WHERENET CORPORATION TEST REPORT

FOR THE

PROXIMITY COMMUNICATION DEVICE, WHEREPORT WPT-3200

FCC PART 15 SUBPART C SECTIONS 15.207 & 15.209 COMPLIANCE

DATE OF ISSUE: FEBRUARY 14, 2001

PREPARED FOR:

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W.O. No: 76037

Report No: FC01-014

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Date of test: January 18-19, 2001

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ADMINISTRATIVE INFORMATION

DATE OF TEST:	January 18-19, 2001
DATE OF RECEIPT:	January 18, 2001
PURPOSE OF TEST:	To demonstrate the compliance of the Proximity Communication Device, WherePort WPT-3200, with the FCC Part 15 Subpart C Sections 15.209 & 15.207 devices.
MANUFACTURER:	WhereNet Corporation 2855 Bowers Avenue Santa Clara, CA 95051
REPRESENTATIVE:	Walt Johnson
TEST LOCATION:	CKC Laboratories, Inc. 5473A Clouds Rest Mariposa, CA 95338
TEST PERSONNEL:	Randal Clark
TEST METHOD:	ANSI C63.4 1992
FREQUENCY RANGE TESTED:	9 kHz - 1000 MHz
EQUIPMENT UNDER TEST:	**Proximity Communication Device** Manuf: WhereNet Corporation Model: WherePort WPT-3200 Serial: 001 FCC ID: Pending

SUMMARY OF RESULTS

The WhereNet Corporation Proximity Communication Device, WherePort WPT-3200, was tested in accordance with ANSI C63.4 1992 for compliance with FCC Part 15 Subpart C Sections 15.209 and 15.207.

As received, the above equipment was found to be fully compliant with the limits of FCC Part 15 Subpart C Sections 15.209 and 15.207. The results in this report apply only to the items tested, as identified herein.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

Equipment is: ❍ Prototype Unit ● Production Unit

WherePort is a proximity communication device used to alert the WhereTag ID (tag). WherePort is designed for fixed indoor and outdoor installation in areas requiring a prompt and specific tag response when it passes through the area.

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ±4dB measurement uncertainty.

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Power Supply
Manuf: CUI Stack
Model: DPA240167C-S/T
Serial: N/A
FCC ID: N/A

REPORT OF MEASUREMENTS

The following tables report the highest worst case levels recorded during the tests performed on the Proximity Communication Device, WherePort WPT-3200. All readings taken are peak readings unless otherwise noted by a "Q" or "A". The data sheets from which these tables were compiled are contained in Appendix B.

Table 1: Fundamental Emission Levels

FREQUENCY	METER READING	CORRECTION FACTORS				CORRECTED READING	SPEC LIMIT	MARGIN	NOTES
		Mag	Cable	FCC 15.31	Dist				
MHz	dBµV	dB	dB	dB	dB	dBµV/m	dBµV/m	dB	
0.115	73.3	10.9	0.1	-60.0	0.0	24.3	26.4	-2.1	NA
0.127	71.1	10.8	0.1	-60.0	0.0	22.0	25.5	-3.5	NA

Test Method: ANSI C63.4 1992
Spec Limit: FCC Part 15.209
Test Distance: 10 Meters

NOTES: N = No Polarization
A = Average Reading

COMMENTS: WherePort is transmitting on 114.6 & 126.9 kHz and is powered by a 24VAC transformer. Distance correction factor of -40dB/dec used in accordance with FCC15.31.

Table 2: Six Highest Radiated Emission Levels - 9 kHz - 30 MHz									
	METER	CORRECTION FACTORS				CORRECTED	SPEC		
FREQUENCY	READING	Mag	Cable	FCC 15.31	Dist	READING	LIMIT	MARGIN	NOTES
MHz	dBµV	dB	dB	dB	dB	dBµV/m	dBµV/m	dB	
0.231	49.7	10.5	0.2	-60.0	0.0	0.4	20.3	-19.9	N
0.254	43.8	10.6	0.1	-60.0	0.0	-5.5	19.5	-25.0	N
0.350	44.1	10.6	0.0	-60.0	0.0	-5.3	16.7	-22.0	N
0.384	39.6	10.6	0.0	-60.0	0.0	-9.8	15.9	-25.7	N
0.462	38.7	10.7	0.0	-60.0	0.0	-10.6	14.3	-24.9	N
0.511	36.6	10.7	0.1	-60.0	0.0	27.4	33.4	-6.0	N

Test Method: ANSI C63.4 1992
Spec Limit: FCC 15.209
Test Distance: 10 Meters

NOTES: N = No Polarization

COMMENTS: WherePort is transmitting on 114.6 & 126.9 kHz and is powered by a 24VAC transformer. Distance correction factor of -40dB/dec used in accordance with FCC15.31.

Table 3: Six Highest Radiated Emission Levels - 30 MHz - 1000 MHz									
	METER	CORRECTION FACTORS				CORRECTED	SPEC		
FREQUENCY	READING	Bicon/ Log 1	Preamp	Cable	Dist	READING	LIMIT	MARGIN	NOTES
MHz	dBµV	dB	dB	dB	dB	dBµV/m	dBµV/m	dB	
30.046	41.0	11.7	-25.1	1.1	10.0	38.7	40.0	-1.3	VQ
32.700	40.4	11.3	-25.1	1.1	10.0	37.7	40.0	-2.3	VQ
37.580	42.3	11.1	-25.0	1.1	10.0	39.5	40.0	-0.5	VQ
352.066	37.7	18.7	-25.0	3.9	10.0	45.3	46.0	-0.7	HQ
416.066	38.4	16.6	-25.5	4.3	10.0	43.8	46.0	-2.2	HQ
448.064	38.8	17.0	-25.6	4.6	10.0	44.8	46.0	-1.2	HQ

Test Method: ANSI C63.4 1992
Spec Limit: FCC 15.209
Test Distance: 10 Meters

NOTES: H = Horizontal Polarization
V = Vertical Polarization
Q = Quasi Peak Reading

COMMENTS: WherePort is transmitting on 114.6 & 126.9 kHz and is powered by a 24VAC transformer.

