

HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

PRODUCT COMPLIANCE TEAM
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CERTIFICATION

Manufacture; CAS Corporation #19 Ganap-ri Gwangjuk-Myoun angju-gun Gyeonggi-do, Seoul Korea CAS FRN : 0007-1276-16	Date of Issue: MAY 21, 2002 Test Report No.: HCT-F02-0504 Test Site: HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD. HCT FRN : 0005-8664-21
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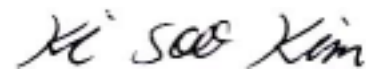
FCC ID :**QD8TW200****APPLICANT :****CAS Corporation**

FCC Rule Part(s): Part 15 & 2; ET Docket 95-19
Equipment Class: Communications Receiver used w/ Pt 15 Tx (CYY)
Frequency Range: 20 ch, 903.000Mhz 918.500Mhz
Standard(s): FCC Class B: 2001
Equipment(EUT) Type: Weighing indicator
Model(s): TW-200
Port/ Connector(s): Power cable 1.5m

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-1992.(See Test Report if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HYUNDAI C-Tech. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse of 1988,21 U.S.C.853(a).



Report prepared by : Ki-Soo Kim
Manager of EMC Tech. Part



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1. GENERAL INFORMATION

1.1 Product Description

These goods perform excellently and exhibit splendid properties through strike tests. CAS indicator is delicately designed to coincide with the special requirements of several industrial fields and includes many functions and various external interfaces. Also, it is programmed for the user's convenience and contains display functions that are easily accessible.

Product specification information described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	METAL
LIST OF EACH OSC. OR XTAL. FREQ.(FREQ. 1MHz)	22.11840MHz
Display	LCD (5 digit)
CHIPSET BRAND AND PART NO.	HYUNDAI : GMS97C58 NEC : D71055C MALAY : HIN232CP NEC : D7225G MOTORLA : MC14066BCP
NUMBER OF LAYER	MAIN BOARD 4 LAYER POWER BOARD 2 LAYER
Channel	20 channels
Operation temperature	-10 to +40
SIZE	30.5 X 73 X 12mm
FREQUENCY RANGE	903.000Mhz 918.500Mhz
Product size	200mm x 130mm x 53mm
Weight	Approx. 1 kg (2.2 lb)

1.2 Related Submittal(s) / Grant(s)

ORIGINAL SUBMITTAL ONLY

1.3 Tested System Details

The Model names for all equipment, plus descriptions used in the tested system (including inserted cards) are:

DEVICE TYPE	MANUFACTURER	MODEL NUMBER	FCC ID / DoC	CONNECTED TO
Weighing indicator (EUT)	CAS Corporation	TW-200	QD8TW200	N/A
AC ADAPTOR	CAS Corporation	CK-1212500U	-	HOST

1.4 Test Methodology

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 3 meters.

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1,MAEKOK-RI,HOBUP-MYUN,ICHON-SI,KYOUNGKI-DO, 467-701,KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 24,2000(Confirmation Number: EA90661)

2.SYSTEM TEST CONFIGURATION

2.1 Justification

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the following components inside the E.U.T were used.

DEVICE TYPE	MANUFACTURE	MODEL/PART NUMBER
MAIN BOARD	CAS	6100-PTW-100-0
POWER BOARD	CAS	-

2.2 EUT exercise Software

N/A

2.3 Cable Description

DEVICE TYPE	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
Weighing indicator (EUT)	N	N/A	1.5(P)

The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

2.4 Noise Suppression Parts on Cable. (I/O CABLE)

DEVICE TYPE	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
Weighing indicator (EUT)	Y	EUT END	N	N/A

