

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

for

TANKSCAN MONITOR RADIO MODULE

Assembly Number: WL20-4040B

Prepared for

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

COMPATIBLE ELECTRONICS INC.
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BREA, CALIFORNIA 92823
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DATE: FEBRUARY 12, 2001

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
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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: TankScan Monitor Radio Module
Assembly Number: WL20-4040B
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: February 9, 2001

Test Specifications: EMI requirements
CFR Title 47, Part 15, Subpart B
CFR Title 47, Part 15 Subpart C, Sections 15.205, 15.209, 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	This test was not performed because the EUT operates on battery power only
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, 15.209, and 15.249
3	Radiated RF Emissions for the EUT in receive mode, 30 MHz – 5000 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 TankScan Monitor Radio Module Assembly Number: WL20-4040B. 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 the **Class B** limits of CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, 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

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 February 7, 2001.

2.5 Disposition of the Test Sample

The test sample was returned to Barton Instrument Systems, LLC on February 9, 2001.

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 EUT was tested in 2 different configurations:

Direct Antenna Configuration: The TankScan Monitor Radio Module Assembly Number: WL20-4040B was tested as a stand alone unit. The connector for the antenna is a reverse polarity and reverse thread TNC.

Remote Antenna Configuration: The TankScan Monitor Radio Module Assembly Number: WL20-4040B was mounted inside an all plastic case. A nine inch cable was connected to the EUT, which allowed the remote antenna to be connected without having to open the plastic case. The connector for the antenna is a reverse polarity and reverse thread TNC.

The EUT was tested in 2 different modes:

1. Receive mode – The EUT was continuously receiving.
2. Transmit mode – The EUT was continuously transmitting.

Note: only one of these modes can be active at a given time. The 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, 15.209, and 15.249.

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



4.1.1 Cable Construction and Termination

For the Remote Antenna Mode Only

Cable 1 This is a 20 foot braid shielded cable connecting the remote antenna to cable #2. It has a reverse polarity, reverse thread metallic TNC connector at the cable #2 end and is hard wired into the remote antenna. Due to the stiffness of the cable, it was coiled so that it was 40 centimeters above the ground plane.

Cable 2 This is a 9 inch braid shielded cable connecting the EUT to cable #1. It has a metallic MMT connector at the EUT end and a reverse polarity, reverse thread metallic TNC connector at the other end. The shield of the cable was grounded to the chassis via the connector.

Note: Cable #2 is inside the plastic case, which will not be able to accessed by the end user. The only connector the user will be able to access is the reverse polarity, reverse thread metallic TNC connector that is external to the plastic case.

For the Direct Antenna Mode Only

There are no external cables connected to the EUT.



5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	ASSEMBLY NUMBER	SERIAL NUMBER	FCC ID
TANKSCAN MONITOR RADIO MODULE (EUT)	BARTON INSTRUMENT SYSTEMS, LLC	WL20-4040B	N/A	OKZ-WL20-4040B



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. 5, 2001	Jan. 5, 2002
Quasi-Peak Adapter	Hewlett Packard	85650A	2811A01363	June 24, 2000	June 24, 2001
Biconical Antenna	Com Power	AB-100	1548	Oct. 16, 2000	Oct. 16, 2001
Log Periodic Antenna	Com Power	AL-100	16039	Oct. 16, 2000	Oct. 16, 2001
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. 9, 2001	Jan. 9, 2002
Horn Antenna	Antenna Research	DRG-118/A	1053	Jan. 15, 2001	Jan. 15, 2002
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 7.1.2 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 RF Emissions

7.1.1 Conducted Emissions Test

The spectrum analyzer was used as a measuring meter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4: 1992. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the Compatible Electronics conducted emissions software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix E.

Test Results:

This test was not performed because the EUT operates on battery power only and cannot be plugged into the AC public mains.



7.1.2 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.



Radiated Emissions (Spurious and Harmonics) Test (con't)

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 TankScan Monitor Radio Module Assembly Number: WL20-4040B 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, 15.209, 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

TankScan Monitor Radio Module
Assembly Number: WL20-4040B
S/N: N/A

There were no additional models covered under this report.



