



# FSC-BT691

**BLE 5.1 Single Mode Bluetooth Module**

**Datasheet Version 1.5**























activator and rosin get activated and start eliminating oxide film formed on the surface of each solder particle and PCB board. **The temperature is recommended to be 150° to 210° for 60 to 120 second for this zone.**

**Equilibrium Zone 2 (C) (optional)** — In order to resolve the upright component issue, it is recommended to keep the temperature in 210 – 217 ° for about 20 to 30 second.

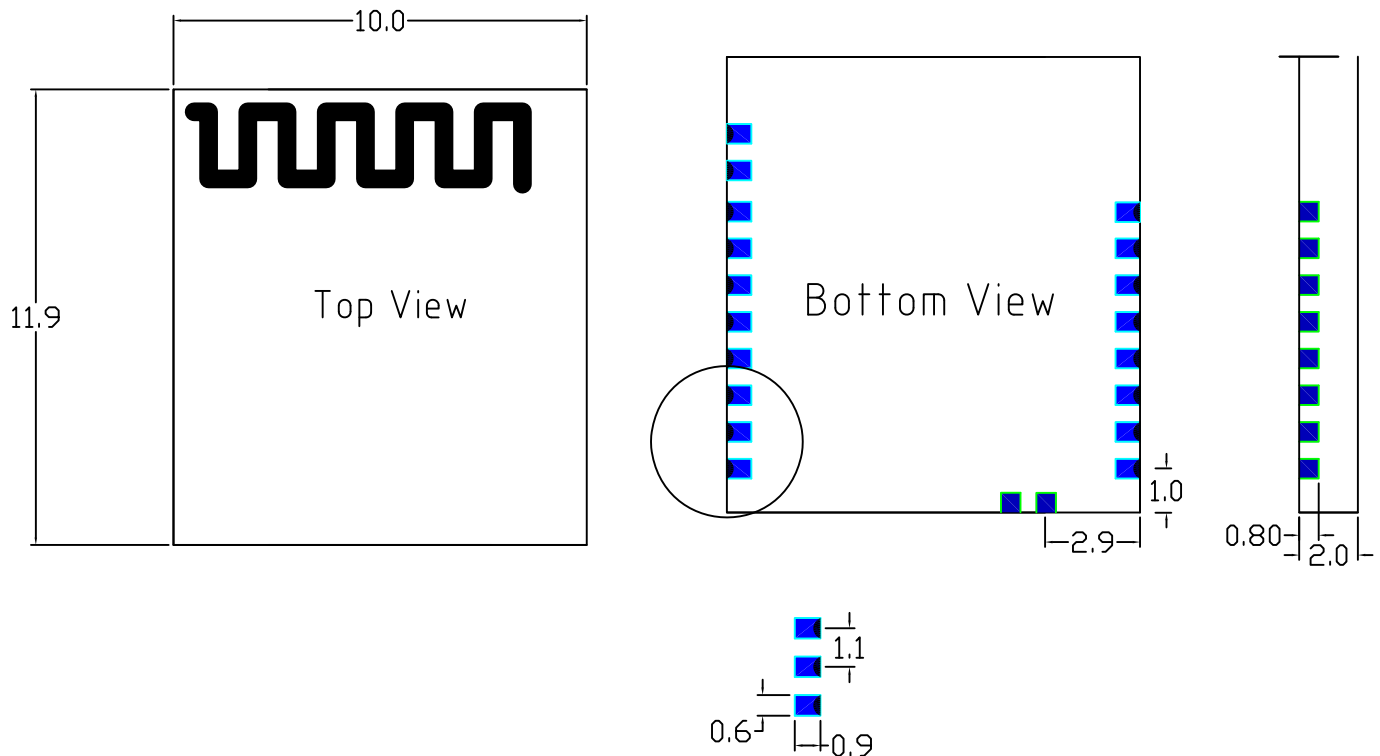
**Reflow Zone (D)** — The profile in the figure is designed for Sn/Ag3.0/Cu0.5. It can be a reference for other lead-free solder. The peak temperature should be high enough to achieve good wetting but not so high as to cause component discoloration or damage. Excessive soldering time can lead to intermetallic growth which can result in a brittle joint. The recommended peak temperature (Tp) is 230 ~ 250 °C. The soldering time should be 30 to 90 second when the temperature is above 217 °C.

