EXHIBIT B – Technical Report

FCC ID O7O-SPR

Measurement/Technical Report

Diamond Traffic Products

Sprite

FCC ID: O7O-SPR

August 24, 2000

This report concerns (check one): Original Grant__X__ *Class II Change*____

Equipment Type: Part 15, Low Power Transmitter below 1.705 MHz Rule Part: 47 CFR 15C__

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

If yes, defer until: _____N/A_____
Date

Diamond Traffic Products 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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1.0 General Information

1.1 Product Description

Manufactured By.....Diamond Traffic Products

Address..... PO Box 1455 Oakridge, OR 97463

Test Requested By: .....Guy Gibson

Model..... Sprite

FCC ID.....O7O-SPR

Serial Number(s) 50197

Date of Test.....August 24, 2000

Job Number.....HIGH0003

Prepared By:

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Approved By:

Donald Facteau, IS Manager

1.1 Product Description - continued

The EUT is a 115 to 160 kHz transmitter seeking authorization under 47 CFR 15.201. The EUT is contained on a loop sensor board that is a subassembly to the Sprite unit. The Sprite is a road-way traffic counter that makes use of inductive loop sensor antennas installed in the surface of roads and highways. The EUT is designed to be connected to these antennas and monitor traffic events. Government agencies responsible for operation of traffic signals and collection of traffic data are the users of the Sprite. Speed, length, and number of axels are typical of the data which can be recorded and later retrieved.

Sprite consists of several circuit boards that include the microprocessor, memory, and the loop sensor board (EUT). Ports include serial interface (for data retrieval via a PC), and loop inputs (for connection of the inductive loop sensor antennas). There is no provision for connection to the AC mains. Sprite is powered from 5 "C" cell batteries.

Users (government agencies) install the inductive loop sensor antennas in the road surface. The typical traffic counting loop will use 14 to 18 gauge, 8 to 80 strand wire in loops ranging from 4ft x 4ft to 8ft. x 8ft., with lead-in wire ranging from 25ft to 600ft long. The EUT was tested with three different loop sizes, 4ft. x.4ft., 6ft. x 6ft., and 8ft. x 8ft.

The Sprite has also been tested and found compliant with FCC Part 15 Subpart B rules as a Class B computer peripheral*.

**** A copy of the DoC certificate may be referenced in Exhibit "M", file name"DoC Certificate.pdf"***

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1.2 Related Submittals/Grants

