

MEASUREMENT / TECHNICAL REPORT

HYUNDAI ELECTRONICS INDUSTRIES CO.,LTD.

MODEL : A526

This report concerns(check one) : Original grant **X** Class change

Equipment type : **CRT MONITOR**

Deferred grant requested per 47 CFR 0.457(d)(1)() ? yes ___ no **X**

If yes, defer until:

___ agrees to notify the Commission by

of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by : **BONG JAE, HUR General Manager of QA Office**

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1. GENERAL INFORMATION

1.1 Product Description

The Hyundai Electronics Industries Co., Ltd. Model (referred to as the EUT in this report) is a 15" COLOR LCD Monitor HOR. Freq. 53.7 kHz w/max. Resolution of 800X600 Non-Interlaced.

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

CHASSIS TYPE	PLASTIC
LIST OF EACH OSC. OR XTAL. FREQ.(FREQ. 1MHz)	8 MHz
CHIPSET BRAND AND PART NO.	
POWER REQUIREMENT	100 - 240 VAC 50/60Hz 2.0A
NUMBER OF LAYERS	MAIN BOARD 1 LAYER CRT BOARD 1 LAYER
MAX. RESOLUTION	800X600 NON-INTERLACED (@ 53.7 kHz/85 Hz)
H-SYNC FREQUENCY RANGE	30kHz 54KHz
V-SYNC FREQUENCY RANGE	50 Hz 130Hz
LCD SIZE	15" (CRT Type :SAMSUNG M36QAW351X111)

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
COLOR MONITOR (EUT)	HYUNDAI	A525	CKLC15R08050	HOST
PC(HOST)	H/P	DTPC-17	DoC	N/A
KEY BOARD	H/P	SK-2501-2D-K	GYUR385K	HOST
PRINTER	H/P	HP895C	DoC	HOST
MODEM	3COM CORPORATION	56K FAX MODEM	DoC	HOST
VIDEO CARD	DIAMOND	3D3000	DoC	HOST
MOUSE	H/P	M-S34	DZL211029	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 10 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 on May 22, 1997 and accepted dated July 25,1997(1300F2)

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 and I/O cards inside the E.U.T were used.

DEVICE TYPE	MANUFACTURE	MODEL/PART NUMBER
MAIN BOARD	HYUNDAI	
CRT BOARD	HYUNDAI	

2.2 EUT exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disc, was inserted into drive A and is auto starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is :(1) Display test, (2) RS 232 test (3) Key board test,(4) Printer test,(5) FDD test,(6) HDD test. The complete cycle takes about 20 seconds and is repeated continuously. As the keyboard and mouse are strictly input devices, no data is transmitted to them during test. They are however, continuously scanned for data input activity. The video resolution modes setup and change program was used during the radiated and conducted emission testing.

2.3 Cable Description

	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
PC(HOST)	N	N/A	1.8(P)
CRT MONITOR(EUT)	N	Y	1.8(P), 1.5(D)
PRINTER	N	Y	2.0(P),1.5(D)
KEYBOARD	N/A	Y	2.0(D)
MODEM	N	Y	2.0(P),1.5(D)
MOUSE(PS/2)	N/A	Y	1.8(D)

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

2.4 Noise Suppression Parts on Cable.

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
PC(HOST)	N	N/A	N	N/A
PRINTER	N	N/A	Y	BOTH END
KEYBOARD	Y	PC END	N	N/A
MODEM	N	N/A	Y	BOTH END
MOUSE(PS/2)	N	N/A	N	N/A
MONITOR(EUT)	Y	BOTH END	Y	BOTH END

