FCC PART 15 CLASS B

EMI MEASUREMENT AND TEST REPORT

For

GANA I & C CO., LTD

154-17 Kyongdong B/D 3F, Karak-Dong, Songpa-Gu, Seoul, Korea 138-160

FCC ID: TVXGN716J

This Report Concerns:	**Equipment Type:**
☒ Original Report	16 Channel Stand Alone DVR

Test Engineer:	Jerry Wang
Report Number:	R0511163
Report Date:	2005-12-9
Reviewed By:	Snell Leong
Prepared By:	Bay Area Compliance Laboratory Corporation 230 Commercial Street Sunnyvale, CA 94086 Tel: (408) 732-9162 Fax: (408) 732-9164

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *GANA I & C CO., LTD's* product, FCC ID: *TVXGN716J*, model number: *GN-716J*, or the "EUT" as referred to this report, is a 16 Channel Stand Alone DVR, which measures approximately 40.0cmW x43.0cmL x 7.0cmH.

** The test data gathered are from production sample, serial number: GN-0001, provided by the manufacturer.*

Objective

This Class B report is prepared on behalf of *GANA I & C CO., LTD* in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with U.S.A. FCC Class B and Canada ICES-003 issue 4 limits for conducted and radiated margin requirements for Information Technology Equipment.

Related Submittal(s)/Grant(s)

No Related Submittals.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp.

Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA with registration number: 90464.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules and Article 8 of the VCCI regulations. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations is attached hereinafter and can also be found at
http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

SYSTEM TEST CONFIGURATION

Justification

The EUT was tested in accordance with ANSI C63.4-2003.

EUT Exercise Software

The EUT exercising software program was designed to exercise the various installed components in accordance with ANSI C63.4-2003.

Special Accessories

The unit was tested with the normally supplied cabling and accessories provided by the supporting equipment and no special accessories were used.

Schematics / Block Diagram

Exhibit D contains a copy of the EUT's schematics diagram as reference.

Equipment Modifications

No modifications were made to the EUT.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
TOSHIBA	TV	14AF41	20448785A	DoC
HP	ThinkJet	2225C	2821S14783	DS16XU2225
EXTREME	DVD PLAYER	DVD-8812	NONE	NONE
Compaq	Notebook	Preasarlo 2100	CNF43403FB	DOC

Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number	FCC ID
Sventeam	Power Supply	ST-150SL	S508022944	N/A

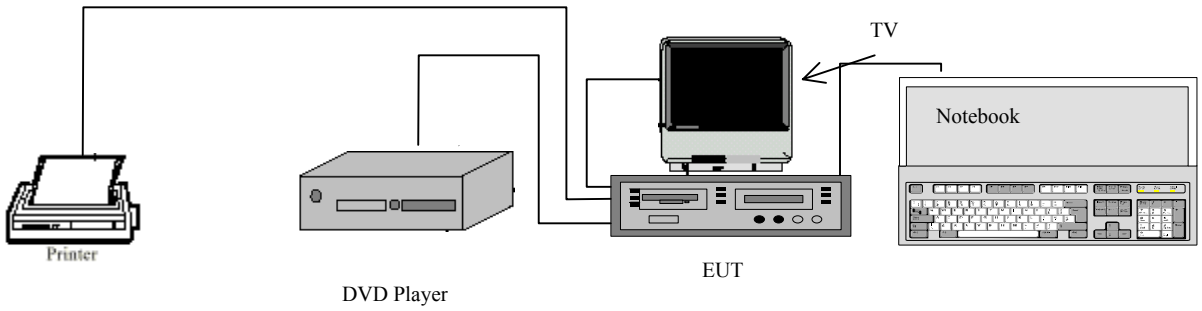
Host Configuration Details

Manufacturer	Description	Model	Serial Number	FCC ID
Excel Stor	HDD	E83230	MA12F73	DOC
GANA I&C	Motherboard	GN-716J	None	N/A
Western Digital	HDD	WD800BB-00JHCO	WCAM95878264	DOC
Seventeam	Power Supply	ST-150SL	S508022944	N/A