Table 4: Six Highest Conducted Emission Levels - AC Power									
FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Lisn dB	dB	dB	dB	CORRECTED READING dBµV	SPEC LIMIT dBµV	MARGIN dB	NOTES
4.826200	43.3	0.7				44.0	48.0	-4.0	B
5.051380	43.8	0.8				44.6	48.0	-3.4	BQ
5.165200	45.3	0.8				46.1	48.0	-1.9	BQ
5.280060	44.8	0.9				45.7	48.0	-2.3	BQ
13.884420	43.1	1.2				44.3	48.0	-3.7	BQ
13.997040	43.1	1.2				44.3	48.0	-3.7	BQ

Test Method: ANSI C63.4 1992
Spec Limit: FCC 15.207

NOTES: Q = Quasi Peak Reading
A = Average Reading
B = Black Lead

COMMENTS: WherePort is transmitting on 114.6 & 126.9 kHz and is powered by a 24VAC transformer. Power supplied to transformer is 120VAC/60Hz.

TABLE A

LIST OF TEST EQUIPMENT

Mariposa Site B

Ref#	Equipment	Mfr	Model #	S/N	Cal Date	Cal Due
508	Spectrum Analyzer (Rf)	HP	8568B	2007A01066	11/10/2000	11/10/2001
463	SA Display	HP	85662A	2005A01550	11/10/2000	11/10/2001
433	QP Adapter	HP	85650A	2043A00272	11/10/2000	11/10/2001
401	Preamp	HP	8447D	1937A02604	4/3/2000	4/3/2001
341	Antenna, Log Periodic	A&H	SAS-200/510	154	5/8/2000	5/8/2001
92	Antenna, Bicon	A&H	SAS 200/542	156	12/8/2000	12/8/2001
354	Antenna, Mag Loop	EMCO	6502	1074	7/3/2000	7/3/2001
327	LISNs set	Solar	8028-50-TS-24-BNC	814493, 474	6/5/2000	6/5/2001

EUT SETUP

The equipment under test (EUT) and the peripheral(s) listed were set up in a manner that represented their normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany Tables 1 through 3 for radiated emissions and Table 4 for conducted emissions.

Radiated Emissions

During radiated emissions testing, the EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters. This configuration is typical for radiated emissions testing of table top devices.

Conducted Emissions

During conducted emissions testing, the EUT was located on a wooden table measuring approximately 80 cm high, 1 meter deep, and 1.5 meters in length. One wall of the room where the EUT is located has a minimum 2 meter by 2 meter conductive plane. The EUT was mounted on the wooden table 40 cm away from the conductive plane, and 80 cm from any other conductive surface.

The vertical metal plane used for conducted emissions was grounded to the earth. Power to the EUT was provided through a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 80 cm away from the EUT during the conducted test. Conducted emissions tests required the use of the LISNs listed in Table A.

EUT TESTING

Radiated Emissions

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. The frequency range of 9 kHz – 30 MHz was scanned using the mag loop antenna. The frequency range of 30 MHz - 88 MHz was then scanned with the bicon antenna located about 1.5 meter above the ground plane in the vertical configuration. During this scan, the turntable was rotated and all peaks that were at or near the limit were recorded. The frequency range of 100 - 300 MHz was scanned in the same manner, with the bicon antenna, and the peaks recorded. Lastly, a scan of the FM band from 88 - 110 MHz was made, using a reduced resolution bandwidth and a reduced frequency span. The bicon antenna was changed to the horizontal polarity and the above steps were repeated. After changing to the log periodic antenna in the horizontal configuration, the frequency range of 300 - 1000 MHz was scanned. The log periodic antenna was changed to the vertical polarity and the frequency range of 300 - 1000 MHz was again scanned. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable as needed. Comparison with the previously recorded measurments was then made.

Using the peak readings from both scans as a guide, the engineer then maximized the readings with respect to the table rotation and antenna height. Photographs showing the final worst case configuration of the EUT are contained in Appendix A.

Conducted Emissions

For conducted emissions testing, a 30 to 50 second sweep time was used for automated measurements in the frequency bands of 450 kHz to 1.705 MHz, 1.705 MHz to 3 MHz, and 3 MHz to 30 MHz. All readings within 20 dB of the limit were recorded. At frequencies where the recorded emissions were close to the limit, further investigation was performed manually at a slower sweep rate.

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Table A were used to collect both the radiated and conducted emissions data for the Proximity Communication Device, WherePort WPT-3200. For radiated measurements below 30 MHz, the mag loop antenna was used. For frequencies between 30 MHz and 300 MHz, the bicon antenna was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used. All antennas were located at a distance of 10 meters from the edge of the EUT.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. For conducted emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. A 10 dB external attenuator was also used during conducted tests, with internal offset correction in the analyzer. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dBµV, and a vertical scale of 10 dB per division.

TABLE B: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE

TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	450 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in Tables 1 through 4 indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data for the Proximity Communication Device, WherePort WPT-3200.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

TEST METHODS

The radiated and conducted emissions data of the Proximity Communication Device, WherePort WPT-3200, was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the "Sample Calculations". The corrected data was then compared to the FCC Part 15 Subpart C Sections 15.209 & 15.207 emissions limits to determine compliance.

Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

SAMPLE CALCULATIONS

The basic spectrum analyzer reading was converted using correction factors as shown in the six highest emissions readings in Tables 1 through 4. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula:

Meter reading (dBµV)
+ Antenna Factor (dB)
+ Cable Loss (dB)
- Distance Correction (dB)
- Pre-amplifier Gain (dB)

= Corrected Reading(dBµV/m)

This reading was then compared to the applicable specification limit to determine compliance.

A typical data sheet will display the following in column format:

#	Freq MHz	Rdng dBuV	Mag	Cable	FCC 15.31	Preamp	Bicon	Log	Dist	Corr dBuV/m	Spec	Margin	Polar
	LISN												

#	Reading number, order of frequencies listed by margin.
Freq MHz	Frequency in MHz of the obtained reading.
Rdng dBuV	Reading obtained on the spectrum analyzer in dBµV.
Mag	Magnetic loop antenna factor in dB
Cable	Cable loss in dB of the coaxial cable on the OATS.
FCC 15.31	Distance correction called out in FCC Part 15.31.
Preamp	Preamplifier factor or gain in dB.
Bicon	Bicon antenna factor in dB.
Log	Log Periodic antenna factor in dB
Dist	Distance factor in dB, used when testing at a different test distance than otherwise stated in the spec.
Corr dBµV/m	Corrected reading which is now in dBµV/m (field strength).
Spec	Specification limit (dB) stated in the appropriate standard.
Margin	Closeness to the specified limit in dB; + is over and - is under the limit.
Polar	Polarity of the antenna with respect to earth.
LISN	Is the line impedence stabilization network factor in dB.

APPENDIX A

INFORMATION ABOUT THE EQUIPMENT UNDER TEST

Not provided by customer at this time.

INFORMATION ABOUT THE EQUIPMENT UNDER TEST	
Test Software/Firmware: CRT was displaying: Power Supply Manufacturer: Power Supply Part Number: AC Line Filter Manufacturer: AC Line Filter Part Number:	
The AC power cord is NOT removable and is NOT shielded	
Line voltage used during testing: 120V 60Hz	

I/O PORTS	
Type	#

CRYSTAL OSCILLATORS	
Type	Freq. In MHz

PRINTED CIRCUIT BOARDS				
Function	Model & Rev	Clocks, MHz	Layers	Location

REQUIRED EUT CHANGES TO COMPLY:

CABLE INFORMATION

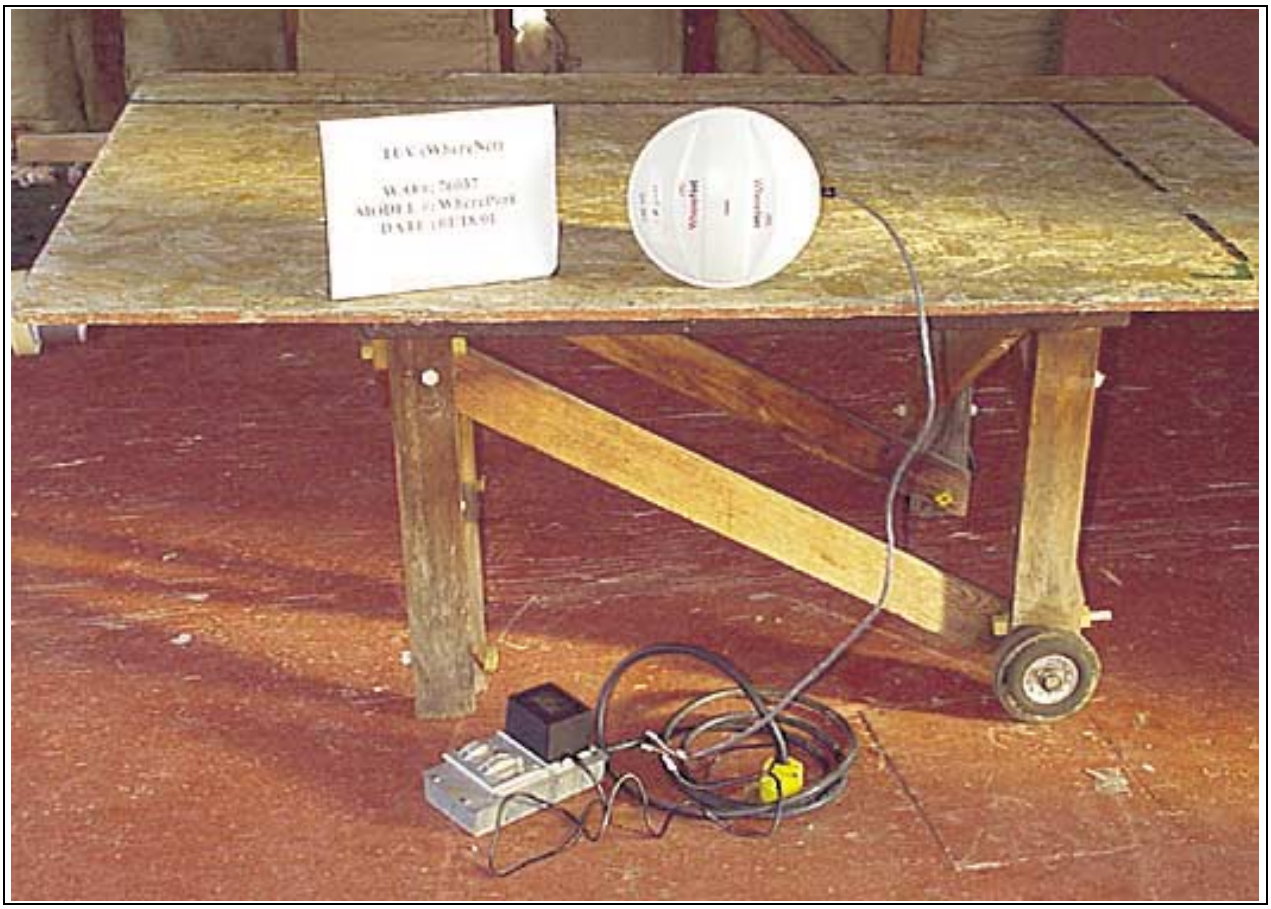
Not provided by customer at this time.