APPENDIX C

DIAGRAMS, CHARTS AND PHOTOS



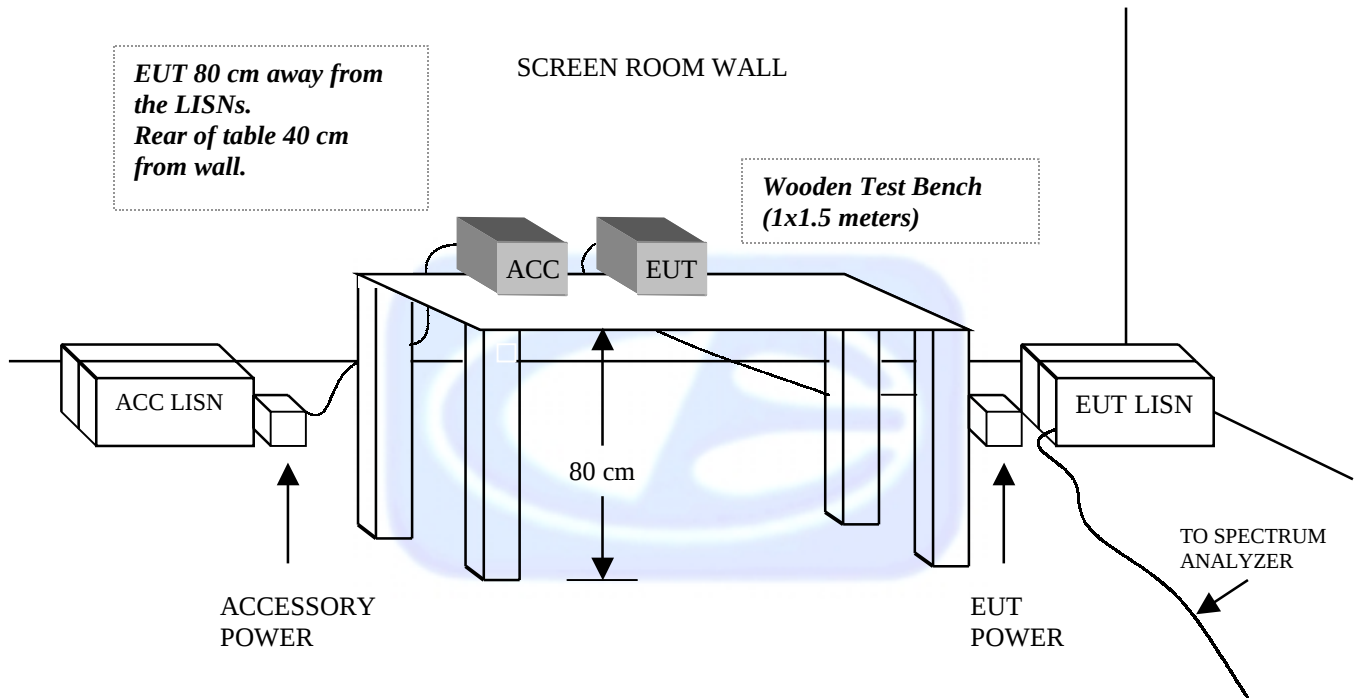
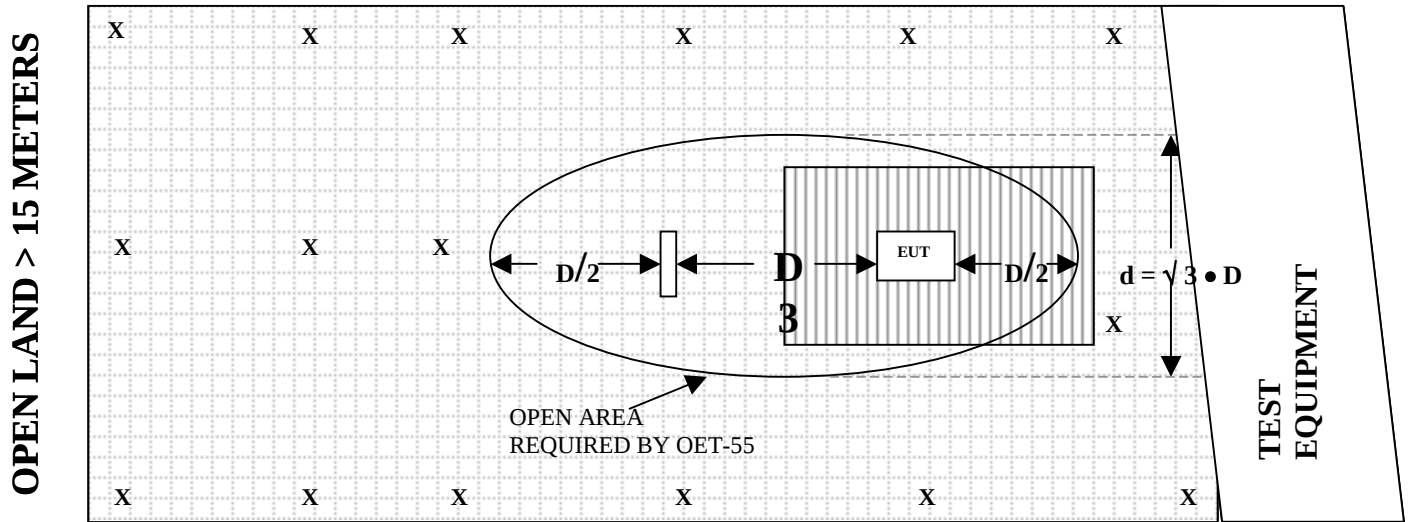
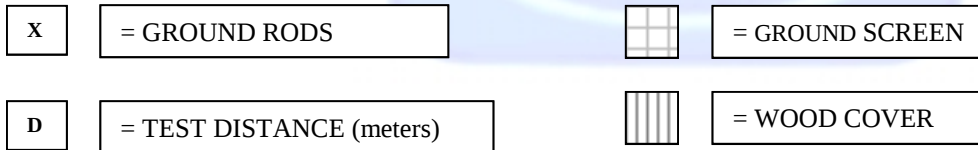
FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE

OPEN LAND > 15 METERS



OPEN LAND > 15 METERS





FRONT VIEW

BARTON INSTRUMENT SYSTEMS, LLC
TANKSCAN MONITOR RADIO MODULE – DIRECT ANTENNA
ASSEMBLY NUMBER: WL20-4040B
FCC SUBPART C - RADIATED EMISSIONS – 2-9-01

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





REAR VIEW

BARTON INSTRUMENT SYSTEMS, LLC
TANKSCAN MONITOR RADIO MODULE – DIRECT ANTENNA
ASSEMBLY NUMBER: WL20-4040B
FCC SUBPART C - RADIATED EMISSIONS – 2-9-01

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





FRONT VIEW

BARTON INSTRUMENT SYSTEMS, LLC
TANKSCAN MONITOR RADIO MODULE – REMOTE ANTENNA
ASSEMBLY NUMBER: WL20-4040B
FCC SUBPART C - RADIATED EMISSIONS – 2-9-01

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





REAR VIEW

BARTON INSTRUMENT SYSTEMS, LLC
TANKSCAN MONITOR RADIO MODULE – REMOTE ANTENNA
ASSEMBLY NUMBER: WL20-4040B
FCC SUBPART C - RADIATED EMISSIONS – 2-9-01

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



COM-POWER AB-100
BICONICAL ANTENNA

S/N: 01548

CALIBRATION DATE: OCTOBER 16, 2000

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	14.01	120	10.33
35	13.63	125	11.61
40	13.26	140	12.70
45	11.62	150	12.95
50	11.03	160	13.58
60	8.52	175	14.82
70	8.94	180	14.84
80	8.17	200	14.80
90	8.08	250	16.42
100	8.64	300	20.26