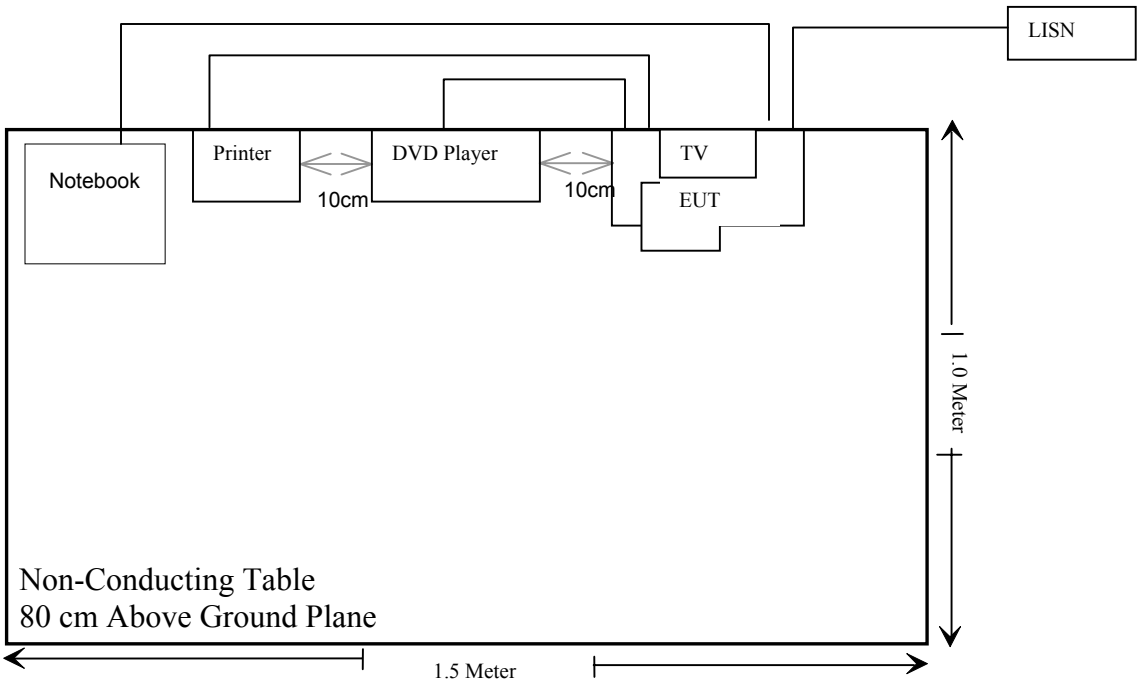
Interface Ports and Cabling

Cable Description	Length (M)	From	To
Shielded S-Video Cable	1.5	S-Video Port/EUT	TV
Shielded Video Cable	1.0	Video in Port/EUT	Video Out Port/DVD
Shielded Printer Cable	1.5	Parallel Port / EUT	HP Printer
Shielded Serial Cable	1.5	Serial Port/EUT	Notebook

Configuration of Test System



Test Setup Block Diagram



SUMMARY OF TEST REPORT

RULE	DESCRIPTION	RESULTS
15.107	Conducted Emissions	Compliant
15.109	Radiated Emissions	Complies*
15.19	Labelling Requirements	Compliant
15.21, 15.105	Information to the User	Compliant
15.27	Special Accessories	Compliant

*: Test data are within the measurement uncertainty.

§15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are receiver, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is ±2.4 dB.

EUT Setup

The measurement was performed in the shielded room, using the same setup per ANSI C63.4-2003 measurement procedure. The specification used was FCC 15 Class B limits.

The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and bundled as required.

The EUT was connected to 120Vac/60Hz power source.