2.5 Equipment Modifications

N/A

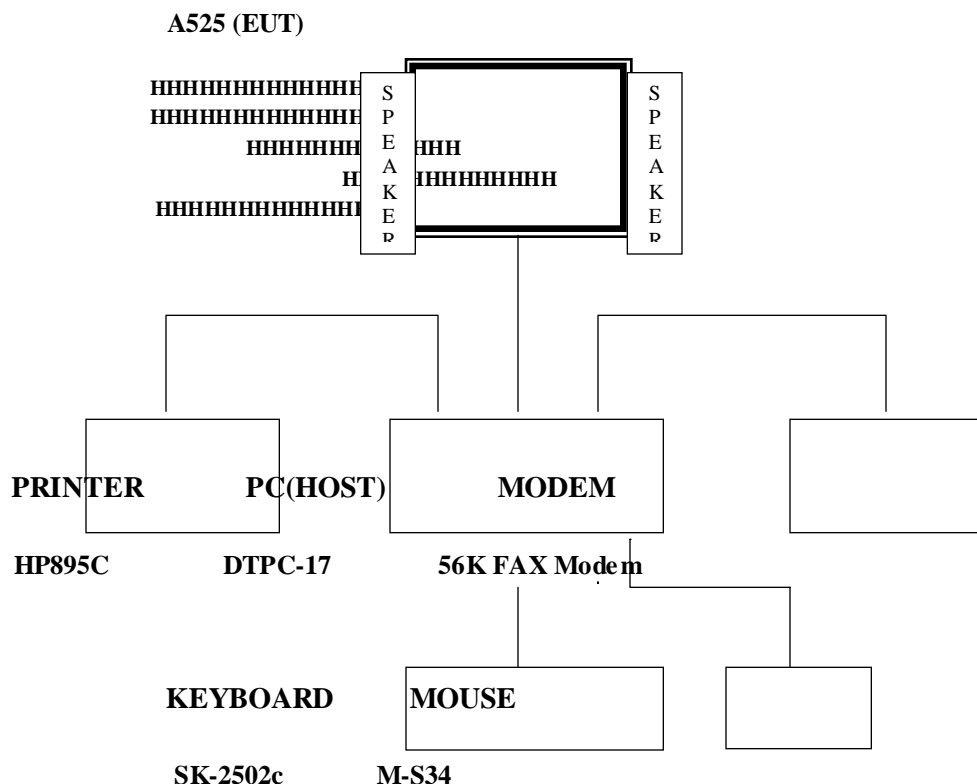
2.6 Configuration of Test system

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. PRELIMINARY TESTS

3.1 AC Power line Conducted Emission Tests

During Preliminary Tests, the following operating mode were investigated

Processor Speed (MHz)	Video Resolution (w/max)	The worst operating condition
Pentium 350 MHz	1024 x 768 Non-Interlaced (48 kHz/60Hz)	X
Pentium 350 MHz	800 x 600 Non-Interlaced (53.7 kHz/85Hz)	
Pentium 350 MHz	640 x 480 Non-Interlaced (31.5 KHz/60Hz)	

4.2 Radiated Emission Tests

Processor Speed (MHz)	Video Resolution (w/max)	The worst operating condition
Pentium 350 MHz	1024 x 768 Non-Interlaced (48 kHz/60Hz)	
Pentium 350 MHz	800 x 600 Non-Interlaced (53.7 kHz/85Hz)	
Pentium 350 MHz	640 x 480 Non-Interlaced (31.5 KHz/60Hz)	

During Preliminary Tests, the following operating mode were investigated

Tested by KEUN HO, PARK

Date : MAY 22, 2000

4. FINAL CONDUCTED AND RADIATED EMISSION TESTS SUMMARY

4.1 Conducted Emission Test

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

Humidity Level : 32% Temperature : 25
 Limit apply to : CISPR 22
 Type of Tests : CLASS B
 Date : MAY 24, 2000
 Result : PASSED BY -3.5 dB
 EUT : 15" CRT MONITOR

Operating Condition : 1600 X1200 Non-Interlaced (Hf : 93.8 KHz, Vf : 75Hz)

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

Line Conducted Emission Tabulated Data

Power Line Conducted Emissions			CISPR 22 (Average)	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
0.157	51.8	N	55.8	-4.0
0.164	51.9	N	55.4	-3.5
4.293	41.6	H	46.0	-4.4
4.399	41.0	H	46.0	-5.0
4.616	41.6	H	46.0	-4.4

NOET:

1. All video modes and resolutions were investigated and the worst-case emissions are reported
 Other video modes & resolution were tested and found to be in compliance.

