Intertek ETL SEMKO

TEST REPORT

Report Number: 3069738.011
Project Number: 309738
January 12, 2005

Evaluation of the
Wireless Tire Pressure Monitor; DBL

FCC ID:
SX8-DBL
to

FCC Part 15, Subpart C, Sections 15.215, 15.209

For
Bartec USA, LLC

Test Performed by:
Intertek
7250 Hudson Blvd. Suite 100
Oakdale, MN 55128

Test Authorized by:
Bartec USA, LLC
44231 Phoenix Drive
Sterling Heights, MI 48314

Prepared by: _____ Date: January 12, 2005
Uri Spector

Approved by: _____ Date: January 12, 2005
Norman Shpilsher

CONTENTS

1.0 GENERAL DESCRIPTION

1.1 Related Submittals Grants

This is single application of the Bartec USA, LLC *DBL Wireless Tire Pressure Monitor* for Certification under FCC Part 15, Subpart C.
There are no other simultaneous applications.

1.2 Product Description

DBL Wireless Tire Pressure Monitor is a RF remote control transmitter operating in 125.733 KHz. The intended use of the *DBL Wireless Tire Pressure Monitor* is to generate and transmit a RF signal to verify tire sensor functionality. The *DBL Wireless Tire Pressure Monitor* is powered at 9VDC Alkaline Battery.

Antenna Description:

Integrated antenna

Sample Submitted: January 10, 2005
Test Work Started: January 10, 2005
Test Work Completed: January 12, 2005

1.3 Test Methodology

Emission measurements were performed according to the procedures in ANSI C63.4-2001. All field strength radiated emissions measurements were performed in the semi-anechoic chamber, and for each scan, the procedure for maximizing emissions in Appendices D and E were followed. All field strength radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The test site facility used to collect the radiated and conducted measurement data is located at 7250 Hudson Blvd., Suite 100, Oakdale, Minnesota. This test facility has been fully described in a report dated on March 2003 submitted to FCC. Please reference the site registration number: 90706, dated April 18, 2003.

2.0 SYSTEM TEST CONFIGURATION

2.1 Justification

N/A

2.2 EUT Setup

For simplicity of testing, the transmitter was wired to transmit continuously

2.3 EUT Exercising Software

N/A

2.4 Special Accessories

There are no special accessories necessary for compliance of these products.

2.5 Equipment Modification

No modifications were installed during the testing.

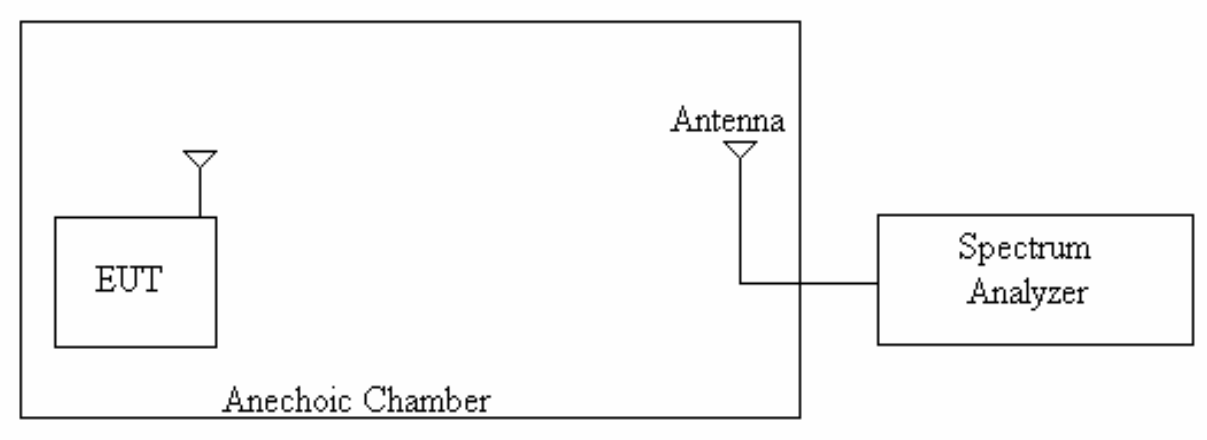
2.6 Support Equipment List and Description

N/A

2.7 Test Configuration Block Diagrams

The EUT was setup as tabletop equipment.
The EUT was powered at 9VDC from new alkaline battery

Field Strength Measurements



3.0 TEST RESULTS

Data is included for the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs, data tables and graphical representations of the emissions are included.