2.5 Equipment Modifications

N/A

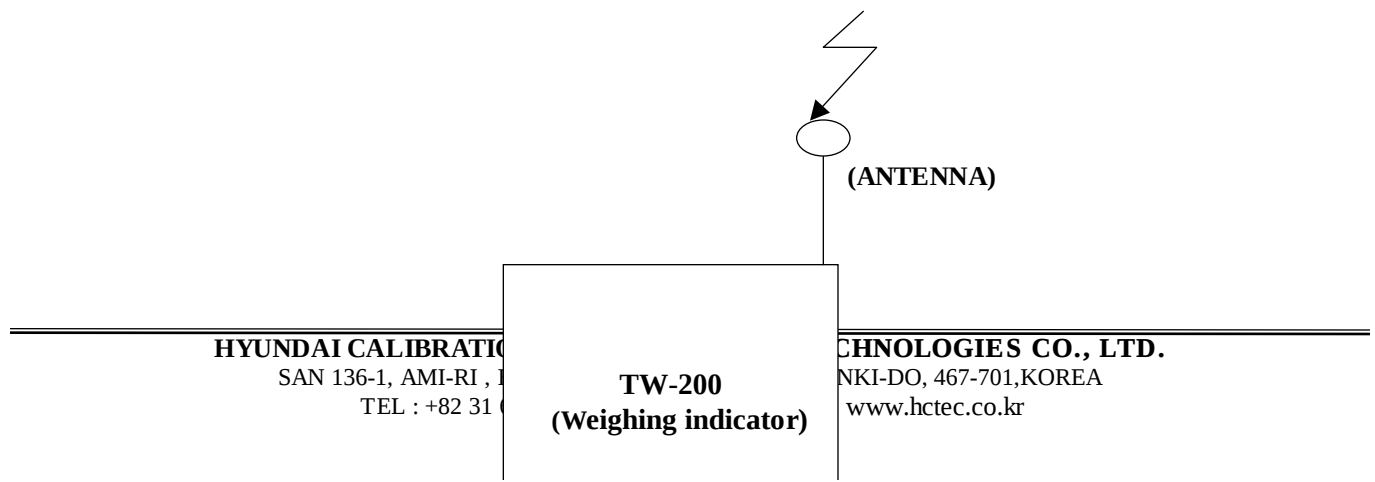
2.6 Configuration of Test system

Line Conducted Test : EUT was connected to LISN, all other supporting equipment were connected to another LISN.

Preliminary Power line Conducted Emission tests were performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated 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 condition. Final Radiated Emission tests were conducted at 3 meter open area test site.

[Configuration of Tested System]



CK-1212500U
(AC ADAPTOR)

3. FINAL CONDUCTED AND RADITED EMISSION TESTS SUMMARY

3.1 Conducted Emissions

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

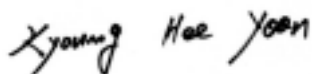
Humidity Level : 34% Temperature : 20
Limit apply to : FCC CFR 47, PART 15, SUBPART B §15.207
Type of Tests : CLASS B
Date : April 17, 2002
Result : PASSED

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EUT : Weighing indicator / TW-200
Detector : CISPR Quasi-Peak (6 dB Bandwidth : 9 KHz)

Power Line Conducted Emissions			FCC Class B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
0.585	29.5	NEUTRAL	48	-18.5
0.625	29.8	NEUTRAL	48	-18.2
0.630	33.3	HOT	48	-14.7
0.645	33.3	HOT	48	-14.7
0.655	33.5	HOT	48	-14.5
0.660	33.4	HOT	48	-14.6

0.670	33.2	HOT	48	-14.8
0.685	33.0	HOT	48	-15.0
0.980	16.5	NEUTRAL	48	-31.5
1.025	16.5	NEUTRAL	48	-31.5
13.565	32.2	NEUTRAL	48	-15.8
22.120	32.9	NEUTRAL	48	-15.1



