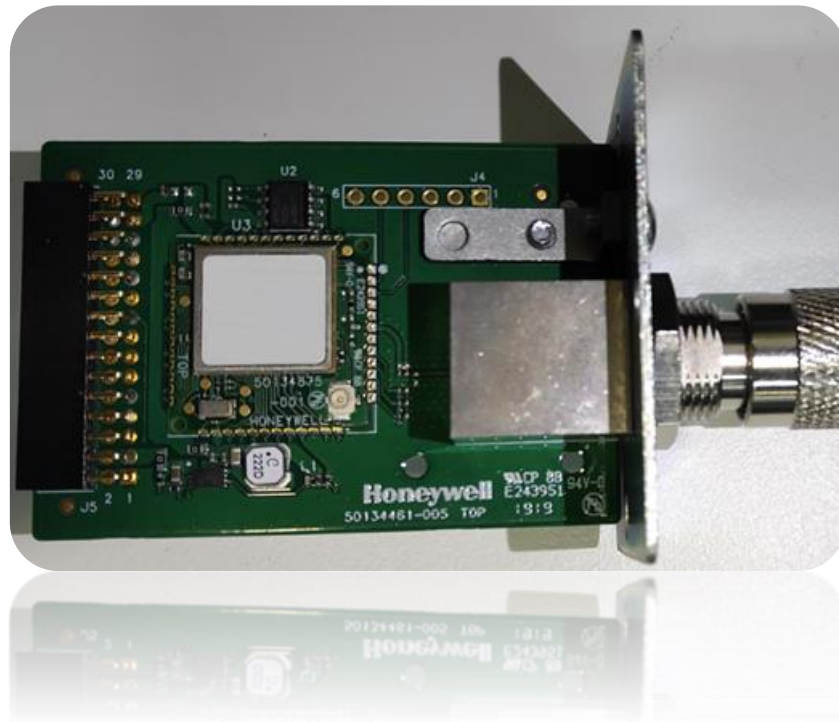


Wi-Fi Module Data Sheet



This device is pre-calibrated and integrates the complete transmit/receive RF paths including band pass filter, diplexer, switches, reference crystal oscillator, and power manage units (PMU).

The HON-ST60Q device supports IEEE 802.11 ac 1X1 receive multi-user MIMO spatial stream multiplexing with data rates up to MCS9 (433.3 Mbps).

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Advanced WLAN

- A-MPDU RX (de-aggregation) and TX (aggregation) supports 802.11ac single-MPDU A-MPDU.
- Multi-BSS/Station
- Transmit rate adaption, transmit power control
- Modulation and coding scheme (MCS): 802.11ac—MCS0-9 & 802.11n—MCS0-7
- Dynamic frequency selection (radar detection) DFS
- 20/40/80 MHz channel bandwidths support
- On-chip gain selectable LNA with optimized noise figure and power consumption
- Internal PA with optimized gain distribution for linearity and noise performance
- Support wide variety of WLAN encryption: TKIP/WEP/AES

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SPECIFICATIONS

Main Chip: Marvell 88W8997 (WLAN);

Input Voltage Requirements: DC 3.3 V \pm 10%

Operating Temperature: -30° to 85°C (-22° to 185°F)

Operating Humidity: 10 to 90% (non-condensing)

Storage Temperature: -40° to 85°C (-40° to 185°F)

Storage Humidity: 10 to 90% (non-condensing)

Maximum Electrostatic Discharge Conductive 4KV;

Air coupled 8KV follow EN61000-4-2

Wi-Fi Media: Direct Sequence-Spread Spectrum (DSSS)

Complementary Code Keying (CCK)

Orthogonal Frequency Divisional Multiplexing (OFDM)

Wi-Fi Media Access Protocol:

Carrier sense multiple access with collision avoidance (CSMA/CA)

A- MPDU Rx (De-aggregation) and Tx (aggregation) (802.11ac single-MPDU A-MPDU

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Feature

Wi-Fi Standards:

IEEE 802.11a, 802.11b, 802.11d*, 802.11e, 802.11g, 802.11h, 802.11i, 802.11k*, 802.11n, 802.11r, 802.11s*, 802.11v*, 802.11ac * Summit version only

Wi-Fi Data Rates Supported:

Support 802.11 ac/a/b/g/n 1X1 MIMO.

802.11b (DSSS, CCK) 1, 2, 5.5, 11 Mbps

802.11a/g (OFDM) 6, 9, 12, 18, 24, 36, 48, 54 Mbps

802.11n (OFDM, HT20/HT40, MCS 0-7)

802.11ac (OFDM, HT20, MCS0-8; OFDM HT40/HT80, MCS 0-9)

Modulation Table BPSK, QPSK, CCK, 16-QAM, 64-QAM, and 256-QAM.

802.11ac 802.11n	HT MCS Index	VHT MCS Index	Spatial Streams	Modulation	Coding	20 MHz		40 MHz		80 MHz	
						No SGI	SGI	No SGI	SGI	No SGI	SGI
	0	0	1	BPSK	1/2	6.5	7.2	13.5	15	29.3	32.5
	1	1	1	QPSK	1/2	13	14.4	27	30	58.5	65
	2	2	1	QPSK	3/4	19.5	21.7	40.5	45	87.8	97.5
	3	3	1	16-QAM	1/2	26	28.9	54	60	117	130
	4	4	1	16-QAM	3/4	39	43.3	81	90	175.5	195
	5	5	1	64-QAM	2/3	52	57.8	108	120	234	260
	6	6	1	64-QAM	3/4	58.5	65	121.5	135	263.3	292.5
	7	7	1	64-QAM	5/6	65	72.2	135	150	292.5	325
	8	8	1	256-QAM	3/4	78	86.7	162	180	351	390
	9	9	1	256-QAM	5/6	N/A	N/A	180	200	390	433.3