Measured by : KEUN HO, PARK / Engineer

Date : MAY 24, 2000

RFI Voltage Test

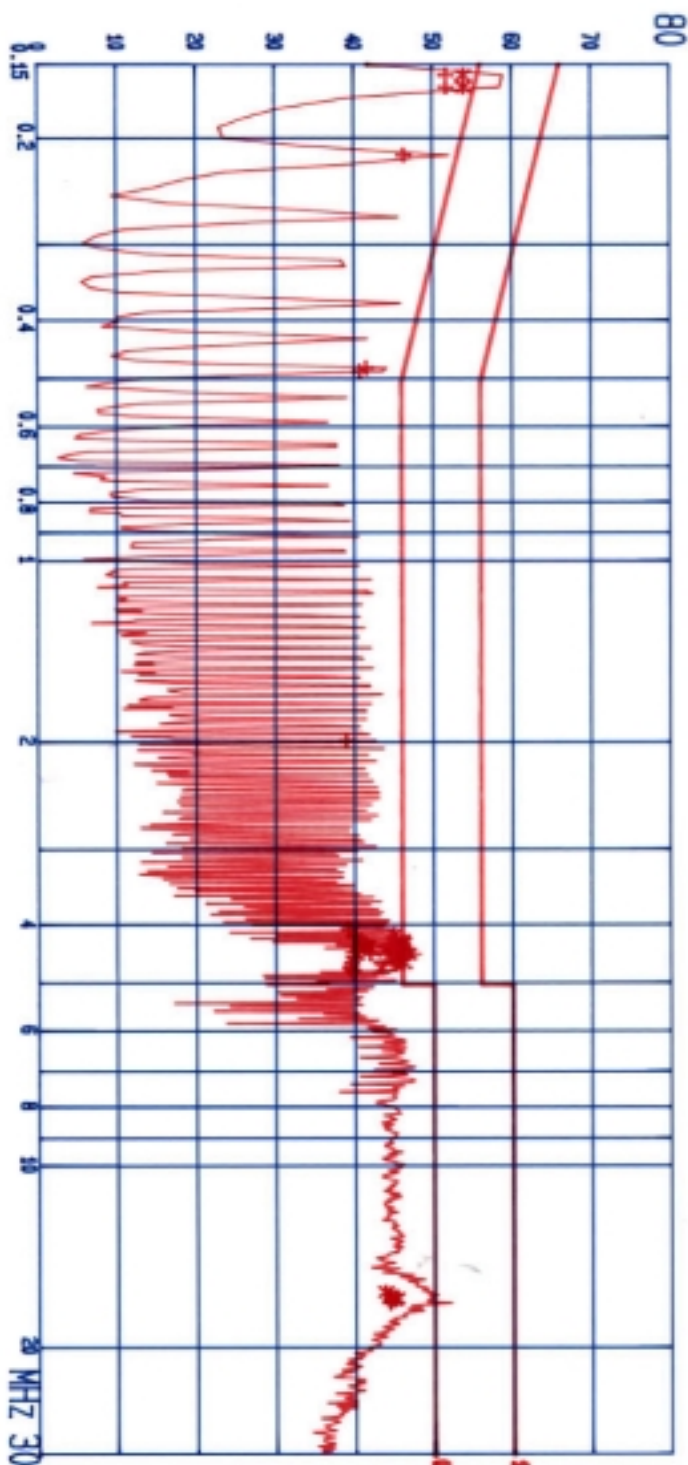
E.U.T.:
Operator: 800X600 Mf: 53.7KHz Vf: 85Hz
Operator: Keun Ho, Park
Test Spec:
CISPR 22 CLASS B

Start Fr.	Stop Fr.	IF-BW	Data	Att.	Meas.T.	Traced.
MHz	MHz	KHz	for	dB	u	type
0.1500	5.0000	10	Peak	LD	0.010	
5.0000	30.0000	10	Peak	LN	0.010	

Final evaluation: Quasi Peak/average

* = QUASI PEAK + = AVERAGE

dBuV



POWER LINE POLARITY: NEUTRAL

RFI Voltage Test

E.U.T.: AG35
 Oper. Condition: 800X800 Hf: 53.7KHz Vf: 85Hz
 Operator: Kaun Ho, Park
 Test Spec:
 CIRPA 22 CLASS B

Start Fr. Stop Fr. IF-BW Detect Att. Meas. T. Trend.
 MHz MHz KHz tor dB # type
 0.1500 5.0000 10 Peak LD 0.010
 5.0000 30.0000 10 Peak LN 0.010