COM-POWER AL-100
LOG PERIODIC ANTENNA

S/N: 16101

CALIBRATION DATE: OCTOBER 16, 2000

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	12.96	700	19.24
400	16.92	800	21.37
500	16.73	900	22.13
600	16.32	1000	22.19



COM-POWER PA-102

PREAMPLIFIER

S/N: 1017

CALIBRATION DATE: JANUARY 5, 2001

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	39.0	300	38.9
40	39.2	350	38.9
50	39.2	400	38.6
60	39.2	450	38.5
70	38.8	500	38.7
80	38.6	550	38.4
90	38.5	600	38.8
100	38.7	650	38.5
125	39.2	700	38.6
150	38.8	750	38.1
175	38.8	800	37.9
200	39.0	850	38.0
225	38.8	900	37.8
250	38.8	950	36.9
275	39.0	1000	38.2



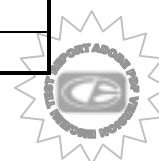
COM-POWER PA-122

MICROWAVE PREAMPLIFIER

S/N: 25195

CALIBRATION DATE: JANUARY 9, 2001

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	33.1	9.5	30.7
1.1	33.0	10.0	31.6
1.2	33.2	11.0	30.6
1.3	33.0	12.0	28.5
1.4	32.4	13.0	31.5
1.5	32.3	14.0	33.2
1.6	32.1	15.0	31.5
1.7	32.0	16.0	30.2
1.8	31.8	17.0	31.6
1.9	32.2	18.0	31.7
2.0	32.6		
2.5	31.9		
3.0	31.7		
3.5	31.7		
4.0	32.3		
4.5	31.5		
5.0	32.3		
5.5	34.2		
6.0	30.9		
6.5	32.0		
7.0	32.1		
7.5	33.0		
8.0	31.9		
8.5	31.9		
9.0	31.3		



ANTENNA RESEARCH DRG-118/A

HORN ANTENNA

S/N: 1053

CALIBRATION DATE: JANUARY 15, 2001

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	25.4	9.5	39.6
1.5	26.7	10.0	39.7
2.0	29.6	10.5	40.8
2.5	30.7	11.0	40.4
3.0	31.2	11.5	42.2
3.5	32.3	12.0	43.0
4.0	33.2	12.5	42.6
4.5	33.2	13.0	41.3
5.0	34.8	13.5	40.3
5.5	35.4	14.0	40.9
6.0	36.6	14.5	44.0
6.5	36.6	15.0	43.3
7.0	38.7	15.5	42.7
7.5	38.6	16.0	42.6
8.0	37.9	16.5	42.8
8.5	37.9	17.0	43.5
9.0	39.9	17.5	44.6
		18.0	42.2

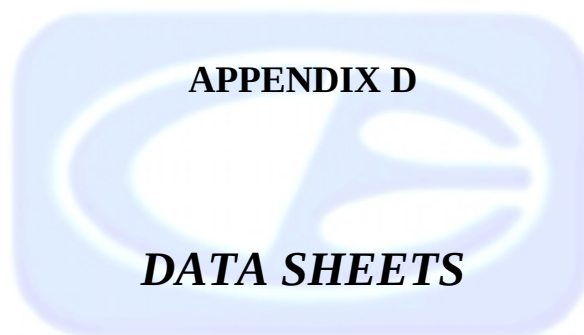


Com-Power Corporation

(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



TRANSMITTER MODE – DIRECT ANTENNA
DATA SHEETS



RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH DIRECT ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
909.7500	50.1	50.0 QP	H	2.0	90	X	LOW	22.1	5.1	0.0	77.2	-16.8	94.0	
909.7500	66.2	66.1 QP	V	1.5	90	X	LOW	22.1	5.1	0.0	93.3	-0.7	94.0	
914.7500	52.5	52.2 QP	H	1.5	90	X	MED.	22.1	5.1	0.0	79.4	-14.6	94.0	
914.7500	66.3	66.2 QP	V	1.0	270	X	MED.	22.1	5.1	0.0	93.4	-0.6	94.0	
919.7500	49.4	49.3 QP	H	1.5	90	X	HIGH	22.1	5.1	0.0	76.5	-17.5	94.0	
919.7500	65.2	65.1 QP	V	1.0	90	X	HIGH	22.1	5.1	0.0	92.3	-1.7	94.0	

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

** DELTA = SPEC LIMIT - CORRECTED READING

PAGE 1

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH DIRECT ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
1819.5000	39.0	33.8 A	H	1.0	90	X	LOW	28.4	3.4	31.8	33.8	-20.2	54.0	
1819.5000	47.1	43.9 A	V	1.5	90	X	LOW	28.4	3.4	31.8	43.9	-10.1	54.0	
1829.5000	42.6	35.7 A	H	1.5	270	X	MED.	28.4	3.4	31.8	35.7	-18.3	54.0	
1829.5000	50.6	48.6 A	V	1.0	180	X	MED.	28.4	3.4	31.8	48.6	-5.5	54.0	
1839.5000	42.7	34.8 A	H	1.0	90	X	HIGH	28.4	3.4	31.8	34.8	-19.2	54.0	
1839.5000	46.6	43.6 A	V	1.0	90	X	HIGH	28.4	3.4	31.8	43.6	-10.4	54.0	

