

*FCC PART 15, SUBPART B AND C
TEST REPORT*

for

ULTRASONIC LEVEL MONITOR

Model: WU20

Prepared for

BARTON INSTRUMENT SYSTEMS, LLC
900 SOUTH TURNBULL CANYON ROAD
CITY OF INDUSTRY, CALIFORNIA 91749-1882

COMPATIBLE ELECTRONICS INC.
114 OLINDA DRIVE
BREA, CALIFORNIA 92823
(714) 579-0500

DATE: AUGUST 1, 2000

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	17	2	2	9	16	2	48

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LIST OF APPENDICES

APPENDIX	TITLE
A	Modifications to the EUT
B	Additional Models Covered Under This Report
C	Diagrams, Charts and Photos <ul style="list-style-type: none">• Test Setup Diagrams• Radiated Emissions Photos• Antenna and Effective Gain Factors
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LIST OF FIGURES

FIGURE	TITLE
1	Conducted Emissions Test Setup
2	Plot Map And Layout of Test Site



GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full with the written permission of Compatible Electronics.

This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Device Tested: Ultrasonic Level Monitor
Model: WU20
S/N: N/A

Product Description: See Expository Statement.

Modifications: The EUT was not modified during the testing.

Manufacturer: Barton Instrument Systems, LLC
900 South Turnbull Canyon Road
City of Industry, California 91749-1882

Test Date: July 26, 2000

Test Specifications: EMI requirements
CFR Title 47, Part 15, Subpart B
CFR Title 47, Part 15 Subpart C, Sections 15.205 and 15.249

Test Procedure: ANSI C63.4: 1992

Test Deviations: The test procedure was not deviated from during the testing.



SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 450 kHz - 30 MHz	The EUT runs off batteries only and cannot be plugged into the AC public mains. Therefore, this test was not performed.
2	Radiated RF Emissions for the EUT in transmit mode, 10 kHz - 9300 MHz	Complies with the limits of CFR Title 47, Part 15, Subpart C, sections 15.205 and 15.249
3	Radiated RF Emissions for the EUT in ultrasonic and receive mode, 10 kHz - 9300 MHz	Complies with the Class B limits of CFR Title 47, Part 15, Subpart B



1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Ultrasonic Level Monitor Model: WU20. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 1992. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the specification limits defined by CFR Title 47, Part 15, Subpart C, sections 15.205 and 15.249.



2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Barton Instrument Systems, LLC

Tanh T. Ngo	Sr. Electronic Engineer
Brian Dearden	Staff Engineer

Compatible Electronics Inc.

Kyle Fujimoto	Test Engineer
Scott McCutchan	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on July 26, 2000.

2.5 Disposition of the Test Sample

The test sample was returned to Barton Instrument Systems, LLC on July 26, 2000.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
TDR	Time Domain Reflectometer



3.**APPLICABLE DOCUMENTS**

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
CFR Title 47, Subpart C	FCC Rules – Radio frequency devices – Intentional Radiators
ANSI C63.4 1992	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.



4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

The Ultrasonic Level Monitor Model: WU20 (EUT) tested as a stand alone unit and placed on the wooden table. The EUT was operating was mentioned below.

The EUT was tested in 2 different modes:

1. Ultrasonic and Receive mode – The EUT is receiving and using ultrasonic technology (used to measure inside the tank) on a continuous basis.
2. Transmit mode – The EUT is continuously transmitting.

Note: only one of these modes can be active at a given time. The Ultrasonic and Receive mode was tested to the Class B specification limits defined by CFR Title 47, Part 15, Subpart B. The Transmit mode was tested to the specification limits defined by CFR Title 47, Part 15, Subpart C, sections 15.205 and 15.249.

The final radiated data was taken in all of the modes above. Please see Appendix D for the data sheets.



4.1.1 **Cable Construction and Termination**

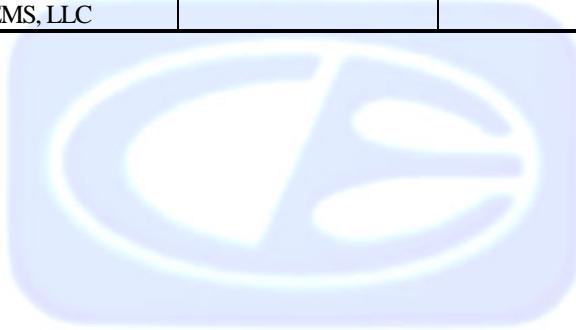
There were no external cables connected to the EUT.



