

Theory of Operation WIC213S IoT Module

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Introduction

The WIC213S is a IoT Module for Home automation networks.

Connected to the Monitor-remote control device, it acts as a pathway between remote home automation.

Power is provided by External 5V power supply with 10pin zip type connector.

Networking

The WIC213S is applied EFR32 IoT Multi-Protocol of Silicon Labs.

The IoT Module delivers the information received from the remote control device to the main board with 10pin zip type connector.

Power Source

The WIC213S is powered by an external [5VDC@500mA](#) regulated power source with 10pin zip type connector.

Indication

None.

Expansion Ports

None.

Eurpoe

Parameter	Description
SW Protocol	IEEE 802.15.4
Modulation type	DSSS-OQPSK
Channel interval	5MHz
Antenna gain	1.36dBi
frequency range	2405MHz~2480MHz
Carrier frequency tolerance	$\leq 20 \times 10^{-6}$
Duty Cycle @ actual used	Max within 1%

US/Canada

FCC approval

This device complies with Part 15 of the FCC's 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 undesirable operation.

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.
- The OEM integrator is responsible for ensuring the end-user has no manual instruction to remove or install module.

Test results

Test condition	Transmitter Power						Limit (dBm)
	2 405 MHz		2 440 MHz		2 480 MHz		
	RMS burst power (dBm)	e.i.r.p. (dBm)	RMS burst power (dBm)	e.i.r.p. (dBm)	RMS burst power (dBm)	e.i.r.p. (dBm)	
NTNV	7.54	8.88	7.61	8.95	7.50	8.84	20
LTVN	7.55	8.89	7.45	8.79	7.24	8.58	
HTNV	7.83	9.17	7.71	9.05	7.34	8.68	

Note.

1. Measured power is the RMS burst power of the transmitter (conducted).
= reading value of the power meter + cable loss
2. e.i.r.p. is calculated as defined in clause 5.6.2.2.1.2 step 6; e.i.r.p = Measured power(A) + G
3. Max RF output power e.i.r.p. 9.17 dBm.

-The module is limited to installation in mobile or fixed applications.

IC approval

This device contains licence-

exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic development Canada's licenceexempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible de compromettre le fonctionnement.

IMPORTANT NOTE

This device complies with FCC & IC radiation exposure limits set forth for an uncontrolled environment. This device should be installed and must not be colocated or operating in conjunction with any other antenna or transmitter.

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

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

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 with this module installed.

In the event that these conditions cannot be met, then the FCC & IC authorizations are 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 reevaluating the end product including this module and obtaining separate FCC & IC authorizations.

Cet appareil est conforme aux limites de la FCC et IC exposition aux radiations dans un environnement non contrôlé.

Cet appareil doit être installé et ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ouun autre émetteur.

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

1) L' antenne doit être installée de telle sorte que 20 cm est maintenue entre l'antenne et les utilisateurs .

2) Ce module ne peut pas être co-localisé avec d'autres émetteurs ou des antennes .

Aussi longtemps que deux conditions précitées sont remplies, le test du transmetteur supplémentaires ne seront pas tenus. Toutefois, l'intégrateur OEM est toujours responsable de tester leurs produits finis pour toutes les exigences de conformité supplémentaires avec ce module installé.

Dans le cas où ces conditions ne peuvent pas être remplies, alors la FCC et IC autorisations ne sont plus considérés comme valides et l'ID de la FCC ne peut pas être utilisé sur le produit final.

Dans ces circonstances, l'intégrateur OEM sera responsable de réévaluer le produit final, y compris l'obtention de ce module et séparée de la FCC et IC Autorisations

User Information

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

Attention: Toute changé ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'utilisateur `autorité de faire fonctionner cet équipement.

Supplemental User's Manual

INTEGRATION INSTRUCTIONS per FCC KDB 996369 D03, Section 2.0

2.2 List of applicable FCC rules

The module has been certified for use under FCC Part 15.247 only

2.3 Summarize the specific operational use conditions

The host device must be tested for spurious emissions due to the module's lack of its own shielding.

2.4 Limited module procedures

The host device must be tested for spurious emissions due to the module's lack of its own shielding.

2.5 Trace antenna designs

Antenna is integrated into module and the module should be used with no other antennas

2.6 RF exposure considerations

The antenna(s) 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 device.

2.7 Antennas

Antenna is soldered on the module and and the module should be used with no other antennas.

2.8 Label and compliance information

Module contains its own label

2.9 Information on test modes and additional testing requirements

None required.

2.10 Additional testing, Part 15 Subpart B disclaimer

This module has been tested and certified to comply with FCC Part 15C requirements. The host device to which it is installed may require additional testing to show compliance with FCC Part 15B requirements.

Supplemental User's Manual

INTEGRATION INSTRUCTIONS per FCC KDB 996369 D03, Section 2.0

Notice:

OEM should include the following warnings on the label:

“Contains FCC ID:*****, IC Number:*****”

As well as the model name:

“*****”

Installer should include the following in the user’s manual:

“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.”

“Changes of modification not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.”