WIM2480

The compact-sized BLE 5.2 module, designed for intelligent wireless controls, enables ultra-low power connectivity and provides considerable design flexibility to the engineers. WIM2480, with options for an external or a chip antenna, also has 18 General Purpose IO pins including, 6 PWM, ADC, I2C, UART, and SPI.

Table of Contents

1. Features

- BLE 5.2 based non-flooding intelligent mesh
- PWM/AIO/SPI/I2C/UART/IO interfaces
- External or chip antenna options
- TX output power up to +8dBm
- -92dBm RX sensitivity
- 18 programmable GPIOs
- 6 PWM channels
- Compact form factor
- Zero downtime Over-the-Air (OTA) firmware updates

2. Specifications

Electrical specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input voltage	VDD	1.7	3.0	5.5	V
IO supply voltage			VDD		V

RF specifications

Parameter	Min.	Typ.	Max.	Unit
Operating frequency	2402	-	2480	MHz
Maximum output power	-	8	-	dBm
Receiver sensitivity	-	-92	-	dBm

ADC specifications

Parameter	Min.	Typ.	Max.	Unit	Remarks
ADC input voltage	0.6	-	3.6	V	@3.3V input

PWM specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
PWM frequency		0.1	32	1000	kHz	Up to 10KHz for low frequency PWM pins
Maximum voltage for logic low	VIL	0	-	1.08	V	
Absolute maximum current sourced	IMAX	-	-	15	mA	
Absolute maximum voltage level	VMAX	-	-	3.6	V	

Current specifications

Parameter	Min.	Typ.	Max.	Unit	Remarks
Deep sleep current	-	-	1.5	μA	@3V
TX peak current	-	15.5	-	mA	@8dBm
RX peak current	-	6.0	-	mA	@1Mbps

Environmental specifications

Parameter	Symbol	Min.	Max.	Unit
Operating temperature	T_{opr}	-40	85	°C
Storage temperature	T_{str}	-40	125	°C

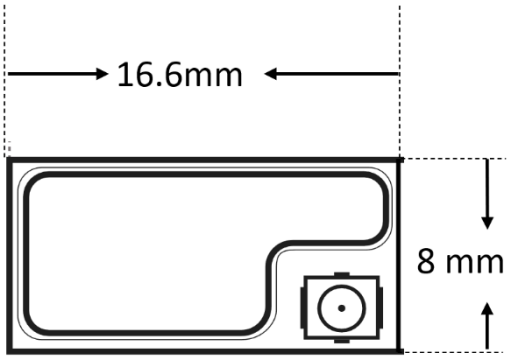
Mechanical specifications

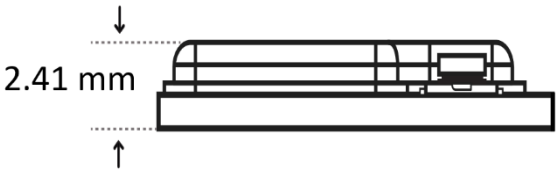
Parameter	Typ.	Max.	Unit	Remarks
Dimension	22.5 x 8.0 x 2.95		mm	For chip antenna
Dimension	16.60 x 8.0 x 2.41		mm	For external antenna

3. Module Dimensions

External antenna version (WIM2480E)

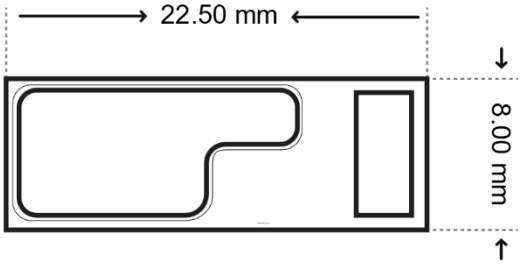
- Dimensions: 16.60 x 8.0 x 2.41 mm (with external antenna)
- Pitch: 1.33 mm
- Module pad dimensions: 0.737 x 0.698 mm

