

Signify Classified - Internal


SMART RF MODULE GEN II



SMART RF MODULE GEN II USER MANUAL

Changing Content List:

Updated Date	Change Request No.	Remarks
2019/10/12		Initial version

Signify Classified - Internal	SMART RF MODULE GEN II	
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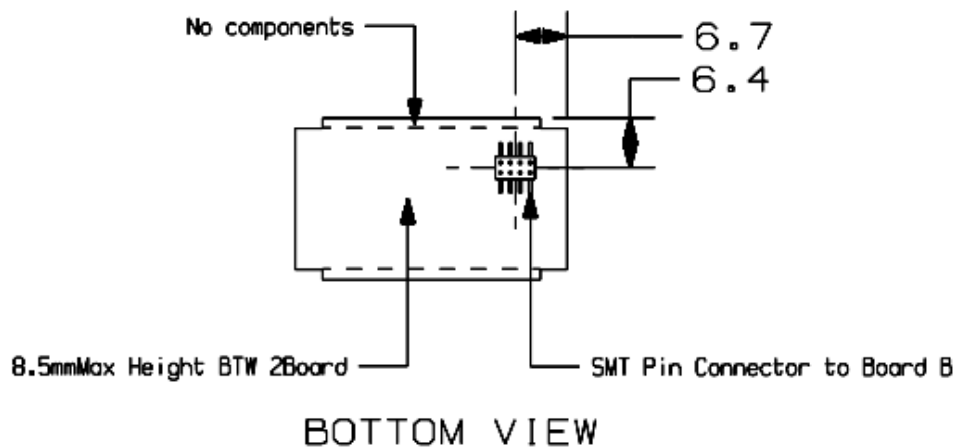
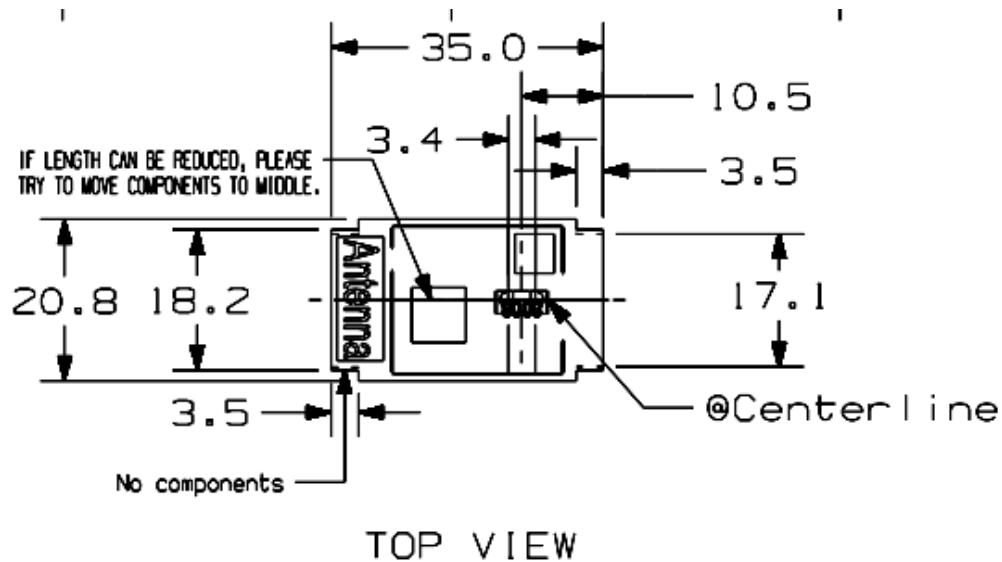
1) Module layout and drawing

a. Module picture



b. Dimensions

Name	Value	Tolerance	Remarks
Width (mm)	20.8	±0.2	
Length (mm)	35.0	±0.2	
Height (mm)	12	±1	



