Product Description

- **Dual-band Normal Power Module**

The BCM43520 normal power WiFi module series are MIMO 3 x 3 3-streams 802.11a/b/g/n/ac wireless networking card with PCIe mini form factor designed to implement up to 1.3 Gbps in the 802.11ac wireless data rate with wider coverage for high-reliable enterprise and whole home wireless LAN access.

The advanced MIMO multiplexing technology design provide more stable connection and wider coverage than legacy 802.11 products. This gives a very robust radio channel, which is made even better by the excellent receiver sensitivity and delay spread robustness.

A firmware-based architecture is capable of supporting the latest industry standards in the security and quality of service (QoS), as the draft 802.11i and 802.11e (WMM™) standards, respectively.

The BCM43460 normal power WiFi module series achieve the requirement of high-reliable enterprise networking with optional enhanced in-building location and spectral sensing capablilities.

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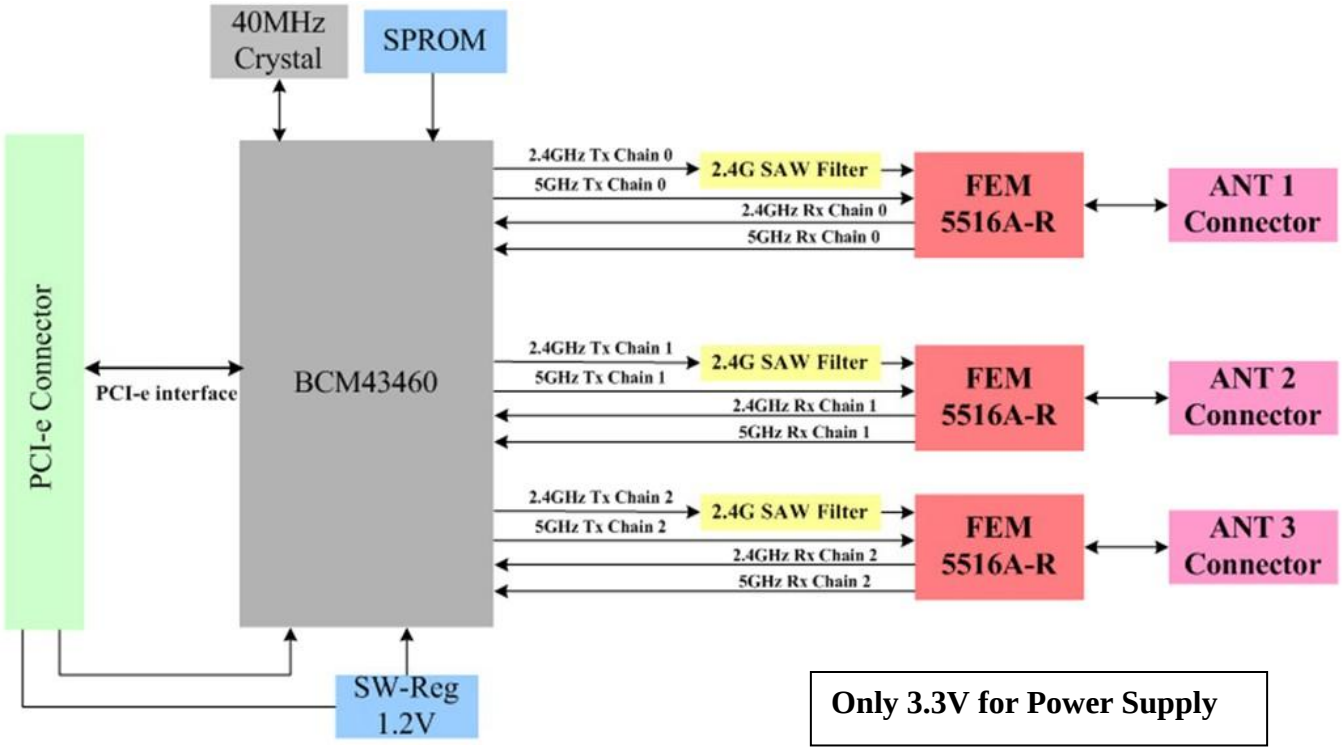
Features