5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
ULTRASONIC LEVEL MONITOR (EUT)	BARTON INSTRUMENT SYSTEMS, LLC	WU20	N/A	OKZ-WU20



5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Spectrum Analyzer	Hewlett Packard	8566B	3701A22262	June 24, 2000	June 24, 2001
Preamplifier	Com Power	PA-102	1017	Jan. 11, 2000	Jan. 11, 2001
Quasi-Peak Adapter	Hewlett Packard	85650A	2811A01363	June 24, 2000	June 24, 2001
RF Attenuator	Sertek	412-10	N/A	Nov. 22, 1999	Nov. 22, 2000
LISN	Com Power	LI-215	12075	Nov. 13, 1999	Nov. 13, 2000
LISN	Com Power	LI-215	12078	Nov. 13, 1999	Nov. 13, 2000
Biconical Antenna	Com Power	AB-100	1548	Oct. 14, 1999	Oct. 14, 2000
Log Periodic Antenna	Com Power	AL-100	16039	Oct. 14, 1999	Oct. 14, 2000
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Hewlett Packard	D5251A 888	US74458128	N/A	N/A
Microwave Preamplifier	Com-Power	PA-122	25195	Jan. 13, 2000	Jan. 13, 2001
Horn Antenna	Antenna Research	DRG-118/A	1053	Dec. 8, 1995	N/A
Loop Antenna	Com-Power	AL-130	25309	May 25, 2000	May 25, 2001



6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was not grounded.



7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1

Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Preamplifier Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, and the Com-Power Microwave Preamplifier Model: PA-122 was used for frequencies above 1 GHz. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps.

For the peak readings below 1000 MHz that were within 3 dB of the spec limit or higher, the quasi-peak adapter was used.

For the peak readings above 1000 MHz that were within 3dB of the spec limit or higher, the readings were averaged manually by narrowing the video filter down to 10 Hz and slowing the sweep time to keep the amplitude reading calibrated.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna
1 GHz to 9.3 GHz	1 MHz	Horn Antenna

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 1992. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results.



The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain final test data. The final qualification data sheets are located in Appendix D.



7.2

Band Edge Plots of the Low and High Channels

A spectral plot was taken of the EUT to show that the emissions at the band edges were attenuated by at least 50 dB below the level of the fundamental or to the general radiated emissions limits in FCC Title 47, Subpart C, section 15.209, whichever is the lesser attenuation. Please see Appendix D for the spectral plot.

The spectral plot was taken at a distance of 3 meters.



8. CONCLUSIONS

The Ultrasonic Level Monitor Model: WU20 meets all of the **Class B** specification limits defined in CFR Title 47, Part 15, Subpart B, and the specification limits defined in CFR Title 47, Part 15, Subpart C, sections 15.205 and 15.249.



APPENDIX A

MODIFICATIONS TO THE EUT



MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC Subpart B and C specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT during the testing.



APPENDIX B

***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***



ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Ultrasonic Level Monitor
Model: WU20
S/N: N/A

There were no additional models covered under this report.