Cable #:		Cable(s) of this type:	
Cable Type:		Shield Type:	
Construction:		Length In Meters:	
Connected To End (1):		Connected To End (2):	
Connector At End (1):		Connector At End (2):	
Shield Grounded At (1):		Shield Grounded At (2):	
Part Number:		Number of Conductors:	
Notes:			

Cable #:		Cable(s) of this type:	
Cable Type:		Shield Type:	
Construction:		Length In Meters:	
Connected To End (1):		Connected To End (2):	
Connector At End (1):		Connector At End (2):	
Shield Grounded At (1):		Shield Grounded At (2):	
Part Number:		Number of Conductors:	
Notes:			

Cable #:		Cable(s) of this type:	
Cable Type:		Shield Type:	
Construction:		Length In Meters:	
Connected To End (1):		Connected To End (2):	
Connector At End (1):		Connector At End (2):	
Shield Grounded At (1):		Shield Grounded At (2):	
Part Number:		Number of Conductors:	
Notes:			

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Back View

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Back View (Mag Loop Antenna)

PHOTOGRAPH SHOWING CONDUCTED EMISSIONS

Conducted Emissions

APPENDIX B

MEASUREMENT DATA SHEETS

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **TUV (WhereNet)**
Specification: **FCC 15 C PARA 15.209**
Work Order #: **76037** Date: 01/18/2001
Test Type: **Maximized Emissions** Time: 18:27:42
Equipment: **Transmitter** Sequence#: 3
Manufacturer: WhereNet Tested By: Randal Clark
Model: WherePort
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Transmitter*	WhereNet	WherePort	001

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	CUI Stack	DPA240167C-S/T	N/A

Test Conditions / Notes:

WherePort is transmitting on 114.6 & 126.9 kHz and is powered by a 24VAC transformer. Distance correction factor of -40dB/dec used in accordance with FCC15.31.

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Mag dB	FCC 15.31 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	115.100k	73.3	+0.1	+10.9	-60.0		+0.0	24.3	26.4	-2.1	None
Ave			Fundamental Reading								
^	115.104k	75.8	+0.1	+10.9	-60.0		+0.0	26.8	26.4	+0.4	None
			Fundamental Reading (See #1)								
3	127.360k	71.1	+0.1	+10.8	-60.0		+0.0	22.0	25.5	-3.5	None
Ave			Fundamental Reading								
^	127.360k	72.2	+0.1	+10.8	-60.0		+0.0	23.1	25.5	-2.4	None
			Fundamental Reading (See #3)								
5	511.500k	36.6	+0.1	+10.7	-20.0		+0.0	27.4	33.4	-6.0	None
6	230.500k	49.7	+0.2	+10.5	-60.0		+0.0	0.4	20.3	-19.9	None
7	350.000k	44.1	+0.0	+10.6	-60.0		+0.0	-5.3	16.7	-22.0	None
8	461.800k	38.7	+0.0	+10.7	-60.0		+0.0	-10.6	14.3	-24.9	None
9	254.200k	43.8	+0.1	+10.6	-60.0		+0.0	-5.5	19.5	-25.0	None
10	384.400k	39.6	+0.0	+10.6	-60.0		+0.0	-9.8	15.9	-25.7	None

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **TUV (WhereNet)**
Specification: **FCC 15.209**
Work Order #: **76037** Date: 01/19/2001
Test Type: **Maximized Emissions** Time: 16:37:29
Equipment: **Transmitter** Sequence#: 2
Manufacturer: WhereNet Tested By: Randal Clark
Model: WherePort
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Transmitter*	WhereNet	WherePort	001

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	CUI Stack	DPA240167C-S/T	N/A

Test Conditions / Notes:

WherePort is transmitting on 114.6 & 126.9 kHz and is powered by a 24VAC transformer.

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq	Rdng	Log 1	Cable	Preamp	Bicon	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	37.580M	42.3	+0.0	+1.1	-25.0	+11.1	+10.0	39.5	40.0	-0.5	Vert
	QP										
^	37.580M	44.6	+0.0	+1.1	-25.0	+11.0	+10.0	41.7	40.0	+1.7	Vert
3	352.066M	37.7	+18.7	+3.9	-25.0	+0.0	+10.0	45.3	46.0	-0.7	Horiz
	QP										
^	352.081M	39.8	+18.7	+3.9	-25.0	+0.0	+10.0	47.4	46.0	+1.4	Horiz
5	448.064M	38.8	+17.0	+4.6	-25.6	+0.0	+10.0	44.8	46.0	-1.2	Horiz
	QP										
^	448.098M	40.3	+17.0	+4.6	-25.6	+0.0	+10.0	46.3	46.0	+0.3	Horiz
7	30.046M	41.0	+0.0	+1.1	-25.1	+11.7	+10.0	38.7	40.0	-1.3	Vert
	QP										
^	30.046M	45.4	+0.0	+1.1	-25.1	+11.7	+10.0	43.1	40.0	+3.1	Vert
9	416.066M	38.4	+16.6	+4.3	-25.5	+0.0	+10.0	43.8	46.0	-2.2	Horiz
	QP										
^	416.060M	39.8	+16.6	+4.3	-25.5	+0.0	+10.0	45.2	46.0	-0.8	Horiz
11	32.700M	40.4	+0.0	+1.1	-25.1	+11.3	+10.0	37.7	40.0	-2.3	Vert
	QP										
^	32.700M	43.7	+0.0	+1.1	-25.1	+11.3	+10.0	41.0	40.0	+1.0	Vert