POWER LINE POLARITY: NEUTRAL

Guest Peak values				Average values			
Frequency MHz	Peak dBuv	Q-Peak dBuv	Q-Margin dB	Frequency MHz	Peak dBuv	Average dBuv	Average-Margin dB
0.1570	59.1	54.0	-11.7	0.1570	59.1	51.8	-4.0
0.1640	58.6	54.0	-11.3	0.1640	58.6	51.8	-3.5
0.1730	45.6	45.1	-10.8	0.2130	52.3	46.5	-6.7
4.2380	46.3	46.0	-9.9	0.4790	44.2	41.5	-4.8
4.2939	47.1	46.3	-9.6	0.4860	43.8	40.8	-5.6
4.3430	47.0	41.5	-14.4	1.9840	42.8	39.1	-6.9
4.3500	46.7	45.4	-10.5	4.0770	44.8	39.3	-6.7
4.3990	47.7	46.1	-9.8	4.1330	45.6	40.0	-6.0
4.4050	46.0	44.0	-11.9	4.1890	45.3	40.0	-6.0
4.5110	46.7	45.5	-10.4	4.2380	46.3	40.9	-5.1
4.5509	46.1	44.9	-11.0	4.2939	47.1	41.4	-4.6
4.6160	46.4	46.3	-9.6	4.3500	46.7	41.0	-5.0
4.7210	48.3	43.4	-12.5	4.3990	47.7	40.5	-5.5
16.2630	49.6	43.9	-16.0	4.4550	48.4	42.0	-4.0
16.3750	50.4	44.4	-15.5	4.5110	48.7	39.8	-6.2
16.5850	49.9	44.6	-15.3	4.5509	48.1	40.3	-5.7
16.6409	49.9	45.2	-14.7	4.6160	45.7	39.6	-6.4
16.6970	49.7	45.1	-14.8	4.7210	46.3	39.4	-6.6
				4.7770	45.5	39.6	-6.2
				16.6580	52.2	44.5	-5.5
* Limit exceeded							

RFI Voltage Test

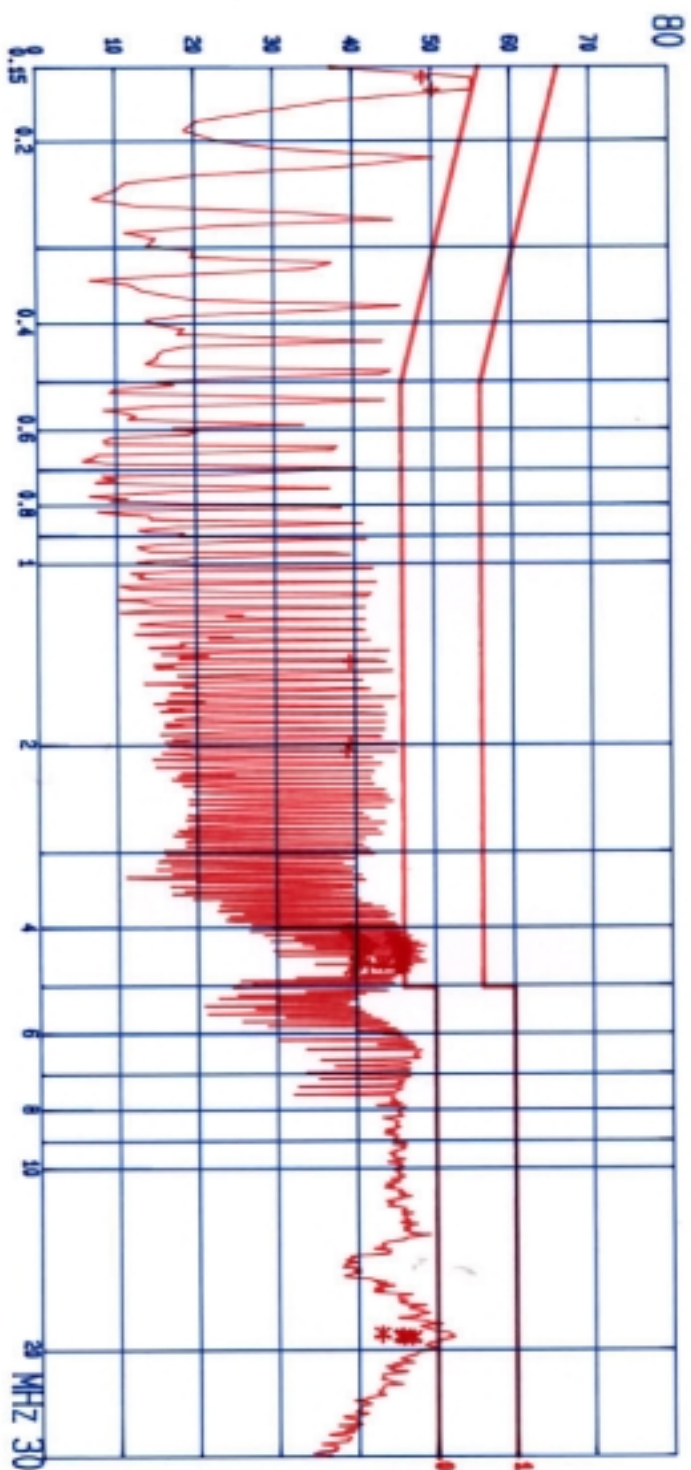
E.U.T.:
Operator: AG2B
Test Spec: 800X600 Hf: 59.7KHz Vf: 85Hz
Operator: Keun Ho, Park
Test Spec: CISPR 22 CLASS B