Receiver Setup

The receiver was set to investigate the frequency from 150 kHz to 30MHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Artificial LISN	ESH2-Z5	871884/039	2005-08-16
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2005-09-15
Fluke	Calibrated Voltmeter	189	18485-38	2005-07-18

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the EUT was connected to the mains outlet of the LISN-1. Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak detection mode, quasi-peak and average. Average readings are distinguished with an "Ave".

Test Results Summary

According to the recorded data, the EUT complied with the FCC Conducted limits for a Class B device, with the worst margin reading of:

-12.3 dB at **0.21 MHz** on the **Line** conductor mode.

Conducted Emissions Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	48%
ATM Pressure:	1021mbar

**Testing was performed by Jerry Wang on 2005-11-28.*

LINE CONDUCTED EMISSIONS				FCC15 CLASS B	
Frequency MHz	**Amplitude dBµV**	**Detector Qp/Ave/Peak**	**Phase Line/Neutral**	**Limit dBµV**	**Margin dB**
0.21	50.9	QP	Line	63.20	-12.3
0.15	52.4	QP	Line	66.00	-13.6
0.27	47.2	QP	Line	61.11	-13.9
0.27	46.0	Ave	Line	61.11	-15.1
0.21	47.6	Ave	Line	63.20	-15.6
0.21	47.5	QP	Neutral	63.20	-15.7
0.15	49.1	Ave	Line	66.00	-16.9
0.27	43.6	QP	Neutral	61.11	-17.5
0.15	47.5	QP	Neutral	66.00	-18.5
0.27	42.5	Ave	Neutral	61.11	-18.6
0.21	43.2	Ave	Neutral	63.20	-20.0
0.15	41.6	Ave	Neutral	66.00	-24.4

Plots of Conducted Emission

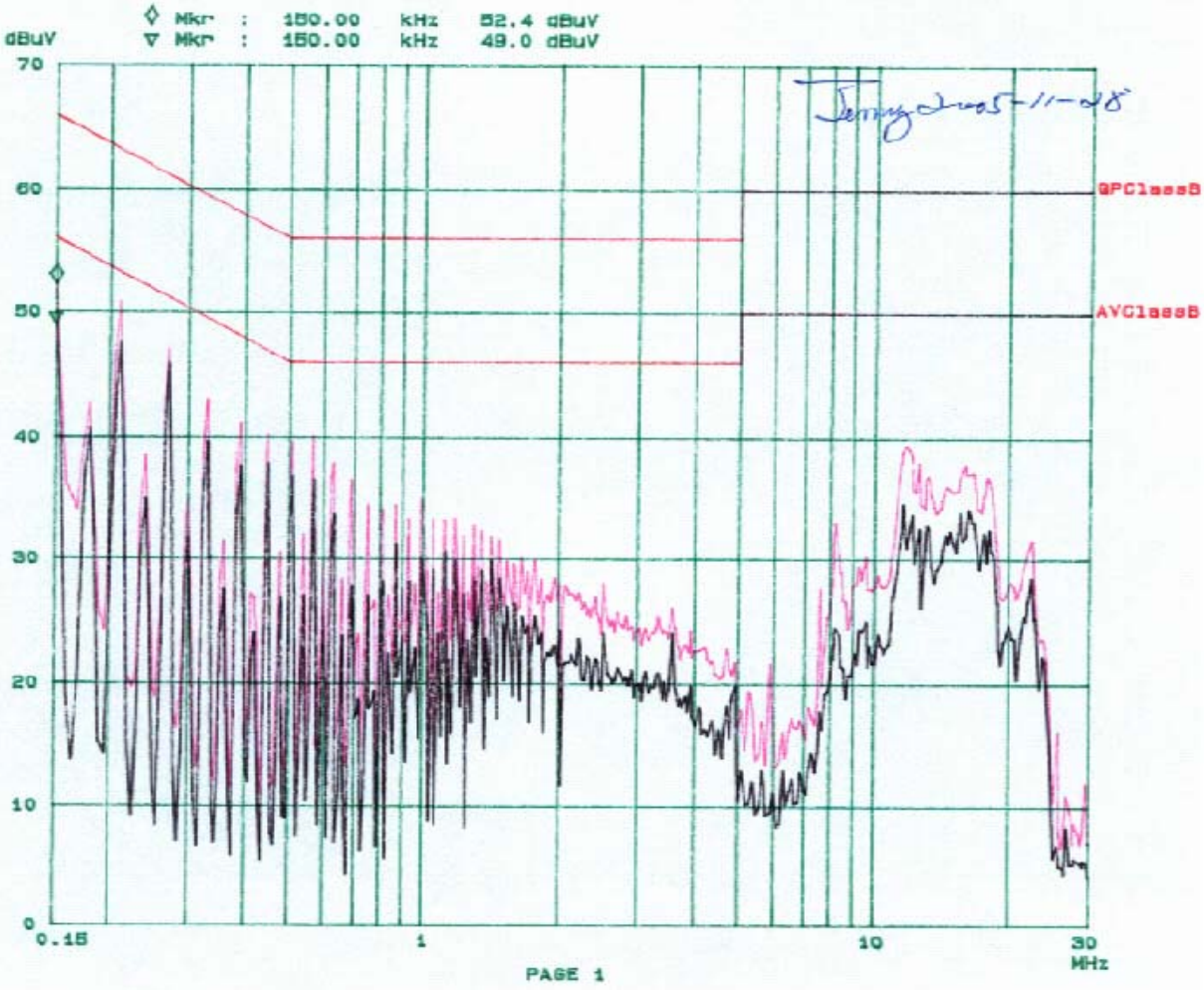
The plots of conducted emission are presented hereinafter as reference.

