11abgn/ac WLAN/Bluetooth Combo Module

SHARP

DHUB-SP69

User Manual

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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:

-	Reorient or relocate the receiving antenna.
-	Increase the separation between the equipment and receiver.
-	Connect the equipment into an outlet on a circuit different from that
to which the receiver is connected.
-	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:
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.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/CANADA

This device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna,
3) For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 3 conditions above are met, further <u>transmitter</u> test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

IMPORTANT NOTE

In the event that these conditions <u>can not be met</u> (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID <u>can not</u> 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.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: NKR-SP69".

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Industry Canada statement:

This device complies with Industry Canada's licence-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.

Cet appareil est conforme aux CNR exemptes de licence d'Industrie Canada. Son fonctionnement est soumis aux deux conditions suivantes:
(1) Ce dispositif ne peut causer d'interférences; et(2) Ce dispositif doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

Caution:

(i) the device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

(ii) the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall comply with the e.i.r.p. limit; and

(iii) the maximum antenna gain permitted for devices in the band 5725-5825 MHz shall comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate.

(iv) Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

Avertissement:

(i) les dispositifs fonctionnant dans la bande 5 150-5 250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

(ii) le gain maximal d'antenne permis pour les dispositifs utilisant les bandes 5 250-5 350 MHz et 5 470-5 725 MHz doit se conformer à la limite de p.i.r.e.;

(iii) le gain maximal d'antenne permis (pour les dispositifs utilisant la bande 5 725-5 825 MHz) doit se conformer à la limite de p.i.r.e. spécifiée pour l'exploitation point à point et non point à point, selon le cas.

(iv) De plus, les utilisateurs devraient aussi être avisés que les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5 250-5 350 MHz et 5 650-5 850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

Caution:

This device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes:

1) L'antenne doit être installée de telle sorte qu'une distance de 20 cm est respectée entre l'antenne et les utilisateurs, et
2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not 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 Canada authorization.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC: 4441A-SP69".

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 4441A-SP69".

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which

integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

Antenna information for WLAN			Peak gain (dBi)				
Model	Type	Connector	2400~2483.5MHz	5150~5250MHz	5250~5350MHz	5470~5725MHz	5725~5850MHz
Left antenna	Printed	NA	4.29	3.02	3.51	4.25	4.32
Right antenna	Printed	NA	4.47	4.35	4.43	4.43	4.19

Antenna information for BT	Type	PIFA
	Peak Gain(dBi)	4.2
	Connector	U.FL

Table of Contents

1. Introduction

Thank you for purchasing the 802.11 a/b/g/n/ac / Bluetooth Combo module that provides the easiest way to wireless networking. This User Manual contains detailed instructions in the operation of this product. Please keep this manual for future reference.

System Requirements
- 128 MB of RAM or later (recommended)
- 300 MHz processor or higher

2. Driver/Utility Installation

The driver should have been installed before the TV is shipped from the manufacturer. You can start using its network function without installing driver or utility.

This module is associated product for TV host.
The following description provides a basic installation for wireless module.
For more information about the Wireless Module, please refer to your TV manual.
Installing Wi-Fi module :

1. Link cable with USB connector on wireless module
2. Link wireless module with USB connector to PC and install software in wireless module
3. Open the back lid of TV, lock wireless module on internal main board of TV
4. Power supply on internal main-board and allow TV to load fully.

3. Connecting to an Existing Network

1. Use the remote control that came with your TV to access the network configuration settings page.

2. Select the scanning wireless network function. The system starts to scan for available network. On this list, click Refresh to refresh the list at any time

3. Select the network you want to connect to.

4. If the chosen network has security enabled, you will have to setup corresponding security

parameter. Contact the network manager for the correct settings. Select the security type and fill in required parameters. The options include the following:

- WPA/WPA2/CCKM
- WPA/WPA2 Passphrase
- 802.1x
- Pre-Shared Key (Static WEP)
- None

4. Modifying a Wireless Network

4.1 Modifying General Settings

1. Use the remote control that came with your TV to access the network configuration settings page.
2. From the profile list, select one profile and choose the modify function.
3. Modify the settings below for your network.

Profile Name	Identifies the configuration wireless network profile. This name must be unique. Profile names are not case sensitive.
Client Name	Identifies the client machine.
Use this profile for Access Point mode	Configures station to operate in Access Point mode.
Network Names (SSIDs)	The IEEE 802.11 wireless network name. This field has a maximum limit of 32 characters. Configure up to three SSIDs (SSID1, SSID2, and SSID3).

4.2 Modifying Security Settings

1. Use the remote control that came with your TV to access the network configuration settings page.
2. Select a security option of this wireless network. This product provides security options below. Contact your wireless network administrator for choosing a correct option.

