



Radio Frequency Exposure Evaluation Report

for

Digital Security Controls (DSC)

Models: SCW9067, SCW9067C, SCW9067H

All in one wireless home security, life safety, and home automation system

FCC ID: F53SCW9067

IC Certification Number: 160A-SCW9067

Applied Rules and Standards

**CFR Part Part 1 (1.1307 &1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General 24 RF Exposure Guidance v05r02**

Industry Canada RSS-102, Issue 5 of March 2015

Report number: EMC-QOLSY-001-15001_MPE-1

DATE: 2015-Mar-26

1 Administrative Data

1.1 Identification of the Testing Laboratory Issuing the Test Report

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Department:	Compliance
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1.2 Identification of the Client / Manufacturer

Applicant's Name:	Digital Security Controls, a div. of Tyco Safety Products Canada Ltd.
Street Address:	3301 Langstaff Rd
City/Zip Code	Concord, ON L4K4L2
Country	Canada
Contact Person:	Dan Nita
Phone No.	905-760-3000
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Manufacturer's Name:	HONGFUJIN PRECISION ELECTRONICS (TIANJIN) CO LTD
Manufacturers Address:	No. 36 North St West Zone, Economic & Technological Development Area
City/Zip Code	Tianjin 300462
Country	China

2 Equipment under Assessment

Marketing Name / Description:	DSC Touch
Model Number:	SCW9067C (w. CDMA module), SCW9067H (w. HSPA module), SCW9067 (no cellular module)
FCC-ID :	F53SCW9067
IC Cert Number:	160A-SCW9067
Technical Product Description:	wireless home security, life safety, and home automation system equipped with WiFi, Zigbee, Z-Wave, 433.92 MHz security receiver, and optional with HSPA or CDMA cellular radio module
contained radio transmitter information:	1. Wi-Fi, 802.11 b,g,n(HT20 and HT40), 11 channels, 2412-2462MHz, max conducted output power 15.8dBm, integral PCB antenna +3 dBi peak gain; (data from WiFi test report #00825363MPK-030 of identical Qolsys sister product); 2. Zigbee, 7 channel, 912-924MHz, max conducted output power 2.8dBm, $\lambda/4$ dipole wire antenna -3dBi peak gain; (data from Zigbee test report #00825363MPK-028 of identical Qolsys sister product); 3. Z-Wave, 2 channel, 908.4-908.42MHz, max conducted output power -12dBm, $\lambda/4$ dipole wire antenna -3dBi peak gain; (data from ZWave test report #00825363MPK-029 of identical Qolsys sister product); 4. 3G cellular radio module: Novatel, model CNN0403, FCC-ID: PKRNVWCNN0403, IC ID: 3229A-CNN0403, GSM 850/1900MHz, GPRS ms class 10 / EDGE multi-slot class 12 WCDMA / HSPA+ 850/1900/ MHz; max conducted output power (burst avg, dBm): GSM850: 31.9, GPRS850: 31.7, EDGE850: 27.0, UMTS850: 23.4, GSM1900: 29.2, GPRS1900: 29.1, EDGE1900: 26.7, UMTS1900: 23.1; (data from HSPA module test report #1306FR17-01 of ATL); 5. CDMA 2000 cellular radio module: Novatel, model CNN0301, FCC-ID: MIVCNN0301, IC ID: 4160A-CNN0301, bands 850/1900MHz; max conducted output power in dBm: @850MHz: 23.2, @1900MHz: 23.3; (data from CDMA module test report #RFI-RPT-RP86318JD02A V3.0);
Co-located Transmitters/ Antennas?	☒ Yes (Cellular and WiFi, for the models with cellular) co-location with ZWave and Zigbee is neglected due to low radiated power; ☐ No
Device Category:	☒ Fixed Installation ☐ Mobile ☐ Portable ☐ mixed Mobile and Portable
Exposure Category:	☐ Occupational/ Controlled; ☒ General Population/ Uncontrolled
Antenna info:	internal, peak gain -2.2dBi @ 850MHz, -1.0dBi @ 1900MHz
Rated Operating Voltage Range:	Vmin: not specified - Vmax: 8.4VDC (Lilon Polymer Battery)
Rated Operating Temperature Range:	not specified
Test Sample Status:	Prototype

3 Assessment

This RF Exposure evaluation report provides information about compliance of the below identified device with the RF Exposure limits for mobile or fixed devices as defined in FCC CFR Part 1 (1.1307 & 1.1310), Part 2 (2.1091) and IC standard RSS-102 under given conditions (measured or rated RF output power, antenna gain, distance towards human body, multiple transmitter information as presented by the applicant).