Start Fr.	Stop Fr.	IF-BW	Detec	Att.	Meas.T.	Trend.
MHz	MHz	KHz	top	dB	#	type
0.1500	5.0000	10	Peak	LD	0.010	
5.0000	30.0000	10	Peak	LN	0.010	

Final evaluation: Quasi Peak/average

* = QUASI PEAK + = AVERAGE

dBuV



POWER LINE POLARITY: HOT

RFI Voltage Test

E.U.T.: AC25
 Oper. Condition: 800X600 Mf: 53.7MHz Vt: 65Hz
 Operator: Kaun Ho, Park
 Test Spec: CISPR 22 CLASS B

Start Fr. Stop Fr. IF-BW Detect Att. Meas. T. Transd.
 MHz MHz KHz for dB s type
 0.1500 5.0000 10 Peak LD 0.010
 5.0000 30.0000 10 Peak LN 0.010

POWER LINE POLARITY: HOT

Quasi Peak values		O-Peak		O-Peak GP-Margin	
Frequency MHz	Peak dBuV	dBuV	dB	dB	
4.1330	47.1	44.7	-11.4		
4.2380	48.1	45.5	-10.6		
4.2938	48.8	46.0	-10.1		
4.3500	47.7	45.4	-10.7		
4.3990	48.4	45.8	-10.3		
4.4550	48.1	46.0	-10.1		
4.5110	47.8	45.6	-10.5		
4.5599	48.8	45.6	-10.5		
4.5870	47.0	43.5	-12.6		
4.6160	47.2	45.8	-10.3		
4.7339	51.6	43.0	-17.1		
4.9510	51.6	45.6	-14.5		
4.9900	52.3	45.4	-14.7		
4.9960	51.7	47.1	-13.0		
4.9960	51.8	46.9	-13.2		
4.9960	51.3	45.9	-14.2		
Average values					
Frequency MHz	Peak dBuV	Average dBuV	Average-Margin dB		
0.1570	55.3	49.0	-6.8		
0.1640	55.3	50.3	-5.1		
1.4520	44.0	39.5	-6.5		
1.9840	45.5	39.5	-6.5		
2.0400	45.2	39.1	-6.9		
4.0278	45.7	39.3	-6.7		
4.0770	46.5	39.1	-6.9		
4.1330	47.1	40.3	-5.7		
4.1890	46.9	40.5	-5.5		
4.2380	48.1	40.4	-5.6		
4.2939	48.8	41.6	-4.4		
4.3500	47.7	40.5	-5.5		
4.3990	48.4	41.0	-5.0		
4.4550	48.1	40.3	-5.7		
4.5110	47.8	40.0	-5.0		
4.5599	48.8	40.7	-5.3		
4.6160	47.2	41.6	-4.4		
4.6720	48.3	39.9	-6.1		
4.7770	46.0	39.5	-6.5		
4.9960	51.7	43.1	-6.9		
M Limit exceeded					

4.2 Radiated Emissions Tests

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

Humidity Level : 27 % Temperature : 24

Limit apply to : CISPR 22

Type of Tests : CLASS B

Date : MAY 25, 2000

Result : PASSED BY -3.8 dB

EUT : 15" COLOR MONITOR

Operating Condition : 800X600 Non-Interlaced (Hf :53.7 kHz, Vf : 85 Hz)

Detector : CISPR Quasi-Peak (6 dB Bandwidth : 120 KHz)

Radiated Emissions		Ant.	Correction Factors	Total	CISPR 22	
Freq. (MHz)	Ampl. (dBuV)	Pol.	Antenna & Cable Loss (dB/m)	Ampl. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.8	10.1	V	16.0	26.2	30.0	-3.8
45.0	11.4	V	13.8	25.2	30.0	-4.8
169.9	4.3	H	18.5	22.8	30.0	-7.2
208.3	3.1	V	20.4	23.5	30.0	-6.5
208.3	3.1	H	20.4	23.5	30.0	-6.5
214.0	2.4	V	20.8	23.2	30.0	-6.8
214.0	3.6	H	20.8	24.4	30.0	-5.6

NOTE:

- 1.All video modes and resolutions were investigated and the worst-case emissions are reported.
- 2.Other video modes & resolution were tested and found to be in compliance.

Measured by : KEUN HO, PARK / Engineer

Date : MAY 25, 2000

5. 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.

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

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