**Cooling Zone (E)** — The cooling ate should be fast, to keep the solder grains small which will give a longer-lasting joint. **Typical cooling rate should be 4 °C.**

## 8. MECHANICAL DETAILS

### 8.1 Mechanical Details

- Dimension: 10mm(W) x 11.9mm(L) x 2 mm(H) Tolerance: ±0.2mm
- Module size: 10mm X 11.9mm Tolerance: ±0.2mm
- Pad size: 0.9mmX0.6mm Tolerance: ±0.1mm
- Pad pitch: 1.1mm Tolerance: ±0.1mm



**Figure 6:** FSC-BT691 footprint

## 9. HARDWARE INTEGRATION SUGGESTIONS

### 9.1 Soldering Recommendations

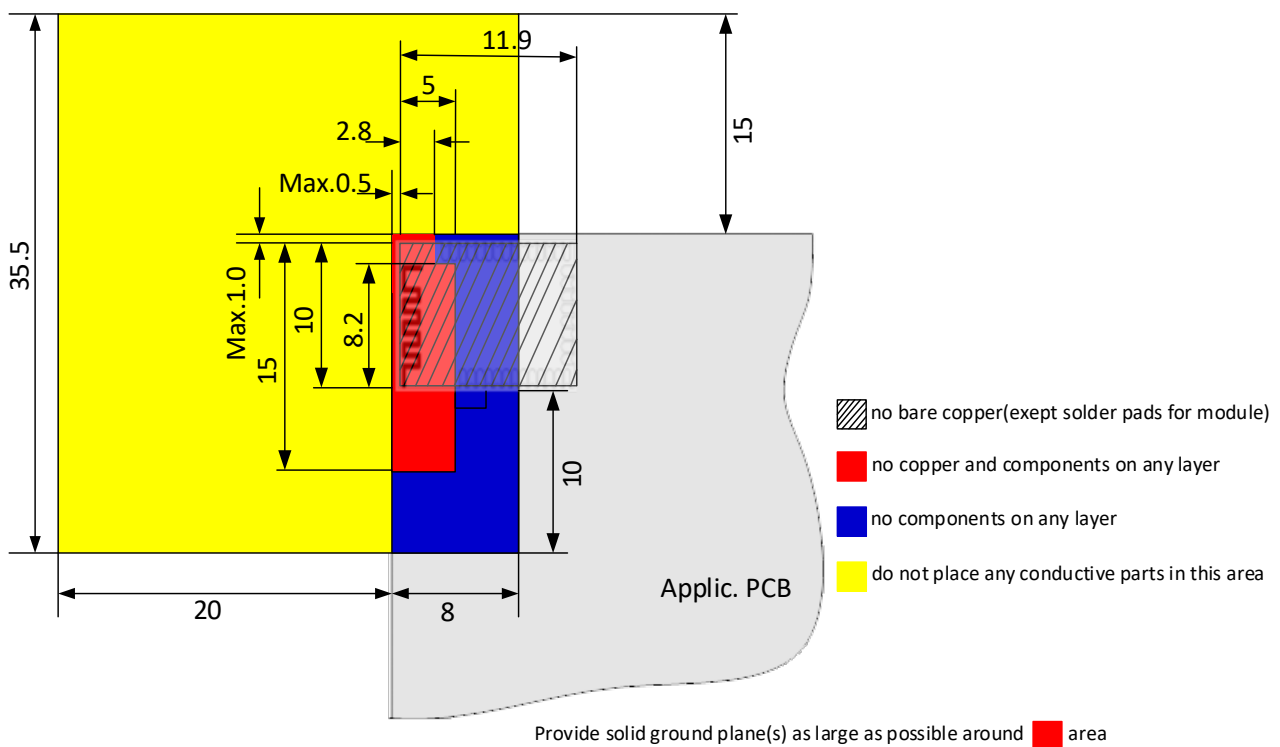
FSC-BT691 is compatible with industrial standard reflow profile for Pb-free solders. The reflow profile used is dependent on the thermal mass of the entire populated PCB, heat transfer efficiency of the oven and particular type of solder paste used. Consult the datasheet of particular solder paste for profile configurations.

Feasycom will give following recommendations for soldering the module to ensure reliable solder joint and operation of the module after soldering. Since the profile used is process and layout dependent, the optimum profile should be studied case by case. Thus following recommendation should be taken as a starting point guide.