APPENDIX C

DIAGRAMS, CHARTS AND PHOTOS



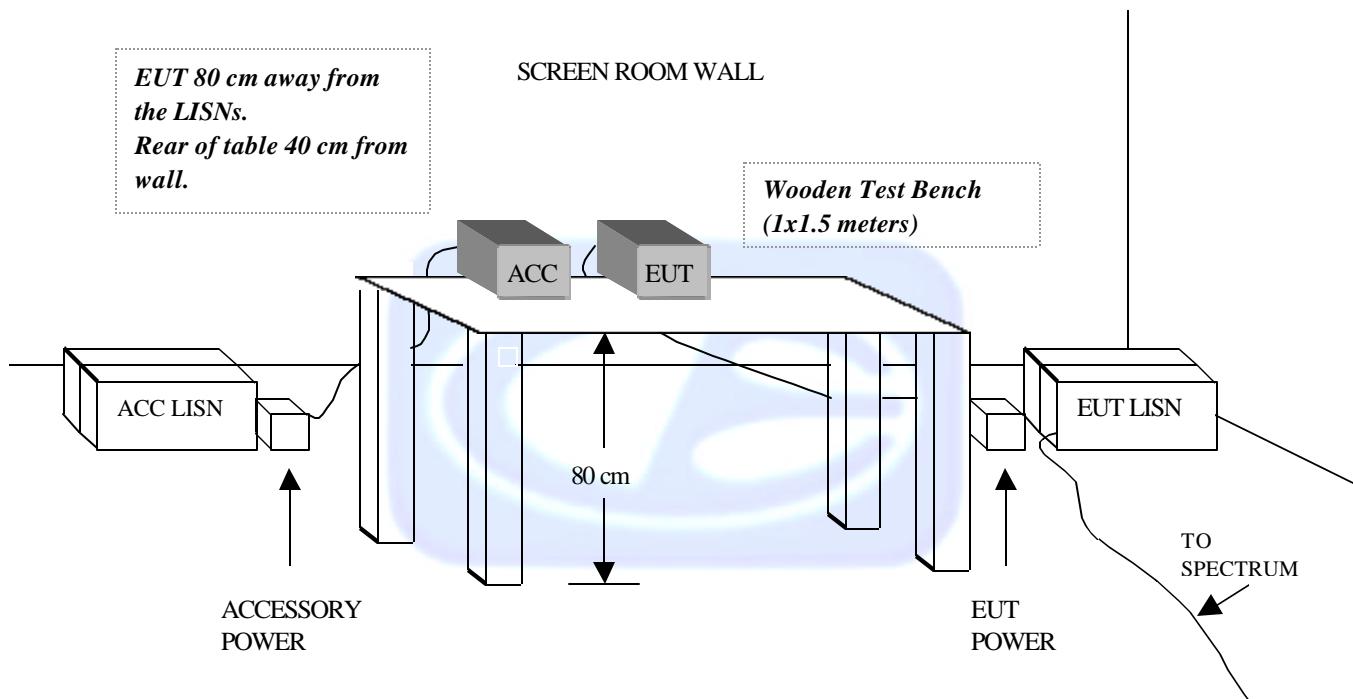
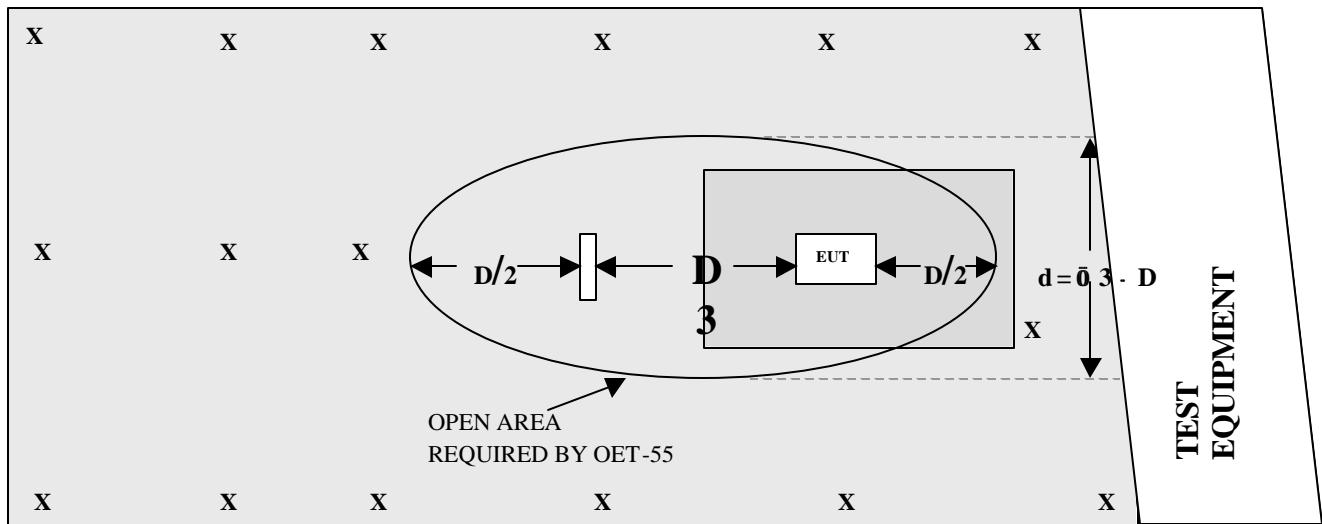
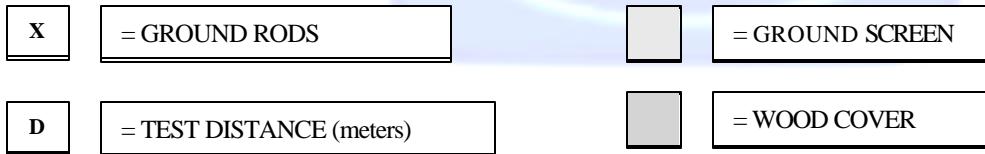
FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

