



# BGM220P22A22A

Bluetooth Module

Version 1.1



## Introduction

### Overview

2AD9P-GM220P is change in ID of a Silicon Labs BGM220P22A module; current FCC ID#: QOQ-GM220P and Current IC ID#: 5123A-GM220P. Silicon Labs BGM220P22A module is designed and built to meet the performance, security and reliability requirements of battery-powered IoT products running on Bluetooth networks. The BGM220P22A enables Bluetooth® Low Energy connectivity while delivering best-in-class RF range and performance, future-proof capability for feature and OTA firmware updates, enhanced security features, and low energy consumption.

Prentke Romich has added host-specific portable configuration for BGM220P22A module, non-composite device. This product differs from the originally approved BGM220P22A module in the following manor:

- (a) Associated digital circuitry. – No changes to this section.
- (b) Functional capabilities. –The SAR exclusion for portable applications was met by setting the Power Output to below 4 mW via firmware running on the device.
- (c) Antenna Characteristics. – No changes to this section.
- (d) Cosmetic differences. – No changes to this section.
- (e) Other. - Relabeled the module to include updated FCC and IC IDs



### 1. Applicable FCC and IC Rules:

FCC Part 15.247

### 2. Operational Use Conditions (if applicable):

#### General Operating Conditions

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Operating ambient Temperature range	T <sub>A</sub>	-G temperature grade	-40	--	+85	°C
		-N temperature grade	-40	--	+105	°C
VDD operating supply voltage	V <sub>VDD</sub>	DCDC in regulation <sup>1</sup>	2.2	3.0	3.8	V
		DCDC in bypass	1.8	3.0	3.8	V
HCLK and SYSCLK frequency	f <sub>HCLK</sub>	VSCALE2, MODE = WS1	--	--	76.8	MHz
		VSCALE2, MODE = WS0	--	--	40	MHz
		VSCALE1, MODE = WS0	--	--	40	MHz
PCLK frequency	f <sub>PCLK</sub>	VSCALE2	--	--	50	MHz
		VSCALE1	--	--	40	MHz
EM01 Group A clock frequency	f <sub>EM01GRPACLK</sub>	VSCALE2	--	--	76.8	MHz
		VSCALE1	--	--	40	MHz
EM01 Group B clock frequency	f <sub>EM01GRPBCLK</sub>	VSCALE2	--	--	76.8	MHz
		VSCALE1	--	--	40	MHz
Radio HCLK frequency	f <sub>RHCLK</sub>	VSCALE2 or VSCALE1	--	38.4	--	MHz
<b>Note:</b>						
1. The supported maximum V <sub>VDD</sub> in regulation mode is a function of temperature and 10-year lifetime average load current.						

### 3. RF Exposure Considerations:

To comply with FCC's RF radiation exposure requirements, the antenna(s) used for this transmitter must be installed such that a minimum separation distance of 20 cm is maintained between the radiating element (antenna) & any user's or bystander at all times and must not be co-located or operating in conjunction with any other antenna or transmitter.

OR

Other Applicable Statement

### 4. Antennas Approved for Use with this Module:

Category	Type	Gain	Manufacturer	Model Number
Bluetooth	Integral	1.86	AMOTECH Co., Ltd	1.86

### 5. Label and Compliance Information



The module must be properly labelled with the text “FCC ID: 2AD9P-GM220P” and “IC: 23408-GM220P”.

The OEM must include the following statements on the exterior of the finished product unless the product is too small (e.g. less than 4 x 4 inches):

*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 any interference that may cause undesired operation.*



## 6. Manual Statements

The following must be included in the manual for *finished products that contain* this module:

*The product contains FCC ID: 2AD9P-GM220P and IC: 23408-GM220P*

**OR**

*Contains FCC ID: 2AD9P-GM220P*

*Contains IC: 23408-GM220P*

Also, manual for products containing this module shall include the appropriate statement:

*This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his expense.*

**OR**

*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.*

## Information on test modes and additional testing requirements

- a) The modular transmitter has been fully tested by original module certification holder (Silicon Labs, grantee code QOQ, IC Company Number 5123A5123A-GM220P) 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 (the installer of 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.
- 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.

**Additional testing, Part 15 subpart B disclaimer**

The final host/module combination must be evaluated against the FCC Part 15B for unintentional radiators, and IC Interference-Causing Equipment Standard for Digital Apparatus in order to be properly authorized for operation as a Part 15 digital device. The host integrator installing this module into their product must ensure that the final composite product complies with the FCC/IC requirements by a technical assessment or evaluation to the FCC/IC rules, including the transmitter operation and should refer to guidance in KDB 996369. For host products including a 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 Sections 15.33(b)(1), whichever is the higher frequency range of investigation.

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 50 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 link/association with a partnering device, 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.

### **FCC Warning**

*WARNING: The Federal Communications Commission warns that changes or modifications of the radio module within this device not expressly approved by Prentke Romich Company could void the user's authority to operate the equipment. 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.*

### **ISED Warning**

The OEM must include the following regulatory statements (shown in italics) in both English and French on the exterior of the finished product and/or in the product's User's Guide:

*This device complies with Industry Canada licence-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.*

*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.*

If the module utilizes external removable antennas the following is required in the module's manual. Furthermore, if the finished product also uses a removable (or replaceable) antenna then the OEM must include the following regulatory statements (shown in italics) in both English and French in the product's User's Guide:

*Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.*

*This radio transmitter IC: 23408-GM220P 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.*

*Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.*

*Le présent émetteur radio IC: 23408-GM220P 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.*

1. AMAN301512ST01 (**AMOTECH Co., Ltd.**)
  - 1) *Approved antenna 2*
  - 2) *Approved antenna 3*
  - 3) *Approved antenna 4*

### 11.5 Proximity to Human Body

When using the module in an application where the radio is located close to the human body, the human RF exposure must be evaluated. FCC, ISED, and CE all have different standards for evaluating the RF exposure, and because of this, each standard requires a different minimum separation distance between the module and human body. Certification of BGM220P allows for the minimum separation distances detailed in the table below in portable use cases (less than 20 cm from human body). The module is approved for the mobile use case (more than 20 cm) without any need for RF exposure evaluation.

**Table 11.1. Minimum Separation Distances for SAR Evaluation Exemption**

Certification	BGM220P22A
FCC	Bluetooth LE: 0 mm
ISED	Bluetooth LE: 14 mm
CE	The RF exposure must always be evaluated using the end-product when transmitting with power levels higher than 20 mW (13 dBm).

For FCC and ISED, using the module in end-products where the separation distance from the human body is smaller than that listed above is allowed but requires evaluation of the RF exposure in the final assembly and applying for a *Class 2 Permissive Change* or *Change of ID* to be applied to the existing FCC/ISED approvals of the module. For CE, RF exposure must be evaluated using the end-product in all cases when transmitting at more than the power level indicated in the table.

**Note:** Placing the module in touch or very close to the human body will have a negative impact on the efficiency of the antenna thus a reduced range is to be expected.