### 9.2 Layout Guidelines (Internal Antenna)

It is strongly recommended to use good layout practices to ensure proper operation of the module. Placing copper or any metal near antenna deteriorates its operation by having effect on the matching properties. Metal shield around the antenna will prevent the radiation and thus metal case should not be used with the module. Use grounding vias separated max 3 mm apart at the edge of grounding areas to prevent RF penetrating inside the PCB and causing an unintentional resonator. Use GND vias all around the PCB edges.

The mother board should have no bare conductors or vias in this restricted area, because it is not covered by stop mask print. Also no copper (planes, traces or vias) are allowed in this area, because of mismatching the on-board antenna.



**Figure 7:** Restricted Area (Design schematic, for reference only. Unit: mm)

Following recommendations helps to avoid EMC problems arising in the design. Note that each design is unique and the following list do not consider all basic design rules such as avoiding capacitive coupling between signal lines. Following list is aimed to avoid EMC problems caused by RF part of the module. Use good consideration to avoid problems arising from digital signals in the design.

Ensure that signal lines have return paths as short as possible. For example if a signal goes to an inner layer through a via, always use ground vias around it. Locate them tightly and symmetrically around the signal vias. Routing of any sensitive

signals should be done in the inner layers of the PCB. Sensitive traces should have a ground area above and under the line. If this is not possible, make sure that the return path is short by other means (for example using a ground line next to the signal line).

### 9.3 Layout Guidelines(External Antenna)

Placement and PCB layout are critical to optimize the performances of a module without on-board antenna designs. The trace from the antenna port of the module to an external antenna should be  $50\Omega$  and must be as short as possible to avoid any interference into the transceiver of the module. The location of the external antenna and RF-IN port of the module should be kept away from any noise sources and digital traces. A matching network might be needed in between the external antenna and RF-IN port to better match the impedance to minimize the return loss.

As indicated in picture below, RF critical circuits of the module should be clearly separated from any digital circuits on the system board. All RF circuits in the module are close to the antenna port. The module, then, should be placed in this way that module digital part towards your digital section of the system PCB.