13	64.876M QP	41.9	+0.0	+1.6	-25.0	+9.0	+10.0	37.5	40.0	-2.5	Vert
^	64.876M	44.2	+0.0	+1.6	-25.0	+9.0	+10.0	39.8	40.0	-0.2	Vert
15	39.744M QP	39.2	+0.0	+1.1	-25.0	+11.1	+10.0	36.4	40.0	-3.6	Vert
^	39.744M	41.0	+0.0	+1.1	-25.0	+11.1	+10.0	38.2	40.0	-1.8	Vert
17	192.066M QP	34.0	+0.0	+2.8	-24.7	+17.3	+10.0	39.4	43.5	-4.1	Horiz
^	192.066M	35.6	+0.0	+2.8	-24.7	+17.3	+10.0	41.0	43.5	-2.5	Horiz
19	66.105M QP	40.4	+0.0	+1.6	-25.0	+8.7	+10.0	35.7	40.0	-4.3	Vert
^	66.105M	41.6	+0.0	+1.6	-25.0	+8.8	+10.0	37.0	40.0	-3.0	Vert
21	71.013M	41.2	+0.0	+1.6	-25.0	+7.9	+10.0	35.7	40.0	-4.3	Vert
22	160.085M	38.1	+0.0	+2.4	-24.9	+13.2	+10.0	38.8	43.5	-4.7	Vert
23	480.048M QP	35.1	+17.3	+4.7	-25.8	+0.0	+10.0	41.3	46.0	-4.8	Horiz
^	480.046M	38.0	+17.3	+4.7	-25.8	+0.0	+10.0	44.2	46.0	-1.8	Horiz
25	736.070M QP	30.4	+21.0	+6.0	-26.2	+0.0	+10.0	41.2	46.0	-4.8	Vert
^	736.068M	33.9	+21.0	+6.0	-26.2	+0.0	+10.0	44.7	46.0	-1.3	Vert
27	512.073M QP	34.4	+17.8	+4.8	-25.9	+0.0	+10.0	41.1	46.0	-4.9	Horiz
^	512.064M	36.7	+17.8	+4.8	-25.9	+0.0	+10.0	43.4	46.0	-2.6	Horiz
29	672.062M QP	31.1	+20.3	+5.7	-26.1	+0.0	+10.0	41.0	46.0	-5.0	Horiz
^	672.048M	34.4	+20.3	+5.7	-26.1	+0.0	+10.0	44.3	46.0	-1.7	Horiz
^	672.079M	33.6	+20.3	+5.7	-26.1	+0.0	+10.0	43.5	46.0	-2.5	Horiz
32	384.071M	35.2	+17.1	+4.0	-25.3	+0.0	+10.0	41.0	46.0	-5.0	Horiz
33	544.064M QP	33.2	+18.4	+5.1	-25.9	+0.0	+10.0	40.8	46.0	-5.2	Vert
^	544.046M	34.0	+18.4	+5.1	-25.9	+0.0	+10.0	41.6	46.0	-4.4	Vert
35	78.090M	41.0	+0.0	+1.7	-25.0	+7.0	+10.0	34.7	40.0	-5.3	Vert
36	192.067M	32.8	+0.0	+2.8	-24.7	+17.3	+10.0	38.2	43.5	-5.3	Vert

37	77.600M	40.6	+0.0	+1.7	-25.0	+7.1	+10.0	34.4	40.0	-5.6	Vert
38	576.099M	32.0	+19.1	+5.2	-26.0	+0.0	+10.0	40.3	46.0	-5.7	Horiz
39	480.077M	34.0	+17.3	+4.7	-25.8	+0.0	+10.0	40.2	46.0	-5.8	Vert
40	128.064M QP	36.2	+0.0	+2.3	-25.0	+14.1	+10.0	37.6	43.5	-5.9	Vert
^	128.083M	40.1	+0.0	+2.3	-25.0	+14.1	+10.0	41.5	43.5	-2.0	Vert
42	704.046M QP	29.9	+20.6	+5.7	-26.2	+0.0	+10.0	40.0	46.0	-6.0	Vert
^	704.046M	34.1	+20.6	+5.7	-26.2	+0.0	+10.0	44.2	46.0	-1.8	Vert
44	672.044M QP	30.1	+20.3	+5.7	-26.1	+0.0	+10.0	40.0	46.0	-6.0	Vert
^	672.044M	34.7	+20.3	+5.7	-26.1	+0.0	+10.0	44.6	46.0	-1.4	Vert
46	320.076M	30.7	+20.4	+3.8	-24.9	+0.0	+10.0	40.0	46.0	-6.0	Horiz
47	50.870M QP	36.3	+0.0	+1.4	-24.9	+10.9	+10.0	33.7	40.0	-6.3	Vert
^	50.870M	39.8	+0.0	+1.4	-24.9	+10.9	+10.0	37.2	40.0	-2.8	Vert
49	416.067M QP	34.2	+16.6	+4.3	-25.5	+0.0	+10.0	39.6	46.0	-6.4	Vert
^	416.075M	36.4	+16.6	+4.3	-25.5	+0.0	+10.0	41.8	46.0	-4.2	Vert
51	512.089M	32.9	+17.8	+4.8	-25.9	+0.0	+10.0	39.6	46.0	-6.4	Vert
52	76.905M	39.7	+0.0	+1.7	-25.0	+7.2	+10.0	33.6	40.0	-6.4	Vert
53	352.082M QP	31.9	+18.7	+3.9	-25.0	+0.0	+10.0	39.5	46.0	-6.5	Vert
^	352.068M	35.4	+18.7	+3.9	-25.0	+0.0	+10.0	43.0	46.0	-3.0	Vert
55	640.046M QP	30.0	+20.0	+5.6	-26.1	+0.0	+10.0	39.5	46.0	-6.5	Horiz
56	224.079M	34.4	+0.0	+3.0	-24.7	+16.8	+10.0	39.5	46.0	-6.5	Horiz
57	768.064M QP	27.9	+21.4	+6.1	-26.1	+0.0	+10.0	39.3	46.0	-6.7	Vert
^	768.092M	32.6	+21.4	+6.1	-26.1	+0.0	+10.0	44.0	46.0	-2.0	Vert
59	128.075M	35.4	+0.0	+2.3	-25.0	+14.1	+10.0	36.8	43.5	-6.7	Horiz