Measured by Kyoung-Hee YOON / Engineer

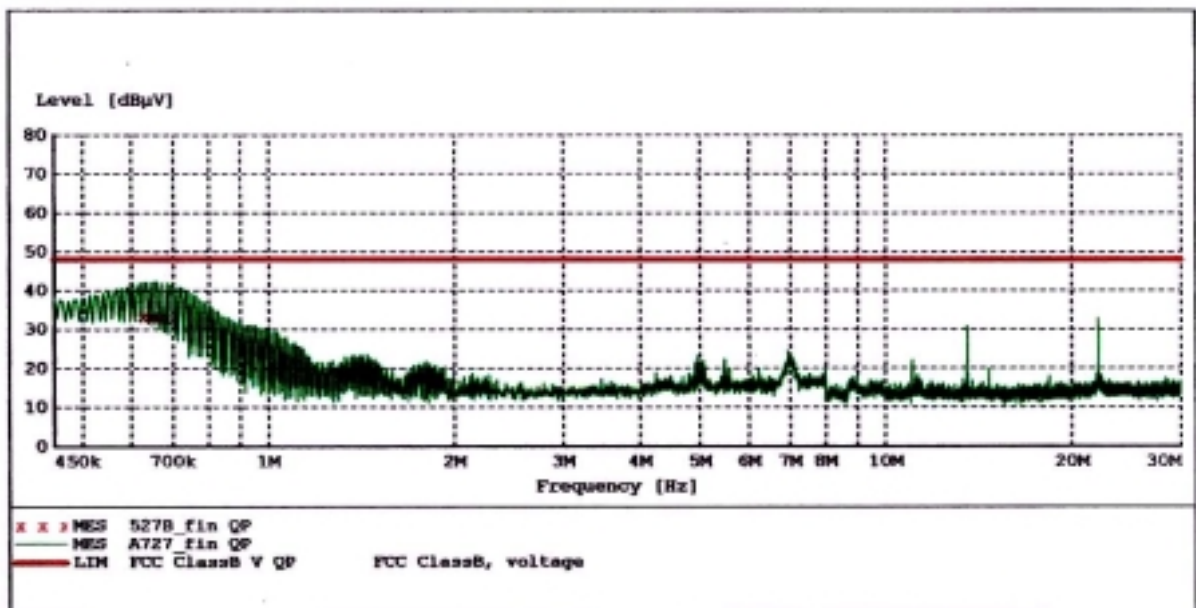
Date : April 17, 2002

HYUNDAI C-TECH. CO., LTD.
EMC TEST LAB.

EUT: TW-200
 Manufacturer: CAS Corporation
 Operating Condition: NORMAL CONDITIONS
 Test Site: Shield Room
 Operator: KH, YOON
 Test Specification: FCC Part 15 Class B
 Comment: HOT

SCAN TABLE: "FCC ClassB Voltage"

Short Description:		FCC ClassB Voltage					IF	Transducer
Start	Stop	Step	Detector	Meas. Time	IF Bandw.			
Frequency	Frequency	Width						
450.0 kHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz		CABLE LOSS (NEW)	


MEASUREMENT RESULT: "527B_fin QP"

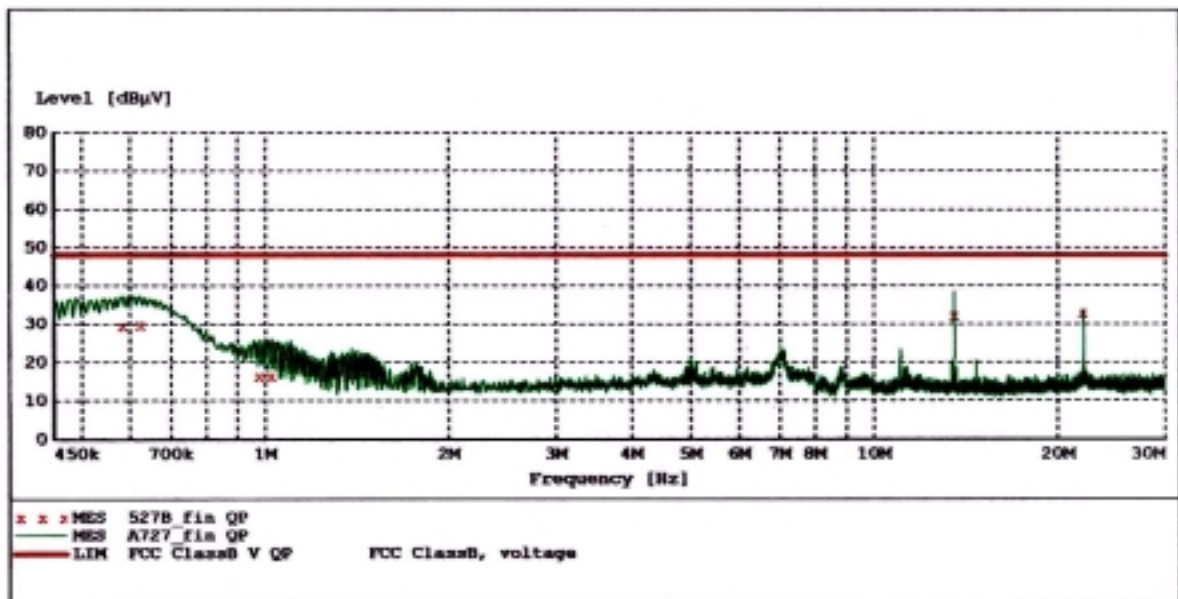
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.630000	33.30	0.5	48	14.7	1	---
0.645000	33.30	0.5	48	14.7	1	---
0.655000	33.50	0.5	48	14.5	1	---
0.660000	33.40	0.5	48	14.6	1	---
0.670000	33.20	0.5	48	14.8	1	---
0.685000	33.00	0.5	48	15.0	1	---

HYUNDAI C-TECH. CO., LTD.
EMC TEST LAB.