* 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)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH DIRECT ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2729.2500	40.5	31.9 A	H	1.5	90	X	LOW	31.0	4.3	31.8	35.4	-18.7	54.0	
2729.2500	42.2	35.8 A	V	1.5	90	X	LOW	31.0	4.3	31.8	39.3	-14.7	54.0	
2744.2500	40.4	30.6 A	H	1.0	90	X	MED.	31.0	4.3	31.8	34.1	-19.9	54.0	
2744.2500	43.6	38.6 A	V	1.5	90	X	MED.	31.0	4.3	31.8	42.1	-12.0	54.0	
2759.2500	39.5	30.9 A	H	2.0	90	X	HIGH	31.0	4.3	31.8	34.4	-19.6	54.0	
2759.2500	42.8	38.1 A	V	3.0	90	X	HIGH	31.0	4.3	31.8	41.6	-12.4	54.0	

* 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)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH DIRECT ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
3639.0000	38.3	28.1 A	H	1.5	90	X	LOW	32.3	5.0	31.7	33.7	-20.3	54.0	
3639.0000	39.0	28.2 A	V	1.0	90	X	LOW	32.3	5.0	31.7	33.8	-20.2	54.0	
3659.0000	36.1	28.4 A	H	1.0	90	X	MED.	32.8	5.2	32.0	34.4	-19.6	54.0	
3659.0000	39.9	29.3 A	V	1.5	0	X	MED.	32.8	5.2	32.0	35.3	-18.7	54.0	
3679.0000	35.5	28.6 A	H	1.5	90	X	HIGH	32.8	5.2	32.0	34.6	-19.4	54.0	
3679.0000	39.7	28.2 A	V	1.5	90	X	HIGH	32.8	5.2	32.0	34.2	-19.9	54.0	

* 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)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH DIRECT ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
4548.7500	37.9	30.5 A	H	2.0	90	X	LOW	33.2	6.3	31.5	38.5	-15.5	54.0	
4548.7500	39.7	31.0 A	V	2.0	90	X	LOW	33.2	6.3	31.5	39.0	-15.0	54.0	
4573.7500	39.2	28.7 A	H	1.0	90	X	MED.	33.2	6.3	31.5	36.7	-17.3	54.0	
4573.7500	37.8	30.7 A	V	1.5	0	X	MED.	33.2	6.3	31.5	38.7	-15.3	54.0	
4598.7500	37.6	29.2 A	H	2.0	90	X	HIGH	33.2	6.3	31.5	37.2	-16.8	54.0	
4598.7500	41.5	29.3 A	V	3.0	90	X	HIGH	33.2	6.3	31.5	37.3	-16.7	54.0	

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

No Harmonic nor Emissions Found after the
5th Harmonic

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Test location: Compatible Electronics
Customer : BARTON INSTRUMENT SYSTEMS, LLC Date : 2/ 9/2001
Manufacturer : BARTON INSTRUMENT SYSTEMS, LLC Time : 8.30
EUT name : TANKSCAN MONITOR RADIO MODULE Model: WL20-4040B
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
Test Mode : WITH DIRECT ANTENNA
SPURIOUS EMISSIONS FROM THE EUT
10 kHz TO 30 MHz

NO EMISSIONS FOUND FROM THE EUT FROM 10 kHz TO 30 MHz
IN EITHER VERTICAL OR HORIZONTAL POLARIZATION

***TRANSMITTER MODE – REMOTE ANTENNA
DATA SHEETS***



RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH REMOTE ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
909.7500	63.1	63.0 QP	H	1.0	90	X	LOW	22.1	5.1	0.0	90.2	-3.8	94.0	
909.7500	63.9	63.0 QP	V	1.5	270	X	LOW	22.1	5.1	0.0	90.2	-3.8	94.0	
914.7500	58.9	58.8 QP	H	1.5	0	X	MED.	22.1	5.1	0.0	86.0	-8.0	94.0	
914.7500	63.2	63.1 QP	V	1.0	270	X	MED.	22.1	5.1	0.0	90.3	-3.7	94.0	
919.7500	58.5	58.4 QP	H	1.0	180	X	HIGH	22.1	5.1	0.0	85.6	-8.4	94.0	
919.7500	64.6	64.5 QP	V	1.0	90	X	HIGH	22.1	5.1	0.0	91.7	-2.3	94.0	

* 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)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH REMOTE ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
1819.5000	44.1	40.2 A	H	1.0	90	X	LOW	28.4	3.4	31.8	40.2	-13.9	54.0	
1819.5000	44.7	40.8 A	V	1.5	0	X	LOW	28.4	3.4	31.8	40.8	-13.2	54.0	
1829.5000	44.2	39.5 A	H	1.5	0	X	MED.	28.4	3.4	31.8	39.5	-14.5	54.0	
1829.5000	43.6	39.1 A	V	1.5	270	X	MED.	28.4	3.4	31.8	39.1	-14.9	54.0	
1839.5000	43.1	37.8 A	H	1.5	90	X	HIGH	28.4	3.4	31.8	37.8	-16.2	54.0	
1839.5000	46.8	43.7 A	V	1.5	270	X	HIGH	28.4	3.4	31.8	43.7	-10.3	54.0	

* 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)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH REMOTE ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2729.2500	40.8	29.9 A	H	1.0	0	X	LOW	31.0	4.3	31.8	33.4	-20.6	54.0	
2729.2500	42.4	34.3 A	V	1.5	0	X	LOW	31.0	4.3	31.8	37.8	-16.2	54.0	
2744.2500	38.5	30.2 A	H	1.5	90	X	MED.	31.0	4.3	31.8	33.7	-20.3	54.0	
2744.2500	41.1	32.3 A	V	1.5	180	X	MED.	31.0	4.3	31.8	35.8	-18.2	54.0	
2759.2500	38.8	28.7 A	H	2.0	90	X	HIGH	31.0	4.3	31.8	32.2	-21.9	54.0	
2759.2500	40.7	33.1 A	V	1.0	180	X	HIGH	31.0	4.3	31.8	36.6	-17.4	54.0	