The EUT is intended for operation under the requirements of Part 15 Subpart C. Specific test requirements include the following:

47 CFR 15.215(b), 15.209	Field Strength of Fundamental and Spurious Emissions
47 CFR 15.215(c)	Bandwidth of Emissions
47 CFR 15.109	Radiated Emissions

3.1 Field Strength of Fundamental and Spurious Emissions, FCC 15.215(b), 15.209

Field Strength of Fundamental and Spurious Emissions measurements were made at Fundamental frequency of 125.733 KHz; Spurious Emissions were tested up to 1257.33 KHz(10^{th} harmonic).

The Tables 3-1-1, 3-1-2 and 3-1-3 show the Field Strength of Fundamental Radiation and Spurious Emissions for DBL Wireless Tire Pressure Monitor.

Radiated Emissions at Fundamental Frequency **Date:** 1/11/2005

Company: Bartec USA
Model: DBL
Test Engineer: Uri Spector
Standard: FCC Part 15.215(b), 15.209
Test Site: 10 meters OATS
Note: Readings below 150 KHz were taken with RBW 100 Hz
Measurements were taken with CISPR Peak detector

Table # 3-1-1

Frequency	Antenna			Amplifier	Peak Reading	Net at 10m.	Limit	Margin	Comments
KHz	Polarity	Hts(cm)	Factor(dB/m)	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	
125.733	V	100	57.0	28.6	40.3	68.7	84.7	-16.0	Fund.
125.733	H	100	57.0	28.6	45.2	73.6	84.7	-11.1	Fund.

Radiated Spurious Emissions in Restricted Band **Date:** 1/12/2005

Company: Bartec USA
Model: DBL
Test Engineer: Uri Spector
Standard: FCC Part 15.209
Test Site: 10 meters OATS
Note: Readings below 150 KHz were taken with RBW 100 Hz
Readings above 150 KHz were taken with RBW 9KHz
Measurements were taken with CISPR Peak detector

Table # 3-1-2

Frequency	Antenna			Amplifier	Peak Reading	Net at 10m.	Limit	Margin	Comments
KHz	Polarity	Hts(cm)	Factor(dB/m)	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	
502.930	V	100	44.0	28.5	21.1	36.6	52.7	-16.1	4 harmonic
502.930	H	100	44.0	28.5	19.2	34.7	52.7	-18.0	4 harmonic

Field Stregth **Date:** 1/12/2005
at lower & upper end of restricted band

Company: Bartec USA
Model: DBL
Test Engineer: Uri Spector
Standard: FCC Part 15.215(b), 15.209
Test Site: 10 meters OATS
Note: Readings below 150 KHz were taken with RBW 100 Hz
Readings above 150 KHz were taken with RBW 9KHz
Measurements were taken with CISPR Peak detector

Table # 3-1-3

Frequency	Antenna			Amplifier	Peak Reading	Net at 10m.	Limit	Margin	Comments
KHz	Polarity	Hts(cm)	Factor(dB/m)	Gain (dB)	dBµV	dBµV/m	dBµV/m	dB	
110.000	V	100	57.9	28.6	30.0	59.3	85.9	-26.6	
110.000	H	100	57.9	28.6	22.6	51.9	85.9	-34.0	
495.000	V	100	44.1	28.5	19.3	34.9	52.8	-17.9	
495.000	H	100	44.1	28.5	20.8	36.4	52.8	-16.4	