- The PCIe mini form factor for dual-band nromal power module with PCIe interface is compatible with the standard PCIe mini card Rev. 1.2.
- Three U.FL antenna connectors provided to allow transmission or reception on both simultaneously.
- 802.11 a/b/g/n/ac with 3Tx/3Rx MIMO architecture to deliver link rate up to 1.3 Gbps for 80MHz channels.
- Support 2.4G Turbo-QAM MCS8 and MCS9.
- Normal output power 15dBm for HT40 MCS8/MCS15/MCS23 at 2.4GHz band and 10dBm for VHT80 MCS9NSS1/2/3 at 5GHz band, respectively.
- Feature enhancement for dynamic frequency selection (DFS) within all 5 GHz band requiring radar detection.
- Security support for IEEE802.1X authentication, WPA, WEP-64, WEP-128, WEP-152, build-in hardware support to 128 bit AES/TKIP encryption. .
- Interoperable with other IEEE 802.11 a/b/g compliant systems.
- WHQL and Wi-Fi pre-test in house.

BCM943520MC Normal Power Module Block Diagram



Only 3.3V for Power Supply

Pin Arrangement

Pin #	PCIe v1.2	BCM43520 NP Module	Pin #	PCIe v1.2	BCM43520 NP Module
51	Reserved	TX_EABLE	52	+3.3Vaux	+3.3V DC
49	Reserved	TX_ACTIVE	50	GND	GND
47	Reserved	GPIO5	48	+1.5V	NC
45	Reserved	NC	46	LED_WPAN#	NC
43	GND	GND	44	LED_WLAN#	LED_WLAN
41	+3.3Vaux	+3.3V DC	42	LEDWWAN#	NC
39	+3.3Vaux	+3.3V DC	40	GND	GND
37	GND	GND	38	USB_D+	NC
35	GND	GND	36	USB_D-	NC
33	PETp0	PCIE_RDN	34	GND	GND
31	PETn0	PCIE_RDP	32	SMB_DATA	SMB_DATA
29	GND	GND	30	SMB_CLK	NC
27	GND	GND	28	+1.5V	NC
25	PERp0	PERP0	26	GND	GND
23	PERn0	PERN0	24	+3.3Vaux	+3.3V DC
21	GND	GND	22	PERST#	PCIE_PERST_L
19	Reserved (UIM_C4)	NC	20	W_DISABLE#	RF_DISABLE_L
17	Reserved (UIM_C8)	NC	18	GND	GND
15	GND	GND	16	UIM_VPP	NC
13	REFCLK+	PCIE_REFCLK_NC	14	UIM_RESET	NC
11	REFCLK-	PCIE_REFCLK_PC	12	UIM_CLK	NC
9	GND	GND	10	UIM_DATA	NC
7	CLKREQ#	PCIE_CLKREQ_L	8	UIM_PWR	NC
5	COEX2	NC	6	1.5V	NC
3	COEX1	NC	4	GND	GND
1	WAKE#	PCIE_WAKE_EL	2	3.3Vaux	+3.3V DC

Table 1. Connector pin-out comparison table of BCM943460MC normal power module

Operating Conditions

Table 2 summarizes the recommended operating conditions for the BCM943460MC normal power WiFi module.