Bay Area Compliance Laboratory Corp 28. Nov 05 16:04
Class B

EUT: DVR GN-7165
Manuf: Gana I&C
Op Cond: Normal
Operator: Jerry
Comment: L
120 VAC

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9K	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF

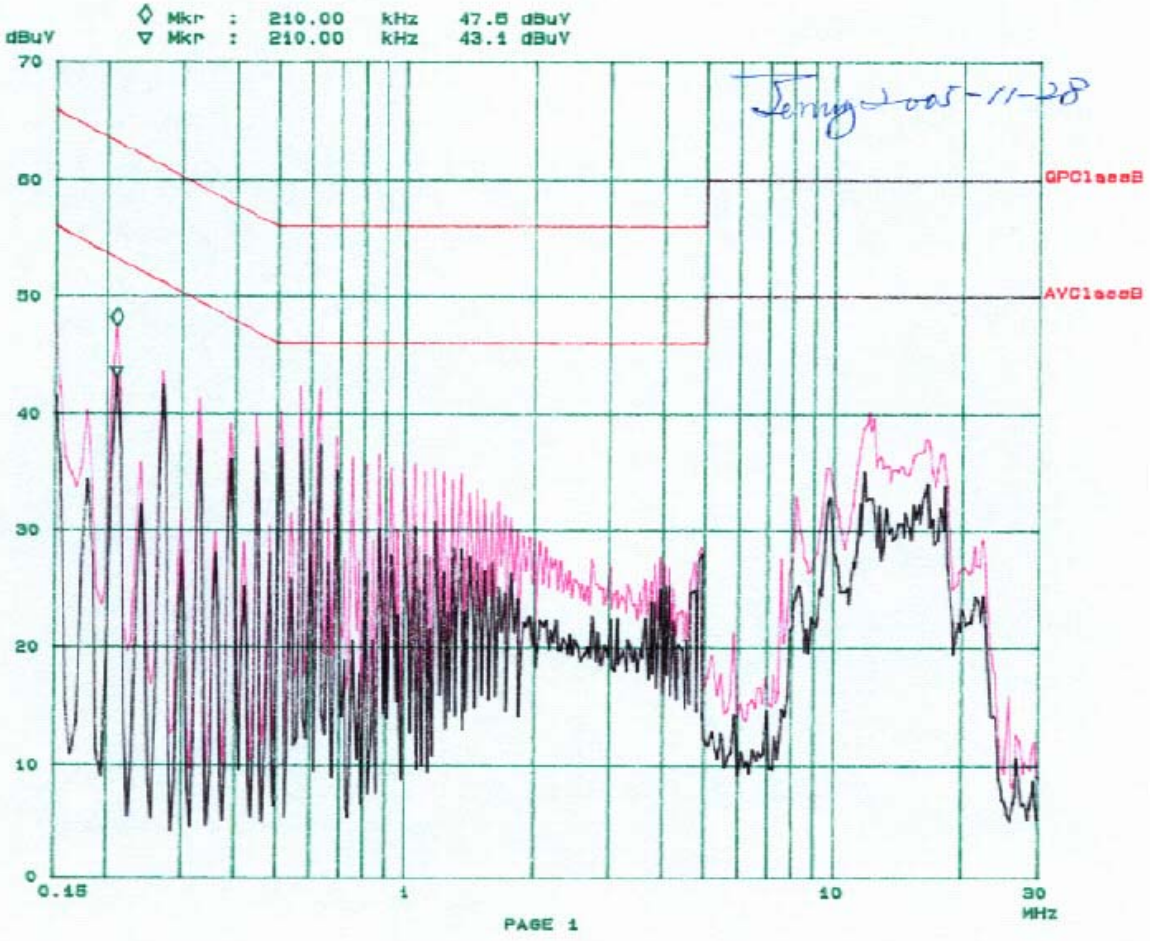


Bay Area Compliance Laboratory Corp 28. Nov 05 16:39
Class B

EUT: DVR GN-7165
Manuf: Gana I&C
Op Cond: Normal
Operator: Jerry
Comment: N
120 VAC

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF



§15.109 - RADIATED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are receiver, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMI Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is ±4.0 dB.

EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with the ANSI C63.4-2003. The specification used was the FCC15B limits.

The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and bundled as required.

The EUT was connected to 120Vac/60Hz power source.

Receiver Setup

The system was tested to 1000 MHz.

During the radiated emission test, the receiver was set with the following configurations:

Frequency Range	***RBW***	***Video B/W***
Below 30MHz	10kHz	10kHz
30 – 1000MHz	100kHz	100kHz
Above 1000MHz	1MHz	1MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal Date
Sunol Sciences	Antenna	JB1	A013105-3	2005-2-11
Sunol Sciences	System Controller	SC99V	122303-1	N/R
Agilent	Amplifier, Pre	8447D	2944A10187	2005-8-20
Rohde & Schwarz	Receiver, EMI Test	ESCI 1166.5950K03	100044	2005-09-29

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test, the EUT all support equipment were connected to the AC floor outlet.

Maximizing procedure was performed on the six (6) highest emissions in the described configurations.

All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limits), and are distinguished with a "**Qp**" in the data table.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor, and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - Class B Limit

Summary of Test Results

According to the following table, the EUT complied with the FCC Class B standards and these test results is deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations, and had the worst margin of:

-0.1 dB at 270.0 MHz in the **Vertical** polarization , 30 to 1000 MHz*
(Test data was within the measurement uncertainty ±4.0dB)