EUT: TW-200
 Manufacturer: CAS Corporation
 Operating Condition: NORMAL CONDITIONS
 Test Site: Shield Room
 Operator: KH, YOON
 Test Specification: FCC Part 15 Class B
 Comment: NEUTRAL

SCAN TABLE: "FCC ClassB Voltage"

Short Description:		FCC ClassB Voltage		IF	Transducer
Start	Stop	Step	Detector	Meas. Time	Bandw.
Frequency	Frequency	Width			
450.0 kHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz
					CABLE LOSS (NEW)



MEASUREMENT RESULT: "527B_fin QP"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.585000	29.50	0.5	48	18.5	1	---
0.625000	29.80	0.5	48	18.2	1	---
0.980000	16.50	0.5	48	31.5	1	---
1.025000	16.50	0.5	48	31.5	1	---
13.565000	32.20	1.4	48	15.8	1	---
22.120000	32.90	1.9	48	15.1	1	---

3.2 Antenna power conduction limits for receivers

The following table shows the highest levels of Antenna power conduction test.

Humidity Level : 34% Temperature : 20
 Limit apply to : FCC CFR 47 PART 15, SUBPART B §15.111
 Date : APRIL, 17 2002
 Result : PASSED

EUT : Weighing indicator / TW-200

Detector : CISPR Quasi-Peak (6dB Bandwidth : 120KHz) – (30MHz-1000MHz)

Average (6dB Bandwidth : 1MHz) – (Above 1000MHz)

Antenna-conducted power			
Frequency (MHz)	Amplitude (dBuV)	Limit (dBuV)	Margin (dB)
905.4	40.0	50	-10.0
1799.5	30.0	50	-20.0
2711.4	30.3	50	-19.7
3609.2	29.2	50	-20.8

NOTES:

The frequency range investigated during radiated emission test was from 30MHz to 8GHz.

