



# **User Manual**

## **BGM220S22A**

### **Compliance and Regulatory Statements**

#### **FCC Compliance Statement (USA)**

This device complies with Part 15.247. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with Class B Digital Devices, 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 residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the product manuals, 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, the user is encouraged to employ one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced RF service technician for help

The end product must be labeled, in a visible area, with the following:

Contains FCC ID: I28-BGM220S22A

#### **Modification Warning**

The user is cautioned that any changes or modifications not expressly approved by Zebra Technologies could void the user's authority to operate the equipment. To ensure compliance, this printer must be used with fully shielded communication cables.

#### **RF Exposure Statement**

This transmitter complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures. This transmitter must be at least 20 cm from the user and must not be co-located or operating in conjunction with any other antenna or transmitter.



### **Canadian DOC Compliance Statement**

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada. This Class B digital apparatus complies with Canadian ICES-003.

### **Innovation, Science, and Economic Development Canada (ISED) Warning**

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.

Énoncé d'exposition aux rayonnements: Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.

This device complies with Industry Canada license-exempt RSS standard(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.

### **ISED Radiation Exposure Statement**

This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and user body.

Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.

The end product must be labeled, in a visible area, with the following:  
Contains IC: 3798B-BGM220S22A

### **Approved Antenna Information**

Only the integrated antenna on the module is allowed and cannot be user replaceable.

Antenna type: dipole

Antenna Gain: 2.8 dBi (2.4GHz)

Antenna type: Integrated

Antenna Gain: 2.3 dBi (2.4GHz)



## **General**

The BGM220S22A module has been certified as a Full Modular device and is not a Limited Module. Additional evaluation is required for use in all host devices.



Maximum ratings and operational conditions:

**Table 4.1. Absolute Maximum Ratings**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Storage temperature range	T <sub>STG</sub>		-40	—	+125	°C
Voltage on any supply pin	V <sub>DDMAX</sub>		-0.3	—	3.8	V
Junction temperature	T <sub>JMAX</sub>	-G grade	—	—	+105	°C
		-N grade	—	—	+105	°C
Voltage ramp rate on any supply pin	V <sub>DDRAMP</sub> MAX		—	—	1.0	V / $\mu$ s
DC voltage on any GPIO pin	V <sub>DIGPIN</sub>		-0.3	—	V <sub>IOVDD</sub> + 0.3	V
Input RF level on RF pin RF_2G4	P <sub>RFMAX2G4</sub>		—	—	+10	dBm
Absolute voltage on RF pin RF_2G4	V <sub>MAX2G4</sub>		-0.3	—	V <sub>VREG</sub> + 0.3	V
Total current into VDD power lines	I <sub>VDDMAX</sub>	Source	—	—	200	mA
Total current into VSS ground lines	I <sub>VSSMAX</sub>	Sink	—	—	200	mA
Current per I/O pin	I <sub>IOMAX</sub>	Sink	—	—	50	mA
		Source	—	—	50	mA
Current for all I/O pins	I <sub>IOALLMAX</sub>	Sink	—	—	200	mA
		Source	—	—	200	mA

**Table 4.2. 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
IOVDDx operating supply voltage (All IOVDD pins)	V <sub>IOVDDx</sub>		1.71	3.0	3.8	V
VREGVDD operating supply voltage	V <sub>VREGVDD</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
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 <sup>2</sup>	f <sub>RHCLK</sub>	VSCALE2 or VSCALE1	—	38.4	—	MHz



The following describes the installation procedures for the various hosts in which the module has been evaluated.

## Installation Instructions for Zebra Printers

The BGM220S22A module is not intended for OEM integrations or end users. It can only be installed in the Zebra printers at the grantee manufacturing facility.

## Test Modes and Testing Requirements

This transmitter is to be tested while installed into a host device. The operational test modes are as follows:

- Normal connection mode paired with a separate master device
- Continuous wave transmission mode: Channels 0-39 selectable, output power selectable, modulated and unmodulated transmission selectable. Example test commands to host device are listed below

<\* To put printer into FCC test mode, highlight the below 3 lines, and press SHIFT-F5 \*>

```
! U1 SETVAR "wlan.test.sar.mode" "on" <CR><LF>
```

```
! U1 SETVAR "bluetooth.test_mode" "on" <CR><LF>
```

```
! U1 SETVAR "device.reset" "" <CR><LF>
```

<\* After printer device resets, highlight the below 4 lines, and press SHIFT-F5 \*>

<\* Change TBLExxx to any of the below Examples \*>

```
! U1 SETVAR "wlan.test.sar.tx_stop" "" <CR><LF>
```

```
! U1 SETVAR "device.friendly_name" "TEST2000" <CR><LF>
```

```
! U1 SETVAR "wlan.test.sar.tx_start" "" <CR><LF>
```

```
! U1 SETVAR "device.reset" "" <CR><LF>
```

<\* After testing is completed, highlight the below 3 lines, and press SHIFT-F5 \*>

```
! U1 SETVAR "wlan.test.sar.mode" "off" <CR><LF>
```

```
! U1 SETVAR "bluetooth.test_mode" "off" <CR><LF>
```

```
! U1 SETVAR "device.reset" "" <CR><LF>
```

## Device Label

FCC ID: I28-BGM220S22A

IC: 3798B-BMG220S22A



R-R-ZTC-BGM220S22A



211-220201