

Datasheet

SDC-PE15N

CONTENTS

Scope	3
Specifications.....	3
Pin Definitions	5
Mechanical Specifications.....	7
Connector Overview.....	7
Mounting.....	7
ESD Consideration.....	7
RF Layout Design Guidelines.....	7
Regulatory.....	8
Certified Antennas.....	9
Documentation Requirements	9
FCC.....	10
Industry Canada	11

SCOPE



This document describes key hardware aspects of the SDC-PE15N embedded wireless LAN module. This document is intended to assist device manufacturers and related parties with integration of this module into their host devices. Data in this document are drawn from a number of sources and includes information found in the Broadcom BCM4322 data sheet issued in August of 2008.

The information in this document is subject to change without notice. Please contact Laird or visit the PE15N page of the Laird website to obtain the most recent version of this document.

SPECIFICATIONS

Feature	Description
System Interface	32-bit Peripheral Component Interconnect Express (PCIe) Mini Card with 52 pin edge connector
Antenna Interface	2 U.FL (Hirose) connectors for 2 x 2 MIMO support
Chip Set	Broadcom BCM4322
Input Power Requirements	3.3 VDC +/- 10%
Current Consumption (At maximum transmit power setting)	Transmit: 600 mA (1980 mW) Receive: 91 mA (300 mW) Standby: 3 mA (10mW)
Operating Temperature	-30° to 75°C (-22° to 167°F)
Operating Humidity	10 to 90% (non-condensing)
Storage Temperature	-40° to 80°C (-40° to 176°F)
Storage Humidity	10 to 90% (non-condensing)
Maximum Electrostatic Discharge	4 kV
Length	51 mm (2.01 in.)
Width	30 mm (1.18 in.)
Thickness	3.3 mm (0.13 in.)
Weight	9 g (0.3 oz.)
Mounting	52 pin edge connector 2 Through Holes (non-metallic screw recommended)
Wireless Media	Direct Sequence-Spread Spectrum (DSSS) Orthogonal Frequency Divisional Multiplexing (OFDM)
Media Access Protocol	Carrier sense multiple access with collision avoidance (CSMA/CA)
Network Architecture Types	Infrastructure and ad hoc
Network Standards	IEEE 802.11a, 802.11b, 802.11d, 802.11g, 802.11h, 802.11i, 802.11n
Data Rates Supported	802.11a (OFDM): 6, 9, 12, 18, 24, 36, 48, 54 802.11b (DSSS): 1, 2, 5.5, 11 802.11g (OFDM): 6, 9, 12, 18, 24, 36, 48, 54 802.11n (OFDM, 20-MHz channels): 14, 29, 43, 58, 87, 116, 130, 144 802.11n (OFDM 40-MHz channels): 30, 60, 90, 120, 180, 240, 270, 300
Modulation	BPSK @ 1, 6, 9, 14, 30 Mbps

