EXHIBIT L – Technical Report

FCC ID# PYUCONSOLE4

Measurement/Technical Report

MSInteractive, L.L.C.

Perception Analyzer Model 400 Console

FCC ID: PYUCONSOLE4

October 02, 2001

This report concerns (check one):	Original Grant__X__ *Class II Change*____
Equipment Type: Unlicensed Low Power Transmitter	Rule Part: 47 CFR 15.249

Deferred grant requested per 47 CFR 0.457 (d)(1)(ii)? Yes_____ no__X__

If yes, defer until: _____N/A_____ date

MSInteractive, L.L.C. agrees to notify the Commission by: _____N/A_____ date

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

Transition Rules Request per 15.37: yes_____ no__X__

If no, assumed Part 15, Subpart C for intentional radiators – new 47 CFR [10-1-92] provision.

Report prepared by:

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Table of Contents

1.0 General Information

1.1 Product Description

Manufactured By ..... MSInteractive, L.L.C.

Address ..... 111 SW 5TH Avenue, Suite 1850, Portland, OR 97204 USA

Test Requested By:..... Forrest Seitz of Seitz & Associates

Model..... Perception Analyzer Model 400 Console

FCC ID PYUCONSOLE4

Serial Number(s) ..... none

Date of Test..... September 25, 2001 through October 02, 2001

Job Number..... SEIT0050

Prepared By:

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Technical Review By:

Greg Kiemel, Director of Engineering

Approved By:

Don Facteau, IS Manager

1.1 Product Description con't

The Equipment Under Test (EUT) is the MSInteractive, L.L.C. Perception Analyzer Model 400 Console module. The Console is part of a wireless perception analyzer system used in marketing research. A test subject uses a dial unit with a potentiometer to "dial" or register their reaction to a marketing presentation. The Console polls the dial units for data corresponding to each participant's reaction.

The Console is an unlicensed, low power transmitter that uses FM modulation at fixed frequency channels of 905, 908, 911, 914, 917 and 920 MHz.

The EUT can be configured with only one antenna. Data is supplied with this application in support of this antenna.

The technical report and exhibits demonstrate compliance with FCC rules 47 CFR 15.249.

1.2 Related Submittals/Grants

None

1.3 Tested System Details

EUT and Peripherals

Item	FCC ID	Description and Serial No.
EUT	PYUCONSOLE4	MSInteractive, L.L.C. Perception Analyzer Model 400 Console S/N none.
AC Adapter for EUT	N/A	Cui Stack, Model DV-530R, S/N DPRO50030-P6

Cables

Cable Type	Shield	Length (meters)	Ferrite	Connection Point 1	Connection Point 2
Dial	No	1.5	No	RJ11 on EUT	Unterminated
DC	No	2.0	No	AC Adapter for EUT	DC input of EUT
RS232	Yes	1.2	No	RS232 on EUT	Unterminated

1.4 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4 (1992. Radiated testing was performed at an antenna to EUT distance of 3 meters, from 30 MHz to 10 GHz.

1.5 Test Facility

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data is located at

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The semi-anechoic chamber, and conducted measurement facility is located in Hillsboro, OR, at the address shown above. This site has been fully described in a report filed with the FCC (Federal Communications Commission), and accepted by the FCC in a letter maintained in our files.

Northwest EMC, Inc. is recognized under the United States Department of Commerce, National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. NVLAP Lab Code: 200059-0.

2.0 System Test Configuration

2.1 Justification

2.1.1 Operating Modes

All operating modes of the EUT were investigated. The EUT was configured to continuously transmit and receive. Both radiated and conducted measurements were made with the radio transmitting at the lowest channel, a middle channel, and the highest channel available.

2.1.2 Test Configuration

The EUT was configured for typical use with each type of port populated with a representative cable. The EUT was powered from an AC adapter connected to the power mains.

2.2 EUT Exercise Software

The software used to exercise the EUT is engineering developmental software designed to provide manual control over the transceiver functions. The software operates on a laptop computer and commands the EUT via communication over a serial cable through the serial port of the computer. After the EUT was commanded to a particular state, the serial cable was disconnected from the laptop computer for testing.

The data selected for transmission generated the maximum density and data rate possible to create a worse case emissions.