   - WPA/WPA2/CCKM
   - WPA/WPA2 Passphrase
   - 802.1x
   - Pre-Shared Key (Static WEP)
   - None

WPA/WPA2	Enables the use of Wi-Fi Protected Access (WPA). Choosing WPA/WPA2 opens the WPA/WPA2 EAP drop-down menu. The options include: • EAP-FAST • EAP-TLS • EAP-TTLS • EAP-SIM • PEAP (EAP-GTC) • PEAP (EAP-MSCHAP V2) • LEAP
WPA/WPA2 Passphrase	Enables WPA/WPA2 Passphrase security. Click on the Configure button and fill in the WPA/WPA2 Passphrase.
802.1x	Enables 802.1x security. This option requires IT administration. Choosing 802.1x opens the 802.1x EAP type drop-down menu. The options include: • EAP-FAST • EAP-TLS • EAP-TTLS • EAP-SIM • PEAP (EAP-GTC) • PEAP (EAP-MSCHAP V2) • LEAP
Pre-Shared Key (Static WEP)	Enables the use of pre-shared keys that are defined on both the access point and the station. To define pre-shared encryption keys, choose the Pre-Shared Key radio button and click the Configure button to fill in the <u>Define Pre-Shared Keys window.</u>

None	No security (not recommended).
Allow Association to Mixed Cells	Check this check box if the access point with which the client adapter is to associate has WEP set to Optional and WEP is enabled on the client adapter. Otherwise, the client is unable to establish a connection with the access point.
Limit Time for Finding Domain Controller To	Check this check box and enter the number of seconds (up to 300) after which the authentication process times out when trying to find the domain controller. Entering zero is like unchecking this check box, which means no time limit is imposed for finding the domain controller. Note: The authentication process times out whenever the authentication timer times out or the time for finding the domain controller is reached.
Group Policy Delay	Specify how much time elapses before the Windows logon process starts group policy. Group policy is a Windows feature used by administrators to specify configuration options for groups of users. The objective is to delay the start of Group Policy until wireless network authentication occurs. Valid ranges are from 0 to 65535 seconds. The value that you set goes into effect after you reboot your computer with this profile set as the active profile. This drop-down menu is active only if you chose EAP-based authentication.

4. Specifications

4.1 WiFi portion

Item	Key specifications
Main chipset	Broadcom BCM43569
TX/RX	2T2R
Frequency range	2.400 ~ 2.497GHz,5.15GHz ~ 5.85GHz
Modulation technique	➢ **802.11 Legacy a/b/g** DSSS (DBPSK, DQPSK, CCK) OFDM (BPSK, QPSK, 16-QAM, 64-QAM) DSSS (Direct Sequence Spread Spectrum) with DBPSK (Differential Binary Phase Shift Keying 1Mbps), DQPSK (Differential Quaternary Phase Shift Keying 2Mbps), and CCK (Complementary Code Keying 5.5&11Mbps), and OFDM (Orthogonal Frequency Division Multiplexing with BPSK for 6,9Mbps、 QPSK for 12,18Mbps、 16QAM for 24,36Mbps、 64QAM for 48,54Mbps) ➢ **802.11n a/g** OFDM (BPSK, QPSK, 16-QAM, 64-QAM) ➢ **802.11n ac** OFDM (BPSK, QPSK, 16-QAM, 64-QAM,256-QAM)
Host interface	➢ USB 2.0
Operation voltage	➢ 5.0V +/-9%
Power consumption @25° C	

	Description	5.0V		Units
		AVG	MAX	
	Driver Disabled	48	55	mA
	Idle(unassociated)	36	43	mA
	Idle(associated)	174	182	mA
11AC	NSS2 MCS9 TX	412	624	mA
	NSS2 MCS9 RX	353	613	mA
	NSS2 MCS0 TX	622	693	mA
	NSS2 MCS0 RX	387	716	mA
11AGN	11AN MCS15 TX	458	700	mA
	11AN MCS15 RX	298	616	mA
	11GN MCS15 TX	377	610	mA
	11GN MCS15 RX	231	551	mA
	11AN MCS7 TX	341	748	mA
	11AN MCS7 RX	241	632	mA
	11GN MCS7 TX	422	621	mA
	11GN MCS7 RX	258	507	mA

***The maximum current consumption would be impacted by radiation environment and the driver mechanism.

Dimension	➢ 90(L) * 25(W) * 5.4(H) mm
Operation temperature	$-10^o \sim 60^o$ C
Storage temperature	$-35^o \sim 70^o$ C ,R.H:90%
Antenna	2 printed antennas on module for WiFi

4.2 BT portion

Item	Key specifications
Main chipset	➢ BCM43569
Compliance	➢ Bluetooth v4.1
Frequency range	➢ 2400 ~ 2483.5MHz
Initial carrier frequency tolerance	➢ +/- 40kHz (typical)
Modulation technique	➢ Frequency hopping, 1600 hops/sec
Channel spacing	➢ 1MHz
Channels support	➢ 79 channels
Operation voltage	➢ 5.0V +/-9%
Power consumption @25°C	<table><tr><td></td><td>Avg (mA)</td><td>Max (mA)</td></tr><tr><td>Idle mode</td><td>2</td><td>10</td></tr><tr><td>Continuous DH5 TX</td><td>12</td><td>34</td></tr><tr><td>Continuous 2DH5 TX</td><td>12</td><td>33</td></tr><tr><td>Continuous 3DH5 TX</td><td>12</td><td>31</td></tr><tr><td>Inquiry Scan</td><td>6</td><td>13</td></tr></table> Note： 1. The WLAN core is in reset (WLAN_REG_ON=low) for all measurement. 2. The maximum current consumption would be impacted by radiation environment and the driver mechanism.
Output power (dBm)	➢ 5 dBm typical, class 1 device (0 dBm < output power < 10 dBm). BT output Power by FW adjust
Sensitivity	➢ -85 dBm (typ.) for pi/4-DQPSK, 0.1%BER
Operation temperature	➢ -10° ~ 60° C

Storage temperature	➢ -35° ~ 70° C , R.H. : 90%
Antenna	➢ 1 U.FL connector on module for BT external antenna.