Feature	Description	
	QPSK @ 2, 12, 18, 29, 43, 60, 90 Mbps CCK @ 5.5, 11 Mbps 16-QAM @ 24, 36, 58, 87, 120, 180 Mbps 64-QAM @ 48, 54, 116, 130, 144, 240, 270, 300 Mbps	
Regulatory Domain Support	FCC (Americas, Parts of Asia and Middle East) ETSI (Europe, Middle East, Africa and Parts of Asia) MIC (formerly TELEC) (Japan) KCC (Korea)	
2.4 GHz Frequency Bands	ETSI 2.4 GHz to 2.483 GHz FCC 2.4 GHz to 2.473 GHz	MIC 2.4 GHz to 2.495 GHz KCC 2.4 GHz to 2.483 GHz
5 GHz Frequency Bands	ETSI 5.15 GHz to 5.35 GHz 5.47 GHz to 5.725 GHz FCC 5.15 GHz to 5.35 GHz 5.47 GHz to 5.725 GHz 5.725 GHz to 5.82 GHz	MIC 5.15 GHz to 5.35 GHz KCC 5.15 GHz to 5.35 GHz 5.725 GHz to 5.82 GHz
2.4 GHz, 20 MHz-wide Operating Channels	ETSI: 13 (3 non-overlapping) FCC: 11 (3 non-overlapping)	MIC: 14 (4 non-overlapping) KCC: 13 (3 non-overlapping)
5 GHz, 20 MHz-wide Operating Channels	ETSI: 19 non-overlapping FCC: 23 non-overlapping	MIC: 8 non-overlapping KCC: 12 non-overlapping
5 GHz, 40 MHz-wide Operating Channels	ETSI: 9 non-overlapping FCC: 11 non-overlapping	MIC: 4 non-overlapping
Operating Systems Supported	Windows XP Professional and Embedded	
Compliance	ETSI Regulatory Domain EN 300 328 EN 301 489 EN 301 893 (R&TTE Directive 3.2)/ EN 301 893 (DFS Test Report) EN 62311:2008 EN60950-1 EU 2002/95/EC (RoHS) FCC Regulatory Domain Part 15.247 Subpart C Part 15.407 Subpart E Industry Canada RSS-210 MIC Regulatory Domain Article 2 Item 19, Category WW (2.4Ghz Channels 1-13) Article 2 Item 19-2, Category GZ (2.4GHz Channel 14) Article 3 Item 19-3, Category XW (5150-5250 W52 & 5250-5350 W53)	

Feature	Description
	NCC Certification
Certifications	Wi-Fi Alliance 802.11a, 802.11b, 802.11g, 802.11n WPA Enterprise WPA2 Enterprise Cisco Compatible Extensions (Version 4)
	 
Warranty	3-Year Warranty
<i>All specifications are subject to change without notice</i>	