2.3 Special Accessories

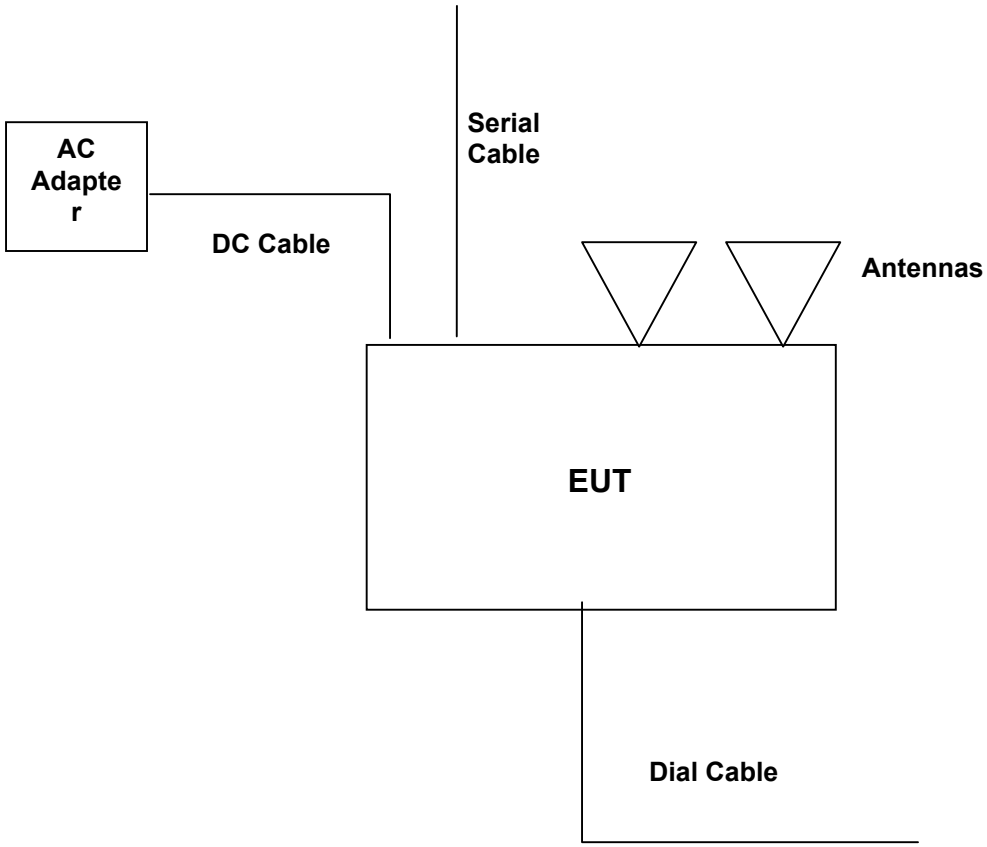
None

2.4 Equipment Modifications

The following modifications were made to achieve compliance:

- Installed 100pF caps at available sites on RJ11 ports.

Figure 2.1: Configuration of Tested System



3.0 Antenna Requirement

Per 47 CFR 15.203, the EUT uses antennas that are designed to ensure that no other antennas other than those supplied by MSInteractive, L.L.C. will be used with the device.

Details about the antenna connection method may be referenced in exhibit "B", file name "Antenna Description.pdf"

4.1 Antenna Information

Per 47 CFR 15.204 (c), a list of antennas tested with the EUT is provided. The type, manufacturer, model number, and gain with reference to an isotropic radiator is given.

Please reference exhibit "B", file name "Antenna Description.pdf" for that information.

Photographs of those antennas are in exhibit "D", file name "External Photos.pdf"

4.2 RF Exposure Compliance Requirements

The EUT meets the requirement that it be operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines (ref . 47 CFR 1.1307, 1.1310, 2.1091, and 2.1093. Also OET Bulletin 65, Supplement C).

The EUT will only be used as a mobile transmitter per 47 CFR 2.1091. The MPE estimates are as follows:

Table 1 in 47 CFR 1.1310 defines the maximum permissible exposure (MPE) for the general population as f/1500 mW/cm^2 (where f = frequency in MHz). For a transmit frequency of 905 MHz, this equals 0.603 mW/cm^2. The distance from the EUT's transmitting antenna where the exposure level reaches the maximum permitted level is calculated using the general equation:

$$S = (PG)/4\pi R^2$$

Where: S = power density (0.603 mW/cm^2, maximum permitted level)
P = power input to the antenna (0.375 mW, see calculation below*)
G = linear power gain relative to an isotropic radiator (assume 3dBi = numeric gain of 2)
R = distance to the center of the radiation of the antenna

Solving for R, the 0.603 mW/cm^2 limit is reached 0.31 cm or closer to the transmitting antenna. Therefore, no warning labels, no RF exposure warnings in the manual, or other protection measures will be used with the EUT.