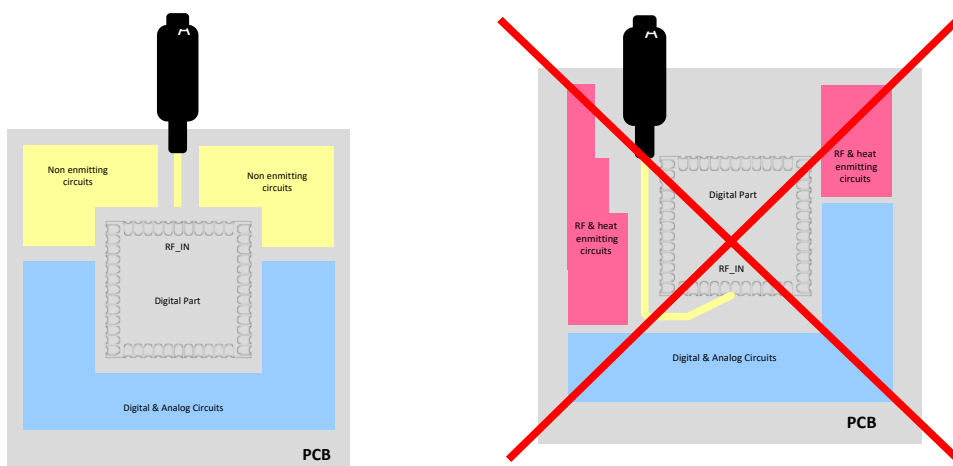


Figure 8: Placement the Module on a System Board

#### 9.3.1 Antenna Connection and Grounding Plane Design

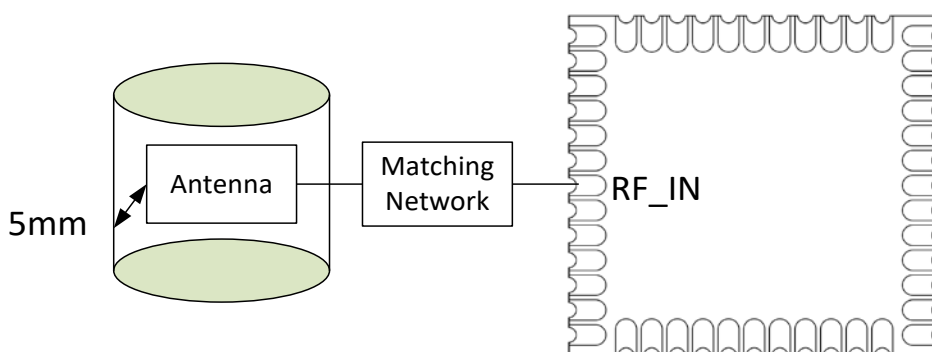
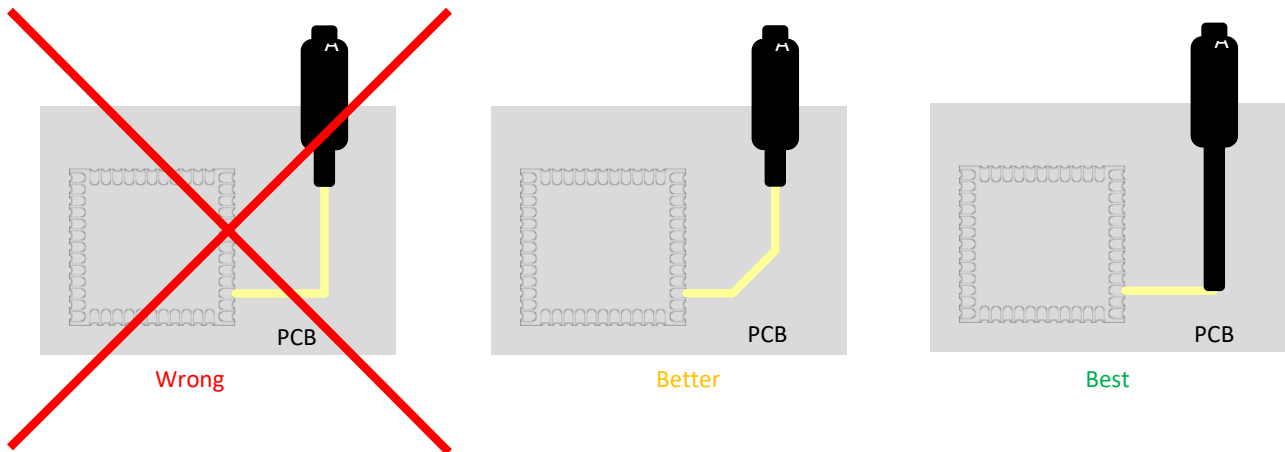


Figure 9: Leave 5mm Clearance Space from the Antenna

General design recommendations are:

- The length of the trace or connection line should be kept as short as possible.

- Distance between connection and ground area on the top layer should at least be as large as the dielectric thickness.
- Routing the RF close to digital sections of the system board should be avoided.
- To reduce signal reflections, sharp angles in the routing of the micro strip line should be avoided. Chamfers or fillets are preferred for rectangular routing; 45-degree routing is preferred over Manhattan style 90-degree routing.



**Figure 10:** Recommended Trace Connects Antenna and the Module

- Routing of the RF-connection underneath the module should be avoided. The distance of the micro strip line to the ground plane on the bottom side of the receiver is very small and has huge tolerances. Therefore, the impedance of this part of the trace cannot be controlled.
- Use as many vias as possible to connect the ground planes.

## 10. Certificate

### 10.1 FCC Certificate

**TCB**

**GRANT OF EQUIPMENT  
AUTHORIZATION**

**TCB**

**Certification  
Issued Under the Authority of the  
Federal Communications Commission  
By:**

**MiCOM Labs  
575 Boulder Court  
Pleasanton, CA 94566**

**Date of Grant: 12/31/2020  
Application Dated: 12/31/2020**

**Shenzhen Feasycom Technology Co.,Ltd  
Room 2004A, 20th Floor, Huichao Technology  
Building, Jinhai Road, Xixiang, Baoan District,,  
Shenzhen,  
China**

**Attention: Wan Zhifu**

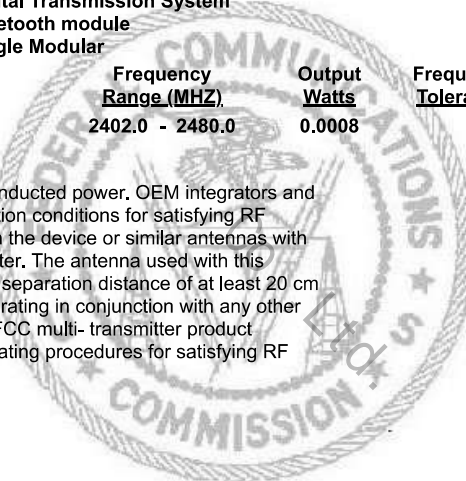
**NOT TRANSFERABLE**

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

**FCC IDENTIFIER:** 2AMWOFSC-BT691  
**Name of Grantee:** Shenzhen Feasycom Technology Co.,Ltd  
**Equipment Class:** Digital Transmission System  
**Notes:** Bluetooth module  
**Modular Type:** Single Modular

