Intertek Testing Services
ETL SEMKO

TEST REPORT

Report Number: 0232034U.doc
Project Number: 3032034
December 11, 2002

Testing performed on the
Water Meter Interface
Model Number: WTR171
to

FCC Part 15.249

For
StatSIGNAL Systems, Inc.

Test Performed by:	**Test Authorized by:**
Intertek Testing Services	StatSIGNAL Systems, Inc.
1950 Evergreen Blvd., Suite 100	2859 Paces Ferry Road, Suite 700
Duluth, GA 30096	Atlanta, GA 30339

Prepared by: Jeremy O. Pickens — Date: 12/11/02

Reviewed by: David J. Schramm — Date: 12/11/02

TABLE OF CONTENTS

1.0 Summary of Test Results

Model: WTR171
FCC ID: PK9WTR171

TEST	REFERENCE	RESULT
Field Strength of Fundamental	15.249a	Complies
Field Strength of Harmonics	15.249a	Complies
Radiated Emissions outside the band	15.249c	Complies
Radiated Emissions in restricted bands	15.205	Complies
Line Conducted Emissions	15.207	NA
Antenna requirement	15.203	Complies

2.0 General Description

2.1 Product Description

Overview of Water Meter Interface

Applicant	StatSIGNAL Systems, Inc.
Trade Name & Model No.	Water Meter Interface, M/N: WTR171
FCC Identifier	PK9WTR171
Use of Product	To accumulate the total number of water meter ticks that are read (or detected) through the two-wire interface, on command from the Site Controller using the SS5494 Transceiver
Type of Transmission	Pulse Modulated
Frequency Range	916.5MHz
Number of Channel(s)	One
Antenna(s)	PCB Antenna
Antenna Requirement	[X] The EUT uses a permanently connected antenna. [ ] The antenna is affixed to the EUT using a unique connector which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector. [ ] The EUT requires professional installation (attach supporting documentation if using this option).
Manufacturer name & address	StatSIGNAL Systems, Inc. 2859 Paces Ferry Road, Suite 700 Atlanta, GA 30339

A Production version of the EUT was received on September 23, 2002 in good operating condition

2.2 Related Submittal(s) Grants

This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.

2.3 Test Methodology

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application. All other measurements were made in accordance with the procedures in Part 2 of CFR 47.

2.4 Test Facility

The Duluth 10-meter chamber site is located at 1950 Evergreen Blvd., Suite 100, Duluth, Georgia. The test site is a 10-meter semi-anechoic chamber. The site meets the characteristics of CISPR 16-1: 1993 and ANSI C63.4: 1992. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters.

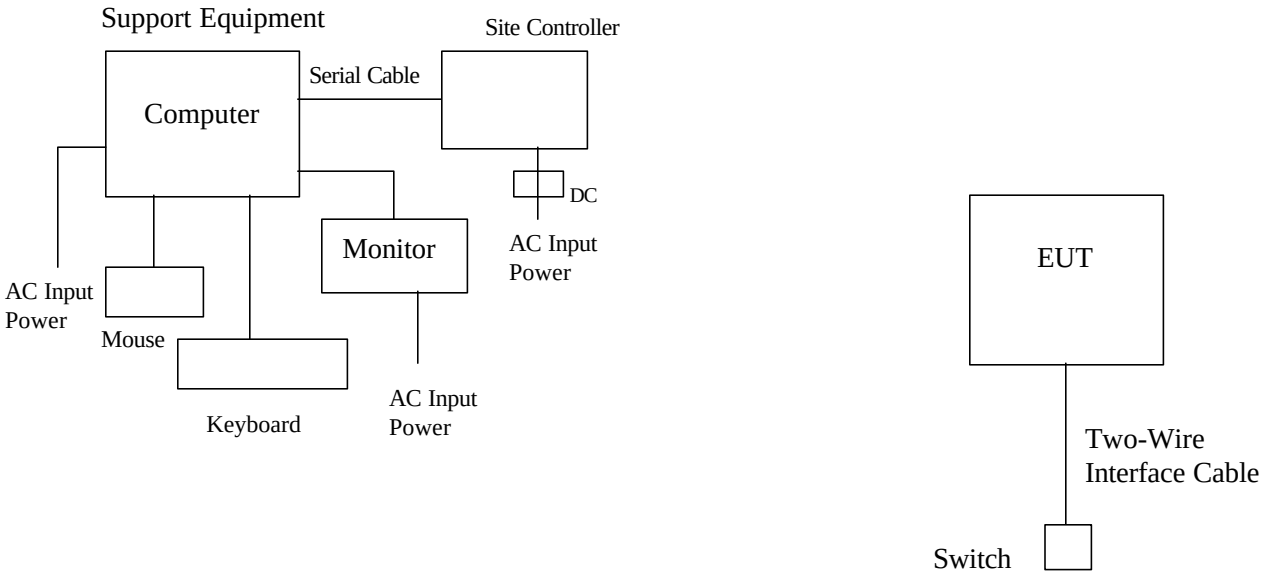
The A2LA accreditation code for this site is 121624 under certificate number 1455.01.