60	62.319M QP	37.2	+0.0	+1.5	-24.9	+9.5	+10.0	33.3	40.0	-6.7	Vert
^	62.319M	42.5	+0.0	+1.5	-24.9	+9.5	+10.0	38.6	40.0	-1.4	Vert
62	76.777M QP	39.0	+0.0	+1.7	-25.0	+7.2	+10.0	32.9	40.0	-7.1	Vert
^	76.777M	43.6	+0.0	+1.7	-25.0	+7.2	+10.0	37.5	40.0	-2.5	Vert
64	160.075M	35.6	+0.0	+2.4	-24.9	+13.2	+10.0	36.3	43.5	-7.2	Horiz
65	640.042M QP	29.2	+20.0	+5.6	-26.1	+0.0	+10.0	38.7	46.0	-7.3	Vert
^	640.042M	33.4	+20.0	+5.6	-26.1	+0.0	+10.0	42.9	46.0	-3.1	Vert
67	832.072M QP	26.1	+22.3	+6.3	-26.0	+0.0	+10.0	38.7	46.0	-7.3	Vert
^	832.050M	31.1	+22.3	+6.3	-26.0	+0.0	+10.0	43.7	46.0	-2.3	Vert
69	704.068M QP	28.3	+20.6	+5.7	-26.2	+0.0	+10.0	38.4	46.0	-7.7	Horiz
^	704.073M	32.2	+20.6	+5.7	-26.2	+0.0	+10.0	42.3	46.0	-3.7	Horiz
71	960.056M	30.6	+24.5	+6.7	-25.5	+0.0	+10.0	46.3	54.0	-7.7	Horiz
72	736.070M QP	27.5	+21.0	+6.0	-26.2	+0.0	+10.0	38.3	46.0	-7.7	Horiz
^	736.082M	31.4	+21.0	+6.0	-26.2	+0.0	+10.0	42.2	46.0	-3.8	Horiz
74	672.048M QP	28.3	+20.3	+5.7	-26.1	+0.0	+10.0	38.2	46.0	-7.8	Horiz
75	608.052M QP	29.4	+19.6	+5.3	-26.1	+0.0	+10.0	38.2	46.0	-7.8	Horiz
^	608.027M	33.5	+19.6	+5.3	-26.1	+0.0	+10.0	42.3	46.0	-3.7	Horiz
^	608.052M	32.9	+19.6	+5.3	-26.1	+0.0	+10.0	41.7	46.0	-4.3	Horiz
78	224.059M	32.9	+0.0	+3.0	-24.7	+16.8	+10.0	38.0	46.0	-8.0	Vert
79	144.150M	35.0	+0.0	+2.3	-24.9	+12.9	+10.0	35.3	43.5	-8.2	Vert
80	448.074M	31.5	+17.0	+4.6	-25.6	+0.0	+10.0	37.5	46.0	-8.5	Vert
81	256.077M	32.1	+0.0	+3.2	-24.6	+16.5	+10.0	37.2	46.0	-8.8	Horiz
82	384.078M	31.1	+17.1	+4.0	-25.3	+0.0	+10.0	36.9	46.0	-9.1	Vert
83	148.420M	33.4	+0.0	+2.3	-24.9	+12.7	+10.0	33.5	43.5	-10.0	Vert

84	544.046M QP	27.1	+18.4	+5.1	-25.9	+0.0	+10.0	34.7	46.0	-11.3	Horiz
^	544.048M	36.2	+18.4	+5.1	-25.9	+0.0	+10.0	43.8	46.0	-2.2	Horiz

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **TUV (WhereNet)**
Specification: **FCC 15.207**
Work Order #: **76037** Date: 01/19/2001
Test Type: **Conducted Emissions** Time: 17:49:02
Equipment: **Transmitter** Sequence#: 4
Manufacturer: WhereNet Tested By: Randal Clark
Model: WherePort
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Transmitter*	WhereNet	WherePort	001

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	CUI Stack	DPA240167C-S/T	N/A