<u>Grant Notes</u>	<u>FCC Rule Parts</u>	<u>Frequency Range (MHZ)</u>	<u>Output Watts</u>	<u>Frequency Tolerance</u>	<u>Emission Designator</u>
	15C	2402.0 - 2480.0	0.0008		

Single Modular Approval. Output power listed is conducted power. OEM integrators and end-users must be provided with transmitter operation conditions for satisfying RF exposure compliance. Only the antenna tested with the device or similar antennas with equal or lesser gain may be used with this transmitter. The antenna used with this transmitter must be installed to provide a minimum 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, except in accordance with FCC multi-transmitter product procedures. End-users must be provided with operating procedures for satisfying RF exposure compliance.



## 10.2 IC Certificate



# TECHNICAL ACCEPTANCE CERTIFICATE

### TECHNICAL ACCEPTANCE CERTIFICATE

23872-FSCBT691 / 31 Dec 2020 / Rev A

for Innovation, Science and Economic Development (ISED) Canada

MiCOM Labs Inc. declares, on the basis of the assessment of the tests and the technical documentation provided by the applicant that the following product complies with the requirements of the above noted regulator.

Product Marketing Name:  
**FSC-BT691**

Applicant Name:  
**Shenzhen Feasycom Technology Co., LTD**

I hereby attest that the subject equipment was tested and found in compliance with the below noted specification.  
J'atteste, par la présente, que le matériel a fait l'objet d'essai et a été jugé conforme à la spécification ci-dessous.



**Gordon Hurst, Product Certifier**

This Certificate is Issued under the Authority of:  
**MiCOM Labs Inc., 575 Boulder Court, Pleasanton, California 94566, USA**  
FCB Number: US0159

Doc - Cert v2.1



**TECHNICAL ACCEPTANCE CERTIFICATE**

**23872-FSCBT691 / 31 Dec 2020 / Rev A**

**for Innovation, Science and Economic Development (ISED)**

Product Marketing Name:

**FSC-BT691**

Unique Product Number: **FSCBT691**

**Applicant:** Shenzhen Feasycom Technology Co., LTD, Room 2004A, 20th Floor, Huichao Technology Building, Jinhai Road, Xixiang, Baoan District, Shenzhen, China; **CN Number: 23872**

**ISED Representative:** TianHeng Consulting Inc., 130 Terence Matthews Cres, Suite C2, Kanata, ON, K2M 0J1, Canada; **CN Number: 11802A**

**Test Lab:** Attestation of Global Compliance (Shenzhen) Co., Ltd, 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China; **CN Number: 24842**

Wireless Test Site	Open Area Test Site	SAR Test Site	Terminal Test Site
24842	--	--	--

**Technical Details**

Specification	Issue	Technology	Frequency Range		Emission Designator	Power		Type
			From	To		Min.	Max.	
RSS-247	2	Bluetooth LE	2402MHz	2480MHz	1M05F1D--	0.0007W	0.0008W	Conducted
Cahiers des charges	Numéro de la version	Technologie	Gamme de fréquence		Désignatif d'émission	Puissance		

Technical Acceptance Certificate		Certificat D'acceptabilite Technique	
Company Name	Shenzhen Feasycom Technology Co., LTD	Nom de l'entreprise	
Certification No.	23872-FSCBT691	No. De certification	
Issue Date / Rev	31 Dec 2020 / Rev A	Date D'émission / Rev	
Equipment Description	Bluetooth module	Description de l'équipement	
Type of Equipment	Bluetooth Device Spread Spectrum/Digital Device (2400-2483.5MHz) Modular Approval	Type de materiel	
Product Marketing Name	FSC-BT691	Nom du produit Marketing(PMN)	

Certification of equipment means only that the equipment has met the requirements of the above-noted specification. Licence applications, where applicable to use certified equipment, are acted on accordingly by the ISED issuing office and will depend on the existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with the requirements and procedures issued by ISED. The equipment for which this certificate is issued shall not be manufactured, imported, distributed, leased, offered for sale or sold unless the equipment complies with the applicable technical specifications and procedures issued by ISED.