2) Electrical Specification

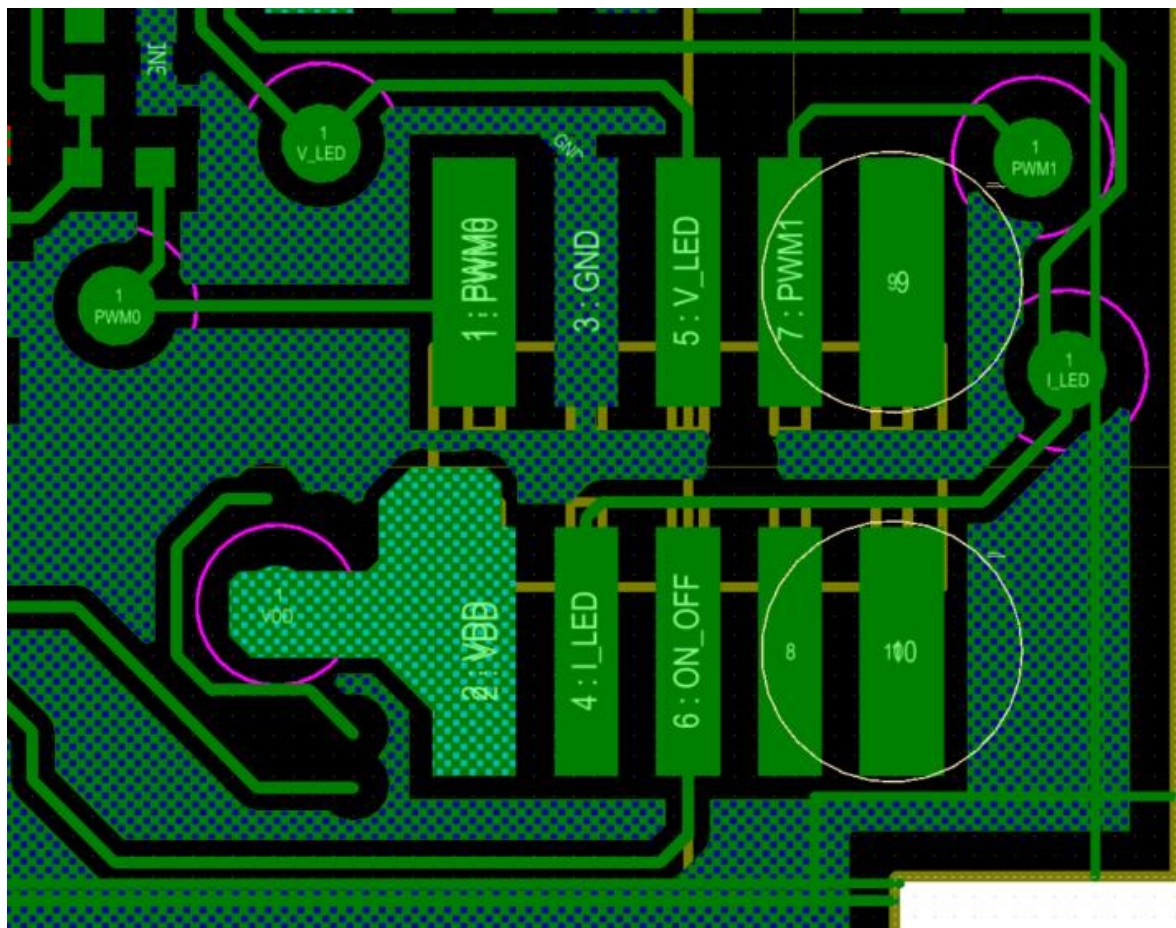
Name	Value	Tolerance	Remarks
Vcc voltage (V)	5V	±5%	
Current (normal, mA)	40		
Storage temperature (°C)	-40~120		

3) RF Specification

Item	Conditions	Spec		
		Min	Typical	Max
Frequency tolerances (ppm)	Continuous single tone		+/-40	
Frequency range (MHZ)		2400~2483.5		
Output power (dBm)	Measured at antenna feed point		4.0±1.0	
Spurious emissions* (dBm)	30 – 1000MHz		-36	
	1 – 12.75GHz		-30	
	1.8 – 1.9GHz		-47	
	5.15 – 5.3GHz		-47	
EVM (%rms)			<10	