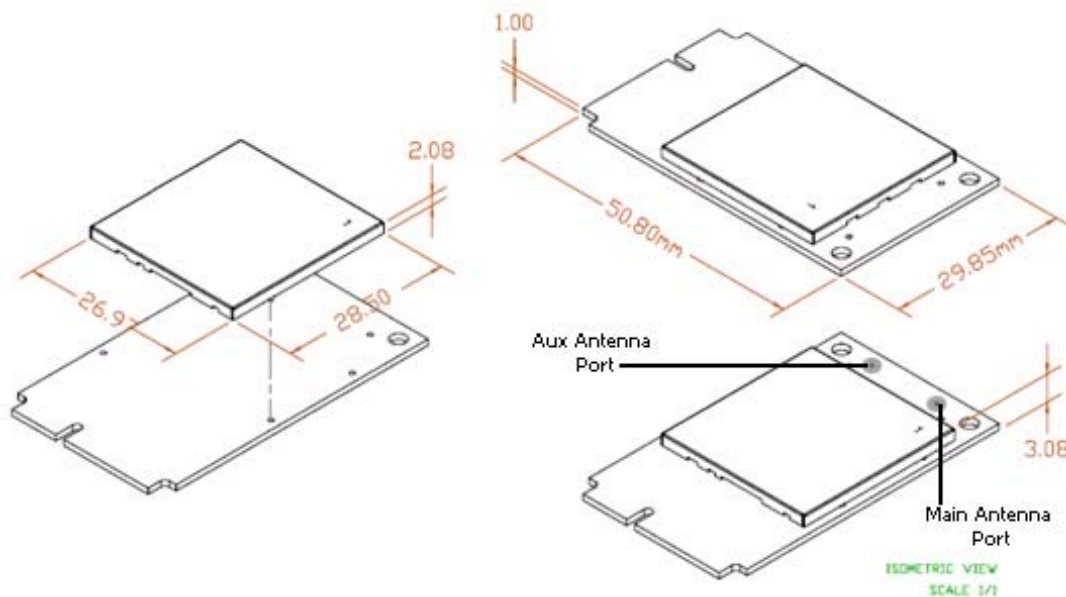
PIN DEFINITIONS

Pin #	Pin Name	I/O	Power Type	Description
1	WL_GPIO_1	O	VDDIO	Wake on Wireless – Not currently supported in the software. May be left open
2	VCC3_3			3.3V Module Power
3	WLAN_ACTIVE	O	VDDIO	Output to BT device. When high, indicates that WLAN is transmitting or receiving. Do not connect when not used
4	GND			Ground
5	BT_ACTIVE	I	VDDIO	Input from BT device. When high, indicates Bluetooth is transmitting or receiving. The Summit radio does not transmit when BT_ACTIVE is high. Tie to GND when not in use
6	No Connect			No Connect. Not Used. Leave Open (Float)
7	CLKREQ_L			Reference clock request signal
8	No Connect			Not Used. Leave Open (Float)
9	GND			Ground
10	No Connect			Not Used. Leave Open (Float)
11	REFCLK_N			Differential reference clock
12	No Connect			Not Used. Leave Open (Float)
13	REFCLK_P			Differential reference clock
14	No Connect			Not Used. Leave Open (Float)
15	GND			Ground
16	No Connect			Not Used. Leave Open (Float)
17	No Connect			Not Used. Leave Open (Float)
18	GND			Ground
19	No Connect			Not Used. Leave Open (Float)
20	RF_DISABLE_L			Module Disable

Pin #	Pin Name	I/O	Power Type	Description
21	GND			Ground
22	PERST_L			Module Reset
23	PETn0			Differential receive
24	VAUX_3_3			Auxiliary 3.3 V Module Power
25	PETp0			Differential receive
26	GND			Ground
27	GND			Ground
28	No Connect			No Connect. Not Used. Leave Open (Float)
29	GND			Ground
30	No Connect			Not Used. Leave Open (Float)
31	PERn0			Differential transmit
32	No Connect			Not Used. Leave Open (Float)
33	PERp0			Differential transmit
34	GND			Ground
35	GND			Ground
36	No Connect			Not Used. Leave Open (Float)
37	GND			Ground
38	No Connect			Not Used. Leave Open (Float)
39	VCC3_3			Primary 3.3 V Module Power
40	GND			Ground
41	VCC3_3			Primary 3.3 V Module Power
42	No Connect			Not Used. Leave Open (Float)
43	No Connect			Not Used. Leave Open (Float)
44	WL_LED_ACT	O	VDDIO	WLAN LED Activity Indicator
45	No Connect			Not Used. Leave Open (Float)
46	No Connect			Not Used. Leave Open (Float)
47	No Connect			Not Used. Leave Open (Float)
48	No Connect			No Connect. Not Used. Leave Open (Float)
49	No Connect			Not Used. Leave Open (Float)
50	GND			Ground
51	No Connect			Not Used. Leave Open (Float)
52	VCC3_3			Primary 3.3 V Module Power

MECHANICAL SPECIFICATIONS

Connector Overview



Mounting

The SDC-PE15N is fully compliant with the PCIe full length Mini Card mechanical specifications. As such, it may be connected to the host device via any standards-compliant host connector. It may be mounted to host devices using a variety of standards-compliant latches and or via the two mounting holes located on the top end of the device.

ESD Consideration

The two mounting holes are also for the purpose of ESD (electrostatic discharge) consideration. To handle maximum ESD levels, two screws must be used on the SDC-PE15N with proper grounding (connected to the customer's main board ground and the case ground of the device).

RF LAYOUT DESIGN GUIDELINES

The following is a list of RF layout design guidelines and recommendation when installing a Summit radio into your device. **Please note** that because each device is different, Summit cannot approve and/or guarantee the outcome of your specific design.

- Do not run antenna cables directly above or directly below the radio.
- Do not place any parts or run any high speed digital lines below the radio.
- If there are other radios or transmitters located on the device (such as a Bluetooth radio), place the devices as far apart from each other as possible.
- Ensure that there is the maximum allowable spacing separating the antenna connectors on the Summit radio from the antenna. In addition, do not place antennas directly above or directly below the radio.