La certification du matériel signifie seulement que le matériel a satisfait aux exigences de la norme indiquée ci-dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en conséquence par le bureau de délivrance d'ISDE et dépendent des conditions radio ambiantes, du service et de l'emplacement d'exploitation. Le présent certificat est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences et aux procédures d'ISDE. Le matériel à l'égard duquel le présent certificat est délivré ne doit pas être fabriqué, importé, distribué, loué, mis en vente ou vendu à moins d'être conforme aux procédures et aux spécifications techniques applicables publiées par ISDE.



**TECHNICAL ACCEPTANCE CERTIFICATE**

**23872-FSCBT691 / 31 Dec 2020 / Rev A**

**for Innovation, Science and Economic Development (ISED)**

**Technical Acceptance Certificate - Continued**

**Certificat D'acceptabilite Technique**

Host Marketing Name	--	Nom de l'hôte marketing (HMN)
Hardware Version Identification Number	<b>FSC-BT691</b>	Version Hardware numéro d'identification (HVIN)
Firmware Version Identification Number	<b>V1.1</b>	Firmware Version numéro d'identification (FVIN)

**Antennas**

Antenna Type	Manufacturer	Model/Part No.	Gain (dBi)	Frequency Range (MHz)
PCB Antenna	Shenzhen Feasycom Technology Co., LTD	2.4GHZ PCB antenna	2dBi	2400-2500MHz

### 10.3 CE Certificate



Recognized by China National Accreditation Service for Conformity Assessment & Taiwan Accreditation Foundation

T: 0086-755-2523 4088  
E-mail: agc@agc-cert.com  
Web: Http://www.agc-cert.com

1-2/F, Building 19, Junfeng Industrial Park  
Chongqing Road, Heping Community, Fuhai Street  
Bao'an District, Shenzhen, Guangdong, China

## Attestation of Conformity

Registration No. AGC03285201201E0

Applicant Shenzhen Feasycom Technology Co., LTD  
Room 2004A, 20th Floor, Huichao Technology Building,  
Jinhai Road, Xixiang, Baoan District, Shenzhen, China

Product Designation Bluetooth module

Brand Name Feasycom

Model / Series Models FSC-BT691

Manufacturer Shenzhen Feasycom Technology Co., LTD  
Room 2004A, 20th Floor, Huichao Technology Building,  
Jinhai Road, Xixiang, Baoan District, Shenzhen, China

Requirement	Applied Standards	Document Evidence	Result
Art.3.1(a) Health	EN 62479:2010 EN 50663:2017	Test Report: AGC03285201201EH02	Conform
Art.3.1(a) Safety	EN 62368-1:2014+A11:2017	Test Report: AGC03285201201ES01	Conform
Art.3.1(b) EMC	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.4 (2020-09)	Test Report: AGC03285201201EE01	Conform
Art.3.2 Radio	ETSI EN 300 328 V2.2.2 (2019-07)	Test Report: AGC03285201201EE11	Conform