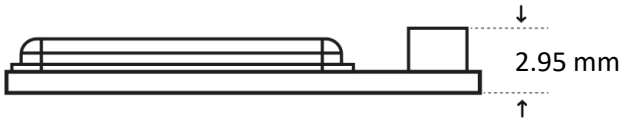




Chip antenna version (WIM2480C)

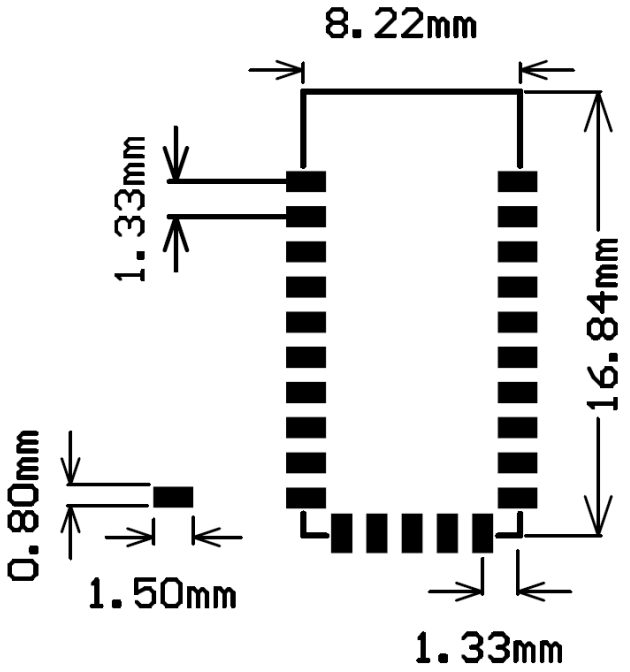
- Dimensions: 22.50 x 8.0 x 2.95 mm (with chip antenna)
- Pitch: 1.33 mm
- Module pad dimensions: 0.737 x 0.698 mm



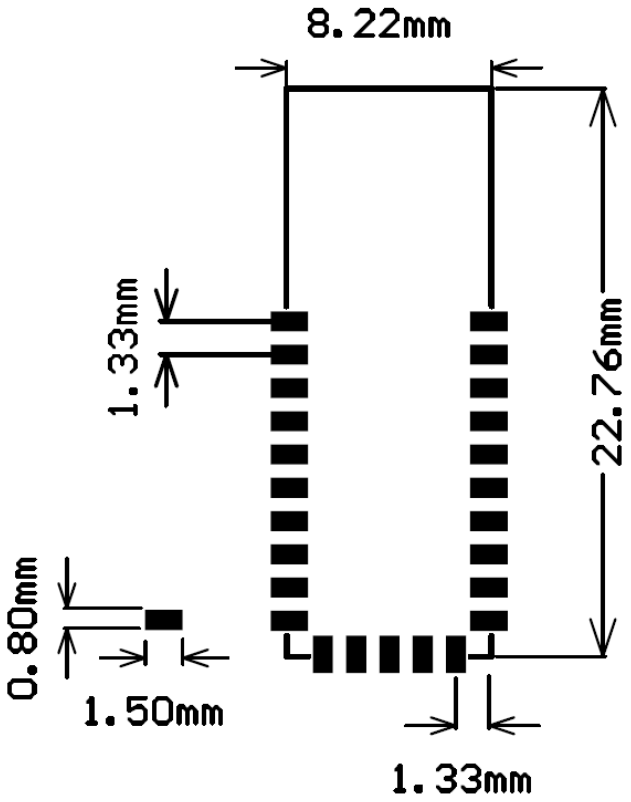


4. Land Pattern Dimensions

All dimensions are in mm



WIM2480E



WIM2480C

5. Design Recommendations

a) Keep out enough area for the chip antenna.

b) Avoid any routing under antenna area as shown in the below image.

