

11a/b/g/n/ac 2Tx2R USB Combo Module

WM05
OEM/Integrator Manual

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FCC WARNING STATEMENT

FEDERAL COMMUNICATIONS 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 or more 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.

CAUTION:

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

RF exposure warning

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

Roku, Inc.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antenna(s) must not be co-located with any other transmitters except in accordance with FCC multi-transmitter product procedures.

This device is restricted for indoor use.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated.

Additional testing and certification may be necessary when multiple modules are used.

20 cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20 cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: TC2-N1003 ". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label: This

Roku, Inc.

device complies with Part 15 of 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.

IC WARNING STATEMENT

Canada, Industry Canada (IC) Notices

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.

Canada, avis d'Industry Canada (IC)

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.

Radio Frequency (RF) Exposure Information

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

Informations concernant l'exposition aux fréquences radio (RF)

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Roku, Inc.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

This device and its antenna(s) must not be co-located with any other transmitters except in accordance with IC multi-transmitter product procedures.

Cet appareil et son antenne (s) ne doit pas être co-localisés ou fonctionnement en association avec une autre antenne ou transmetteur.

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.

les dispositifs fonctionnant dans la bande 5150-5250 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.

The maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate.

le gain maximal d'antenne permis (pour les dispositifs utilisant la bande 5725-5850 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.

This radio transmitter (Model: WM05) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type 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 (Model: WM05) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Antenna list:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)			Remark
					2.4GHz	5GHz		
						Band 1	Band 4	
1	LiteON	WM950B DVT2	PIFA Antenna	I-PEX	3.7	3.8	4.5	External WiFi Antenna
2	LiteON	WM950B DVT2	PIFA Antenna	N/A	4.6	1.2	3.4	On-board WiFi Antenna

Note: The EUT has two antennas.

This module is intended for OEM integrator. The OEM integrator is still responsible for the IC compliance requirement of the end product, which integrates this module.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20 cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX IC : 5959A-N1003 ".

PRODUCT FEATURES

WI-FI FEATURE:

- Operate at ISM frequency Band (2.4/5GHz)
- IEEE Standards Support, 802.11a ,802.11b, 802.11g 802.11n and 802.11ac
- Support for both 20 MHz/40 MHz channel width in 2.4GHz and 20 MHz/40 MHz/80MHz channel width in 5GHz
- Enterprise level security supporting: WPS2.0,WAPI, WPA, WPA2
- Dual-stream IEEE 802.11n support for 20MHz and 40MHz channels provides PHY layer rates up to 300Mbps
- Dual-stream IEEE 802.11ac support for 80MHz channels provides PHY layer rates up to 867Mbps
- Support for WI-Fi Direct
- Support Wake On WLAN

COMMON FEATURE:

- BCM43569 is a single chip integrated IEEE 802.11 a/b/g/n/ac
- Support OS: Linux based
- RoHS compliance
- Low Halogen compliance

PRODUCT SPECIFICATIONS

MAIN CHIPSET

Broadcom BCM43569

FUNCTIONAL SPECIFICATIONS

Wi-Fi Function	
Standard	IEEE802.11a; IEEE802.11b; IEEE 802.11g; IEEE 802.11n; IEEE802.11ac
Bus Interface	USB2.0
Data Rate	802.11a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps
	802.11b: 11, 5.5, 2, 1 Mbps
	802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps
	802.11n: MCS 0 to 15 for HT20MHz MCS 0 to 15 for HT40MHz
	802.11ac: MCS 0 to 8 for HT20MHz MCS 0 to 9 for HT40MHz MCS 0 to 9 for HT80MHz
Media Access Control	CSMA/CA with ACK
Modulation Technique	802.11a: 64QAM, 16QAM, QPSK, BPSK
	802.11b: CCK, DQPSK, DBPSK
	802.11g: 64QAM, 16QAM, QPSK, BPSK
	802.11n: 64QAM, 16QAM, QPSK, BPSK
	802.11ac: 256QAM, 64QAM, 16QAM, QPSK, BPSK
Network Architecture	Ad-hoc mode (Peer-to-Peer) Infrastructure mode
Operation Channel	2.4GHz 11: (Ch. 1-11) – United States
	5GHz 36,40,44,48,149,153,157,161,165 (USA)
Frequency Range	802.11bg 2.400 ~ 2.4835 GHz
	802.11a 5.15~5.25 and 5.725-5.85 GHz
Receiver Sensitivity	802.11a: -86 dBm@6Mbps -70 dBm@54Mbps
	802.11b: -88 dBm@1Mbps