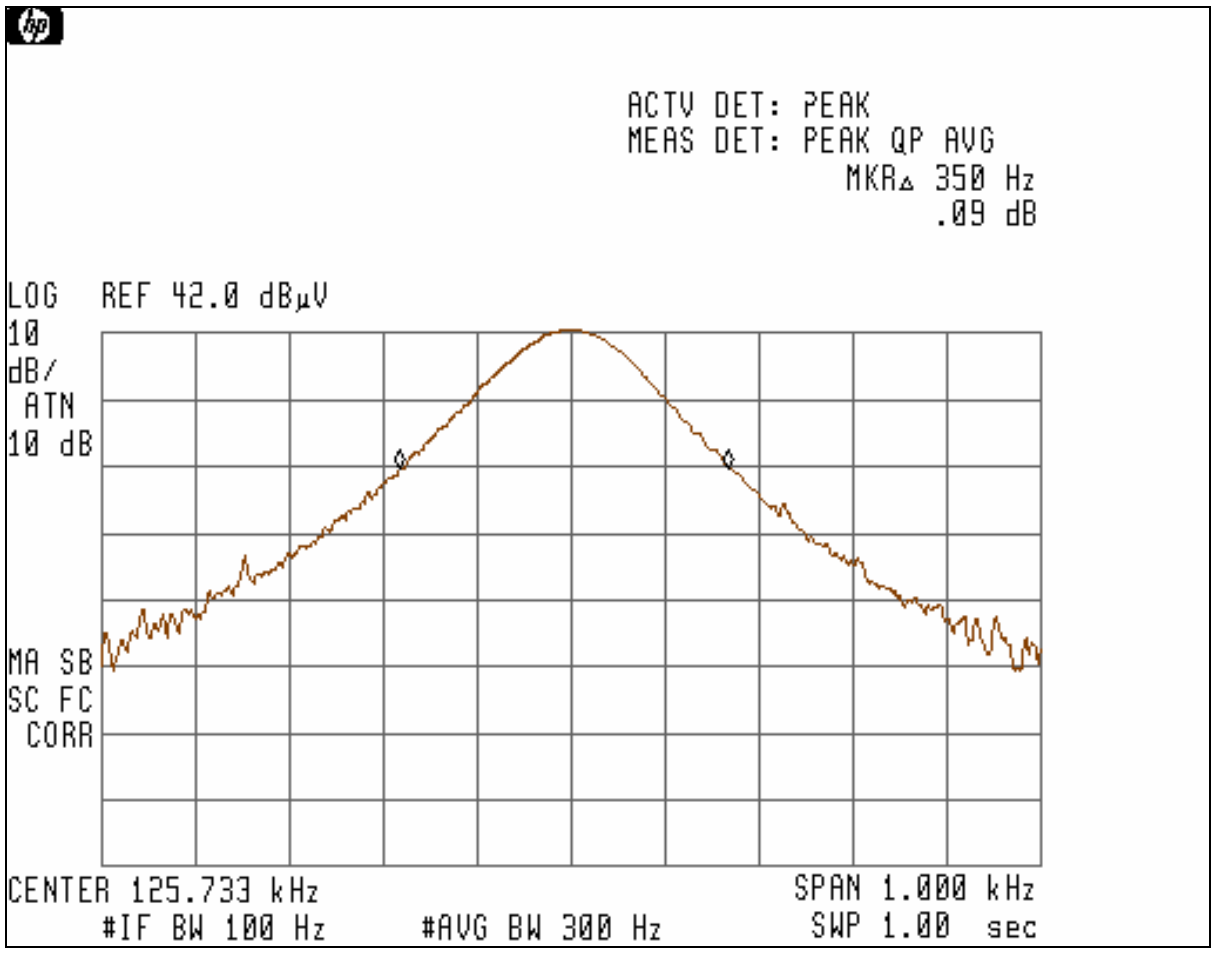
3.2 Bandwidth of Emissions, FCC 15.215(c)

Bandwidth of Emissions measurements was made for frequency of 125.733 KHz.

Bandwidth of Emissions for Base Unit at –20dB level was measured at 350 Hz.

Graph 3-2-1 shows the Bandwidth of Emission.

Graph 3-2-1



3.3 Radiated Emissions, FCC 15.109, Class A

The DBL Wireless Tire Pressure Monitor as a digital device was tested according to FCC Part 15.109, Class A in frequency range from 30MHz to 2.5GHz.

Line Conducted Emissions testing is inappropriate and therefore unnecessary as batteries power the equipment.

Table 3-3-1 shows the Field Strength of Radiated Emissions from 30MHz to 2.5GHz.

