correction Factors		Total	FCC Limit	
Freq. (MHz)	Amp. (dBuV)			Ant. (dBuV)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
80.42	12.8	Peak	V	6.54	3.21	22.55	40.0	-17.45
149.35	13.5	Peak	H	13.6	4.00	31.10	43.5	-12.40
198.99	8.20	Peak	H	17.1	4.20	29.50	43.5	-14.00
291.4	17.9	Peak	H	13.96	5.10	36.96	46.00	-9.04
436.6	18.9	Quasi-Peak	H	16.18	6.04	41.12	46.00	-4.88
497.4	11.2	Peak	H	17.75	6.20	35.15	46.0	-10.85

Measuring by : Gea Won, Lee / Project Engineer

8. 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)

9. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test Receiver	R/S	ESVS 30	826638/008	AUG/98	12MONTH	■
2.	Spectrum Analyzer	HP	8568B	3026A0226	AUG/98	12MONTH	■
3.	RF Pre-selector	HP	85685A	3107A01264	AUG/98	12MONTH	■
4.	Quasi-Peak Adapter	HP	85650A	3107A01542	AUG/98	12MONTH	■
5.	Spectrum Analyzer	HP	8561E	3350A00546	JUN/98	12MONTH	■
6.	Loop Antenna	EMCO	6502	9108-2668	FEB/98	12MONTH	
7.	Dipole Antenna	EMCO	3121C	9107-745	FEB/98	12MONTH	
8.	Biconical Antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	FEB/98	12MONTH	■
9.	Log Periodic Antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	FEB/98	12MONTH	■
10.	Horn Antenna	EMCO	3115	9509-4563	MAR/98	12MONTH	■
11.	LISN	EMCO	3825/2	9109-1867 9109-1869	AUG/98	12MONTH	■
12.	RF Amplifier	HP	8447F	3113A04554	N/A	N/A	■
13.	Spectrum Analyzer	HP	8591A	3131A02312	APR/98	12MONTH	
14.	Spectrum Analyzer	ADVANTEST	R4131BN	91520070	FEB/98	12MONTH	
15.	Computer System Hard disk drive	HP	98581C 9153C	98543A CMC762Z9153	N/A N/A	N/A N/A	■ ■
16.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
17	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
18.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
19.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■

EXHIBIT 5. PHOTO REPORT

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“Please find in/outside photos of EUT at External Photos in Exhibit Type”

EXHIBIT 6. USER'S MANUAL & SCHEMATIC (BLOCK DIAGRAM)

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“Please find a manual and block diagram for EUT at User Manual in Exhibit Type”