	-82 dBm@11Mbps
802.11g:	
	-86 dBm@6Mbps
	-70 dBm@54Mbps
802.11n(2.4GHz):	
	20MHz
	-86 dBm@MCS0
	-69 dBm@MCS7
	40MHz
	-83 dBm@MCS0
	-66 dBm@MCS7
802.11n(5GHz):	
	20MHz
	-84 dBm@MCS0
	-67 dBm@MCS7
	40MHz
	-81 dBm@MCS0
	-64 dBm@MCS7
802.11ac:	
	20MHz
	-64 dBm@MCS8
	40MHz
	-62 dBm@MCS8
	-59 dBm@MCS9
	80MHz
	-59 dBm@MCS8
	-56 dBm@MCS9

Security

WPS, WPA, WPA2, WEP 64bit & 128bit, IEEE 802.1X, IEEE 802.11i

Common Function

Operating Voltage

3.3 V ±9% I/O supply voltage

Power Consumption	Mode	Average		Peak	
		11b	MCS15/ MCS9	2.4G	5G
	TX	750mA	620mA	850mA	920mA
	RX	250mA			
	Sleep	2mA			

Antenna Type

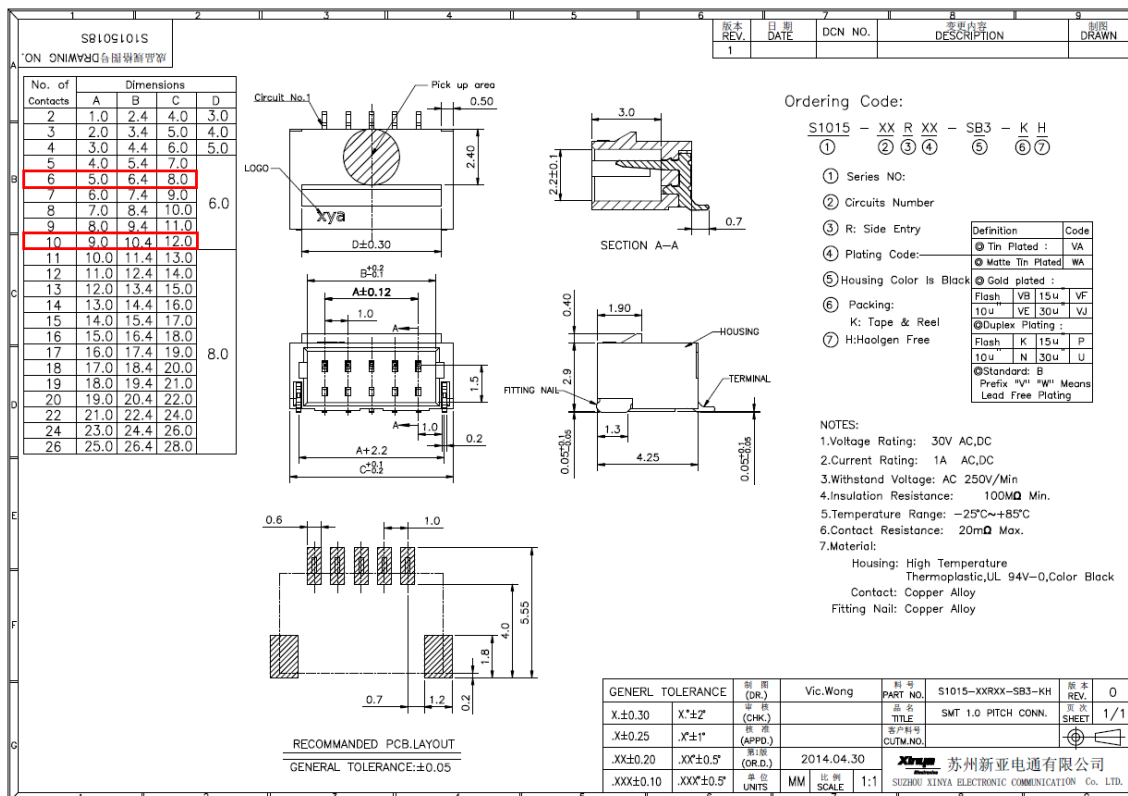
Single on-board Metal antennas for Wi-Fi
Single U.FL Antenna connector for Wi-Fi