* 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)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH REMOTE ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
3639.0000	38.2	28.7 A	H	1.5	90	X	LOW	32.3	5.0	31.7	34.3	-19.8	54.0	
3639.0000	39.0	28.2 A	V	1.0	180	X	LOW	32.3	5.0	31.7	33.8	-20.2	54.0	
3659.0000	38.8	29.0 A	H	1.5	90	X	MED.	32.8	5.2	32.0	35.0	-19.0	54.0	
3659.0000	39.9	29.3 A	V	1.5	0	X	MED.	32.8	5.2	32.0	35.3	-18.7	54.0	
3679.0000	38.6	28.4 A	H	1.5	0	X	HIGH	32.8	5.2	32.0	34.4	-19.6	54.0	
3679.0000	38.9	28.8 A	V	1.5	90	X	HIGH	32.8	5.2	32.0	34.8	-19.2	54.0	

* 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)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH REMOTE ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
4548.7500	41.9	34.7 A	H	1.5	180	X	LOW	33.2	6.3	31.5	42.7	-11.3	54.0	
4548.7500	41.9	35.5 A	V	1.5	90	X	LOW	33.2	6.3	31.5	43.5	-10.6	54.0	
4573.7500	41.1	34.8 A	H	1.0	90	X	MED.	33.2	6.3	31.5	42.8	-11.2	54.0	
4573.7500	42.1	37.1 A	V	1.0	180	X	MED.	33.2	6.3	31.5	45.1	-8.9	54.0	
4598.7500	41.3	35.0 A	H	2.0	90	X	HIGH	33.2	6.3	31.5	43.0	-11.0	54.0	
4598.7500	41.0	37.7 A	V	1.5	180	X	HIGH	33.2	6.3	31.5	45.7	-8.3	54.0	

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

No Harmonic nor Emissions Found after the
5th Harmonic

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Test location: Compatible Electronics
Customer : BARTON INSTRUMENT SYSTEMS, LLC Date : 2/ 9/2001
Manufacturer : BARTON INSTRUMENT SYSTEMS, LLC Time : 10.26
EUT name : TANKSCAN MONITOR RADIO MODULE Model: WL20-4040B
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
Test Mode : WITH REMOTE ANTENNA
SPURIOUS EMISSIONS FROM THE EUT
10 kHz TO 30 MHz

NO EMISSIONS FOUND FROM THE EUT FROM 10 kHz TO 30 MHz
IN EITHER VERTICAL OR HORIZONTAL POLARIZATION

RECEIVE MODE – DIRECT ANTENNA
DATA SHEETS



RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH DIRECT ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
931.2100	55.4	55.3 QP	V	1.5	90	X	LOW	22.2	5.2	37.2	45.5	-0.5	46.0	RECEIVER - LOW CHAN.
1862.4400	41.9	33.4 A	V	1.5	90	X	LOW	28.4	3.4	31.8	33.4	-20.6	54.0	RECEIVER - LOW CHAN.
2793.6100	41.1	35.2 A	V	1.0	90	X	LOW	28.4	3.4	31.8	35.2	-18.8	54.0	RECEIVER - LOW CHAN.
3724.4600	38.4	30.5 A	V	1.5	90	X	LOW	28.4	3.4	31.8	30.5	-23.5	54.0	RECEIVER - LOW CHAN.
4655.8000	41.6	34.4 A	V	1.5	90	X	LOW	28.4	3.4	31.8	34.4	-19.6	54.0	RECEIVER - LOW CHAN.
931.2100	53.8	53.7 QP	H	1.5	0	X	LOW	22.2	5.2	37.2	43.9	-2.1	46.0	RECEIVER - LOW CHAN.
1862.4400	38.0	31.0 A	H	1.5	90	X	LOW	28.4	3.4	31.8	31.0	-23.0	54.0	RECEIVER - LOW CHAN.
2793.6100	40.1	29.5 A	H	1.5	270	X	LOW	28.4	3.4	31.8	29.5	-24.5	54.0	RECEIVER - LOW CHAN.
3724.4600	39.2	28.6 A	H	1.0	90	X	LOW	28.4	3.4	31.8	28.6	-25.4	54.0	RECEIVER - LOW CHAN.
4655.8000	38.4	29.3 A	H	2.0	90	X	LOW	28.4	3.4	31.8	29.3	-24.7	54.0	RECEIVER - LOW CHAN.

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

PAGE 1

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH DIRECT ANTENNA	DUTY CYCLE	0.00 %
MODEL	WL20-4040B	PEAK TO AVG	0 dB
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
936.2100	55.4	55.3 QP	V	1.5	90	X	LOW	22.2	5.2	37.2	45.5	-0.5	46.0	RECEIVER - MID CHAN.
1872.3800	38.0	29.2 A	V	1.5	90	X	LOW	28.4	3.4	31.8	29.2	-24.8	54.0	RECEIVER - MID CHAN.
2808.4000	36.7	28.9 A	V	1.0	90	X	LOW	28.4	3.4	31.8	28.9	-25.1	54.0	RECEIVER - MID CHAN.
3744.6000	36.7	28.1 A	V	1.5	90	X	LOW	28.4	3.4	31.8	28.1	-25.9	54.0	RECEIVER - MID CHAN.
4681.0500	38.5	28.1 A	V	1.5	90	X	LOW	28.4	3.4	31.8	28.1	-25.9	54.0	RECEIVER - MID CHAN.
936.2100	53.9	53.8 QP	H	1.0	90	X	LOW	22.2	5.2	37.2	44.0	-2.0	46.0	RECEIVER - MID CHAN.
1872.3800	39.0	29.2 A	H	1.0	90	X	LOW	28.4	3.4	31.8	29.2	-24.8	54.0	RECEIVER - MID CHAN.
2808.4000	36.9	29.1 A	H	1.0	90	X	LOW	28.4	3.4	31.8	29.1	-24.9	54.0	RECEIVER - MID CHAN.
3744.6000	38.5	28.0 A	H	1.5	90	X	LOW	28.4	3.4	31.8	28.0	-26.0	54.0	RECEIVER - MID CHAN.
4681.0500	37.3	28.1 A	H	1.5	90	X	LOW	28.4	3.4	31.8	28.1	-25.9	54.0	RECEIVER - MID CHAN.