* Note: The power input to the antenna can be derived using the same general equation. Per 15.249, the maximum permitted peak level at the transmit frequency is 50 mV/m (at a 3 meter distance). This is equal to 6.6 E-6 W/m^2. Solving for P, the power input to the antenna is 0.375 mW

4.0 AC Powerline Conducted Emissions

Requirement: Per 47 CFR 15.207, the radio frequency voltage that is conducted back onto the AC power line from the EUT, on any frequency within the 450 kHz to 30 MHz band, shall not exceed 250 microvolts.

Configuration: The AC powerline conducted emissions were measured with the EUT operating in a mode typical of normal operation. The EUT was transmitting and receiving while set at the lowest channel, a middle channel, and the highest channel available. The spectrum was scanned from 450 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.4-1992.

Result: Per 47 CFR 15.207, the radio frequency voltage that is conducted back onto the AC power line from the EUT, on any frequency within the 450 kHz to 30 MHz band, does not exceed 250 microvolts.

The AC Powerline conducted emissions data may be referenced in Exhibit "M", file name "AC Powerline Conducted Emissions.pdf".

4.1 Harmonics and Spurious Radiated Emissions

Requirement: The field strength of harmonics and spurious radiated emissions shall comply with the limits as defined in 47 CFR 15.249. Field strength limits are specified at a distance of 3 meters. Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Sec. 15.209, whichever is the lesser attenuation. As shown in Sec. 15.35(b), for frequencies above 1000 MHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified in Sec. 15.249 by more than 20 dB under any condition of modulation.

Configuration: The antennas to be used with the EUT were tested. The EUT was transmitting and receiving while set at the lowest channel, a middle channel, and the highest channel available. The spectrum was scanned from 30 MHz to 10 GHz. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:1992). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

Result: The peak level complies with the limits specified in 47 CFR 15.35 (b). The average level (taken with a 10Hz VBW) complies with the limits specified in 15.209.

The final radiated data may be referenced in Exhibit "N",
file name "Radiated Emissions.pdf".

4.2 Fundamental Emissions

Requirement: The field strength of the fundamental emission shall comply with the limits, as defined in 47 CFR 15.249. Field strength limits are specified at a distance of 3 meters.

Configuration: The antennas to be used with the EUT were tested. The EUT was transmitting and receiving while set at the lowest channel, a middle channel, and the highest channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:1992).

Result: The quasi-peak level complies with the limits specified in 47 CFR 15.249.

The final radiated data may be referenced in Exhibit "N",
file name "Radiated Emissions.pdf"

5.0 Field Strength Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured level. The basic equation with a sample calculation is as follows:
FS = RA + AF + CF - AG

where : FS = Field Strength

RA = Measured Level

AF = Antenna Factor

CF = Cable Attenuation Factor

AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/meter.

FS = 52.5 + 7.4 + 1.1 - 29 = 32 dBuV/meter
Level in uV/m = Common Antilogarithm [(32 dBuV/m)/20] = 39.8 uV/m

5.1 Measurement Bandwidths

Resolution Bandwidth

Peak Data

150 kHz - 30 MHz .....10 kHz
30 MHz - 1000 MHz .....100 kHz
1000 MHz - 25000 MHz .....1000 kHz

Quasi-peak Data

150 kHz - 30 MHz .....9 kHz
30 MHz - 1000 MHz .....120 kHz

Average Data.

1000 MHz - 25000 MHz .....1000 kHz

Video Bandwidth

The video bandwidth was greater than or equal to the resolution bandwidth for all measurement data except average measurements:

Average Data.

1000 MHz - 25000 MHz .....10 Hz

6.0 Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Antenna, Biconilog	EMCO	3141	AXE	12/14/2000	12 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	12/04/2000	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	12/04/2000	12 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	03/23/2001	12 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	03/23/2001	12 mo
Antenna, Horn	EMCO	3115	AHC	08/24/2001	12 mo
1 - 2 GHz Band Pass Filter	Microlab	FH-1001	422	01/26/2001	12 mo
1.5 – 18 GHz Band Pass Filter	RLC Electronics	84300-80037	001	01/26/2001	12 mo