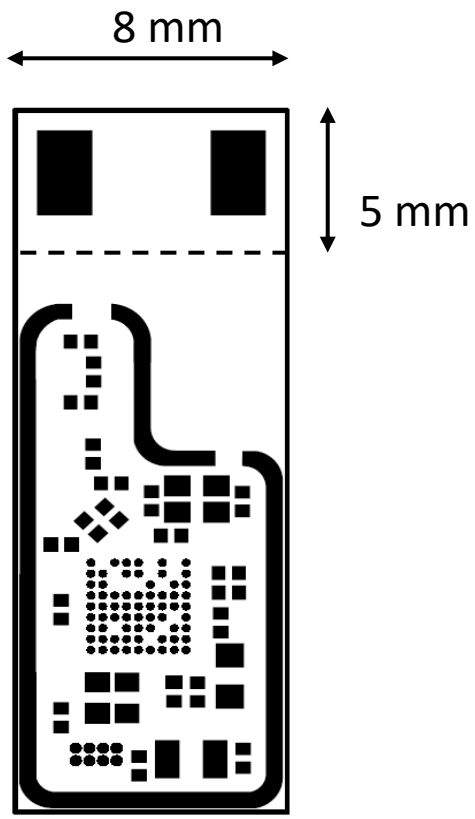
c) Better to place the module away from High frequency circuitry like other RF, and large components or metallic objects.

d) All GND pins must be well grounded.

e) The area around the module should be free of any ground planes, power planes, trace routings or metal for 6 mm from the module antenna position in all directions.

f) Better not to route any traces underneath the module.

g) The WIM2480 series modules contain highly sensitive electronic circuitry and are Electrostatic Sensitive Devices (ESD). Handling the WIM series modules without proper ESD protection may destroy or damage them permanently.



6. Antenna

External wire antenna – 37mm

37mm wire antenna

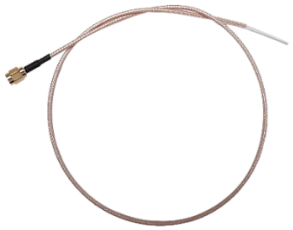
Antenna Properties	
Frequency range	2.4GHz-2.5GHz
Impedance	50Ω Nominal
VSWR	1.92:1 Max
Return loss	-10dB Max
Gain (Peak)	2dBi
Cable loss	0.3dBi Max

External wire antenna – 100mm

100mm wire antenna

Antenna Properties	
Frequency range	2.4GHz-2.5GHz
Impedance	50Ω Nominal
SWR	≤ 2.0
Gain (Peak)	3dBi

External wire antenna – 600mm



600mm wire antenna

Antenna Properties	
Frequency range	2.4GHz-2.5GHz
Impedance	50Ω Nominal
VSWR	≤ 1.3
Gain (Peak)	3dBi