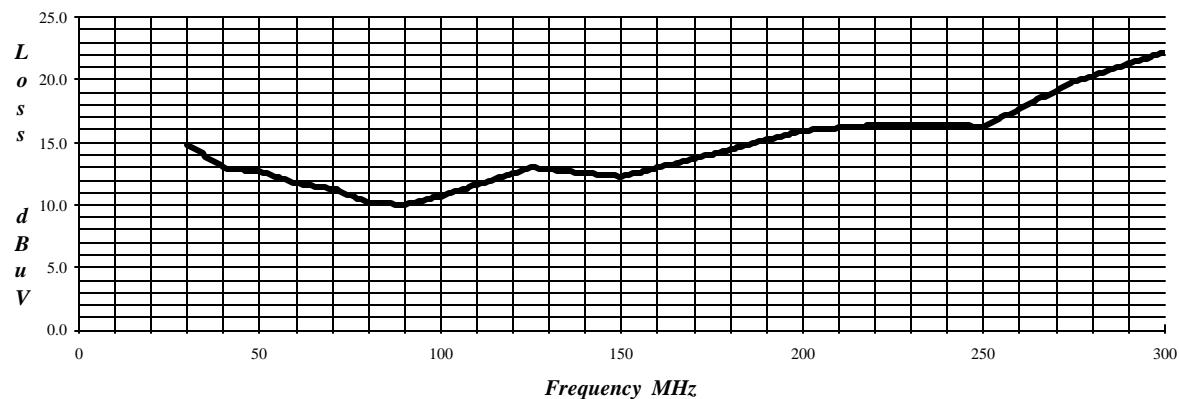
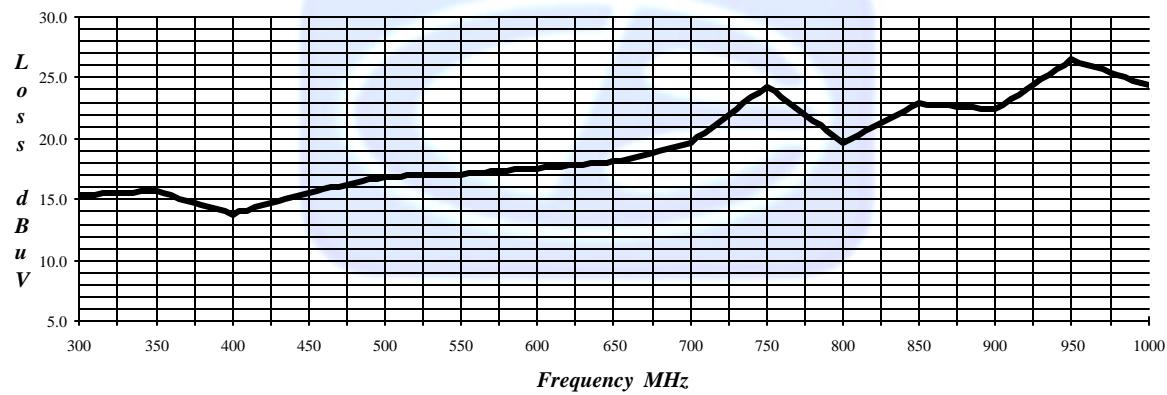
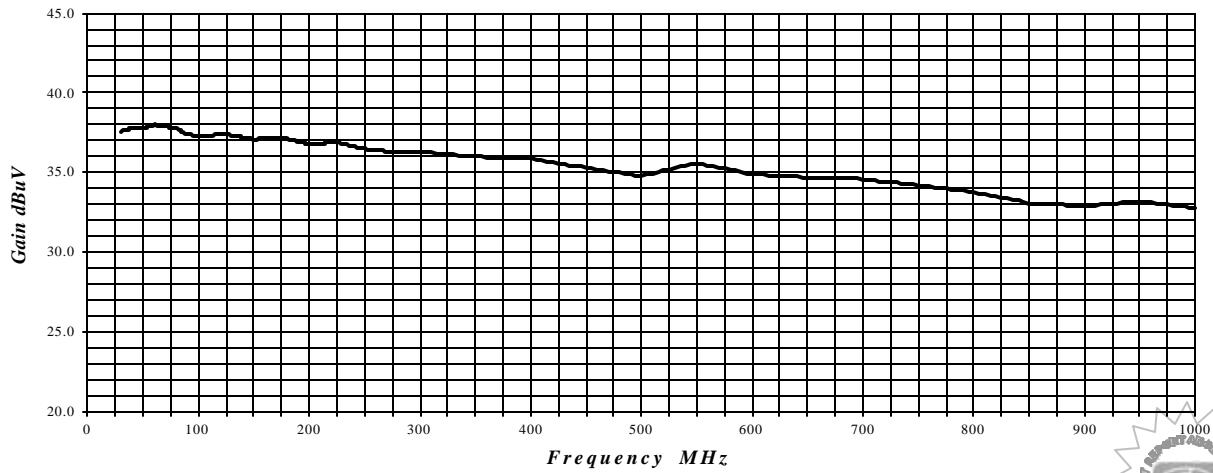
FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE**OPEN LAND > 15 METERS****OPEN LAND > 15 METERS****OPEN LAND > 15 METERS**

**FRONT VIEW****BARTON INSTRUMENT SYSTEMS, LLC****ULTRASONIC LEVEL MONITOR****MODEL: WU20****FCC SUBPART C - RADIATED EMISSIONS – 7-26-00****PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

**REAR VIEW****BARTON INSTRUMENT SYSTEMS, LLC****ULTRASONIC LEVEL MONITOR****MODEL: WU20****FCC SUBPART C - RADIATED EMISSIONS – 7-26-00**

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



LAB "D" BICONICAL ANTENNA AB-100 S/N 01548 Cal: 10-14-99**LAB "D" LOG PERIODIC ANTENNA AL-100 S/N 16039 Cal: 10-14-99****PREAMPLIFIER EFFECTIVE GAIN AT 3 METERS PA-102 S/N: 1017 Effective 1-13-00**

