Intertek ETL SEMKO

TEST REPORT

Report Number: 3087815MIN-001
Project Number: 3087815
December 12, 2005

Evaluation of the
Tire Pressure Monitor; TPMT

FCC ID: RP3-3833

to

FCC Part 15, Subpart C, Sections 15.215, 15.209

For
SPX Corporation

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

Test Authorized by:
SPX Service Solutions
2300 Park Drive
Owatonna, MN 55060

Prepared by: _____ Date: December 12, 2005
Michael Findley

Approved by: _____ Date: December 12, 2005
Yuriy Litvinov

CONTENTS

1.0 GENERAL DESCRIPTION

1.1 Related Submittals Grants

This is a single application of the SPX Service Solutions *TPMT Tire Pressure Monitor* for Certification under FCC Part 15, Subpart C.
There are no other simultaneous applications.

1.2 Product Description

TPMT Tire Pressure Monitor is a RF remote control transmitter operating in 125.683 KHz. The intended use of the *TPMT Tire Pressure Monitor* is to generate and transmit a RF signal to verify tire sensor functionality. The *TPMT Tire Pressure Monitor* is powered at 4.5Vdc with three "C" cell Alkaline Batteries.

Antenna Description:

Integrated antenna

Sample Submitted: December 1, 2005
Test Work Started: December 1, 2005
Test Work Completed: December 5, 2005

1.3 Test Methodology

Emission measurements were performed according to the procedures in ANSI C63.4-2003. 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 and 10 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 December 2005 submitted to FCC. Please reference the site registration number: 90706, dated December 6, 2005.

2.0 SYSTEM TEST CONFIGURATION

2.1 Justification

N/A

2.2 EUT Setup

For simplicity of testing, the transmitter was enabled 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.

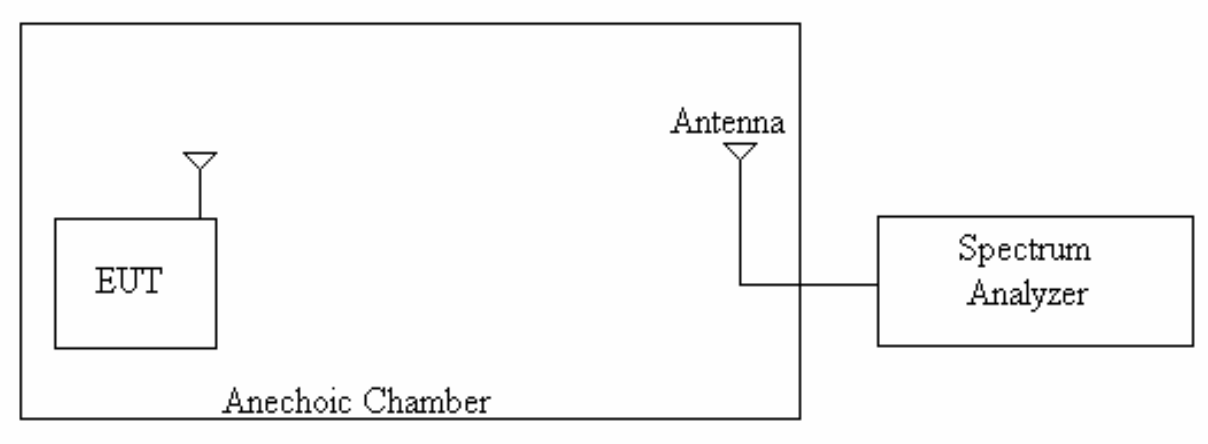
2.6 Support Equipment List and Description

N/A

2.7 Test Configuration Block Diagrams

The EUT was setup as tabletop equipment.
The EUT was powered at 4.5VDC from new alkaline batteries

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
47 CFR 15.107	Conducted Emissions (N/A battery operated device)

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 125.683 KHz; Spurious Emissions were tested up to 1382.513 KHz (10th harmonic).

The Table 3-1-1 shows the Field Strength of Fundamental Radiation and Spurious Emissions for the TPMT Tire Pressure Monitor.