Item	Specification	Remark
3.3V Supply Voltage	3.3 VDC from host (+/-0.2V)	3.3V Pin arrangements are compliant with PCIe mini card specification v1.2.
Operating Temperature	0 ~50 ℃	HW testing is performed at Ambient temp only. Operating temperature ever achieved up to 70 ℃ in practical experiment.
Storage Temperature	-40 ~ 80 ℃	
Humidity	0% ~ 95%	Non condensing, relative humidity

Table 2. Recommended Operating Conditions

Wireless Specification

The BCM943520MC normal power WiFi module will comply with the following wireless specification and standards:

Chip set	BCM43460
Interface/System bus support	PCI express Mini Card v1.2
Standard	IEEE 802.11a/b/g/n/ac
Operating frequencies	2400MHz-2483.5MHz, 4900MHz-5825MHz
Operating channels	**802.11 b/g/gn:** FCC Chan1-11(2412-2462 MHz) EU: Chan 1-13 (2412-2472 MHz) Japan: Chan 14 (2484 MHz) (CH 1 to 13 b/g/n, CH 14 b) **802.11 a/an/ac:** FCC (US and Canada): 5.180 to 5.320 GHz; 8 channels - UNII band I 5.500 to 5.700 GHz, 5 channels - UNII band II 5.680 to 5.700 GHz; 2 channels - UNII band II 5.745 to 5.825 GHz; 5 channels - UNII band III EU (Europe) : 5.180 to 5.320 GHz; 8 channels 5.500 to 5.700 GHz, 11 channels Japan : 4.920 to 4.980 GHz; 4 channels 5.180 to 5.320 GHz; 8 channels 5.500 to 5.700 GHz, 11 channels
Data rate (Mbps)	802.11a: 6, 9, 12, 18, 24, 36, 48 and 54Mbps 802.11b: 1, 2, 5.5 and 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48 and 54Mbps 802.11n: MCS0-MCS23 (20 & 40 MHz bandwidth) 802.11ac: MCS0NSS1-MCS9NSS3 (20, 40 & 80 MHz bandwidth) ◆ 11ac Mode: Data Rate of up to 1.3Gbps for 80MHz channels.
Modulation	DSSS, CCK, BPSK, QPSK, 16QAM, 64QAM, 256QAM, DBPSK, DQPSK
TX EVM	1. 2.4GHz Band 802.11g (54Mbps): EVM SPEC ≤ -25dB. 2.4GHz Band 802.11n HT20 (MCS7/15/23): EVM SPEC ≤ -27dB. 2.4GHz Band 802.11n HT40 (MCS7/15/23): EVM SPEC ≤ -27dB. 2. 5GHz Band 802.11a (54Mbps): EVM SPEC ≤ -25dB. 5GHz Band 802.11n HT20 (MCS7/15/23): EVM SPEC ≤ -27dB.

	5GHz Band 802.11n HT40 (MCS7/15/23): EVM SPEC ≤ -27dB. 5GHz Band 802.11ac VHT20 (MCS8NSS1/2/3): EVM SPEC ≤ -30dB. 5GHz Band 802.11ac VHT40 (MCS9NSS1/2/3): EVM SPEC ≤ -32dB. 5GHz Band 802.11ac VHT80 (MCS9NSS1/2/3): EVM SPEC ≤ -32dB.	
Spectrum Mask	20/40/80MHz bandwidth	
Frequency accuracy	+20 / -20ppm	
Power consumption	2.4GHz normal power Tx	TBD
	5GHz normal power Tx	TBD
Antenna connectors	Allowing transmission or reception 3T x 3R with 3 U.FL antenna connectors.	
Human health & Environment-friendly compliance	REACH and RoHS	
Regulation compliance	FCC, CE	

Federal Communication Commission and Industry Canada Interference requirements.

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 & IC 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 ITV 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 & IC 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 & IC Radiation Exposure Statement:

This equipment complies with FCC & IC 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.

Operations in the 5.15-5.25GHz band are restricted to indoor usage only.

The availability of some specific channels and/or operational frequency bands are country dependent and not accessible by the end user.

The end user must affix a label on the outside of the product containing this module's FCCID that is visible to the user in the format of FCCID: WA7-43460AC

This device complies with Industry Canada license-exempt RSS standard(s). 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, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada.
To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada.

BCM943460MC Normal Power WiFi Module – User Manual
11a/b/g/n/ac 3 x 3 PCIe mini card

www.usi.com.tw

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Dans le but de ré duire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

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