

## HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

PRODUCT COMPLIANCE TEAM  
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## CERTIFICATION

<b>Manufacture:</b>  Digital Products of Delaware, Inc. 625 SW 9 <sup>th</sup> Terrace Pompano Beach, FL 33069  DPD FRN : 0008-2230-26	<b>Date of Issue:</b> FEBRUARY 08, 2002  <b>Test Report No.:</b> HCT-F03-0203  <b>Test Site:</b> HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD. HCT FRN : 0005-8664-21
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<b>FCC ID</b> :	<b>EEB-DTGHMURX</b>
<b>APPLICANT</b> :	<b>Digital Products of Delaware, Inc.</b>

<b>FCC Rule Part(s):</b>	<b>Part 15 &amp; 2</b>
<b>Equipment Class:</b>	<b>Communications Receiver used w/ Pt 15 Tx (CYY)</b>
<b>Frequency Range:</b>	<b>1 ch , Receiver , 418MHz</b>
<b>Standard(s):</b>	<b>FCC Class B: 2001</b>
<b>Equipment(EUT) Type:</b>	<b>Receiver</b>
<b>Model(s):</b>	<b>HMU TELETEK</b>
<b>Port/ Connector(s)</b>	<b>Receiver port(1) , Tel line cord(1)</b>

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).

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



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## 1. GENERAL INFORMATION

### 1.1 Product Description

**The Digital Products of Delaware,Inc. Model HMU Teletek (referred to as the EUT in this report) is Receiver**

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

<b>CHASSIS TYPE</b>	<b>PLASTIC</b>
<b>NUMBER OF LAYERS</b>	<b>MAIN BOARD 4 LAYER VERIFIER BOAED 4LAYER TELEPHONE BOAED 4LAYER</b>
<b>ANTENNA</b>	<b>T-LOOP Antenna On PCB</b>
<b>Dimension</b>	<b>101mm X 3441mm X 15mm</b>
<b>RECEIVING FREQUENCY</b>	<b>418MHz</b>
<b>OPERATING TEMPERATURE</b>	<b>-20°C ~ +70°C</b>
<b>Crystal Frequency</b>	<b>32.768KHz, 3.579545MHz x2, 4.0MHz x3 3.58MHz, 11.0592MHz, 407.35MHz(local osc)</b>
<b>Battery Life</b>	<b>24 hours</b>
<b>Power Voltage</b>	<b>DC 6V , AC 120V</b>

### 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
RECEIVER (EUT)	Digital Products of Delaware. Inc.	HMU TELETEK	EEB-DTGHMURX	N/A

### 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	Digital Products of Delaware, Inc.	HMU 4 PLUS
VERIFIER BOARD	Digital Products of Delaware, Inc.	DHMU-V1
TELEPHONE BOARD	Digital Products of Delaware, Inc.	DHMU-P1
POWER BOARD	Digital Technologies 2000	KU57-10-500D

### 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)
RECEIVER (EUT)	N	N	1.8(P) 2.0(D)

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
RECEIVER (EUT)	N	N/A	N	N/A

## 2.5 Equipment Modifications

N/A

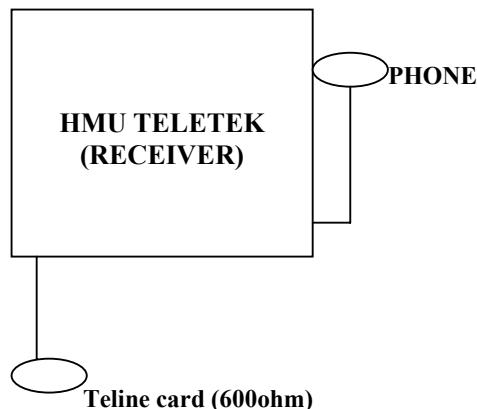
## 2.6 Configuration of Test system

**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]



### 3. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY

#### 3.1 Conducted Emission Test

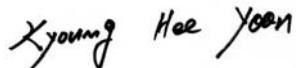
The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Humidity Level	: 28 %	Temperature : 10 $^{\circ}$ C
Limit apply to	: FCC CFR 47, PART 15, SUBPART B	
Type of Tests	: CLASS B	
Date	: JANUARY 23, 2003	
Result	: PASSED BY -30.1 dB	
EUT	: RECEIVER / HMU TELETEK	