None

1.3 Tested System Details

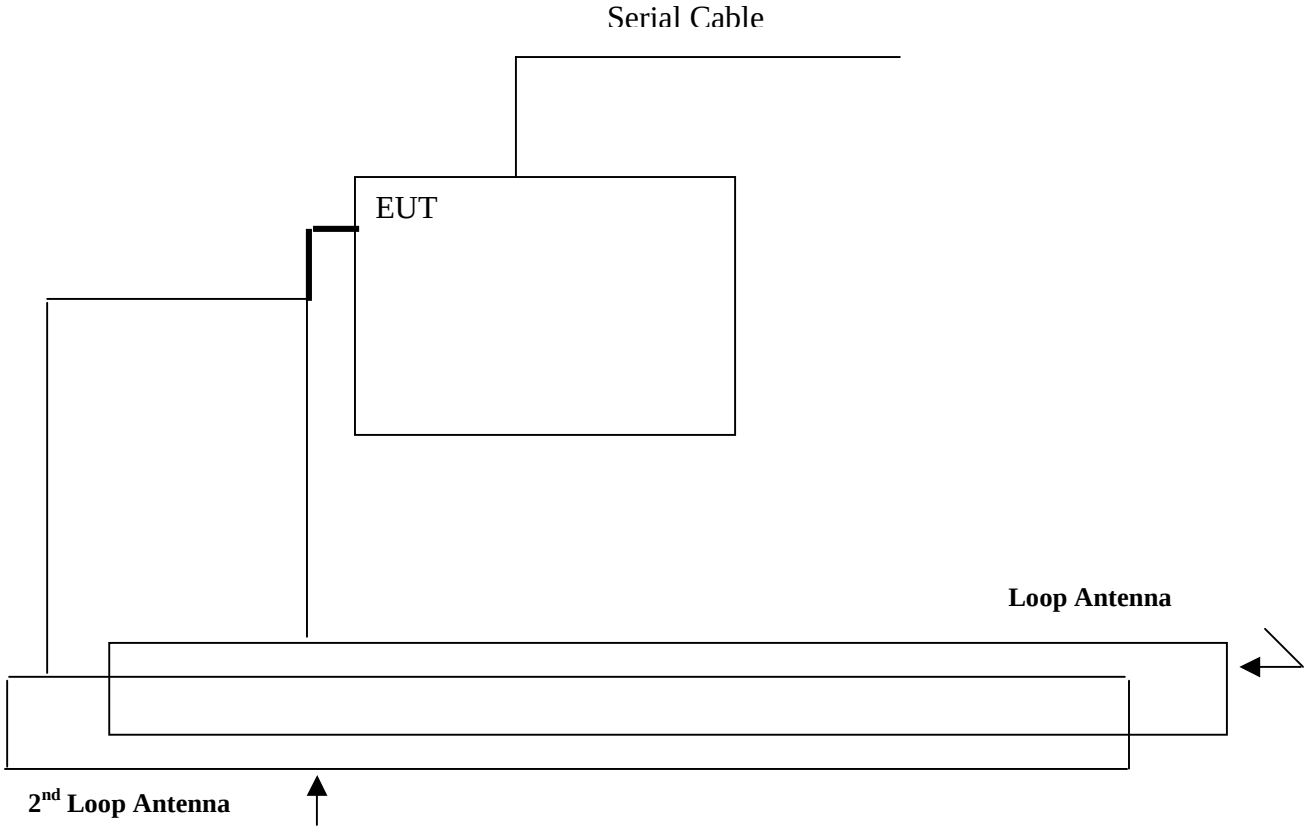
EUT and Peripherals

Item	**FCC ID**	**Description and Serial No.**	
EUT	O7O-SPR	Sprite, 50197	
Loop Antennas	N/A	4’ x 4’, 6’ x 6’, 8’ x 8’	

Cables

Cable Type	Shield	Length (meters)	Ferrite	Connector	Connection Point 1	Connection Point 2
RS 232	Yes	1.2	Yes	Metal	EUT	unterminated
Loop Harness	No	2.0	No	Metal	EUT	Loop Antennas

Figure 1: Configuration of Tested System



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 9 kHz to 1 GHz. However, instead of a rod antenna as specified by ANSI, a loop antenna was used.

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

Software and firmware provided by the manufacturer operated the EUT at its maximum data rate in a configuration that simulated typical use. Each loop antenna was energized and monitored for any change in state. This occurs every 5 msec. Only one loop is energized at time.

2.1.2 Test Configuration

Users (government agencies) install the inductive loop sensor antennas in the road surface. The typical traffic counting loop will use 14 to 18 gauge, 8 to 80 strand wire in loops ranging from 4ft x 4ft to 8ft. x 8ft., with lead-in wire ranging from 25ft to 600ft long. During a telephone conversation on August 15, 2000, Rich Fabina of the FCC provided the following interpretation to Greg Kiemel of Northwest EMC: It is the FCC's interpretation that the EUT is exempt from the antenna connection requirements of 47 CFR 15.203. However, the FCC does require the EUT be tested with a range of loop sizes. Since the exact size, number of turns, and gauge of wire is unknown for any given installation, the FCC requires the EUT to be tested with three different sizes across the possible range (smallest, medium, and largest sizes). In accordance with this interpretation, the EUT was tested with three different loop sizes, 4ft. x.4ft., 6ft. x 6ft., and 8ft. x 8ft. Final data was taken with each loop size.

Although the loop sensor board (EUT) can be configured with up to two inductive loop sensor antennas, only one loop is energized at a time. Final data was taken with two loops connected at a time.

The EUT can only be operated from five "C" cell batteries; no provision is made for connection to the AC mains. .

2.2 EUT Exercise Software

EUT Firmware Ver. 1.0 performed a continuous monitoring of loop inputs.