Stick antenna

Stick antenna

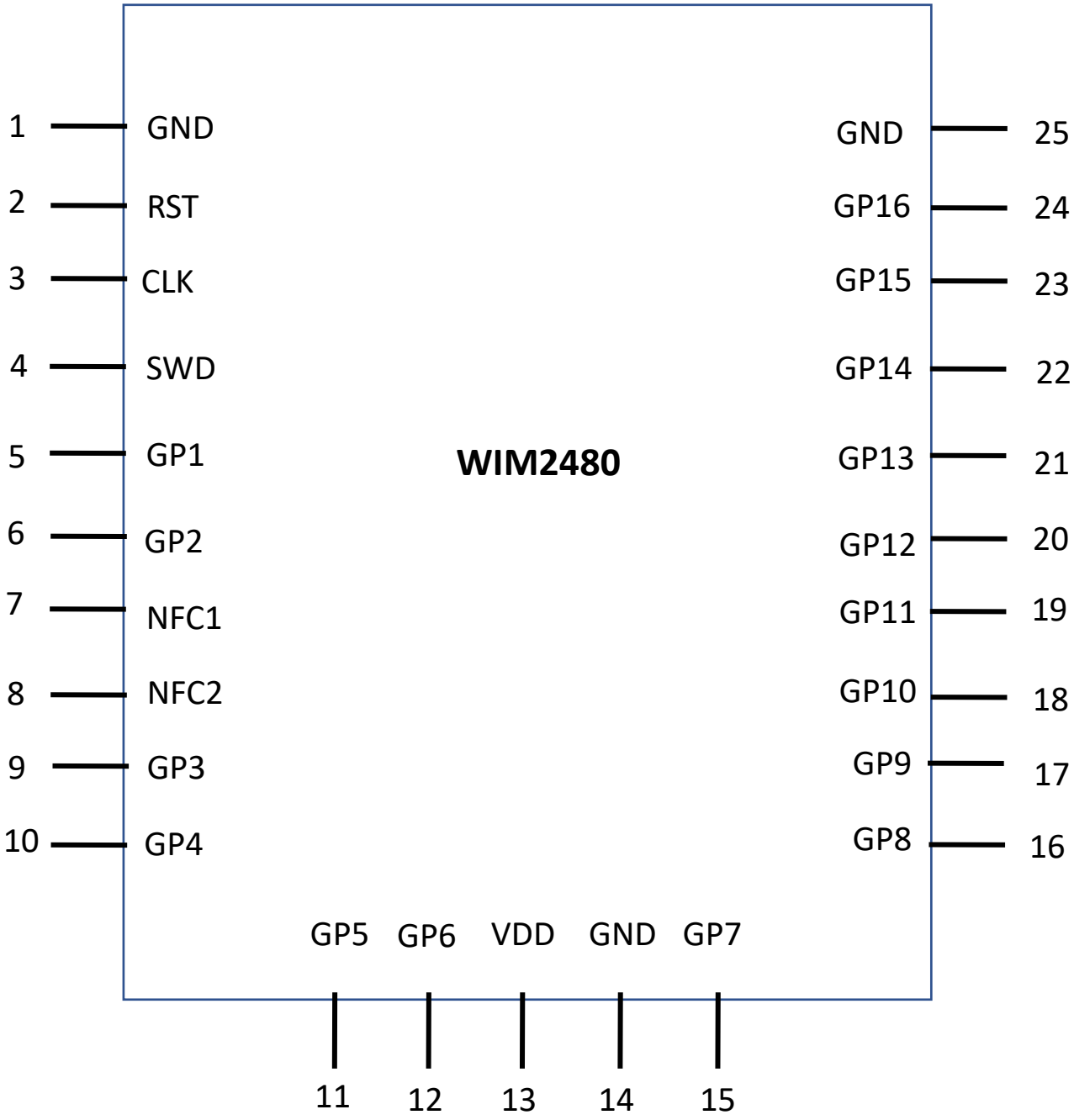
Antenna Properties	
Frequency range	2.4GHz-2.5GHz
Impedance	50Ω Nominal
VSWR	1.92:1 Max
Return loss	-10dB Max
Gain (Peak)	2dBi
Cable loss	0.3dBi Max
Polarization	Linear Vertical

Chip antenna

Chip antenna

Antenna Properties	
Frequency range	2.4 GHz-2.5 GHz
Impedance	50 Ω
Peak Gain	1.7 dBi
VSWR	<2:1
Radiation pattern	Omnidirectional
Polarization	Linear