* 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)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH DIRECT ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
941.2500	50.7	50.6 QP	V	1.0	90	X	LOW	22.2	5.3	37.1	41.0	-5.0	46.0	RECEIVER - HIGH CHAN.
1882.3000	39.3	29.5 A	V	1.0	90	X	LOW	28.4	3.4	31.8	29.5	-24.5	54.0	RECEIVER - HIGH CHAN.
2823.4900	40.3	28.1 A	V	1.5	90	X	LOW	28.4	3.4	31.8	28.1	-25.9	54.0	RECEIVER - HIGH CHAN.
3764.6000	37.7	27.7 A	V	1.0	90	X	LOW	28.4	3.4	31.8	27.7	-26.4	54.0	RECEIVER - HIGH CHAN.
4705.7000	38.9	28.3 A	V	1.0	90	X	LOW	28.4	3.4	31.8	28.3	-25.7	54.0	RECEIVER - HIGH CHAN.
941.2500	39.8	39.7 QP	H	1.5	90	X	LOW	22.2	5.3	37.1	30.1	-15.9	46.0	RECEIVER - HIGH CHAN.
1882.3000	37.2	29.4 A	H	1.0	90	X	LOW	28.4	3.4	31.8	29.4	-24.6	54.0	RECEIVER - HIGH CHAN.
2823.4900	38.9	29.1 A	H	1.5	90	X	LOW	28.4	3.4	31.8	29.1	-24.9	54.0	RECEIVER - HIGH CHAN.
3764.6000	37.6	27.7 A	H	1.0	90	X	LOW	28.4	3.4	31.8	27.7	-26.4	54.0	RECEIVER - HIGH CHAN.
4705.7000	38.1	28.5 A	H	1.5	90	X	LOW	28.4	3.4	31.8	28.5	-25.5	54.0	RECEIVER - HIGH CHAN.

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

PAGE 3

Test location: Compatible Electronics
 Customer : BARTON INSTRUMENT SYSTEMS, LLC Date : 2/ 9/2001
 Manufacturer : BARTON INSTRUMENT SYSTEMS, LLC Time : 8.30
 EUT name : TANKSCAN MONITOR RADIO MODULE Model: WL20-4040B
 Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
 Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
 Test Mode : WITH DIRECT ANTENNA
 SPURIOUS EMISSIONS FROM THE EUT
 30 MHz TO 9300 MHz
 HORIZONTAL AND VERTICAL POLARIZATION
 TEMPERATURE 56 DEGREES F.
 RELATIVE HUMIDITY 55%
 TESTED BY: KYLE FUJIMOTO

Pol	Freq	Rdng	Cable	Ant	Amp	Cor'd	limit	Delta
	MHz	dBuV	loss	factor	gain	rdg = R	= L	R-L
			dB	dB	dB	dBuV	dBuV/m	dB
VERTICAL POLARIZATION								
1V	83.85	44.00	1.34	8.14	38.56	14.91	40.00	-25.09
2V	272.35	35.30	2.77	18.14	38.98	17.23	46.00	-28.77
3V	377.03	37.10	3.16	16.00	38.74	17.53	46.00	-28.47
4V	460.83	34.90	3.26	16.80	38.54	16.42	46.00	-29.58
5V	489.63	35.90	3.44	16.75	38.66	17.43	46.00	-28.57
6V	518.43	35.10	3.65	16.65	38.59	16.81	46.00	-29.19
HORIZONTAL POLARIZATION								
7H	41.96	37.00	1.02	12.62	39.20	11.44	40.00	-28.56
8H	83.85	39.90	1.34	8.14	38.56	10.81	40.00	-29.19
9H	335.14	42.20	2.94	14.35	38.90	20.59	46.00	-25.41
10H	377.03	40.40	3.16	16.00	38.74	20.83	46.00	-25.17
11H	418.92	33.80	3.26	16.88	38.56	15.38	46.00	-30.62
12H	460.81	35.60	3.26	16.80	38.54	17.12	46.00	-28.88

RECEIVE MODE – REMOTE ANTENNA
DATA SHEETS



RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH REMOTE ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
931.2100	55.2	55.1 QP	V	1.5	90	X	LOW	22.2	5.2	37.2	45.3	-0.7	46.0	RECEIVER - LOW CHAN.
1862.4400	44.9	41.2 A	V	1.5	90	X	LOW	28.4	3.4	31.8	41.2	-12.9	54.0	RECEIVER - LOW CHAN.
2793.6100	40.0	29.7 A	V	1.5	270	X	LOW	28.4	3.4	31.8	29.7	-24.4	54.0	RECEIVER - LOW CHAN.
3724.4600	39.1	28.7 A	V	1.5	90	X	LOW	28.4	3.4	31.8	28.7	-25.3	54.0	RECEIVER - LOW CHAN.
4655.8000	41.3	36.0 A	V	1.5	90	X	LOW	28.4	3.4	31.8	36.0	-18.0	54.0	RECEIVER - LOW CHAN.
931.2100	54.5	54.4 QP	H	1.5	180	X	LOW	22.2	5.2	37.2	44.6	-1.4	46.0	RECEIVER - LOW CHAN.
1862.4400	41.9	33.9 A	H	1.0	180	X	LOW	28.4	3.4	31.8	33.9	-20.2	54.0	RECEIVER - LOW CHAN.
2793.6100	38.4	28.8 A	H	1.5	270	X	LOW	28.4	3.4	31.8	28.8	-25.3	54.0	RECEIVER - LOW CHAN.
3724.4600	36.1	28.5 A	H	1.0	90	X	LOW	28.4	3.4	31.8	28.5	-25.5	54.0	RECEIVER - LOW CHAN.
4655.8000	41.0	33.6 A	H	1.5	180	X	LOW	28.4	3.4	31.8	33.6	-20.4	54.0	RECEIVER - LOW CHAN.