In addition, maximum antenna gain or minimum distance towards the human body is calculated, respectively, where relevant.

The device (all 3 identified models) meets the limits as stipulated by the above given FCC and IC rule parts based on available specifications.

Company	Description	Model #
Digital Security Controls	All in one wireless home security, life safety, and home automation system	SCW9067, SCW9067C, SCW9067H

Report reviewed by:

2015-03-31 Compliance Franz Engert
(Compliance Manager)

Date	Section	Name	Signature
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Responsible for the Report:

2015-03-31 Compliance Danh Le
(EMC Engineer)

Date	Section	Name	Signature
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4 RF Exposure Limits and FCC and IC Basic Rules

For the specific described radio apparatus the following basic limits and rules apply for both, FCC and IC where not indicated differently.

4.1 Power Density Limits acc. To FCC 1.1310© / RSS-102 i5, cl. 4:

FCC

Frequency Range (MHz)	Power density (mW/cm ²)	Averaging time (minutes)
300 – 1500	$f \text{ (MHz)} / 1500$	30
1500 – 100.000	1.0	30

IC

300 – 6000	$0.02619 \times f \text{ (MHz)}^{0.6834}$	6
1500 – 100.000	1.0	30

4.2 Routine Environmental Evaluation Categorical Exclusion Limits acc. To FCC 2.109© / RSS-102, cl. 2.5 (rounded to 1 decimal point):

FCC

operating frequency < 1.5GHz: excluded if ERP < 1.5W / 31.8dBm;
operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm;

IC

300MHz < = operating frequency < 6 GHz: excluded if EIRP < $0.0131 \times f \text{ (MHz)}^{0.6834}$

4.3 EMC Output Power Limits (ERP/EIRP) acc. To FCC part 22/24/27 / IC RSS-132, RSS-133, RSS-139 (to be additionally taken into account for maximum antenna gain considerations)

part 22: 7W ERP / 38.5dBm (IC: 11.5W / 40.6dBm EIRP)
part 24: 2W EIRP / 33.0dBm
part 27: 1W EIRP / 30.0dBm

Per KDB 447498 D01 FCC allows calculative estimation of RF exposure for mobile applications when routine environmental evaluation categorical exclusion applies and also for fixed applications.

When categorical exclusion cannot be claimed for mobile applications MPE measurement is required for TCB approval.

RSS-102 of Industry Canada does generally not require RF exposure evaluation for fixed or mobile applications which stay below the given exclusion limits.

4.4 RF Exposure Estimation (MPE Estimation)

Having available the source based average output power and peak antenna gain or the ERP/EIRP of the specified device and for a known minimum distance of it's radiating structures from the body of persons according to it's use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (mW/cm² or W/m²)
P = power input to the antenna (mW or W)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (cm or m)

5 Evaluations

The following calculations are – for the portion of the cellular transmitter – based on the specified (*) maximum conducted average output power of the cellular module incorporated in the EUT and thus – considering the specified peak antenna gain of the internal antennae – resulting in the theoretical worst case maximum average ERP/EIRP, because all measured conducted average values are lower. (* In the absence of maximum output power spec for production samples the maximum values from the related 3GPP standards are used, see below.)

5.1 Routine Environmental Evaluation Applicability

Based on the theoretical maximum average ERP/EIRP, see above.

Pmax is the target conducted output power plus the upper tolerance as specified for the integrated cellular module for the diverse transmission modes .

For the WiFi transmitter the maximum output power value is taken from the relevant part 15.247 emc report (see EUT details) being part of the exhibits filed for FCC/IC certification of this product;

Only the known worst cases with highest resulting average EIRP are listed per band.