Receiver Sensitivity (dBm)	PER < 1%, tested on the feeding point of antenna		-99	
TRP	when connected to motherboard (i.e. SMART TLED)	-2dBm		

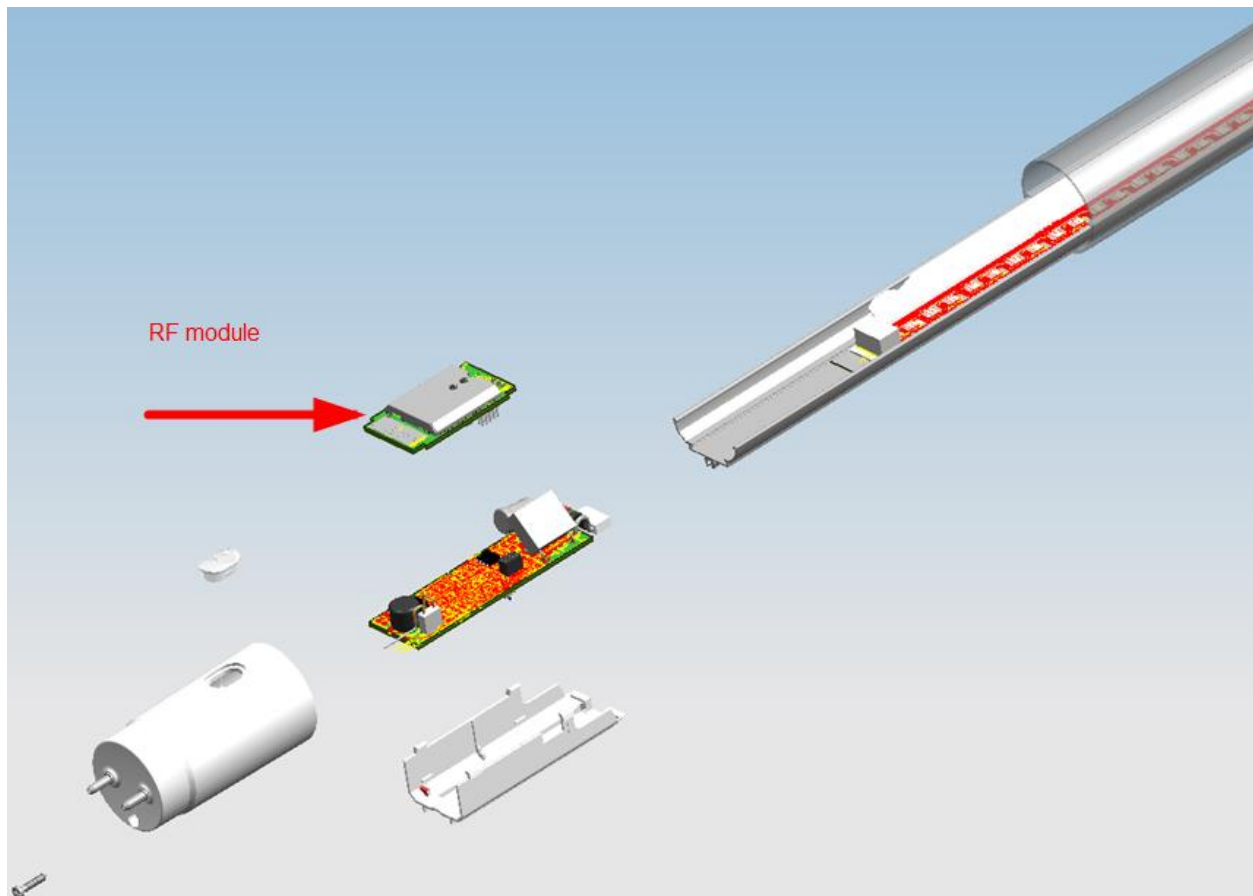
4) Pin out definition



Name	No.	Function
PWM0	1	PWM output
VDD	2	DC input
GND	3	Ground
ILED	4	ILED for Power metering
VLED	5	VLED for Power metering
ON OFF	6	PWM output, for TLED application is for shunting down the power of LED in order to saving power while being standby mode
PWM1	7	PWM output
	8	unused
	9	unused
	10	unused

5) Application

This module is normally integrated in Smart TLED lighting for dimming, via Zigbee/BLE wireless control messages sent by user. Below picture is application on T8 for reference.