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

Line Conducted Emission Tabulated Data

Power Line Conducted Emissions			FCC Class B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
1.310	14.7	NEUTRAL	48	-33.2
1.335	15.3	HOT	48	-32.6
2.450	17.8	HOT	48	-30.1
2.470	17.0	NEUTRAL	48	-30.9
3.330	15.6	NEUTRAL	48	-32.3
3.410	15.8	HOT	48	-32.1



Measured by : Kyoung-Hee YOON / Engineer

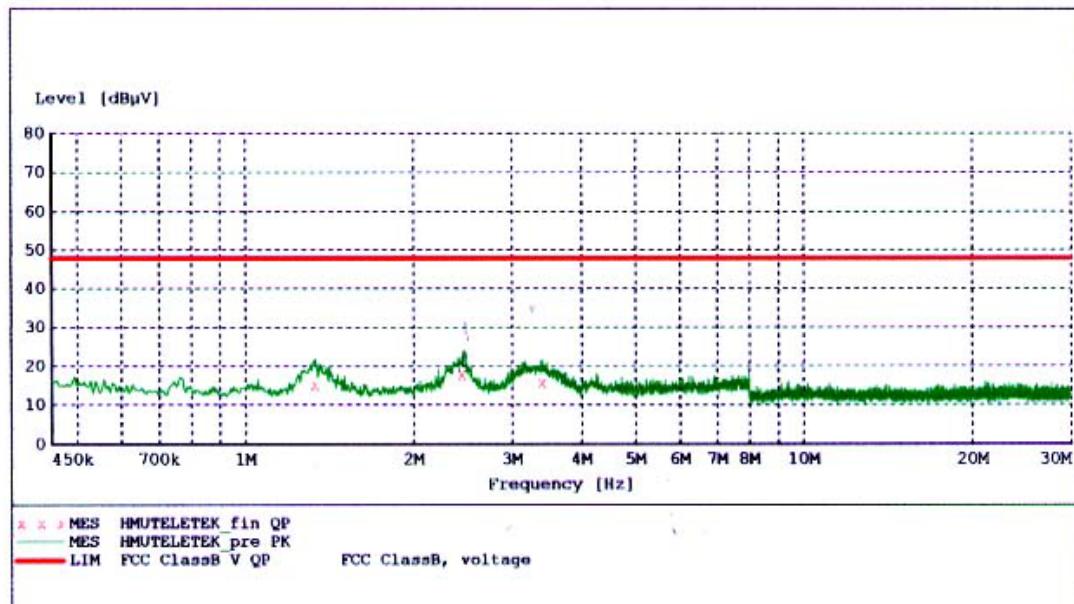
Date : JANUARY 23, 2003

**HYUNDAI C-TECH.  
EMC Testing Laboratory**

EUT: HMU TELETEK  
 Manufacturer: Digital Products of Delaware, Inc.  
 Operating Condition: NORMAL  
 Test Site: SHIELD ROOM  
 Operator: KH, YOON  
 Test Specification: FCC CLASS B  
 Comment: H

**SCAN TABLE: "FCC ClassB Voltage"**

Short Description: FCC ClassB Voltage  
 Start Stop Step Detector Meas. IF Transducer  
 Frequency Frequency Width Time Bandw.  
 450.0 kHz 30.0 MHz 5.0 kHz MaxPeak 10.0 ms 9 kHz ESH3-Z5