3.0 System Test Configuration

3.1 Support Equipment and description

Description	Manufacturer	Model Number	Serial Number	FCC ID number
Desktop Computer	Compaq	Deskpro	6038FR4ZP302	N/A
Keyboard	Dell	SK-1000REW	12741-66H-4976	GYUR26SK
Mouse	Microsoft	91289	00187564	C3KKMP3
Monitor	Dell	D1526TX-HS	8268135	AK8CPD15SF1
Site Controller	StatSIGNAL	2000147	N/A	N/A

3.2 Block Diagram of Test Setup



3.1 Justification

For emissions testing, the test procedures, as described in American National Standards Institute C63.4-1992, were employed. The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it).

During testing, the only cable exited the EUT and was connected to a switch. The switch was positioned on the rear edge of the table, 10cm away from the EUT.

The EUT was configured to continuously transmit at full power.

The EUT was rotated such that it was positioned in each of 3 axes. The tabular data reflect only the highest result for each orientation.

3.2 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. For emissions testing, the unit was setup to transmit continuously to simplify the measurement methodology. The EUT was powered from a fully charged 3 VDC Lithium battery during testing.

3.3 Mode of Operation During Test

Using a StatSIGNAL Site Controller software supplied by StatSIGNAL, the EUT was configured to operate in a continuous fashion. The support equipment was then removed from the test area.

3.4 Modifications Required for Compliance

No modifications were installed by Intertek Testing Services during compliance testing in order to bring the product into compliance (Please note that this does not include changes made specifically by StatSIGNAL Systems, Inc. prior to compliance testing).

3.5 Additions, deviations and exclusions from standards

No additions, deviations or exclusions from the standard were made.

4.0 Measurement Results

4.1 Transmitter Radiated Emissions

FCC Rules 15.249, 15.209

Requirements

The Field Strength of emissions shall not exceed the following levels:

94 dB(μV/m) for fundamental frequency,

54 dB(μV/m) for harmonics.

Emissions radiated outside of the specified frequency band, except for harmonics, shall be attenuated by at least 50 dB below the level of fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.

Procedure

For radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable The signal is maximized through rotation and placement in the three orthogonal axes.

During the test the EUT is rotated and the antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

Radiated emission measurements were performed from 30 MHz to 10 GHz.
Analyzer resolution was:

100 kHz or greater for frequencies 1000 MHz and below,

1 MHz for frequencies above 1000 MHz.

For frequencies below 1GHz, Quasi-Peak values were recorded. For frequencies above 1GHz, peak and average values were recorded.

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

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 reading. The basic equation is as follows:

FS = RA + AF + CF - AG

Where FS = Field Strength in dB (μV/m)

RA = Receiver Amplitude (including preamplifier) in dB (μV)

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB(1/m)

AG = Amplifier Gain in dB

Test Result

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

4.2 AC Line Conducted Emission
FCC Rule 15.207

The AC Line Conducted emission requirements of 15.207 were not applicable to the Water Meter Interface because the device was battery powered.

4.3 Fundamental and Radiated Spurious Emissions

The following table shows the fundamental and radiated spurious emission levels of the transmitter.

Radiated Emissions / Interference

Table: 1

Company:	**StatSignal**	Tested by:	Matthew Van Steen
Model:	**Water Project**	Location:	Duluth
Project No.:	**3032034**	Detector:	HP8546
Date:	11/26/02	Antenna:	AH571
Standard:	FCC15	PreAmp:	hp8449b
Class:	B	Cable(s):	TW3 + HS400(HS7000 N-SMA
Notes:	Group: None	Distance:	**3**

Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB
X	916.500	59.2	23.1	5.7	0.0	0.0	87.9	94.0	-6.1
Y	916.500	57.1	23.1	5.7	0.0	0.0	85.8	94.0	-8.2
Z	916.500	58.4	23.1	5.7	0.0	0.0	87.1	94.0	-6.9
H	1833.000	46.7	28.8	8.3	37.2	0.0	46.5	54.0	-7.5
V	1833.000	NF	28.8	8.3	37.2	0.0	N/A	54.0	N/A
H	2749.500	43.9	30.7	10.6	37.0	0.0	48.2	54.0	-5.8
V	2749.500	NF	30.7	10.6	37.0	0.0	N/A	54.0	N/A

Scanned up to the 10th harmonic. All other emissions were below the noise floor, which was at least 6dB below the limit.

5.0 Antenna Requirement

X	The transmitter uses a permanently connected antenna.
	The antenna is affixed to the EUT using a unique connector which allows for replacement of a broken antenna, but does NOT use a standard antenna jack or electrical connector.
	The EUT requires professional installation.

Please refer to the attached documentation for details.

6.0 List of test equipment

Description	Make	Model	Serial #	Cal Date
EMI Receiver	HP	8546A	3410A00173	3/28/02
RF Filter Selector	HP	85460A	3348A00203	3/28/02
Spectrum Analyzer	HP	8593	213180	8/23/02
PreAmp	HP	8449B	3008A0089	10/24/02
PreAmp	HP	8447D	2648A04296	8/16/02
BiLog Antenna	Schaffner-Chase	CBL6112B	2622	8/26/02
Horn Antenna	AH Systems	SAS200/571	246	1/21/02
Cable	Huber-Suhner	HS7kNN		6/11/02
Cable	Huber-Suhner	HS4kNN		6/11/02
Cable	Andrews	CableTW2	ITS#211411	6/11/02
Cable	Andrews	CableTW3	ITS#211412	6/11/02
Cable	N/A	Cable N2	ITS#211999a2	6/11/02

7.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3032034	JOP	December 11, 2002	Original document