COM-POWER PA-122
MICROWAVE PREAMPLIFIER
S/N: 25195

CALIBRATION DATE: JANUARY 13, 2000

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	34.4	9.0	30.7
1.1	34.1	9.5	31.5
1.2	34.2	10.0	31.0
1.3	34.1	10.5	31.4
1.4	33.9	11.0	30.7
1.5	33.8	11.5	29.5
1.6	33.0	12.0	27.8
1.7	33.3	12.5	31.4
1.8	33.3	13.0	31.0
1.9	31.9	13.5	31.0
2.0	32.7	14.0	31.5
2.5	31.8	14.5	30.2
3.0	31.7	15.0	29.2
3.5	31.9	15.5	30.1
4.0	31.0	16.0	29.0
4.5	31.4	16.5	27.8
5.0	31.1	17.0	30.8
5.5	31.0	17.5	31.5
6.0	32.0	18.0	30.8
6.5	31.6		
7.0	32.3		
7.5	32.9		
8.0	32.1		
8.5	31.6		



E-FIELD ANTENNA FACTOR CALIBRATION

$$E(\text{dB V/m}) = V_o(\text{dB V}) + AFE(\text{dB/m})$$

Model number : DRG-118/A

Frequency GHz	AFE dB/m	Gain dBi
1	22.3	8.0
2	26.7	9.5
3	29.7	10.1
4	29.5	12.8
5	32.3	12.0
6	32.4	13.4
7	36.1	11.0
8	37.4	10.9
9	36.8	12.5
10	39.5	10.7
11	39.6	11.5
12	39.8	12.0
13	39.7	12.8
14	41.8	11.3
15	41.9	11.9
16	38.1	16.3
17	41.0	13.9
18	46.5	8.9

Serial number : 1053
Job number : 96-092
Remarks : 3 meter calibration
Standards : LPD-118/A, TE-1000

Temperature : 72° F
Humidity : 56 %
Traceability : A01887
Date : December 08, 1995

Calibrated By

Com-Power Corporation

(949) 587-9800

Antenna Calibration

Antenna Type:			Loop Antenna
Model:			AL-130
Serial Number:			25309
Calibration Date:			05/25/00
Frequency MHz	Magnetic (dB/m)	Electric dB/m	
0.009	-41.0	10.5	
0.01	-41.0	10.5	
0.02	-41.9	9.6	
0.05	-41.9	9.6	
0.075	-41.8	9.7	
0.1	-42.2	9.3	
0.15	-42.2	9.3	
0.25	-40.7	10.8	
0.5	-42.1	9.4	
0.75	-40.9	10.6	
1	-41.3	10.2	
2	-40.8	10.7	
3	-41.1	10.4	
4	-41.2	10.3	
5	-40.7	10.8	
10	-40.6	10.9	
15	-42.0	9.5	
20	-42.0	9.5	
25	-42.9	8.6	
30	-42.3	9.2	
Trans. Antenna Height	2 meter		
Receiving Antenna Height	2 meter		

APPENDIX D

DATA SHEETS



TRANSMITTER MODE

DATA SHEETS



RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)



COMPATIBLE ELECTRONICS

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	7/26/00
EUT	ULTRASONIC LEVEL MONITOR	DUTY CYCLE	0.00 %
MODEL	WU20	PEAK TO AVG	0 dB
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

• CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

■ DELTA = SPEC. LIMIT - CORRECTED READING

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RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)



**COMPATIBLE
ELECTRONICS**

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	7/26/00
EUT	ULTRASONIC LEVEL MONITOR	DUTY CYCLE	0.00 %
MODEL	WU20	PEAK TO AVG	0 dB
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

- CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

PAGE 2

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)



COMPATIBLE ELECTRONICS

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	7/26/00
EUT	ULTRASONIC LEVEL MONITOR	DUTY CYCLE	0.00 %
MODEL	WU20	PEAK TO AVG	0 dB
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

- CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED BEARING

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RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)



COMPATIBLE ELECTRONICS

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	7/26/00
EUT	ULTRASONIC LEVEL MONITOR	DUTY CYCLE	0.00 %
MODEL	WU20	PEAK TO AVG	0 dB
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

- CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED BEARING

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RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)



COMPATIBLE ELECTRONICS

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	7/26/00
EUT	ULTRASONIC LEVEL MONITOR	DUTY CYCLE	0.00 %
MODEL	WU20	PEAK TO AVG	0 dB
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMT - CORRECTED BEARING

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RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)



COMPATIBLE ELECTRONICS

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	7/26/00
EUT	ULTRASONIC LEVEL MONITOR	DUTY CYCLE	0.00 %
MODEL	WU20	PEAK TO AVG	0 dB
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