Radiated Emissions **Date:** 01-11-2005
30MHz-2.5GHz

Company: Bartec USA
Model: DBL
Test Engineer: Uri Spector
Standard: FCC Part 15.109
Test Site: 3m Anechoic Chamber, 3m measurement distance
Note: The table shows the worst case radiated emissions
All measurements were taken using a Peak detector

Table # 1

Frequency	Ant. Polarity	Peak Reading dBμV	Total CF dB1/m	Total at 3m dBμV/m	QP Limit dBμV/m	Margin dB
30.122 MHz	V	12.8	20.5	33.3	49.5	-16.2
105.642 MHz	V	14.9	12.5	27.4	54.0	-26.6
216.840 MHz	V	13.9	12.4	26.3	56.9	-30.6
257.720 MHz	V	14.2	14.6	28.8	56.9	-28.1
315.000 MHz	V	14.5	16.1	30.6	56.9	-26.3
363.800 MHz	V	13.1	17.5	30.6	56.9	-26.3
400.880 MHz	H	16.0	18.4	34.4	56.9	-22.5
489.685 MHz	H	13.9	20.2	34.1	56.9	-22.8
1.0028 GHz	H	49.13	-8.31	40.81	60.0	-19.19
2.1212 GHz	H	42.31	-1.6	40.71	60.0	-19.29
2.3354 GHz	H	42.69	-0.72	41.96	60.0	-18.04

3.4 Test Procedure

Field Strength Measurements

The EUT was placed on a non-conductive table 0.8m above the ground plane inside the Anechoic Chamber. The table was centered on a motorized turntable, which allows 360-degree rotation. The measurement antenna was positioned at 3m distance. The Bicono-Log antenna was used in frequency range from 30MHz to 1GHz, and the Horn antenna was used in frequency range above 1GHz. The radiated emissions were maximized by configuring the EUT through its placement in three orthogonal axes, by rotating the EUT, by changing antenna polarization, and by changing antenna height from 1 to 4m. Method of the direct Field Strength Calculation is shown in Section 3.6.

Conducted Emissions

For conducted emissions testing, the equipment is moved to an insulating platform over the ground plane, and the EUT is powered from a LISN. Both sides of the AC line are measured and the results are compared to the applicable limits. Measurements are taken using CISPR quasi-peak and average detectors when the peak readings approach or exceed the average limit. Only quasi-peak readings are taken when the emissions from the EUT meet the average limit as measured with the quasi-peak detector.

3.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured emissions reading on the EMI Receiver.
The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

Where: FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude in dB(μV)
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB(m^{-1})
AG = Amplifier Gain in dB

Assume a receiver reading of 48.1 dB(μV) is obtained. The antenna factor of 7.4 dB(m^{-1}) and cable factor of 1.6 dB is added and amplifier gain of 16.0 dB is subtracted giving field strength of 41.1 dB(μV/m).

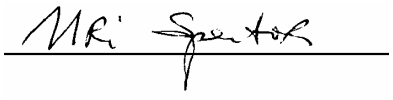
RA = 48.1 dB(μV)
AF = 7.4 dB(m^{-1})
CF = 1.6 dB
AG = 16.0 dB
FS = RA + AF + CF - AG
FS = 48.1 + 7.4 + 1.6 – 16.0
FS = 41.1 dB(μV/m)

In the tables the Cable correction factors are included to the Antenna Factors.

Tested by:

Uri Spector
EMC Project Engineer
Intertek ETL SEMKO

Signature



Date: January 12, 2005

4.0 TEST EQUIPMENT

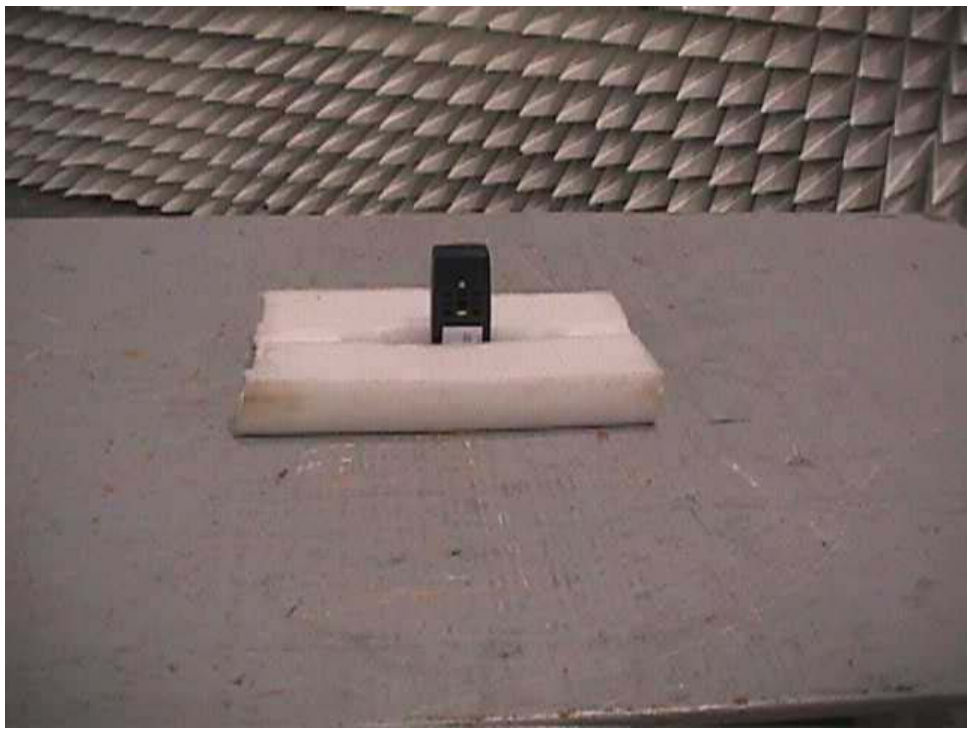
Receivers/Spectrum Analyzers and Test Software