Radiated Emissions Test Data, Measure at 10 Meter, and convert to 3 Meter

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	45%
ATM Pressure:	1016mbar

**Testing was performed by Jerry Wang on 2005-11-28.*

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC PART 15 CLASS B		
Frequency	Meter Reading	Angle	Height	Polar	Antenna Loss	Cable Loss	Amp.	Corr. Ampl.	Limit	Margin	PK/AV/QP
MHz	dBμV/m	Degree	Meter	H/ V	dB	dB	dB	dBμV/m	dBμV/m	dB	
270.00	47.5	180	1.2	V	13.2	2.6	27.4	45.9	46.0	-0.1*	QP
378.00	44.8	200	1.2	V	15.5	3.5	27.9	45.9	46.0	-0.1*	QP
297.00	46.9	200	3	H	13.5	2.9	27.4	45.9	46.0	-0.1*	QP
270.00	47.2	200	1.2	V	13.2	2.7	27.4	45.7	46.0	-0.3*	QP
297.00	46.8	200	1.2	V	13.4	2.8	27.4	45.6	46.0	-0.4*	QP
310.00	45.3	200	3	H	13.8	3.8	27.5	45.4	46.0	-0.6*	QP
324.00	44.9	180	3	H	14.1	3.8	27.5	45.3	46.0	-0.7*	QP
270.00	45.9	200	3	H	13.2	2.7	27.4	44.4	46.0	-1.6*	PK
416.00	40.9	200	1.2	V	16.1	4.4	28.1	43.3	46.0	-2.7*	QP
76.00	45.5	200	1.2	V	8.2	1.8	28.4	37.1	40.0	-2.9*	QP
240.00	45.6	280	3	H	11.5	3.3	27.5	42.9	46.0	-3.1*	PK
432.00	39.7	180	3	H	16.5	4.4	28.2	42.4	46.0	-3.6*	QP
76.00	44.8	200	3	H	8.2	1.8	28.4	36.4	40.0	-3.6*	QP
360.00	41.2	180	3	H	14.8	4.1	27.8	42.3	46.0	-3.7*	PK
216.00	43.6	200	3	H	10.6	3.1	27.6	39.7	43.5	-3.8*	QP
86.70	44.7	200	1.2	V	7.9	2.0	28.5	36.1	40.0	-3.9*	QP
230.50	45.2	180	1.2	V	11.0	3.3	27.6	41.9	46.0	-4.1	PK
351.00	40.8	200	1.2	V	14.5	4.2	27.7	41.8	46.0	-4.2	QP
216.00	42.9	200	1.2	V	10.6	3.1	27.6	39.0	43.5	-4.5	QP
337.50	40.8	180	1.2	V	14.2	3.9	27.5	41.4	46.0	-4.6	QP
162.00	42.1	120	1.2	V	12.2	2.5	28.0	38.8	43.5	-4.7	QP
360.00	39.6	200	1.2	V	14.8	4.1	27.8	40.7	46.0	-5.3	PK
253.86	41.8	180	1.2	V	11.9	3.4	27.4	39.7	46.0	-6.3	PK
108.00	42.1	180	1.2	V	11.0	2.1	28.2	37.0	43.5	-6.5	QP
60.00	42.1	120	1.2	V	7.4	1.7	28.5	32.7	40.0	-7.3	PK
112.60	39.8	200	1.2	V	12.1	2.2	28.2	35.9	43.5	-7.6	QP

Continuations

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC PART 15 CLASS B		
Frequency	Meter Reading	Angle	Height	Polar	Antenna Loss	Cable Loss	Amp.	Corr. Ampl.	Limit	Margin	PK/AV/QP
MHz	dBμV/m	Degree	Meter	H/ V	dB	dB	dB	dBμV/m	dBμV/m	dB	
116.00	38.6	180	2.6	H	13.1	2.2	28.2	35.7	43.5	-7.8	PK
72.00	40.5	200	1.2	V	8.1	1.8	28.4	32.0	40.0	-8.0	PK
184.50	38.7	180	1.5	V	11.6	2.8	27.8	35.3	43.5	-8.2	PK
180.00	38.6	200	1.2	V	11.6	2.8	27.8	35.2	43.5	-8.3	QP
416.00	35.2	180	3	H	16.1	4.4	28.1	37.6	46.0	-8.4	PK
132.00	36.3	180	1.2	V	14.1	2.4	28.3	34.5	43.5	-9.0	PK
144.00	36.5	200	1	V	13.3	2.4	28.1	34.1	43.5	-9.4	PK
300.00	34.7	180	1	V	13.6	3.6	27.4	34.5	46.0	-11.5	PK

** The test data was within the measurement of uncertainty.*