**MEASUREMENT RESULT: "HMUTELETEK\_fin QP"**

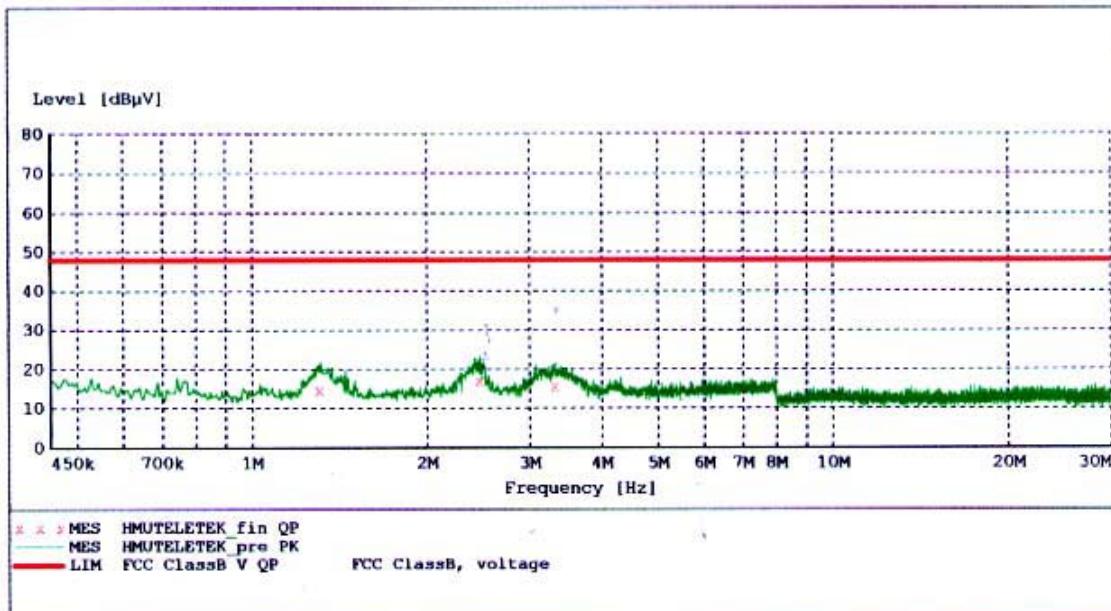
Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line dB	PE
1.335000	15.30	10.2	48	32.6	1	---
2.450000	17.80	10.3	48	30.1	1	---
3.410000	15.80	10.2	48	32.1	1	---

**HYUNDAI C-TECH.  
EMC Testing Laboratory**

EUT: HMU TELETEK  
 Manufacturer: Digital Products of Delaware, Inc.  
 Operating Condition: NORMAL  
 Test Site: SHIELD ROOM  
 Operator: KH, YOON  
 Test Specification: FCC CLASS B  
 Comment: N

**SCAN TABLE: "FCC ClassB Voltage"**

Short Description:		FCC ClassB Voltage				
Start Frequency	Stop Frequency	Step Width	Detector	Meas.	IF Time	Transducer
450.0 kHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-25



**MEASUREMENT RESULT: "HMUTELETEK\_fin QP"**

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line dB	PE
1.310000	14.70	10.2	48	33.2	1	---
2.470000	17.00	10.3	48	30.9	1	---
3.330000	15.60	10.2	48	32.3	1	---

### 3.2 Radiated Emissions

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

**Humidity Level** : 19% **Temperature** : 10 °C  
**Limit apply to** : FCC CFR 47, PART 15, SUBPART B  
**Type of Tests** : CLASS B  
**Date** : JANUARY 24, 2003  
**Result** : PASSED BY -4.0dB

EUT : RECEIVER/HMU TELETEK  
Detector : CISPR Quasi-Peak (6 dB Bandwidth : 120 KHz)

Frequency	Reading	Ant. Factor	Cable Loss	ANT POL	Total	Limit	Margin
MHz	dBuV	dB	dB	(H/V)	dBuV/m	dBuV/m	dB
78.5	26.91	6.09	1.80	V	34.8	40.0	-5.2
95.1	24.58	9.42	2.00	H	36.0	43.5	-7.5
135.3	18.19	14.31	2.50	V	35.0	43.5	-8.5
146.4	17.63	14.67	2.50	V	34.8	43.5	-8.7
156.1	16.83	14.77	2.60	V	34.2	43.5	-9.3
204.6	14.06	15.94	3.00	V	33.0	43.5	-10.5
207.4	17.68	16.02	3.00	H	36.7	43.5	-6.8
224.5	12.30	17.10	3.30	V	32.7	46.0	-13.3
279.4	16.79	17.81	3.80	H	38.4	46.0	-7.6
303.0	19.63	15.67	3.80	H	39.1	46.0	-6.9
370.9	15.74	16.56	4.10	H	36.4	46.0	-9.6
407.3	21.16	16.64	4.20	H	42.0	46.0	-4.0
521.5	10.70	18.90	5.10	V	34.7	46.0	-11.3

## NOTES:

The frequency range investigated during radiated emission test was from 30MHz to 1GHz.

Young Hee Yoon

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Measured by Kyoung-Hee YOON / Engineer

**Date : JANUARY 24, 2003**

## 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

<u>TYPE</u>	<u>MANUFACTURE</u>	<u>MODEL</u>	
<u>CAL. DATE</u>			
EMI Test Receiver	Rohde & Schwarz	ESI40	2002.11.5
EMI Test Receiver	Rohde & Schwarz	ESVS30	2002.3.6
Graphic Plotter	HP	7440+	N.A
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