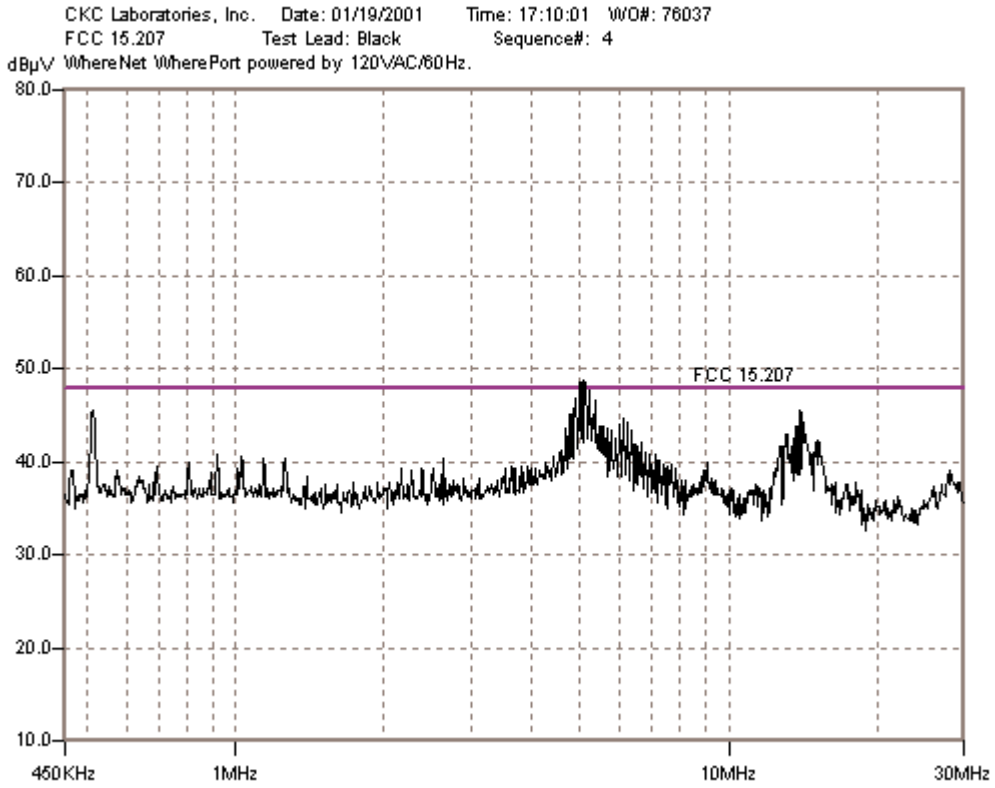
Test Conditions / Notes:

WherePort is transmitting on 114.6 & 126.9 kHz and is powered by a 24VAC transformer. Power supplied to transformer is 120VAC/60Hz.

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq	Rdng	LISN	LISN			Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1 QP	5.165M	45.3	+0.2	+0.6			+0.0	46.1	48.0	-1.9	Black
^	5.164M	46.7	+0.2	+0.6			+0.0	47.5	48.0	-0.5	Black
3 QP	5.280M	44.8	+0.2	+0.7			+0.0	45.7	48.0	-2.3	Black
^	5.280M	45.8	+0.2	+0.7			+0.0	46.7	48.0	-1.3	Black
5 QP	5.051M	43.8	+0.2	+0.6			+0.0	44.6	48.0	-3.4	Black
^	5.050M	45.4	+0.2	+0.6			+0.0	46.2	48.0	-1.8	Black
^	5.050M	44.9	+0.2	+0.6			+0.0	45.7	48.0	-2.3	Black
8 QP	5.052M	43.7	+0.2	+0.6			+0.0	44.5	48.0	-3.5	Black
9 QP	13.884M	43.1	+0.2	+1.0			+0.0	44.3	48.0	-3.7	Black
^	13.883M	44.6	+0.2	+1.0			+0.0	45.8	48.0	-2.2	Black
11 QP	13.997M	43.1	+0.2	+1.0			+0.0	44.3	48.0	-3.7	Black
^	13.999M	44.7	+0.2	+1.0			+0.0	45.9	48.0	-2.1	Black

13	4.826M	43.3	+0.1	+0.6		+0.0	44.0	48.0	-4.0	Black
14	13.652M	42.6	+0.2	+1.0		+0.0	43.8	48.0	-4.2	Black
15	514.200k	43.1	+0.1	+0.5		+0.0	43.7	48.0	-4.3	Black
QP										
^	513.584k	45.0	+0.1	+0.5		+0.0	45.6	48.0	-2.4	Black
17	6.198M	42.2	+0.2	+0.8		+0.0	43.2	48.0	-4.8	Black
QP										
^	6.197M	43.7	+0.2	+0.8		+0.0	44.7	48.0	-3.3	Black
19	14.227M	41.7	+0.2	+0.9		+0.0	42.8	48.0	-5.2	Black
QP										
^	14.226M	43.8	+0.2	+0.9		+0.0	44.9	48.0	-3.1	Black
21	6.313M	41.3	+0.2	+0.7		+0.0	42.2	48.0	-5.8	Black
QP										
^	6.315M	43.2	+0.2	+0.7		+0.0	44.1	48.0	-3.9	Black
23	4.937M	41.4	+0.2	+0.6		+0.0	42.2	48.0	-5.8	Black
QP										
^	4.937M	44.3	+0.2	+0.6		+0.0	45.1	48.0	-2.9	Black
25	5.367M	39.9	+0.2	+0.7		+0.0	40.8	48.0	-7.2	Black
QP										
^	5.368M	45.8	+0.2	+0.7		+0.0	46.7	48.0	-1.3	Black
27	14.343M	39.6	+0.2	+0.9		+0.0	40.7	48.0	-7.3	Black
QP										
^	14.340M	42.1	+0.2	+0.9		+0.0	43.2	48.0	-4.8	Black


CKC Laboratories, Inc. Date: 01/19/2001 Time: 17:10:01 WO#: 76037
FCC 15.207 Test Lead: Black Sequence#: 4
dBµV WhereNet WherePort powered by 120VAC/60Hz.
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
FCC 15.207
450KHz
1MHz
10MHz
30MHz

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **TUV (WhereNet)**
Specification: **FCC 15.207**
Work Order #: **76037** Date: 01/19/2001
Test Type: **Conducted Emissions** Time: 18:15:02
Equipment: **Transmitter** Sequence#: 5
Manufacturer: WhereNet Tested By: Randal Clark
Model: WherePort
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Transmitter*	WhereNet	WherePort	001