Note: NO Emissions nor harmonics found after the 6th Harmonic for the EUT

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Test location: Compatible Electronics
Customer : BARTON INSTRUMENT SYSTEMS, LLC Date : 7/26/2000
Manufacturer : BARTON INSTRUMENT SYSTEMS, LLC Time : 15.47
EUT name : ULTRASONIC LEVEL MONITOR Model: WU20
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor($20 \log(\text{test/spec})$) : 0.00
Test Mode :
TRANSMITTER MODE - 10 kHz TO 9300 MHz VERTICAL AND HORIZONTAL
TEMPERATURE 71 DEGREES F.
RELATIVE HUMIDITY 68%
TESTED BY: Kyle Fujimoto
KYLE FUJIMOTO

NO SPURIOUS EMISSIONS FOUND FOR THE TRANSMITTER MODE
IN EITHER POLARIZATION

ULTRASONIC AND RECEIVE MODE

DATA SHEETS



Test location: Compatible Electronics

Customer : BARTON INSTRUMENT SYSTEMS, LLC Date : 7/26/2000

Manufacturer : BARTON INSTRUMENT SYSTEMS, LLC Time : 10.55

EUT name : ULTRASONIC LEVEL MONITOR Model: WU20

Specification: Fcc_B Test distance: 3.0 mtrs Lab: D

Distance correction factor(20*log(test/spec)) : 0.00

Test Mode :

RECEIVER AND ULTRASONIC MODE - 30 MHz TO 300 MHz VERTICAL

TEMPERATURE 71 DEGREES F.

RELATIVE HUMIDITY 68%

TESTED BY: Kyle Fujimoto

KYLE FUJIMOTO

Pol	Freq	Rdng	Cable	Ant	Amp	Cor'd	limit	Delta
	MHz	dBuV	loss	factor	gain	rdg = R	= L	R-L
1V	39.98	53.30	0.80	12.96	38.60	28.46	40.00	-11.54
2V	48.05	52.60	0.88	12.73	38.68	27.53	40.00	-12.47
3V	61.31	52.90	0.83	11.67	38.81	26.58	40.00	-13.42
4V	63.93	49.50	0.88	11.57	38.84	23.11	40.00	-16.89
5V	109.13	56.80	1.34	11.57	38.67	31.03	43.50	-12.47
6V	113.37	59.30	1.35	11.95	38.71	33.90	43.50	-9.60
7V	116.59	57.10	1.37	12.25	38.73	31.98	43.50	-11.52
8V	121.13	56.10	1.38	12.66	38.77	31.37	43.50	-12.13
9V	125.90	63.40	1.41	12.98	38.80	38.99	43.50	-4.51
10V	138.57	62.30	1.51	12.60	38.75	37.66	43.50	-5.84
11V	145.42	59.10	1.56	12.39	38.72	34.33	43.50	-9.17
12V	150.47	61.90	1.60	12.28	38.70	37.08	43.50	-6.42
13V	152.07	59.60	1.60	12.40	38.71	34.89	43.50	-8.61
14V	168.09	51.80	1.60	13.57	38.77	28.19	43.50	-15.31
15V	197.41	51.70	1.78	15.75	38.62	30.61	43.50	-12.89
16V	200.54	57.50	1.80	15.96	38.60	36.66	43.50	-6.84
17V	214.88	46.40	1.86	16.24	38.72	25.78	43.50	-17.72
18V	225.53	42.70	1.90	16.44	38.80	22.24	46.00	-23.76
19V	251.76	50.70	2.11	16.52	38.59	30.73	46.00	-15.27
20V	276.99	48.70	2.21	20.02	38.51	32.42	46.00	-13.58



Test location: Compatible Electronics

Customer : BARTON INSTRUMENT SYSTEMS, LLC Date : 7/26/2000

Manufacturer : BARTON INSTRUMENT SYSTEMS, LLC Time : 11.15

EUT name : ULTRASONIC LEVEL MONITOR Model: WU20

Specification: Fcc_B Test distance: 3.0 mtrs Lab: D

Distance correction factor($20 \log(\text{test/spec})$) : 0.00

Test Mode :

RECEIVER AND ULTRASONIC MODE - 30 MHz TO 300 MHz HORIZONTAL

TEMPERATURE 71 DEGREES F.