2.4 GHz Frequency Bands

ETSI: 2.4 GHz to 2.483 GHz & FCC: 2.4 GHz to 2.473 GHz

2.4 GHz Operating Channels

ETSI: 13 (3 non-overlapping) & FCC: 11 (3 non-overlapping)

5 GHz Frequency Bands

ETSI

5.15 GHz to 5.35 GHz (Ch 36/40/44/48/52/56/60/64)

5.47 GHz to 5.725 GHz (Ch 100/104/108/112/116/120/124/128/132/136/140/144)

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FCC

5.15 GHz to 5.35 GHz (Ch 36/40/44/48/52/56/60/64)

5.47 GHz to 5.725 GHz (Ch 100/104/108/112/116/120/124/128/132/136/140/144)

5.725 GHz to 5.85 GHz (Ch 149/153/157/161/165)

5 GHz Operating Channels (Wi-Fi)

ETSI: 19 non-overlapping; FCC: 24 non-overlapping

Transmit Power:

802.11a: 15 dBm +/- 1dBm

802.11b: 13 +/- 1dBm

802.11g: 13 +/- 1dBm

802.11n (2.4GHz) HT20 & HT40: 13 +/- 1dBm

802.11n (5GHz) HT20: 15 dBm +/- 1dBm

802.11n (5GHz) HT40: 14 dBm +/- 1dBm

802.11ac (5GHz) VHT20: 16 dBm +/- 1dBm

802.11ac (5GHz) VHT40: 14 dBm +/- 1dBm

802.11ac (5GHz) VHT80: 10 dBm +/- 1dBm

Typical Receiver Sensitivity:

802.11a: -89dBm

802.11b: -95dBm

802.11g: -91dBm

802.11n (2.4 GHz): -91dBm

802.11n (5 GHz): -89dBm

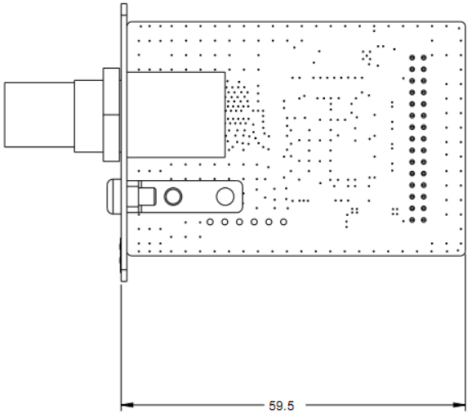
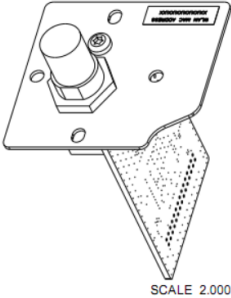
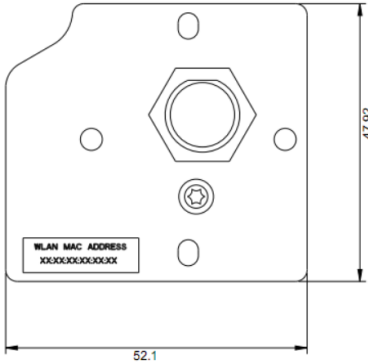
802.11ac (5 GHz): -89dBm

Operating Systems Supported:

Linux 3.x to 4.9.x kernel

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DIMENSIONS ARE IN MM



SCALE 3.000

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Compliance Information

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.

FCC 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 generate, 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.

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

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20cm between the radiator and 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 must 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.

If the three conditions above are met, further transmitter testing is not 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

If these conditions cannot be met (for example certain laptop 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 is 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 end product must be labeled in a visible area with the following: Contains FCC ID: HD5-HONST60Q.

Manual Information to the End User

The OEM integrator must 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.

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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 license-exempt RSSs. Operation is subject to the following two conditions:

- This device may not cause interference; and
- 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:

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

This radio transmitter (IC: 1693B-HONST60Q) 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 (IC: 1693B-HONST60Q) 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.

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;

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(ii) For devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with EIRP limit;

(iii) For devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the EIRP limits specified for point-to-point and non-point-to-point operation as appropriate; and Operations in the 5.25-5.35GHz band are restricted to indoor usage only.

Avertissement:

(i) les dispositifs fonctionnant dans la bande de 5150 à 5250MHz 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) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis pour les dispositifs utilisant les bandes de 5250 à 5350MHz et de 5470 à 5725 MHz doit être conforme à la limite de la p.i.r.e;

(iii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis (pour les dispositifs utilisant la bande de 5725 à 5850 MHz) doit être conforme à la limite de la p.i.r.e. spécifiée pour l'exploitation point à point et l'exploitation non point à point, selon le cas;

Les opérations dans la bande de 5.25-5.35GHz sont limités à un usage intérieur seulement.

Radiation Exposure Statement

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

Déclaration d'exposition aux radiations

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Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

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

- The transmitter module may not be co-located with any other transmitter or antenna.

If the condition above is met, further transmitter test is not 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:

- Le module émetteur peut ne pas être coimplanté avec un autre émetteur ou antenne.

Tant que les 1 condition 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:

If these conditions cannot 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 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 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

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l'obtention d'une autorisation distincte au Canada.

End Product Labeling

The end product must be labeled in a visible area with the following: Contains IC: 1693B-HONST60Q.

Plaque signalétique du produit final

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante:
Contient des IC: 1693B-HONST60Q.

Manual Information to the End User

The OEM integrator must 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.