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

PAGE 1

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH REMOTE ANTENNA	DUTY CYCLE	0.00 %
MODEL	WL20-4040B	PEAK TO AVG	0 dB
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
936.2100	55.1	55.0 QP	V	1.5	90	X	LOW	22.2	5.2	37.2	45.2	-0.8	46.0	RECEIVER - MID CHAN.
1872.3800	43.5	38.5 A	V	1.5	270	X	LOW	28.4	3.4	31.8	38.5	-15.5	54.0	RECEIVER - MID CHAN.
2808.4000	40.5	29.2 A	V	1.0	90	X	LOW	28.4	3.4	31.8	29.2	-24.8	54.0	RECEIVER - MID CHAN.
3744.6000	38.2	27.8 A	V	1.5	270	X	LOW	28.4	3.4	31.8	27.8	-26.2	54.0	RECEIVER - MID CHAN.
4681.0500	44.6	40.5 A	V	1.5	180	X	LOW	28.4	3.4	31.8	40.5	-13.5	54.0	RECEIVER - MID CHAN.
936.2100	55.1	55.0 QP	H	1.5	0	X	LOW	22.2	5.2	37.2	45.2	-0.8	46.0	RECEIVER - MID CHAN.
1872.3800	42.7	36.7 A	H	1.0	180	X	LOW	28.4	3.4	31.8	36.7	-17.3	54.0	RECEIVER - MID CHAN.
2808.4000	38.7	29.2 A	H	1.0	90	X	LOW	28.4	3.4	31.8	29.2	-24.8	54.0	RECEIVER - MID CHAN.
3744.6000	40.0	28.4 A	H	1.5	90	X	LOW	28.4	3.4	31.8	28.4	-25.6	54.0	RECEIVER - MID CHAN.
4681.0500	41.0	34.0 A	H	1.5	90	X	LOW	28.4	3.4	31.8	34.0	-20.0	54.0	RECEIVER - MID CHAN.

* 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)

COMPANY	BARTON INSTRUMENT SYSTEMS, LLC	DATE	2/9/01
EUT	TANKSCAN MONITOR RADIO MODULE WITH REMOTE ANTENNA	DUTY CYCLE	N/A
ASSEMBLY #	WL20-4040B	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

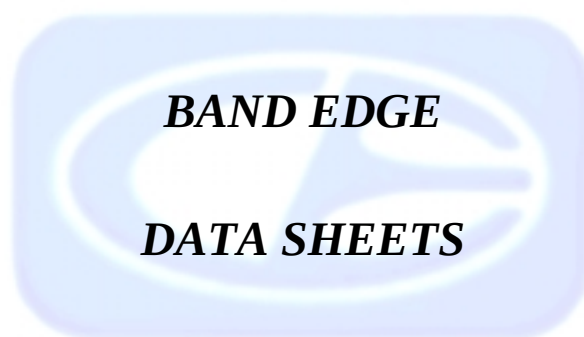
Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
941.2500	51.7	51.1 QP	V	1.0	90	X	LOW	22.2	5.3	37.1	41.5	-4.5	46.0	RECEIVER - HIGH CHAN.
1882.3000	43.3	37.9 A	V	1.0	90	X	LOW	28.4	3.4	31.8	37.9	-16.1	54.0	RECEIVER - HIGH CHAN.
2823.4900	41.1	29.4 A	V	1.5	90	X	LOW	28.4	3.4	31.8	29.4	-24.6	54.0	RECEIVER - HIGH CHAN.
3764.6000	37.8	27.8 A	V	1.0	90	X	LOW	28.4	3.4	31.8	27.8	-26.2	54.0	RECEIVER - HIGH CHAN.
4705.7000	43.8	39.9 A	V	1.0	180	X	LOW	28.4	3.4	31.8	39.9	-14.1	54.0	RECEIVER - HIGH CHAN.
941.2500	49.5	49.4 QP	H	1.5	0	X	LOW	22.2	5.3	37.1	39.8	-6.2	46.0	RECEIVER - HIGH CHAN.
1882.3000	43.2	37.6 A	H	1.0	270	X	LOW	28.4	3.4	31.8	37.6	-16.5	54.0	RECEIVER - HIGH CHAN.
2823.4900	40.2	29.6 A	H	1.5	90	X	LOW	28.4	3.4	31.8	29.6	-24.4	54.0	RECEIVER - HIGH CHAN.
3764.6000	37.8	27.9 A	H	1.0	180	X	LOW	28.4	3.4	31.8	27.9	-26.1	54.0	RECEIVER - HIGH CHAN.
4705.7000	39.9	34.2 A	H	1.0	90	X	LOW	28.4	3.4	31.8	34.2	-19.8	54.0	RECEIVER - HIGH CHAN.

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

PAGE 3

Test location: Compatible Electronics
 Customer : BARTON INSTRUMENT SYSTEMS, LLC Date : 2/ 9/2001
 Manufacturer : BARTON INSTRUMENT SYSTEMS, LLC Time : 10.04
 EUT name : TANKSCAN MONITOR RADIO MODULE Model: WL20-4040B
 Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
 Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
 Test Mode : WITH REMOTE ANTENNA
 SPURIOUS EMISSIONS FROM THE EUT
 30 MHz TO 9300 MHz
 HORIZONTAL AND VERTICAL POLARIZATION
 TEMPERATURE 56 DEGREES F.
 RELATIVE HUMIDITY 55%
 TESTED BY: KYLE FUJIMOTO