7. Pinout Details



MODULE PIN	CHIP PIN	NAME	SUPPORTING FUNCTIONS	COMMENTS
1		GND	GROUND	Ground
2	H4/P0.18	RST	RESET	Reset
3	H2	CLK	SWDCLK	Serial wire debug clock input for debug and programming
4	J2	SWD	SWDIO	Serial wire debug IO for debug and programming
5	C8/P0.27	GP1	IO/PWM/I2C/SPI/UART	PWM or Digital IO or Serial interface
6	F7/P0.13	GP2	IO/PWM/I2C/SPI/UART	PWM or Digital IO or Serial interface
7	F2/P0.09	NFC1	NFC1/IO	Digital IO (Low Freq)
8	E2/P0.10	NFC2	NFC2/IO	Digital IO (Low Freq)
9	E7/P0.08	GP3	IO/PWM/I2C/SPI/UART	PWM or Digital IO or Serial interface
10	D9/P0.05	GP4	IO/PWM/I2C/SPI/UART/AIO	AIO or Digital IO or PWM or Serial interface
11	J3/P0.22	GP5	IO/PWM/I2C/SPI/UART	PWM or Digital IO or Serial interface
12	J5/P0.17	GP6	IO/PWM/I2C/SPI/UART	PWM or Digital IO or Serial interface
13		VDD	POWER (3.3V)	Power
14		GND	GROUND	Ground
15	A4/P0.03	GP7	IO/PWM/AIO	AIO or Digital IO or PWM (up to 10KHz)
16	A3/P0.25	GP8	IO/PWM	Digital IO or PWM (up to 10KHz)
17	B4/P1.03	GP9	IO/PWM	Digital IO or PWM (up to 10KHz)
18	C6/P0.02	GP10	IO/PWM/AIO	AIO or Digital IO or PWM (up to 10KHz)
19	C4/P1.05	GP11	IO/PWM	Digital IO or PWM (up to 10KHz)
20	C5/P0.19	GP12	IO/PWM	Digital IO or PWM (up to 10KHz)
21	A5/P0.29	GP13	IO/PWM/AIO	AIO or Digital IO or PWM (up to 10KHz)
22	E9/P0.06	GP14	IO/PWM	PWM/ Digital IO
23	C9/P0.26	GP15	IO/PWM/I2C/SPI/UART	PWM or Digital IO or Serial interface
24	F9/P1.08	GP16	IO/PWM/I2C/SPI/UART	PWM or Digital IO or Serial interface
25		GND	GROUND	Ground

Note: If SPI is used with 8 Mbps data rate, the recommended GPIOs for the clock signal (SCK) are GP1, and GP16