2.3 Special Accessories

None

2.4 Equipment Modifications

The following modifications were made in order to achieve EMI compliance:

- Ferrico NF-130 ferrite with one turn on internal loop cable near receptacle.

Please reference exhibit "N", file name "Equipment Modifications Attestation Letter.pdf" for the manufacturer's attestation statement.

3.0 Antenna Requirement

During a telephone conversation on August 15, 2000, Rich Fabina of the FCC provided the following interpretation to Greg Kiemel of Northwest EMC: It is the FCC's interpretation that the EUT is exempt from the antenna connection requirements of 47 CFR 15.203.

3.1 Antenna Information

Users (government agencies) install the inductive loop sensor antennas in the road surface. The typical traffic counting loop will use 14 to 18 gauge, 8 to 80 strand wire in loops ranging from 4ft x 4ft to 8ft. x 8ft., with lead-in wire ranging from 25ft to 600ft long. The effective inductance is kept within a defined range as detailed in the Road Loop Installation Guide. Loop inductance must be between 65 to 500 uH. During installation, the loop antennas are permanently soldered to the loop connector by professional installers according to the loop installation guide.

Please reference exhibit "C", file name "Loop Installation Guide.pdf" for the Loop Antenna Installation Guide.

4.0 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 in roadside installations, therefore it is considered a fixed installation. It will not be incorporated into any other device.

The following is an excerpt from FCC Public Notice DA000912:

> "It is important to note that the Commission's RF exposure rules apply to all facilities, operations and devices regulated by the Commission. While a given facility, operation or device might be categorically excluded from routine evaluation for RF exposure by Section 1.1307(b)(1) of our rules, it must still comply with the FCC's exposure guidelines."

The EUT is categorically excluded from routine evaluation for RF exposure per Section 1.1307(b)(1) due to its use, transmit frequency, and output power. Also, the transmit frequency falls below the exposure guidelines shown in 47 CFR 1.1310. If the EUT were evaluated against the MPE limits of 1.1310, it would be found well within the permissible limits for the general population. Therefore, no warning labels, no RF exposure warnings in the manual, or other protection measures will be used with the EUT.

5.0 Spurious Radiated Emissions

The field strength of the spurious emissions shall meet the limits as defined in 47 CFR 15.209. Compliance with the provisions of 15.205 shall be demonstrated. The EUT was configured for continuous modulated operation. The spectrum was scanned from 9 kHz to 1 GHz.

While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT in 3 orthogonal planes (per ANSI C63.4:1992). A magnetic loop antenna was used for measurements below 30 MHz. The loop antenna orientation was maximized in both horizontal and vertical planes.

Although the loop sensor board (EUT) can be configured with up to two inductive loop sensor antennas, only one loop is energized at a time. Final data was taken with two loops connected at a time. The EUT was tested with three different loop sizes, 4ft. x.4ft., 6ft. x 6ft., and 8ft. x 8ft. Final data was taken with each loop size.

The EUT can only be operated from five “C” cell batteries; no provision is made for connection to the AC mains.

5.1 Results

The field strength of the spurious emissions meet the limits as defined in 47 CFR 15.209. In addition, spurious emissions meet the provisions of 15.205.

The final radiated data may be referenced in Exhibit “E”,
file name “Radiated Emissions.pdf”.

6.0 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

6.1 Measurement Bandwidths

Peak Data

9 kHz – 150 kHz .....1 kHz
150 kHz - 30 MHz .....10 kHz
30 MHz - 1000 MHz .....100 kHz
1000 MHz - 10000 MHz .....1000 kHz

Quasi-peak Data

9 kHz – 150 kHz ..... 200 Hz
150 kHz - 30 MHz .....9 kHz
30 MHz - 1000 MHz .....120 kHz

7.0 Measurement Equipment

Instrument	Manufacturer	Model	Serial No.	Cal Due
Spectrum Analyzer	Hewlett Packard	8566B	2747A05213	01/19/2001
Quasi-Peak Adapter	Hewlett Packard	85650A	2811A01353	01/19/2001
Pre-Amplifier	AR	LN1000A	25660	09/02/2000
Loop Antenna	EMCO	6502	9303-2808	02/02/2002
Biconilog Antenna	EMCO	3141	9906-1146	12/02/2000