RELATIVE HUMIDITY 68%

TESTED BY:

Kyle Fujimoto

KYLE FUJIMOTO

Pol	Freq	Rdng	Cable	Ant	Amp	Cor'd	limit	Delta
	MHz	dBuV	loss	factor	gain	rdg = R	= L	R-L
1H	38.54	51.30	0.79	13.24	38.56	26.77	40.00	-13.23
2H	41.94	53.50	0.82	12.91	38.62	28.61	40.00	-11.39
3H	56.65	38.90	0.83	12.04	38.77	13.01	40.00	-26.99
4H	68.51	43.10	0.97	11.40	38.89	16.58	40.00	-23.42
5H	83.30	54.70	1.07	10.16	38.73	27.19	40.00	-12.81
6H	85.96	46.30	1.12	10.11	38.68	18.85	40.00	-21.15
7H	108.91	47.50	1.34	11.55	38.67	21.71	43.50	-21.79
8H	112.91	47.80	1.35	11.91	38.70	22.36	43.50	-21.14
9H	125.91	60.40	1.41	12.98	38.80	35.99	43.50	-7.51
10H	133.91	51.50	1.47	12.74	38.76	26.95	43.50	-16.55
11H	150.44	60.40	1.60	12.28	38.70	35.58	43.50	-7.92
12H	162.60	51.80	1.60	13.17	38.75	27.82	43.50	-15.68
13H	176.42	43.50	1.61	14.18	38.79	20.50	43.50	-23.00
14H	194.73	48.50	1.76	15.55	38.64	27.17	43.50	-16.33
15H	210.73	45.20	1.84	16.16	38.69	24.52	43.50	-18.98
16H	229.47	48.70	1.94	16.41	38.76	28.28	46.00	-17.72

Test location: Compatible Electronics
 Customer : BARTON INSTRUMENT SYSTEMS, LLC Date : 7/26/2000
 Manufacturer : BARTON INSTRUMENT SYSTEMS, LLC Time : 9.47
 EUT name : ULTRASONIC LEVEL MONITOR Model: WU20
 Specification: FCC_B Test distance: 3.0 mtrs Lab: D
 Distance correction factor($20 \log(\text{test/spec})$) : 0.00
 Test Mode :
 RECEIVER AND ULTRASONIC MODE - 300 MHz TO 9300 MHz VERTICAL
 TEMPERATURE 71 DEGREES F.
 RELATIVE HUMIDITY 68%
 TESTED BY: Kyle Fujimoto
Kyle Fujimoto
 KYLE FUJIMOTO

Pol	Freq	Rdng	Cable	Ant	Amp	Cor'd	limit	Delta
	MHz	dBuV	loss	factor	gain	rdg = R	= L	R-L
1V	300.78	49.60	2.30	15.41	38.60	28.72	46.00	-17.28
2V	302.14	49.40	2.31	15.42	38.60	28.53	46.00	-17.47
3V	325.86	47.80	2.46	15.55	38.60	27.20	46.00	-18.80
4V	350.99	40.70	2.60	15.64	38.60	20.34	46.00	-25.66
5V	372.95	41.70	2.65	14.80	38.60	20.54	46.00	-25.46
6V	384.15	49.70	2.67	14.37	38.60	28.14	46.00	-17.86
7V	401.04	53.00	2.70	13.80	38.59	30.91	46.00	-15.09
8V	406.92	49.90	2.71	14.01	38.53	28.10	46.00	-17.90
9V	453.33	42.60	2.82	15.69	38.09	23.02	46.00	-22.98
10V	472.15	47.00	2.93	16.17	38.01	28.09	46.00	-17.91
11V	549.33	39.40	3.59	17.09	39.18	20.90	46.00	-25.10
12V	753.28	32.70	3.99	20.44	38.17	18.96	46.00	-27.04
13V	870.06	47.70	4.48	22.70	37.50	37.38	46.00	-8.62
14V	1740.00	40.70	3.20	24.50	33.30	35.10	54.00	-18.90
15V	1870.70	54.50	3.50	24.50	33.30	49.20	54.00	-4.80



Test location: Compatible Electronics

Customer : BARTON INSTRUMENT SYSTEMS, LLC Date : 7/26/2000

Manufacturer : BARTON INSTRUMENT SYSTEMS, LLC Time : 10.25

EUT name : ULTRASONIC LEVEL MONITOR Model: WU20

Specification: Fcc_B Test distance: 3.0 mtrs Lab: D

Distance correction factor($20 \log(\text{test/spec})$) : 0.00

Test Mode :

RECEIVER AND ULTRASONIC MODE - 300 MHz TO 9300 MHz HORIZONTAL
TEMPERATURE 71 DEGREES F.

RELATIVE HUMIDITY 68%

TESTED BY:

Kyle Fujimoto
KYLE FUJIMOTO

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	limit = L dBuV/m	Delta R-L dB
1H	300.74	59.80	2.30	15.41	38.60	38.92	46.00	-7.08
2H	302.10	58.60	2.31	15.42	38.60	37.73	46.00	-8.27
3H	317.73	51.10	2.41	15.51	38.60	30.41	46.00	-15.59
4H	325.85	60.10	2.46	15.55	38.60	39.50	46.00	-6.50
5H	330.65	49.70	2.48	15.58	38.60	29.16	46.00	-16.84
6H	350.91	50.80	2.60	15.65	38.60	30.45	46.00	-15.55
7H	401.04	54.70	2.70	13.80	38.59	32.61	46.00	-13.39
8H	451.13	47.80	2.81	15.63	38.10	28.14	46.00	-17.86
9H	503.93	37.20	3.14	16.90	38.00	19.23	46.00	-26.77
10H	543.93	35.90	3.54	17.06	39.04	17.46	46.00	-28.54
11H	799.78	41.10	3.90	19.67	37.70	26.97	46.00	-19.03
12H	870.06	45.70	4.48	22.70	37.50	35.38	46.00	-10.62