Radiated Emissions **Date:** 12/5/2005
at Fundamental Frequency with harmonic content

Company: SPX Service Solutions
Model: 3833-1
Test Engineer: Michael Findley
Standard: FCC Part 15.215(b), 15.209
Test Site: 10 meters OATS
Note: Readings below 150 KHz were taken with RBW 100 Hz

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	
125.683	V	100	57.2	28.6	38.1	66.7	84.8	-18.1	Fund.
251.366	V	100	51.0	28.5	39.8	62.3	84.8	-22.5	1st
377.049	V	100	47.5	28.5	39.1	58.1	84.8	-26.7	2nd
502.732	V	100	45.0	28.5	39.2	55.7	84.8	-29.1	3rd
628.415	V	100	43.2	28.5	47.0	61.7	84.8	-23.1	4th
754.098	V	100	41.7	28.5	28.4	41.6	84.8	-43.2	5th
879.781	V	100	40.4	28.5	48.5	60.4	84.8	-24.4	6th
1005.464	V	100	39.4	28.5	44.5	55.4	84.8	-29.4	7th
1131.147	V	100	38.6	28.5	49.4	59.5	84.8	-25.3	8th
1256.830	V	100	37.8	28.5	26.6	35.9	84.8	-48.9	9th
1382.513	V	100	37.0	28.5	29.1	37.6	84.8	-47.2	10th

Comments:

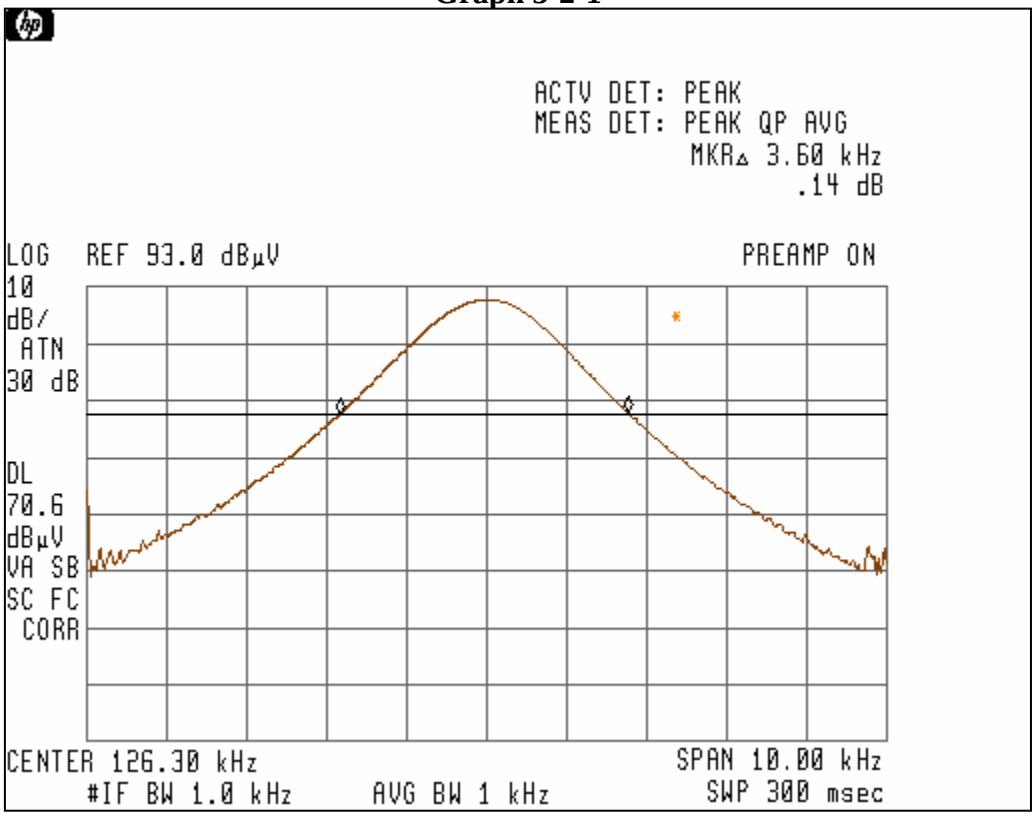
3.2 Bandwidth of Emissions, FCC 15.215(c)