PIN ASSIGNMENT

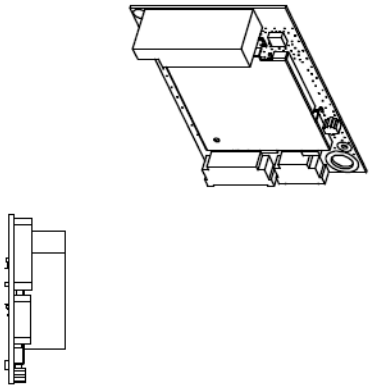
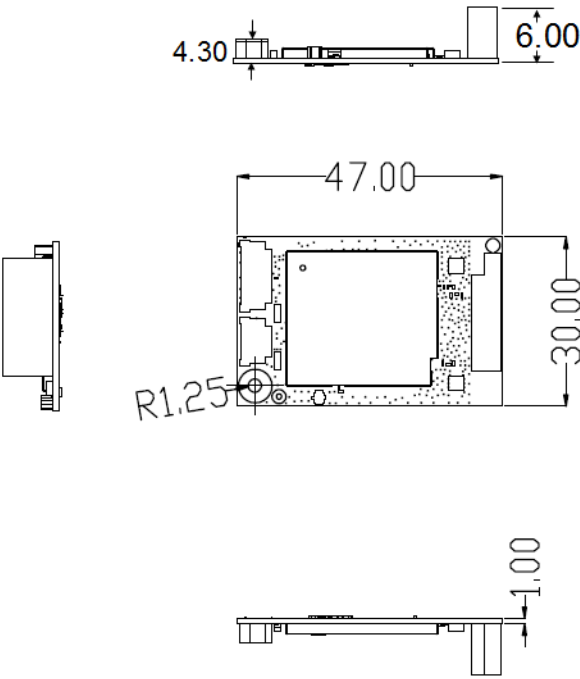
10 pin connector for WiFi

Pin.	Pin Define	Description	Status
1	+3.3V	3.3V source	YES
2	+3.3V	3.3V source	YES
3	USB_D-	USB Data-	YES
4	USB_D+	USB Data+	YES
5	GND	Ground	YES
6	WL_HOST_WAKE#	WLAN wake up Host, Low Active	YES
7	WL_REG_ON#	Active Low to Reset WLAN	YES
8	GND	Ground	YES
9	+5.0V	5.0V source	NC
10	GND	Ground	YES

USB CONNECTOR SPEC



MECHANICAL



DIM \ DEG	A	B	C	D
0-5	± 0.02	± 0.05	± 0.10	
5-10	± 0.05	± 0.10	± 0.15	
10-50	± 0.10	± 0.15	± 0.20	
50-100	± 0.15	± 0.20	± 0.25	
100-	$\pm 0.15\%$	$\pm 0.20\%$	$\pm 0.25\%$	

EEPROM INFORMATION

Wi-Fi

ccode	0xTBD
regrev	0xTBD
Vendor ID	0x0A5C
Device ID	0xBD27

ENVIRONMENTAL

OPERATING

Ambient Operating Temperature: 0 to 70 °C (32 to 158 °F)

Relative Humidity: 5-90% (non-condensing)

STORAGE

Temperature: -40 to 80 °C (-40 to 176 °F)

Relative Humidity: 5-95% (non-condensing)