- Summit recommends the use of a double shielded 32 AWG cable for the connection between the radio and the antenna elements.

REGULATORY

Note: Operation in the 5150-5250 MHz band is limited to indoor use only.

Remarque: Le fonctionnement dans la bande 5150-5250MHz est limité à l'utilisation à l'intérieur seulement.

Certified Antennas

The SDC-PE15N provides two Hirose U.FL type antenna connectors to support transmit and receive diversity. For single antenna, non-diversity applications, OEMs are advised to use the Main (not Aux) antenna connector and should disable transmit and receive diversity from the Global tab of the Summit Client Utility (SCU) software utility.

Notice: The module is professionally installed device and installed in industry computer that is generally for industrial use. The device cannot be sold retail, to the general public or by mail order. It must be sold to dealers or have strict marketing control (such as Datalogic S.r.l. and SOREDI touch system GmbH).

The module must be installed by a specified installers that require approval installation by Datalogic S.r.l. and SOREDI touch system GmbH.

Due to this module is a professional installation device, only the antennas listed below are allowed to use.

Model	Type	Connector	2400~2500MHz 5150~5875MHz
HUBER+SUHNER 1399.99.0124	PCB	Antenna includes cable pigtail, terminated by connector U.FL	1dBi (2.4-2.5GHz), 1dBi (5.15-5.875GHz)

Model	Type	Connector	2400~2500MHz 2500~2700MHz 3400~3700MHz 4900~5470MHz 5470~5935MHz
HUBER+SUHNER 1399.17.0106	Sency® Omni-S Antenna	N, 50 jack (female)	6dBi (2.4-2.5GHz), 6dBi (2.5-2.7GHz) 7dBi (3.4-3.7GHz), 8dBi (4.9-5.47GHz) 8dBi (5.47-5.935)

Note: The formal test reports for the SDC-PE15N show transmit power was decreased to less than 100% on 2.4 GHz edge channels. Summit has made these transmit power reductions in firmware for the edge channels. Integrators do not need to reduce transmit power on a channel-by-channel basis to account for band edge regulations.

Antennas of differing types and higher gains may be integrated as well. With the Summit Manufacturing Utility software utility, OEMs may reduce the transmit power of the SDC-PE15N to account for higher antenna gain when necessary. In some cases, OEMs may be able to reduce certification efforts by using antennas that are of like type and equal or lesser gain to the above listed antennas.

Documentation Requirements

In order to maintain regulatory compliance, when integrating the SDC-PE15N into a host device and leveraging Summit’s grants and certifications, it is necessary to meet the documentation requirements set forth by the applicable regulatory agencies. The following sections (FCC, Industry Canada, and

European Union) outline the information that must be included in the user's guide and external labels for the host devices into which the SDC-PE15N is integrated.

FCC

User's Guide Requirements

As outlined in the Operational Description, the SDC-PE15N complies with **FCC Part 15 Rules** for a signal Modular Approval. To leverage Summit's grant, the two conditions below must be met for the host device into which the SDC-PE15N is integrated:

1. The antenna is installed with 20 cm maintained between the antenna and users.
2. The transmitter module is not co-located with any other transmitter or antenna that is capable of simultaneous operation. As long as the two conditions above are met, further *transmitter* testing is typically not required. However, the OEM integrator is still responsible for testing its end-product for any additional compliance requirements required with this module installed, such as (but not limited to) digital device emissions and PC peripheral requirements.

IMPORTANT!

In the event that the two conditions above **cannot be met** (for example certain device configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID **cannot** be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

When using Summit's FCC grant for the SDC-PE15N, the integrator must include specific information in the user's guide for the device into which the SDC-PE15N is integrated. The integrator must not provide information to the end user regarding how to install or remove this RF module in the user's manual of the device into which the SDC-PE15N is integrated. The following FCC statements must be added in their entirety and without modification into a prominent place in the user's guide for the device into which the SDC-PE15N is integrated:

"IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1. Reorient or relocate the receiving antenna.

