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FCC §2.1091 ASSESSMENT

Report Number: M150729-10
FCC ID: 2AHCE-SCS1

Device under Test:	Commercial refrigeration controller with Bluetooth LE connectivity
Model:	SCS Connect
Client:	Wellington Drive Technologies Ltd
Date of Issue:	10 November 2016

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RF Exposure Report

Report Number: M150729-10

Test Sample:	Commercial refrigeration controller with Bluetooth LE connectivity
Model Number:	SCS Connect
Part Number	SCSxCxxxx
Manufacturer:	Wellington Drive Technologies Ltd
Address:	21 Arrenway Drive, Rosedale
Phone:	Auckland 0632, New Zealand
Contact:	Thomas Hong
Email:	Thomas.hong@wdtl.com
Standard:	FCC Title 47, Part 2.1091 *Radiofrequency radiation exposure evaluation: mobile devices.* FCC KDB 447498 D01 General RF Exposure Guidance v06 *Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.*
Result:	The SCS Connect complied with RF exposure requirements of FCC Title 47, Part 2.1091.
Assessment Date:	26th May 2015
Assessed by:	Mahan Ghassempouri
Checked by:	**Rob Weir** **Facility Manager, Melbourne** **EMC Technologies Pty Ltd**

1 INTRODUCTION

The SCS Connect commercial refrigeration controller with Bluetooth LE connectivity was assessed against the requirements of FCC Title 47, Part 2.1091 to ascertain if the device would meet the applicable RF exposure limits without further measurements.

Testing was performed by EMC Technologies Pty Ltd on the Commercial refrigeration controller with Bluetooth LE connectivity, Model SCS Connect, Part Number SCSLC1013. The test sample was determined by the manufacturer to be an SCS variant which included Bluetooth LE radio with full inputs and outputs populated and enabled. The manufacturer has extended compliance from Model SCS Connect, part Number SCSLC1013 to generic SCS model ranges (SCSxCxxxx) and non-Bluetooth SCS variants (SCSxRxxxx).

Refer to Appendix A, Manufacturer's Technical Rationale (Inclusion of SCS Generic Model Range and Non Bluetooth SCS Variants) for complete details.

2 GENERAL INFORMATION

The Equipment Under Test (EUT) was identified as follows:

Test Sample:	Commercial refrigeration controller with BLE connectivity
Model Number:	SCS Connect
Voltage Rating:	90VAC – 240VAC
Supported Radio Standards:	Bluetooth Low Energy (BLE)
Operating Frequency Range:	2400 MHz to 2483.5 MHz Low Channel: 2402 MHz Middle Channel: 2440 MHz High Channel: 2480 MHz
Nominal Channel Bandwidth:	1 MHz
Maximum Conducted power:	2.15 dBm
Maximum Gain of Antenna Assembly:	-1.53 dBi
Output Power (e.r.p):	-1.53 dBm (e.r.p = e.i.r.p. – 2.15 dB)
Operating Temperature Range:	-20 °C to 55 °C

3 COMPLIANCE CRITERIA

Mobile devices that operate in the Cellular Radiotelephone Service, the Personal Communications Services, the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services and the Specialized Mobile Radio Service authorized under subpart H of part 22 of this chapter, parts 24, 25, 26 and 27 of this chapter, part 80 of this chapter (ship earth stations devices only) and part 90 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if:

- They operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or
- If they operate at frequencies above 1.5 GHz and their ERP is 3 watts or more.

Unlicensed personal communications service devices, unlicensed millimeter wave devices and unlicensed NII devices authorized under §§ 15.253, 15.255, and 15.257, and subparts D and E of part 15 of this chapter are also subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if their ERP is 3 watts or more or if they meet the definition of a portable device as specified in § 2.1093(b) requiring evaluation under the provisions of that section.

4 EVALUATION

The device was an unlicensed personal communications service (FCC §15.247) and therefore the maximum allowed ERP to meet RF exposure limits was 3 watts.

The maximum conducted average power for standalone transmitter is presented below. The maximum e.r.p was obtained from a conducted power measurement and compensating for the antenna assembly gain. Refer to EMC Technologies report M150729-1.

Radio Module	Frequency (MHz)	Maximum Output Power e.i.r.p (mW)
BLE	2402 to 2480	0.7 (-1.53 dBm)

$$e.r.p = -1.53\ dBm = 0.7\ mW \leq 3\ W$$

As the e.r.p output power was less than the threshold the device was exempt from RF exposure evaluation according to 47 CFR 2.1091 (c)(2).

5 CONCLUSION

As the SCS Connect commercial refrigeration controller with Bluetooth LE connectivity e.r.p. calculation was within the required limit it was deemed to comply with the radiation exposure limits of §2.1091. Further measurements were not required.