6) Integration instructions

6.1 list of applicable FCC rules

This device complies with part 15.247 of the FCC Rules.

6.2 Summarize the specific operational use conditions

This module can be used in household electrical appliances as well as lighting equipment's. The input voltage to the module should be nominally 4.75~5.25V ,typical value 5.0VDC and the ambient temperature of the module should not exceed 85°C.On-board PCB antenna gain is 4dBi.Other

antenna arrangement is not covered by this certification. The antenna is not field replaceable. If the antenna needs to be changed, the certification should be re-applied.

6.3 Limited module procedures

Not applicable

6.4 Trace antenna designs

Not applicable

6.5 RF exposure considerations

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. If the device built into a host as a portable usage, the additional RF exposure evaluation may be required as specified by§ 2.1093.

6.6 Antennas

The module has a PCB antenna.

6.7 Label and compliance information

The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording such as: “Contains Transmitter Module FCC ID: 2AGBW442294721351X”, or “Contains FCC ID: 2AGBW442294721351X”, Any similar wording that expresses the same meaning may be used.

6.8 information on test modes and additional testing requirements

a) The modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).

b) The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. It is important to note that host product manufacturers should not assume that because the modular transmitter is certified that they do not have any responsibility for final product compliance.

c) If the investigation indicates a compliance concern the host product manufacturer is obligated to mitigate the issue. Host products using a modular transmitter are subject to all the applicable individual technical rules as well as to the general conditions of operation in Sections 15.5, 15.15, and 15.29 to not cause interference. The operator of the host product will be obligated to stop operating the device until the interference has been corrected. Below are steps for TX verification:

- We must flash dedicated RF test firmware to DUT for non-signal TX with dedicated Commands/Tool as attached.
- For Zigbee TX, commands listed below can help to generate CW and modulated wave with expected RF power level after flashing dedicated RF test firmware

- [TH,RfTest,init,0] //RF test initialize
- [TH,RfTest,setmode,unmodtx] // setting CW mode
- [TH,RfTest,setmode,txstream] //setting modulated wave mode
- [TH,RfTest,setchnl,18] //set channel 18
- [TH,RfTest,setpwr,4] //set RF power 4dBm
- [TH,RfTest,start,0] //start to transmit
- For BLE TX, similar function can be activated by using HueApprobationTool.exe attached



6.9 Additional testing, Part 15 subpart B disclaimer

The final host / module combination needs to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital devices. The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation and should refer to guidance in KDB 996369. Frequency spectrum to be investigated For host products with certified modular transmitter, the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a)(1) through (a)(3), or the range applicable to the digital device, as shown in Section 15.33(b)(1), whichever is the higher frequency range of investigation. Operating the host product When testing the host product, all the transmitters must be operating. The transmitters can be enabled by using publicly available drivers and turned on, so the transmitters are active. In certain conditions it might be appropriate to use a technology-specific call box (test set) where accessory devices or drivers are not available. When testing for emissions from the

unintentional radiator, the transmitter shall be placed in the receive mode or idle mode, if possible. If receive mode only is not possible then, the radio shall be passive (preferred) and/or active scanning. In these cases, this would need to enable activity on the communication BUS (i.e., PCIe, SDIO, USB) to ensure the unintentional radiator circuitry is enabled. Testing laboratories may need to add attenuation or filters depending on the signal strength of any active beacons (if applicable) from the enabled radio(s). See ANSI C63.4, ANSI C63.10 and ANSI C63.26 for further general testing details. The product under test is set into a non-signal mode with a partnering device/equipment, as per the normal intended use of the product. To ease testing, the product under test is set to transmit at a high duty cycle, such as by sending a file or streaming some media content.