PCTEST ENGINEERING LABORATORY, INC.
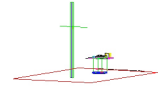
6660-B Dobbin Road, Columbia, MD 21045 USA
Tel. 410.290.6652 / Fax 410.290.6554
http://www.pctestlab.com

RF EXPOSURE EVALUATION
(MAXIMUM PERMISSIBLE EXPOSURE)

Applicant Name:
SmartSynch Inc.
4400 Old Canton Road, Suite 300
Jackson, MS 39211
USA

Date of Testing:
November 30, 2009
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
0911232150.QHC

FCC ID:	**QHC-OPENWAY20**
APPLICANT:	**SmartSynch Inc.**

EUT Type:	Smartmeter
FCC Rule Part(s):	FCC Part 1 (§1.1310) and Part 2 (§2.1091)
FCC Classification:	PCS Licensed Transmitter (PCB)
Test Procedure:	OET Bulletin 65

The device bearing the FCC Identifier specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and has been tested in accordance with the measurement procedures specified in FCC OET Bulletin 65 (See Test Report). These measurements were performed with no deviation from the standards. Test results reported herein relate only to the item(s) tested.

I authorize and attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.

Randy Ortanez
President

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

FCC ID: QHC-OPENWAY20	PCTEST	**MAXIMUM PERMISSIBLE EXPOSURE (MPE) DATA REPORT**		**Reviewed by:** Quality Manager
Test Report S/N: 0911232150.QHC	**Test Dates:** November 30, 2009	**EUT Type:** Smartmeter		Page 1 of 7
© 2009 PCTEST Engineering Laboratory, Inc.				REV 3.1MPE 02/09/09

TABLE OF CONTENTS

1.0 RF EXPOSURE EVALUATION – MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 Introduction

This document is prepared on behalf of SmartSynch Inc. to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC Rules and Regulations and RSS-102 of Industry Canada.

The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1. According to FCC §1.1310 and RSS-102: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits For Occupational / Control Exposures (f = frequency)				
30-300	61.4	0.163	1.0	6
300-1500	…	…	f/300	6
1500-100,000	…	…	5.0	6
(B) Limits For General Population / Uncontrolled Exposure (f = frequency)				
30-300	27.5	0.073	0.2	30
300-1500	…	…	f/1500	30
1500-100,000	…	…	1.0	30

Table 1-1. Limits for Maximum Permissible Exposure (MPE)

1.2 EUT Description

The Smartsynch FCC ID: QHC-OPENWAY20 is a Smartmeter containing an Itron Zigbee module (separately certified under FCC ID: SK9AMI-4) and a Motorola GSM/GPRS module (separately certified under FCC ID: IHDT56HQ1). For this MPE evaluation the device is set to transmit from the antenna of each transmitter and the RF exposure of each transmitter is evaluated individually.

EUT:

Model:	SSI Openway 2.0
Grantee:	SmartSynch Inc.
FCC ID:	QHC-OPENWAY20
Antenna Gains:	4.4dBi – 2.4GHz Zigbee Transmitter

FCC ID: QHC-OPENWAY20	**PCTEST** ENGINEERING LABORATORY, INC.	**MAXIMUM PERMISSIBLE EXPOSURE (MPE) DATA REPORT**	SmartSynch	**Reviewed by:** Quality Manager
Test Report S/N: 0911232150.QHC	**Test Dates:** November 30, 2009	**EUT Type:** Smartmeter		Page 3 of 7

© 2009 PCTEST Engineering Laboratory, Inc.

REV 3.1MPE
02/09/09

1.3   MPE Requirements Overview

Three different categories of transmitters are defined by the FCC in OET Bulletin 65. These categories are fixed installation, mobile, and portable and are defined as follows:

- o **Fixed Installations:** fixed location means that the device, including its antenna, is physically secured at a permanent location and is not able to be easily moved to another location. Additionally, distance to humans from the antenna is maintained to at least 2 meters.

- o **Mobile Devices:** a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to be generally used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structures and the body of the user or nearby persons. Transmitters designed to be used by consumers or workers that can be easily re-located, such as a wireless modem operating in a laptop computer, are considered mobile devices if they meet the 20 centimeter separation requirement. The FCC rules for evaluating mobile devices for RF compliance are found in 47 CFR §2.1091.

- o **Portable Devices:** a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user. Portable device requirements are found in Section 2.1093 of the FCC's Rules (47 CFR§2.1093).

The FCC also categorizes the use of the device as based upon the user's awareness and ability to exercise control over his or her exposure. The two categories defined are Occupational/ Controlled Exposure and General Population/Uncontrolled Exposure. These two categories are defined as follows:

- o **Occupational/Controlled Exposure:** In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means. Awareness of the potential for RF exposure in a workplace or similar environment can be provided through specific training as part of a RF safety program. If appropriate, warning signs and labels can also be used to establish such awareness by providing prominent information on the risk of potential exposure and instructions on methods to minimize such exposure risks.

- o **General Population/Uncontrolled Exposure:** The general population / uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

The Smartsynch Smartmeter FCC ID: QHC-OPENWAY20 is evaluated to the Mobile Device requirements and is considered a device to be used by the General Population/Uncontrolled Exposure.

1.4   Procedure

The procedure used to determine the RF power density was based upon a calculation for determining compliance with the MPE requirements.