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	CUI Stack	DPA240167C-S/T	N/A

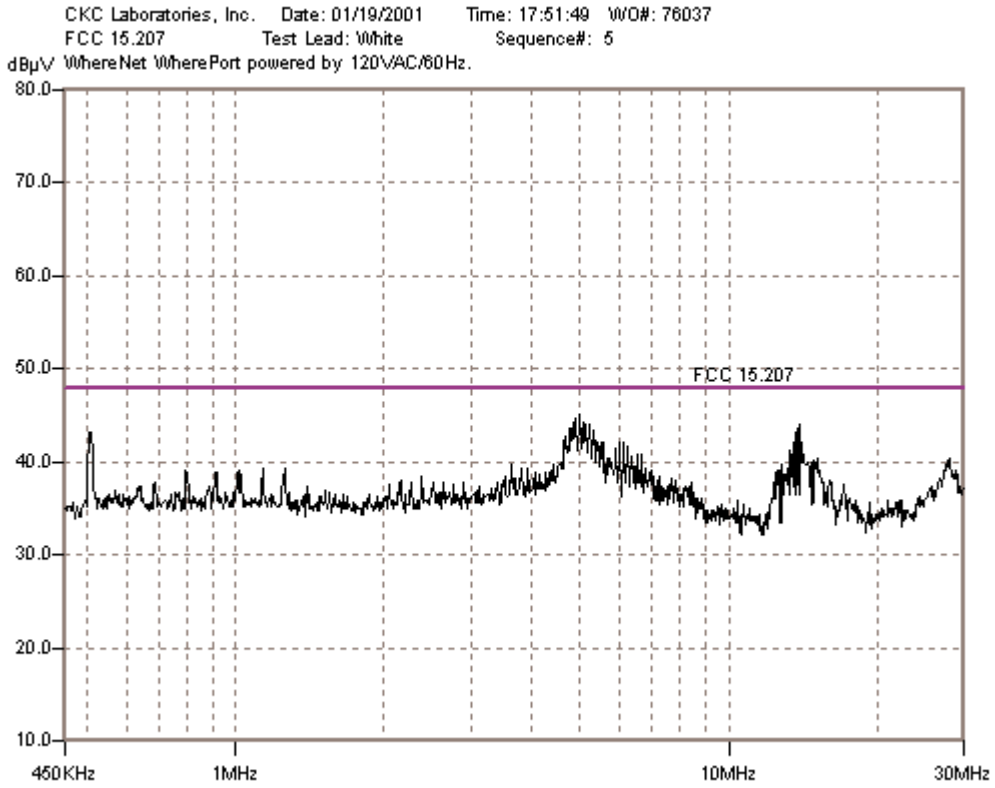
Test Conditions / Notes:

WherePort is transmitting on 114.6 & 126.9 kHz and is powered by a 24VAC transformer. Power supplied to transformer is 120VAC/60Hz.

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq MHz	Rdng dBµV	LISN dB	dB	LISN dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	4.931M	41.6	+0.2		+2.0		+0.0	43.8	48.0	-4.2	White
2	14.053M	43.1	+0.2		+0.4		+0.0	43.7	48.0	-4.3	White
3	4.774M	41.7	+0.1		+1.8		+0.0	43.6	48.0	-4.4	White
4	13.818M	42.9	+0.2		+0.4		+0.0	43.5	48.0	-4.5	White
5	5.327M	41.4	+0.2		+1.7		+0.0	43.3	48.0	-4.7	White
6	506.891k	42.5	+0.1		+0.6		+0.0	43.2	48.0	-4.8	White
7	13.701M	42.5	+0.2		+0.4		+0.0	43.1	48.0	-4.9	White
8	4.685M	41.1	+0.1		+1.6		+0.0	42.8	48.0	-5.2	White
9 QP	13.991M	42.1	+0.2		+0.4		+0.0	42.7	48.0	-5.3	White
^	13.990M	43.9	+0.2		+0.4		+0.0	44.5	48.0	-3.5	White
11 QP	5.160M	40.4	+0.2		+1.9		+0.0	42.5	48.0	-5.5	White
^	5.161M	42.0	+0.2		+1.9		+0.0	44.1	48.0	-3.9	White

13	5.368M	40.6	+0.2	+1.6	+0.0	42.4	48.0	-5.6	White
14	4.658M	40.6	+0.1	+1.6	+0.0	42.3	48.0	-5.7	White
15	13.584M	41.6	+0.2	+0.4	+0.0	42.2	48.0	-5.8	White
16	6.147M	40.7	+0.2	+1.3	+0.0	42.2	48.0	-5.8	White
17	6.038M	41.0	+0.2	+1.0	+0.0	42.2	48.0	-5.8	White
18	5.437M	40.5	+0.2	+1.5	+0.0	42.2	48.0	-5.8	White
19	14.170M	41.5	+0.2	+0.4	+0.0	42.1	48.0	-5.9	White
20	5.046M QP	39.8	+0.2	+2.0	+0.0	42.0	48.0	-6.0	White
^	5.046M	41.8	+0.2	+2.0	+0.0	44.0	48.0	-4.0	White
^	5.045M	41.4	+0.2	+2.0	+0.0	43.6	48.0	-4.4	White
23	5.553M	40.4	+0.2	+1.4	+0.0	42.0	48.0	-6.0	White


CKC Laboratories, Inc. Date: 01/19/2001 Time: 17:51:49 WO#: 76037
FCC 15.207 Test Lead: White Sequence#: 5
dBµV WhereNet WherePort powered by 120VAC/60Hz.
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
FCC 15.207
450KHz
1MHz
10MHz
30MHz