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

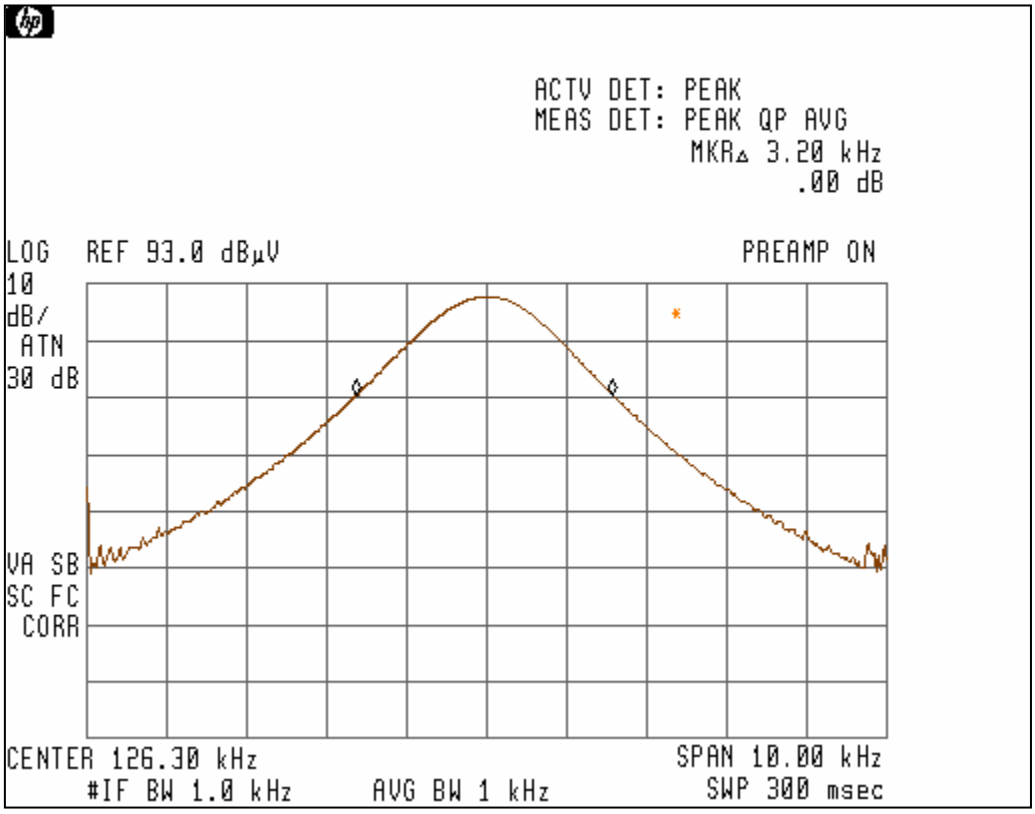
Bandwidth of Emissions for Base Unit at –20dB level was measured at 3.60 kHz and for 99% power at 3.20 kHz

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

Graph 3-2-1



Graph 3-2-2


ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRΔ 3.20 kHz
.00 dB
LOG REF 93.0 dBµV
PREAMP ON
10
dB/
ATN
30 dB
VA SB
SC FC
CORR
CENTER 126.30 kHz
SPAN 10.00 kHz
#IF BW 1.0 kHz
AVG BW 1 kHz
SWP 300 msec

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 1GHz.

Line Conducted Emissions according to FCC Part 15.107, Class A is inappropriate and therefore unnecessary as batteries power the equipment.

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

Radiated Emissions 30MHz-1GHz **Date:** 12/2/2005

Company: SPX Service Solutions
Model: 3833-1
Test Engineer: Michael Findley
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 # 3-3-1

Frequency	Ant. Polarity	Peak Reading dBµV	Total CF dB1/m	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
30.54	V	10.5	20.3	30.8	49.5	-18.7
126.12	V	19.4	13.6	33.0	54.0	-21.0
249.29	V	17.9	14.1	32.0	56.9	-24.9
996.72	V	12.1	26.2	38.3	60.0	-21.7
30.02	H	11.4	20.6	32.0	49.5	-17.5
123.61	H	15.8	13.6	29.4	54.0	-24.5
243.91	H	16.9	13.7	30.6	56.9	-26.3
991.99	H	11.6	26.3	37.8	60.0	-22.2

3.4 Test Procedure

Field Strength Measurements

For emissions greater than 30 MHz; 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. 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.

For emissions less than 30 MHz measurements were performed with a loop antenna at a 10 meter distance at both antenna polarities and at an antenna height of 1 meter.

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:

Michael Findley
EMC Project Engineer
Intertek ETL SEMKO

Signature

Date: December 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	01/05	01/06	X
HP85460A RF Filter Section	3330A00109	01/05	01/06	X
TILE! Instrument Control System	ver. 3.4.H.1	N/A	N/A	X

Antennas/Pre-Amplifiers

DESCRIPTION	SERIAL NO.	LAST CAL	CAL DUE	USED
Schaffner-Chase Bicono-Log Antenna	2630	08/05	08/06	X
A.H. System SAS-200/562B	215	04/05	04/06	X
HP 8447F Pre-Amplifier	3113A04974	02/05	02/06	X

EXHIBIT 1
CONFIGURATION PHOTOS

Radiated Emissions Test Configuration

Radiated Emissions Test Configuration