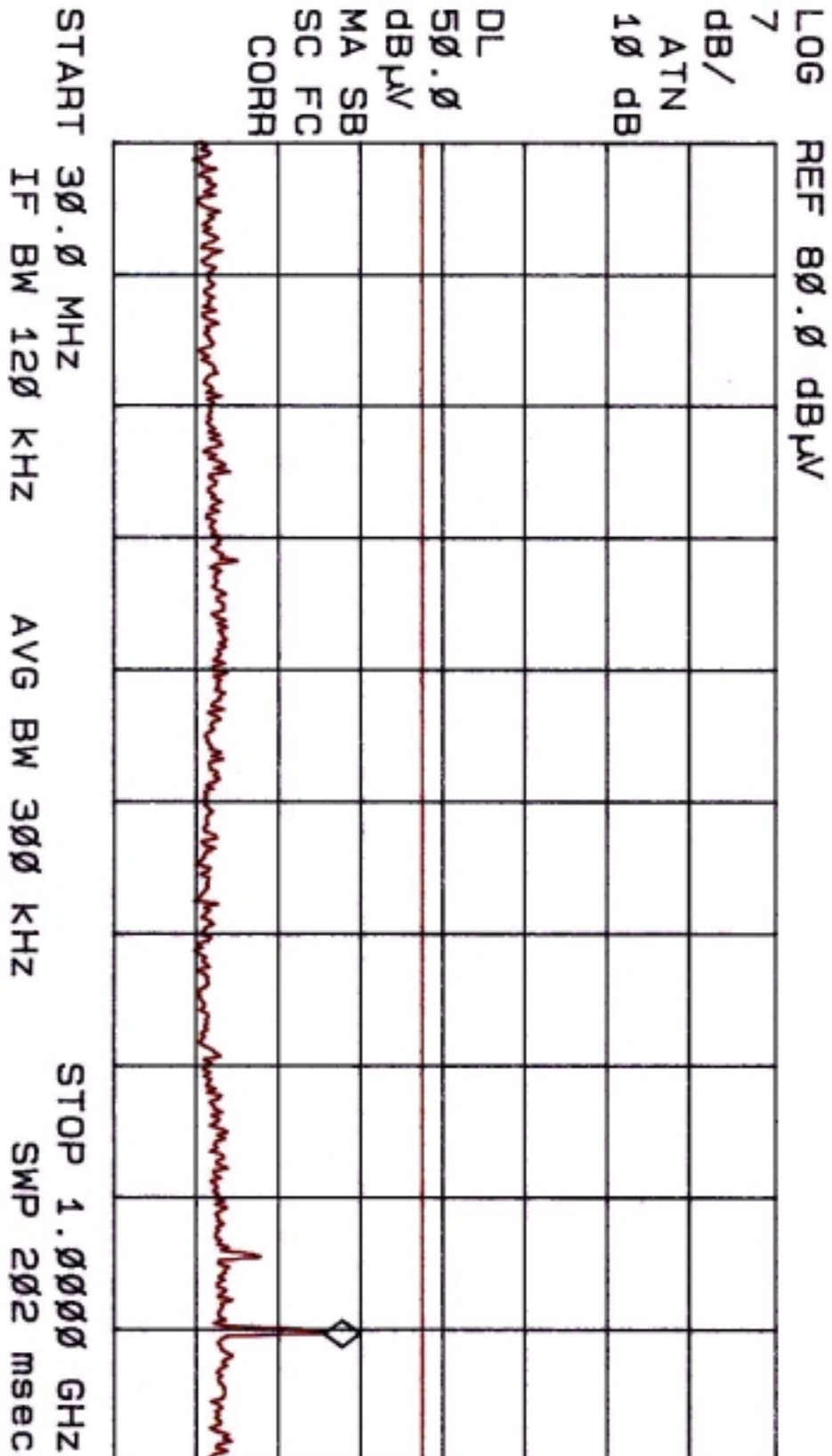
Kyoung Hee Yoon

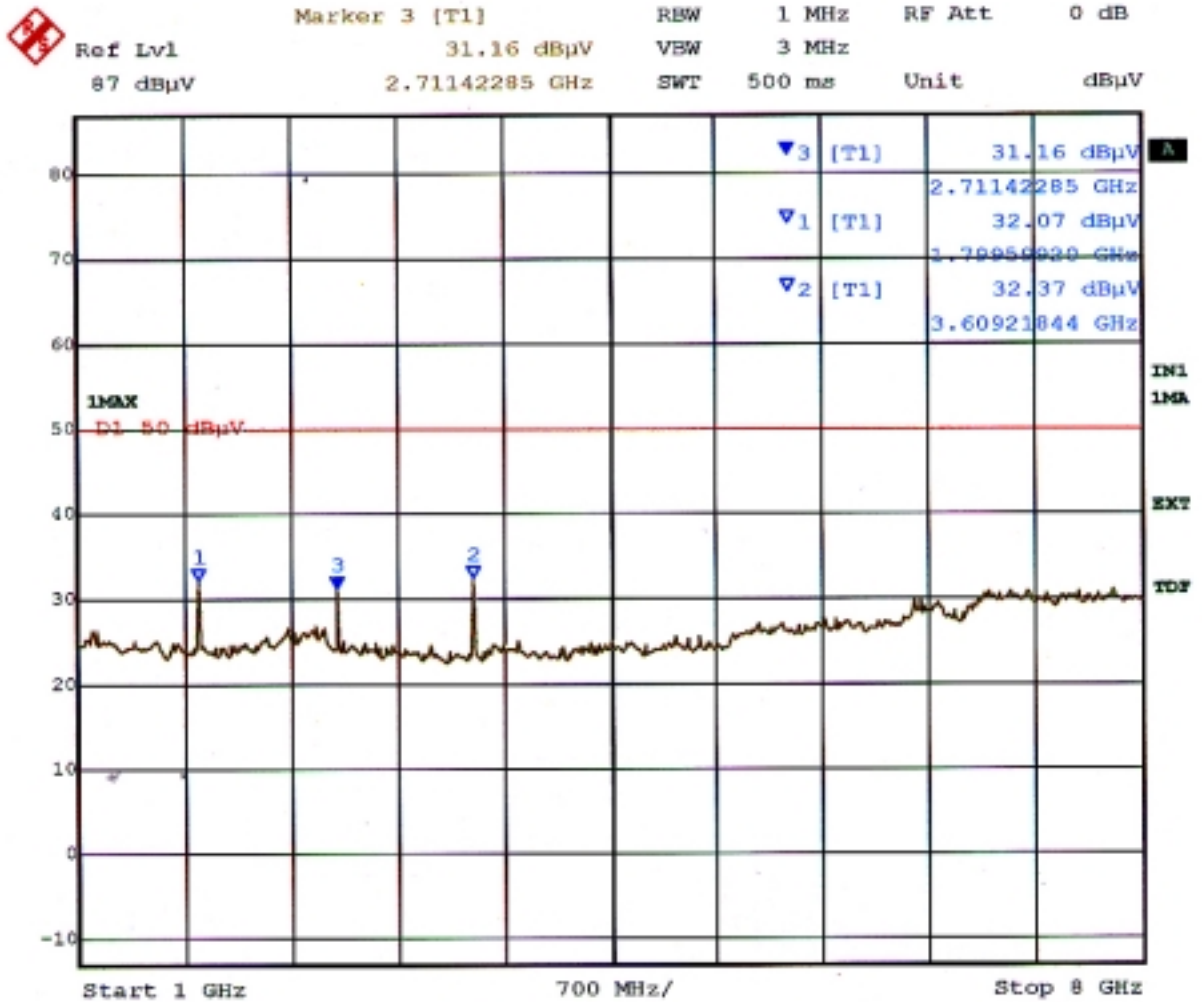
Measured by : Kyoung Hee Yoon / Engineer