2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE: FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Labeling Requirements

The final end product must be labeled in a visible area with the following notice:

Contains FCC ID: U4G-RHINOIWIN

Industry Canada

User's Guide Requirements

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage;
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

As outlined in the Operational Description, the SDC-PE15N complies with Industry Canada (IC) rules for a signal Modular Approval. To leverage Summit's grant, the two conditions below must be met for the host device into which the SDC-PE15N is integrated:

1. The antenna is installed with 20 cm maintained between the antenna and users.
2. The transmitter module is not co-located with any other transmitter or antenna that is capable of simultaneous operation.

As long as the two conditions above are met, further *transmitter* testing is typically not required. However, the OEM integrator is still responsible for testing its end-product for any additional

compliance requirements required with this module installed, such as (but not limited to) digital device emissions and PC peripheral requirements.

Comme indiqué dans la description opérationnelle, la SDC-PE15N est conforme aux règles d'Industrie Canada (IC) pour un signal d'approbation modulaire. Pour tirer parti de la subvention du Sommet, les deux conditions suivantes doivent être remplies pour le périphérique hôte dans lequel la SDC-PE15N est intégrée:

1. l'antenne est installée avec 20 cm d'entretenus par l'antenne et les utilisateurs.
2. Le module émetteur n'est pas co-installé avec un autre émetteur ou antenne capable de fonctionner simultanément.

Tant que les deux conditions ci-dessus sont remplies, il est peu probable que de nouveaux tests de développeur ne soient pas requis. Cependant, l'intégrateur OEM est toujours responsable de tester son produit final pour toutes les exigences de conformité requises avec ce module installé, telles que (mais sans s'y limiter) Émissions de périphériques numériques et exigences de périphériques PC.

IMPORTANT!

In the event that the two conditions above **cannot be met** (for example certain device configurations or co-location with another transmitter), then the IC authorization is no longer considered valid and the IC ID **cannot** be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate IC authorization.

When using Summit’s IC grant for the SDC-PE15N, the integrator must include specific information in the user’s guide for the device into which the SDC-PE15N is integrated. The integrator must not provide information to the end user regarding how to install or remove this RF module in the user’s manual of the device into which the SDC-PE15N is integrated. In addition to the required FCC statements outlined above, the following IC statements must be added in their entirety and without modification into a prominent place in the user’s guide for the device into which the SDC-PE15N is integrated:

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.

This radio transmitter (SDC-PE15N – IC: 3862E-RHINOIWIN) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio(SDC-PE15N –IC: 3862E-RHINOIWIN)a été approuvé par Industrie Canada pour fonctionner avec les types d’antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d’antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l’exploitation de l’émetteur.

Notice: The module is professionally installed device and installed in industry computer that is generally for industrial use. The device cannot be sold retail, to the general public or by mail order. It must be sold to dealers or have strict marketing contr16ol (such as Datalogic S.r.l. and SOREDI touch system GmbH).

The module must be installed by a specified installers that require approval installation by Datalogic S.r.l. and SOREDI touch system GmbH.

Due to this module is a professional installation device, only the antennas listed below are allowed to use.

Model	Type	Connector	2400~2500MHz 5150~5875MHz
HUBER+SUHNER 1399.99.0124	PCB	Antenna includes cable pigtail, terminated by connector U.FL	1dBi (2.4-2.5GHz), 1dBi (5.15-5.875GHz)

Model	Type	Connector	2400~2500MHz 2500~2700MHz 3400~3700MHz 4900~5470MHz 5470~5935MHz
HUBER+SUHNER 1399.17.0106	Sencity® Omni-S	N, 50 jack (female)	6dBi (2.4-2.5GHz), 6dBi (2.5-2.7GHz) 7dBi (3.4-3.7GHz), 8dBi (4.9-5.47GHz)

Antenna

8dBi (5.47-5.935)

Labeling Requirements

The final end product must be labeled in a visible area with the following notice:

Contains IC ID: 3862E-RHINOIWIN