DESCRIPTION	SERIAL NO.	LAST CAL	CAL DUE	USED
HP85462A Receiver RF Section	3325A00106	08/04	08/05	X
HP85460A RF Filter Section	3330A00109	08/04	08/05	X
Advantest Spectrum Analyzer R3271A	55050084	06/04	06/05	X
TILE! Instrument Control System	ver. 3.4.C.2	N/A	N/A	X

Antennas/Pre-Amplifiers

DESCRIPTION	SERIAL NO.	LAST CAL	CAL DUE	USED
Schaffner-Chase Bicono-Log Antenna	2630	06/04	06/05	X
EMCO Horn Antenna 3115	9507-4513	12/04	12/05	X
HP 8447F Pre-Amplifier	3113A04974	10/04	10/05	X
HP 83017A Pre-Amplifier	3123A00475	05/04	05/05	X

EXHIBIT 1
CONFIGURATION PHOTOS



Radiated Emissions Test Configuration

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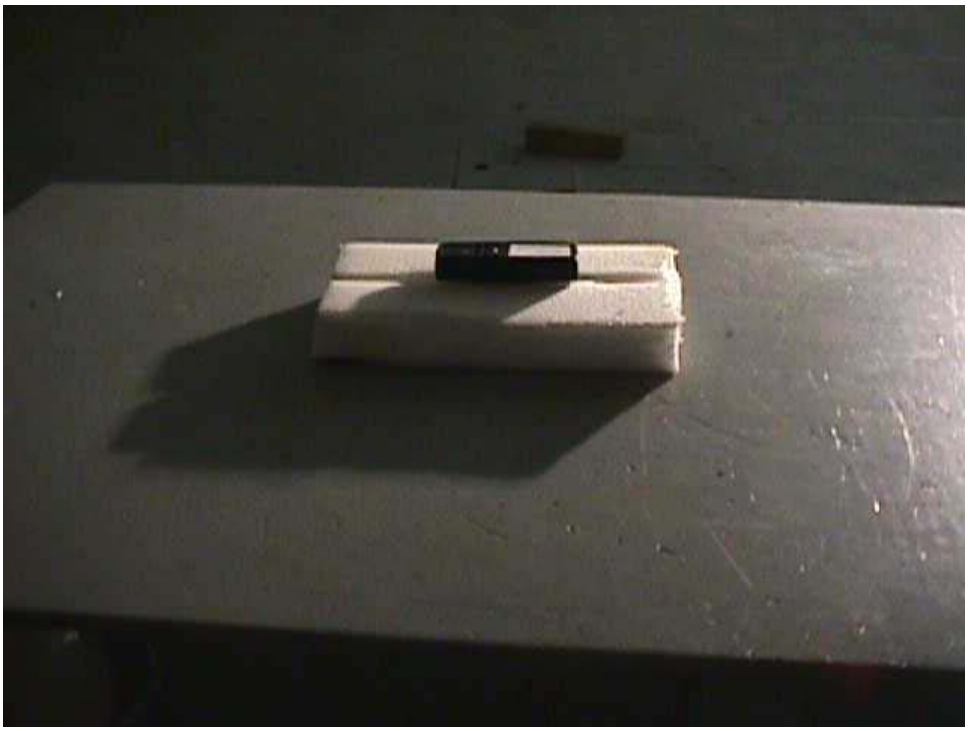

Radiated Emissions Test Configuration