Date : April 17, 2002

hp TW-2000

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 905.4 MHz
 41.74 dBμV





3.3 Radiated Emissions

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

Humidity Level : 39 % Temperature : 20
 Limit apply to : FCC CFR 47, PART 15, SUBPART B §15.209
 Type of Tests : CLASS B
 Date : April 18, 2002
 Result : PASSED

EUT : Weighing indicator / TW-200

Detector : CISPR Quasi-Peak (6dB Bandwidth : 120KHz) – (30MHz-1000MHz)

Average (6dB Bandwidth : 1MHz) – (Above 1000MHz)

Frequency MHz	Reading dBuV	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
33.5	10.67	18.43	0.90	V	30.0	40.0	-10.0
42.5	14.56	14.34	1.30	V	30.2	40.0	-9.8
58.3	20.18	8.62	1.60	V	30.4	40.0	-9.6
68.8	25.47	6.23	1.70	V	33.4	40.0	-6.6
79.9	28.58	6.12	1.80	V	36.5	40.0	-3.5
91.0	23.79	8.71	2.00	H	34.5	43.5	-9.0
170.0	18.03	14.97	2.70	H	35.7	43.5	-7.8
186.6	20.55	15.25	2.80	H	38.6	43.5	-4.9
193.5	18.23	15.47	3.00	V	36.7	43.5	-6.8
905.8	7.46	25.14	7.00	V	39.6	46.0	-6.4
1799.5	1.00	30.14	8.20	V	39.4	54.0	-14.6
2711.4	1.00	35.34	8.90	V	45.2	54.0	-8.8
3609.2	1.00	37.12	9.20	V	47.3	54.0	-6.7

NOTES:

The frequency range investigated during radiated emission test was from 30MHz to 10GHz.

ALL other spurious emissions were 20dB below than limit.

Kyoung Hee Yoon

Measured by : Kyoung Hee Yoon / Engineer

Date : April 18, 2002

4. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor.

The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 21.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The 30 dBuV/m value was mathematically converted to its corresponding level in uV/m.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dBuV/m}$$

$$\text{Level in uV/m} = \text{Common Antilogarithm} [(30 \text{ dBuV/m})/20] = 31.6 \text{ uV/m}$$

5. LIST OF TEST EQUIPMENT

TYPE		MANUFACTURE		MODEL	
CAL.DUE DATE					
EMI Test Receiver		Rohde & Schwarz		ESI40	2002.11.5
EMI Test Receiver		Rohde & Schwarz		ESVS30	2003.3.6
Plotter	HP	7440+	N.A		Graphic
Printer	Rohde & Schwarz		PDN	N.A	
Spectrum Analyzer		H.P	8591EM	2002.7.11	
LISN	EMCO		3825/2	2003.2.7	
LISN		Rohde & Schwarz		ESH2-Z5	2002.8.12
Amplifier		Hewlett-Packard		8447E	2003.3.2
Dipole Antennas		Rohde & Schwarz		VHAP	2002.6.28
Dipole Antennas		Rohde & Schwarz		UHAP	2002.6.28
Biconical Antenna		Rohde & Schwarz		BBA-9106	2002.6.28
Log-Periodic Antenna		Rohde & Schwarz		UHALP-9107	2002.6.26
Broadband Horn Antenna		Rohde & Schwarz		BBHA 9120 D(1099)	2002.10.26
Antenna Position Tower		EMCO		1051-12	N.A
Turn Table	EMCO	1060-06		N.A	
Line Filter		KEENE		ULW 2X30-60	N.A