The power generated by each transmitter used in this product was initially measured by a power meter and the powers were recorded. In the 850MHz and 1900MHz bands for GSM/GPRS mode, a duty cycle correction factor based on slots configuration is used to determine the source-based time-averaged power in order to show compliance with the power density limit. The power density for the Zigbee transmitter in the 2.4GHz band was calculated using the maximum peak power. In the PCS band, the highest theoretical antenna gain is found by determining what antenna gain yields an EIRP of 2 Watts. Through use of the Friis transmission formula with knowledge of the highest theoretical antenna gain, the power density level is calculated at a distance of 20cm. For the 850 MHz band the maximum antenna gain is determined at the point the MPE reaches the limit or to the maximum ERP of 7 Watts is reached.

Evaluation of co-located transmitters was performed to ensure that the effective multiple transmitters do not exceed 100% of the total power density limit.

Friis Transmission Formula

Friis transmission formula: $P_d = (P_{out}*G) / (4\pi r^2)$

Where,

P_d = Power Density (mW/cm^2) π = 3.1416
P_{out} = output power to antenna (mW)   r = distance between observation point and center of the radiator (cm)
G = gain of antenna in linear scale

Duty Cycle Correction

The following table shows the source-based time-averaged power for GPRS based on the number of transmit slots used. The highest value for both bands using 2 transmission slots is used to determine the MPE.

Band	Channel	GPRS			
		Uplink / Downlink Slots Used	Conducted Power	Uplink / Downlink Slots Used	Conducted Power
			[dBm]		[dBm]
Cellular	128	1/1	23.36	2/1	26.24
	190	1/1	23.42	2/1	26.33
	251	1/1	23.36	2/1	26.29
PCS	512	1/1	20.91	2/1	23.85
	661	1/1	21.02	2/1	23.97
	810	1/1	20.90	2/1	23.82

Table 1-2. Source-Based Time- Average Power (GSM Mode)

FCC ID: QHC-OPENWAY20	**MAXIMUM PERMISSIBLE EXPOSURE (MPE) DATA REPORT**	**Reviewed by:** Quality Manager
Test Report S/N: 0911232150.QHC	**Test Dates:** November 30, 2009	**EUT Type:** Smartmeter	Page 5 of 7

© 2009 PCTEST Engineering Laboratory, Inc.

REV 3.1MPE
02/09/09

Frequency	836.6 MHz	
Limit	0.558 mW/cm^2	
Distance (cm), R =	20 cm	
Power (dBm), P =	26.33 dBm	429.48 mW
TX Ant Gain (dBi), G =	8 dBi	
Power Density (S) =	**0.539** mW/cm^2	(at 20cm)
Minimum Distance =	**19.7** cm	

Table 1-3. Calculated MPE Data for Cellular Band

Frequency:	1880 MHz	
Limit:	1.000 mW/cm^2	
Distance (cm), R =	20 cm	
Power (dBm), P =	23.97 dBm	249.43 mW
TX Ant Gain (dBi), G =	9 dBi	
Power Density (S) =	**0.3942** mW/cm^2	(at 20cm)
Minimum Distance =	**12.6** cm	

Table 1-4. Calculated MPE Data for PCS Band

Frequency	2405 MHz	
Limit	1.000 mW/cm^2	
Distance (cm), R =	20 cm	
Power (dBm), P =	15.06 dBm	32.06 mW
TX Ant Gain (dB), G =	4.4 dBi	
Power Density (S) =	**0.018** mW/cm^2	(at 20cm)
Minimum Distance =	**2.7** cm	

Table 1-5. Calculated MPE Data for 2.4GHz Band

1.5 Summary of Results

Frequency Band [MHz]	Maximum Antenna Gain [dBi]	MPE @ 20cm (mW/cm^2)	Test Result
824.2 – 848.8	8	0.539	PASS
1850.2 – 1909.8	9	0.3942	PASS
2405 – 2475	4.4	0.018	PASS

Table 1-6. Maximum Permissible Exposure Summary Table

	Power Density (mW/cm^2)	Limit (mW/cm^2)	Percent MPE Used (%)
Transmitter #1	0.539	0.558	96.66
Transmitter #2	0.018	1.000	1.76
Total			98.42

Table 1-7. Maximum Permissible Exposure Co-location Table

FCC ID: QHC-OPENWAY20	**PCTEST** ENGINEERING LABORATORY, INC.	MAXIMUM PERMISSIBLE EXPOSURE (MPE) DATA REPORT	Smart Synch	**Reviewed by:** Quality Manager
Test Report S/N: 0911232150.QHC	**Test Dates:** November 30, 2009	**EUT Type:** Smartmeter		Page 6 of 7

© 2009 PCTEST Engineering Laboratory, Inc.

REV 3.1MPE
02/09/09

The device meets the mobile RF exposure limit at a 20cm separation distance as specified in §2.1091 of the FCC Rules and Regulations and Health Canada Safety Code 6. An appropriate RF exposure compliance statement will be placed in the user's manual.

FCC ID: QHC-OPENWAY20		**MAXIMUM PERMISSIBLE EXPOSURE (MPE) DATA REPORT**		**Reviewed by:** Quality Manager
Test Report S/N: 0911232150.QHC	**Test Dates:** November 30, 2009	**EUT Type:** Smartmeter		Page 7 of 7

© 2009 PCTEST Engineering Laboratory, Inc.   REV 3.1MPE
02/09/09