Transmission Mode	Pmax (Target Power + Upper Tolerance)	Peak Gain + cable attenuation	Duty Cycle	EIRP, source based time averaged (EIRP _{max})	Total EIRP simultaneous transmissions intra-band (worst cases only)	FCC / IC Limit for Routine Environmental Evaluation Applicability, EIRP	Excluded?
	dBm	dB	%	dBm	dBm	dBm	
GPRS 850 1TS	33+2	-2.2 dBi	12.5	23.8	n.a.	33.9 / 31.1	yes
GPRS 850 2TS	33+2	-2.2 dBi	25	26.8	n.a.	33.9 / 31.1	yes
WCDMA Bd V	24+1	-2.2 dBi	100	22.8	n.a.	33.9 / 31.1	yes
GPRS 1900 1TS	30+2	-1.0 dBi	12.5	22.0	n.a.	36.9 / 33.5	yes
GPRS 1900 2TS	30+2	-1.0 dBi	25	25.0	n.a.	36.9 / 33.5	yes
WCDMA Bd II	24+1	-1.0 dBi	100	24.0	n.a.	36.9 / 33.5	yes
WiFi 2.4GHz	15.8	+3dBi	100	18.8	n.a.	36.9 / 34.3	yes

highest powers within bands in bold letters;

Result: The transmitters in the equipment are categorically excluded from Routine Environmental Evaluation.

Note: the above table shows the values for the HSPA model variant ‘SCW9067H’ but the non cellular model variant ‘SCW9067’ and the CDMA variant ‘SCW9067C’ can be considered to be covered as well, the latter of which using the same antenna (the CDMA max output power acc. To CDMA standards is equal to the listed WCDMA max out put power.)

5.2 Compliance with MPE (Power Density) limits

FCC Limits:

S_{max} @ 824MHz = 0.55mW/cm²

S_{max} @ 1900MHz and @ 2400MHz = 1.0mW/cm²;

IC limits:

S_{max} @ 824MHz = 0.26 mW/cm²

S_{max} @ 1850MHz and @ 2400MHz for FCC = 0.48mW/cm²;

S_{max} @ 2400MHz = 0.53mW/cm²;

Taking the highest source base time averaged EIRP_{max} per band according to the table in section 5.1 above, applying the plane wave power density formula: $S = \text{EIRP}_{\text{max}} / 4 * \pi * r^2$ for the minimum distance of $r = 20\text{cm}$:

Highest source base time averaged EIRP with GPRS 850 MHz, 4TS: **26.8 dBm**;

Resulting maximum power density at 850MHz @ 20cm distance: **S(850MHz) = 0.1 mW/cm²**

Highest source base time averaged EIRP with GPRS 1900 MHz, 4TS: **25.0 dBm**;

Resulting maximum power density at 1900MHz @ 20cm distance: **S(1900MHz) = 0.06 mW/cm²**

Highest source base time averaged EIRP with WiFi, 4TS: **18.8 dBm**;

Resulting maximum power density at 2400MHz @ 20cm distance: **S(2400MHz) = 0.015 mW/cm²**

Result: The equipment fulfills the Power Density FCC and IC limits for the minimum distance between the antenna and the human body of 20cm, for the rated peak antenna gain values.

5.3 Simultaneous Transmission MPE Test Exclusion (per KDB 447498 D01)

Possible simultaneous transmissions: Cellular Radio and WiFi. Simultaneous transmission with Z-Wave and Zigbee is neglected due to low radiated power;

Highest power density to the limit ratio for the Cellular Transmitter:

calculated with FCC S_{max}@850: $0.1\text{mW/cm}^2 / 0.55\text{mW/cm}^2 = 0.18$

calculated with IC S_{max}@850: $0.1\text{mW/cm}^2 / 0.26\text{mW/cm}^2 = 0.39$

Power density to the limit ratio for the WiFi Transmitter:

calculated with FCC S_{max}@2400: $0.015\text{mW/cm}^2 / 1.0\text{mW/cm}^2 = 0.015$

calculated with IC S_{max}@2400: $0.015\text{mW/cm}^2 / 0.53\text{mW/cm}^2 = 0.028$

Σ of Power Density (MPE) ratios* = $0.39 + 0.028 = 0.41 < 1$ (calculated with IC ratios since worst case)

Result: The equipment is excluded from simultaneous transmission MPE test.

5.4 Maximum allowed Antenna Gain – G_{max}

n.a. since only internal antenna is used.

6 Revision History

Date	Change Description	Revision
2015-03-26	First revision	initial
2015-03-31	Operational description updated	-1