APPENDIX A
MANUFACTURER'S TECHNICAL RATIONALE
(INCLUSION OF SCS GENERIC MODEL RANGE and NON BLUETOOTH SCS VARIANTS)

Wellington®

16th of February 2016

Andrew Whiteford
EMC Technologies Pty Ltd
176 Harrick Road
Keilor Park
VIC 3042
Australia

Dear Andrew,

Re: Signed declaration statement for inclusion of SCS generic model range into the radio & EMC test reports

Model 'SCS Connect' devices, part number SCSLC1013, were subjected to radio and EMC testings at EMC Technologies Pty Ltd, Victoria, Australia. This declaration is intended to include generic SCS model ranges to the test reports.

Tested SCS Connect variant, part number SCSLC1013 is a SCS variant which includes Bluetooth LE radio, with full inputs and outputs populated and enabled.

Other variants incorporate either functioning blocks not populated fulfilling specific application with a minimum required electronic parts on PCB, for example only two AC relay switches are required for a particular application so 2 triac outputs are not populated on the PCB to minimise the manufacturing cost, or some cosmetic changes where customer wants to have a different coloured escutcheon. There are no variants that modify any EMC components.

Generic part number SCSxCxxxx is intended to be covered by the following reports:

- Radio test report EN 300 328 V1.9.1 (2015), report number: M150624 Rev 1.0
- Radio test report for certification to FCC part 15 subpart C (section 15.247), report number: M150729-1
- Radio test report for certification to IC RSS-247, report number: M150729-2
- EMC test report EN 301 489-1 V1.9.2, EN 301 489-17 V2.2.1, report number: M150729-3
- Test report verification to FCC part 15 rules, report number: M150729-5
- EMC test report ICES-001, report number: M150729-8

Both generic part number SCSxCxxxx & SCSxRxxxx are intended to be covered by the following reports:

- EN 62479:2010, report number: M150625 Rev 1.0
- EMC test report AS/NZS CISPR 22: 2009, Amdt 1:2010 (CISPR 22: 2008 Ed 6), report number: M150729-4
- EN 55014-1:2006 Amdt. 1: 2009 (CISPR 14-1: 2009, Ed 5.1), EN 55014-2: 1997 Amdt.1:2001 Amdt. 2: 2008 (CISPR 14-2: 2008 Ed 1.2), report number: M150729-6
- EMC test report EN 61000-6-2: 2005 (IEC 61000-6-2: 2005), report number: M150729-7
- RF Exposure report to IC RSS-102, report number: M150729-9
- RF Exposure report to 47 CFR 2.1091, report number: M150729-10

SCS part number scheme and possible variant information is listed as following:

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Part Number Scheme

SCS	L	C	1013

Product ID

Product ID:	
SCS	Smart Commercial Refirgeration Control device

MCU variant

Code	MCU Flash Size
0	Small
M	Medium
L	Large

Controller radio type

Code	Radio Type
C	Bluetooth LE
R	No intended radio transmission

Individual Specification Code

Code that specifies number of output switches, LED display colour, escutcheon (face plate) aesthetic variety (colour, shape and wordings), touch label design etc.
It is added at the end of part number, expressed by four-digit numerics

Generic Part Numbers for Bluetooth LE Model

SCSxCxxxx 1st x representing one digit alphanumeric specifying MCU variant
last 'xxxx' representing 4 digit numerics specifying individual specification code

Generic Part Number for Non-Bluetooth LE Model

SCSxRxxxx 1st x representing one digit alphanumeric specifying MCU variant
last 'xxxx' representing 4 digit numerics specifying individual specification code

Yours sincerely
WELLINGTON DRIVE TECHNOLOGIES LTD

Marc Tinsel
HEAD OF MANUFACTURING
DDI: +64 9 477 4507
Email: marc.tinsel@wdtl.com

Wellington®

2nd of February 2016

Andrew Whiteford
EMC Technologies Pty Ltd
176 Harrick Road
Keilor Park
VIC 3042
Australia

Dear Andrew,

Re: Signed declaration statement for inclusion of non-Bluetooth SCS variants into the EMC test reports

Model 'SCS Connect' devices, part number SCSLC1013, were subjected to radio and EMC testings at EMC Technologies Pty Ltd, Victoria, Australia. This declaration is intended to include non-Bluetooth variants, called 'SCS Ready' and associated part numbers. Please refer to the following engineering justifications:

- Non Bluetooth SCS variant only differs by not placing the Bluetooth electronics.
- Removing the Bluetooth electronics also reduces the loading on the power supply, hence reducing emissions in the lower frequency range. We believe there is no impact on immunity.

Therefore, non-Bluetooth variants (model: SCS Ready, generic part number SCSxRxxxx) also comply to:

- EN 62479:2010
- AS/NZS CISPR 22: 2009 Amdt. 1:2010 (CISPR 22: 2008 Ed 6)
- EN 55014-1:2006 Amdt. 1: 2009 (CISPR 14-1: 2009, Ed 5.1), EN 55014-2: 1997 Amdt. 1: 2001 Amdt. 2: 2008 (CISPR 14-2: 2008 Ed 1.2)
- EN 61000-6-2:2005 (IEC 61000-6-2: 2005)
- IC RSS-102
- 47 CFR 2.1091

Yours sincerely
WELLINGTON DRIVE TECHNOLOGIES LTD

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