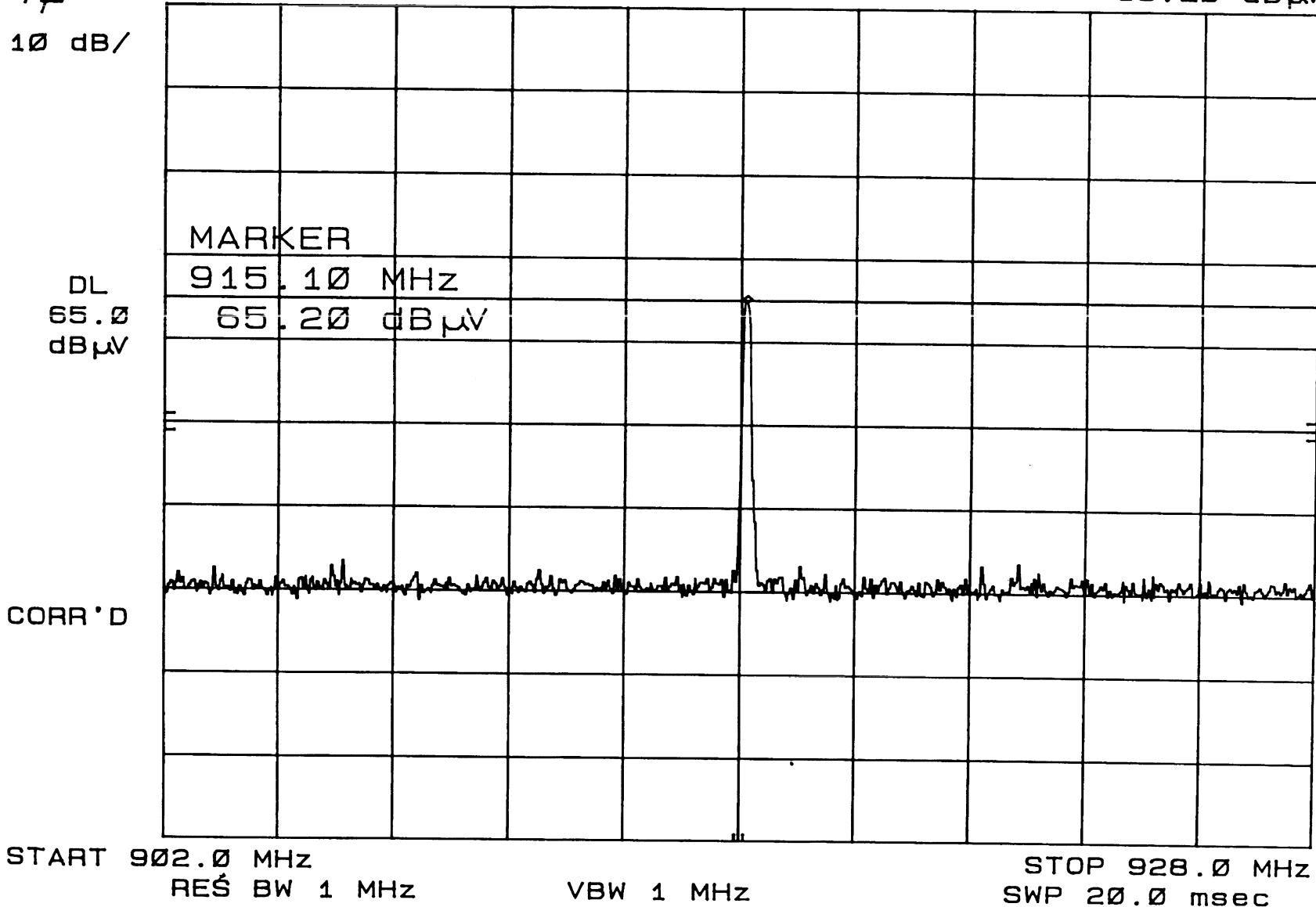
BAND EDGE

DATA SHEETS



hp BAND EDGE PLOT FOR FUNDAMENTAL
REF 100.0 dB μ V ATTN 10 dB

MKR 915.10 MHz
65.20 dB μ V



APPENDIX E

LAB RECOGNITIONS



LAB RECOGNITIONS

Compatible Electronics has the following agency accreditations:

National Voluntary Laboratory Accreditation Program - Lab Code: 200063-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Compatible Electronics is recognized or on file with the following agencies:

Federal Communications Commission

Industry Canada

Radio-Frequency Technologies (Competent Body)

Technology International (Europe) Ltd.