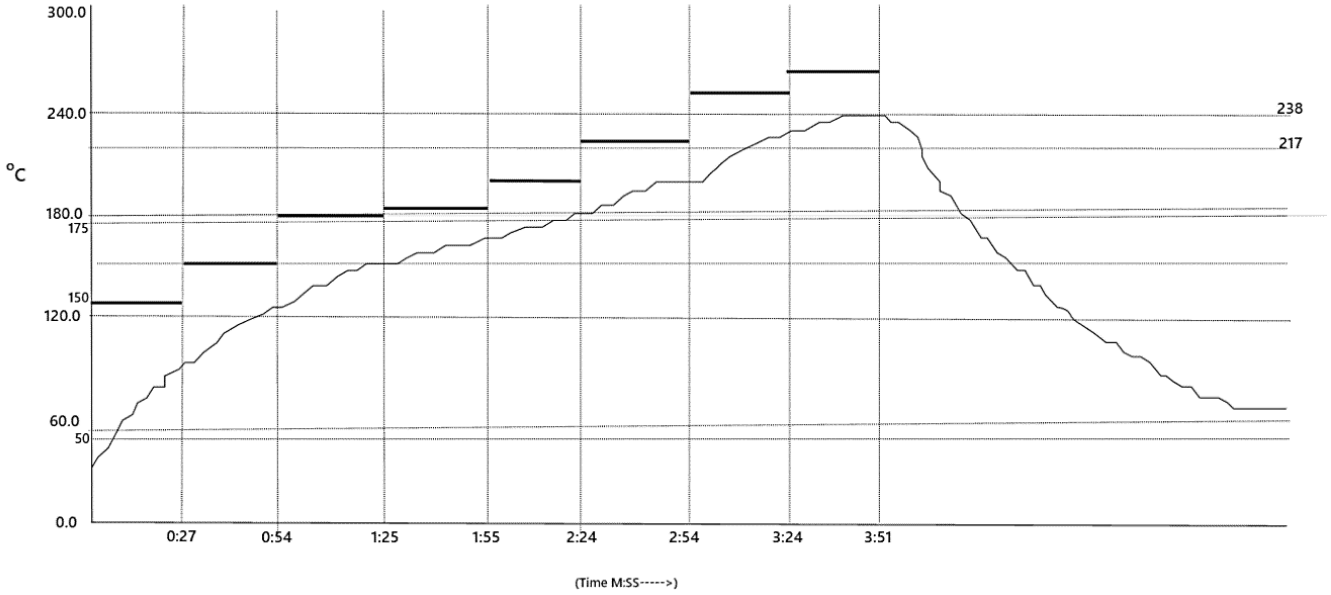
8. Firmware Pin Assignment

PROFILE TYPE / PIN DETAILS	Intensity	Intensity, CCT	Relay On/off, Analog dual channel i/p and o/p	Intensity, CCT, motor control
Pin	**24** (GP16)	**23** (GP15)	**20** (GP12)	**10** (GP4)
Functionality	Intensity channel	Cool channel	Relay PIO	UART TX
Pin		**24** (GP16)	**23** (GP15)	**9** (GP3)
Functionality		Warm channel	Color temperature channel	UART RX
Pin			**24** (GP16)	
Functionality			Intensity channel	
Pin			**18** (GP10)	
Functionality			Analog i/p channel 1	
Pin			**21** (GP13)	
Functionality			Analog i/p channel 2	

PROFILE TYPE / PIN DETAILS	Analog dual channel o/p, PIR	RGB, CCT, Intensity	UART	DALI
Pin	**23** (GP15)	**5** (GP1)	**10** (GP4)	**23** (GP15)
Functionality	Color temperature channel	Red channel	UART TX	DALI-
Pin	**24** (GP16)	**6** (GP2)	**9** (GP3)	**24** (GP16)
Functionality	Intensity channel	Green channel	UART RX	DALI+
Pin	**18** (GP10)	**10** (GP4)		
Functionality	Sensor trigger PIO	Blue channel		
Pin	**11** (GP5)	**23** (GP15)		
Functionality	Sensor data communication	Cool channel		
Pin	**12** (GP6)	**24** (GP16)		
Functionality	Sensor data communication	Warm channel		

9. Soldering Information

Leadfree reflow soldering



Do not exceed peak temperature (Tp) of 242°C. Time at maximum temperature is 27 seconds. After reflow soldering, optical inspection of the module is recommended to verify proper alignment. Hand soldering is also possible.