Pol	Freq	Rdng	Cable	Ant	Amp	Cor'd	limit	Delta
	MHz	dBuV	loss	factor	gain	rdg = R	= L	R-L
			dB	dB	dB	dBuV	dBuV/m	dB
VERTICAL POLARIZATION								
1V	251.34	34.40	2.52	16.52	38.81	14.63	46.00	-31.37
2V	272.29	32.10	2.77	18.13	38.98	14.02	46.00	-31.98
3V	388.78	35.90	3.23	16.47	38.67	16.93	46.00	-29.07
4V	417.58	37.40	3.26	16.88	38.56	18.98	46.00	-27.02
5V	431.98	36.50	3.24	16.85	38.54	18.05	46.00	-27.95
6V	849.58	34.50	4.70	21.75	38.00	22.95	46.00	-23.05
HORIZONTAL POLARIZATION								
7H	86.40	42.70	1.36	8.11	38.54	13.64	40.00	-26.36
8H	201.60	37.70	2.20	14.85	38.99	15.76	43.50	-27.74
9H	331.20	39.50	2.92	14.19	38.90	17.72	46.00	-28.28
10H	432.00	35.50	3.24	16.85	38.54	17.05	46.00	-28.95
11H	475.20	36.90	3.35	16.77	38.60	18.43	46.00	-27.57
12H	590.40	37.30	3.82	16.36	38.72	18.76	46.00	-27.24



2-9-01

BAND EDGE OF LOW CHANNEL
REF 97.0 dB μ V ATTN 0 dB

MKR 902.00 MHz
34.70 dB μ V

hp
10 dB/

DL
66.5
dB μ V

MARKER

902.00 MHz
34.70 dB μ V

CORR'D



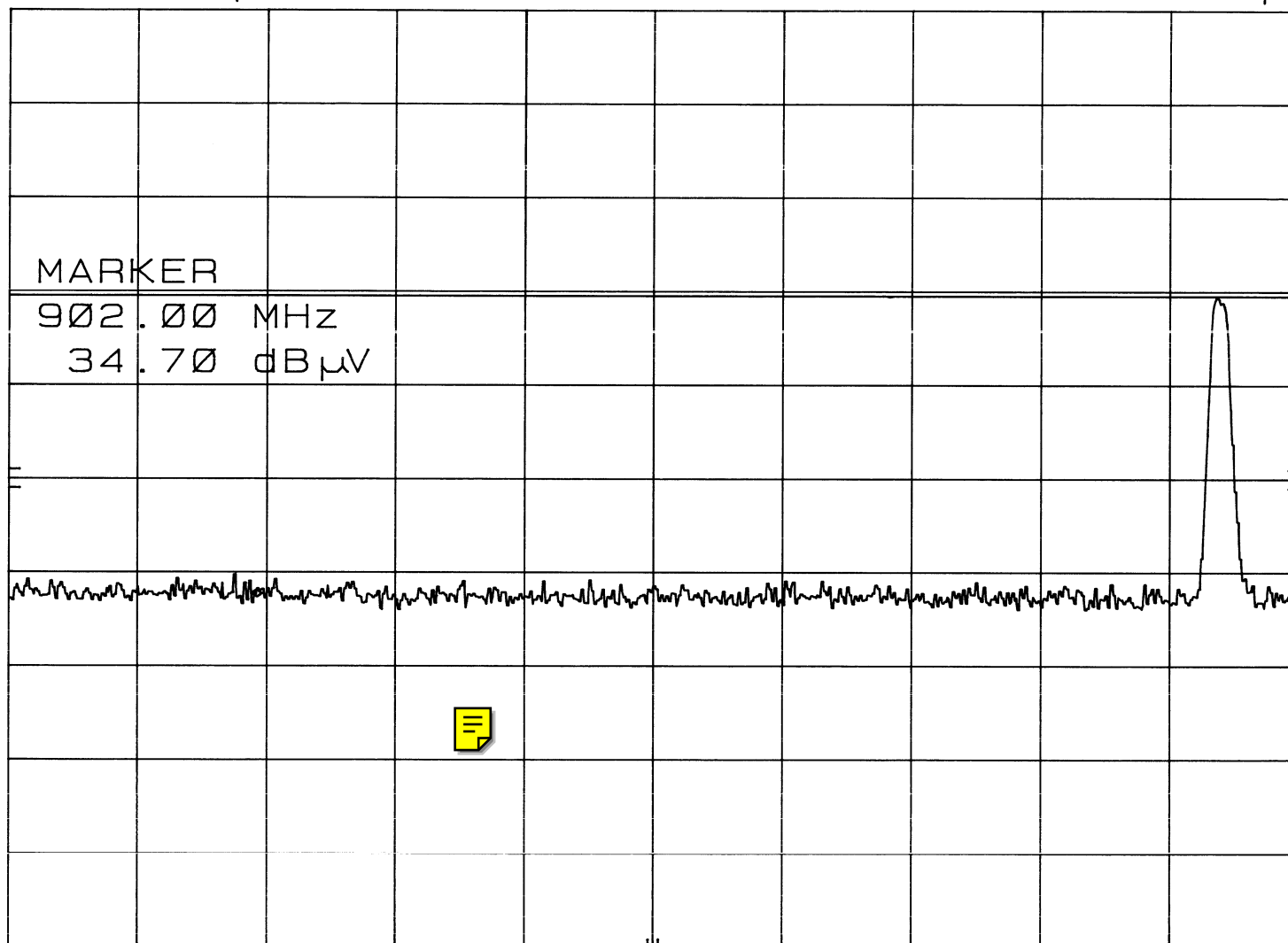
START 900.0 MHz

RES BW 1 MHz

VBW 1 MHz

STOP 910.4 MHz

SWP 20.0 msec



2-9-01

BAND EDGE OF HIGH CHANNEL

MKR 928.00 MHz

hp

REF 97.0 dB μ V ATTN 0 dB

28.90 dB μ V

10 dB/

DL
66.5
dB μ V

MARKER

928.00 MHz
28.90 dB μ V

CORR'D



START 919.0 MHz

RES BW 100 kHz

VBW 300 kHz

STOP 929.0 MHz

SWP 20.0 msec



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.