Cleaning

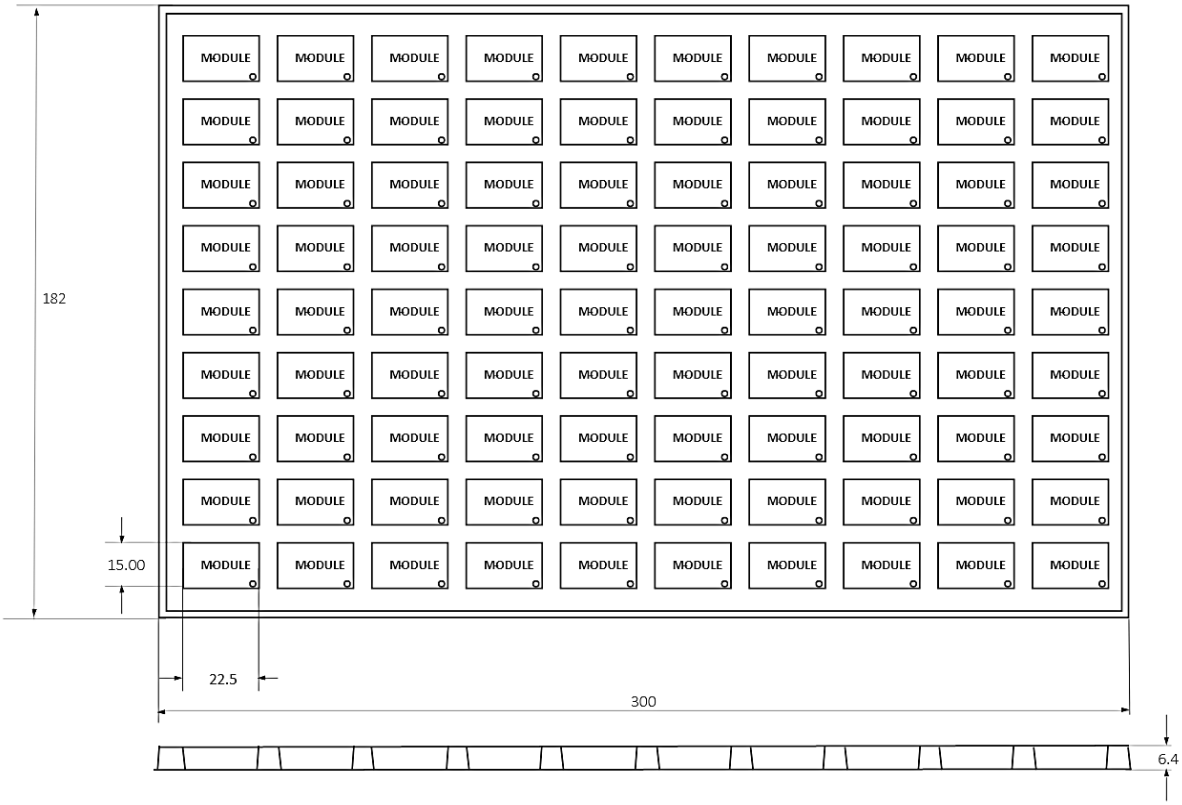
In general, cleaning the populated modules is strongly discouraged. Residuals under the module cannot be easily removed with any cleaning process.

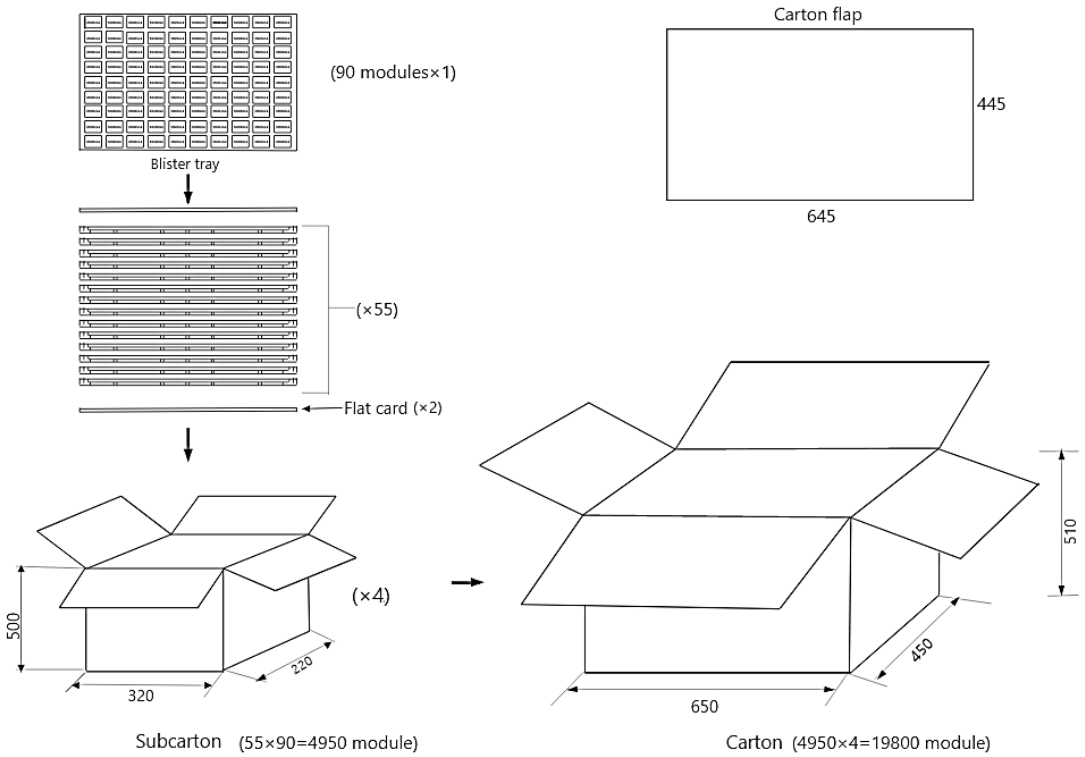
1. Cleaning with water can lead to capillary effects where water is absorbed into the gap between the host board and the module. The combination of soldering flux residuals and encapsulated water could lead to short circuits between neighboring pads. Water could also damage any stickers or labels.

2. Cleaning with alcohol or a similar organic solvent will likely flood soldering flux residuals into the RF shield, which is not accessible for post-washing inspection. The solvent could also damage any stickers or labels.

10. Packaging Information

*All dimensions are in mm





11. Ordering Information

Product code	Communication	Voltage Rating	Analog Channel I/O	PWM I/O	Serial Interface	Antenna	Dimensions (mm)
WIM2480E	BLE 5.2	3.0V DC	4 AIO	6 Channels	UART/SPI/I2C	External	16.60 x 8.0 x 2.41
WIM2480C	BLE 5.2	3.0V DC	4 AIO	6 Channels	UART/SPI/I2C	Chip	22.50 x 8.0 x 2.95

12. Precautions

- While integrating module, make sure all the pads are soldered properly.
- Please use a voltage regulator if the power supply is above the max ratings.
- For best wireless signals, please avoid packing the antenna close to metal parts or cases.
- Stresses above the listed maximum ratings may cause permanent damage to the device.

CONNECTING THINGS TO LIFE

23282 Mill Creek Dr #340, Laguna Hills
CA 92653, USA

Version 1.4

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 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 to this device not explicitly approved by manufacturer could void your authority to operate this 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 Information

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 and your body.

ISED Statement

English:This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada' s licence-exempt 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.

The digital apparatus complies with Canadian CAN ICES-3 (B)/NMB-3(B).

French: Cet appareil contient des é metteurs/r é cepteurs exempts de licence qui sont conformes aux RSS exempt é s de licence d'Innovation, Sciences et D é veloppement é conomique Canada.

L'exploitation est soumise aux deux conditions suivantes :

(1) Cet appareil ne doit pas provoquer d'interf é rences.

(2) Cet appareil doit accepter toute interf é rence, y compris les interf é rences susceptibles de provoquer un fonctionnement ind é sirable de l'appareil.

l'appareil num é rique du ciem conforme canadien peut - 3 (b) / nmb - 3 (b).

This device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS 102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

cet appareil est conforme à l'exemption des limites d' é valuation courante dans la section 2.5 du cnr - 102 et conformit é avec rss 102 de l'exposition aux rf, les utilisateurs peuvent obtenir des donn é es canadiennes sur l'exposition aux champs rf et la conformit é .

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment.

Cet é quipement est conforme aux limites d'exposition aux rayonnements du Canada é tablies pour un environnement non contrôl é .

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet é quipement doit ê tre install é et utilis é à une distance minimale de 20 cm entre le radiateur et votre corps.

2.2 List of applicable FCC rules
CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter.

2.3 Specific operational use conditions
This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures
Not applicable

2.5 Trace antenna designs
Not applicable

2.6 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.

2.7 Antennas
This radio transmitter FCCID: 2AG4N-WIM2480 has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

2.8 Label and compliance information
The final end product must be labeled in a visible area with the following "Contains FCC ID:2AG4N-WIM2480".

2.9 Information on test modes and additional testing requirements
Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

2.10 Additional testing, Part 15 Subpart B disclaimer
Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.