Signed by General Manager (King Zhang)  
Issue Date: December 24, 2020

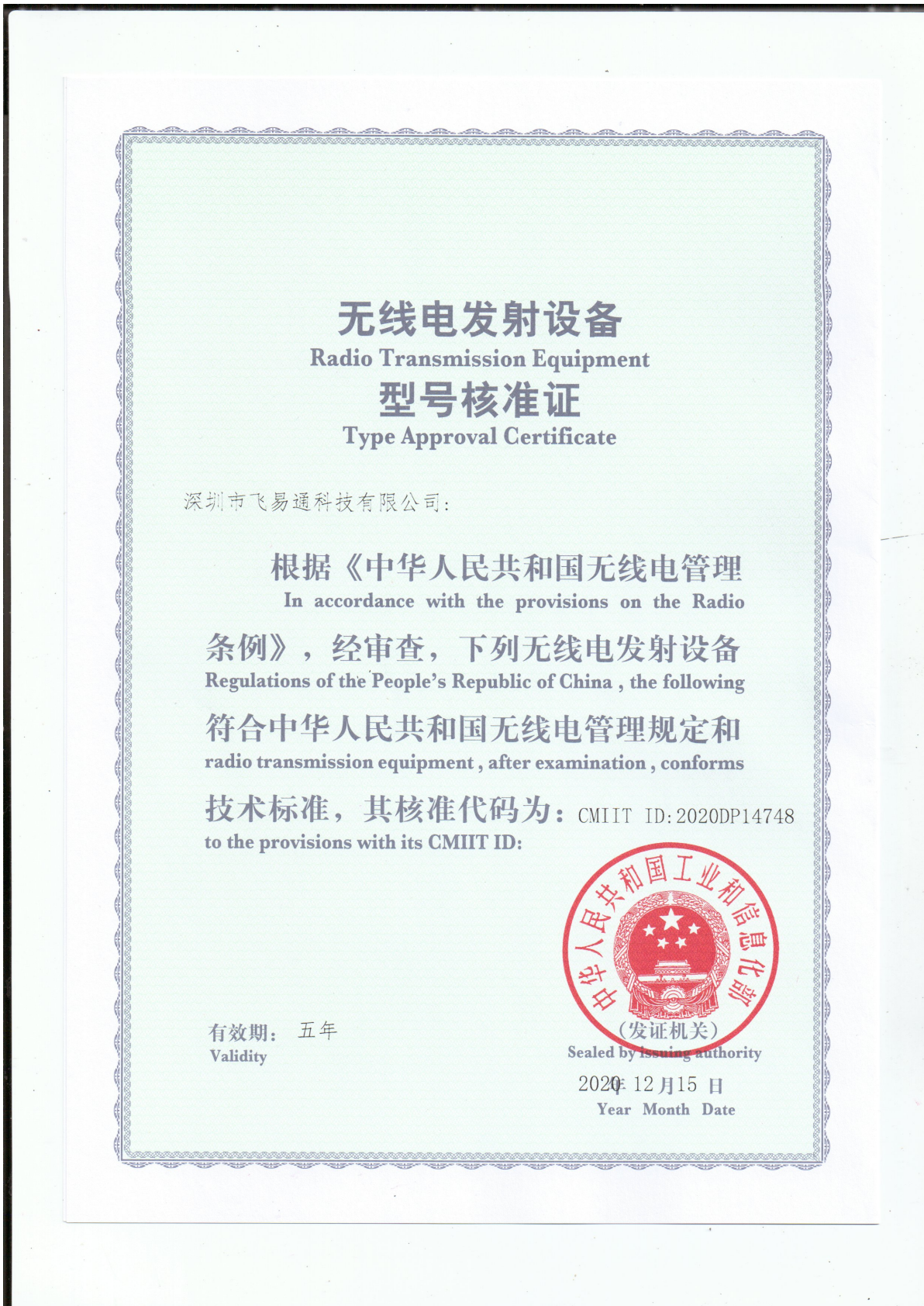


This Attestation of Conformity is recognized by Attestation of Global Compliance (Shenzhen) Co., Ltd. and made in accordance with the RED Directive 2014/53/EU. The attestation doesn't imply assessment of the production. The Applicant of the attestation is authorized to use this attestation in connection with EC declaration of conformity to the Directive. The attestation is only applicable to the equipments described above. This attestation shall not be re-produced except in full without the written approval of Attestation of Global Compliance (Shenzhen) Co., Ltd.

Note: This attestation is part of the full test report(s) and should be used in conjunction with it.

Version: 2.2

## 10.4 SRRC Certificate



编号: 2020-14748  
Number

设备名称: 蓝牙模块  
Equipment Name

设备型号: FSC-BT691  
Equipment Type

主要功能: 数据传输  
Main Functions

调制方式: GFSK  
Modulation Mode

主要技术参数及其指标值:  
Main Technical Parameters

2400-2483.5MHz  
频率范围:  
Frequency Range

频率容限:  $\leq 20\text{ppm}$   
Frequency Tolerance

占用带宽:  $\leq 3\text{MHz}$   
Occupied Bandwidth

发射功率:  $\leq 20\text{dBm (EIRP)}$   
Transmitting Power

杂散发射限值:  $\leq -30\text{dBm}$   
Spurious Emission Limits

工业和信息化部  
(核发单位章)  
Sealed by issuing authority  
2020年12月15日  
Year Month Date

## 11. PRODUCT PACKAGING INFORMATION

### 11.1 Default Packing

a, Tray vacuum

b, Tray Dimension: 180mm \* 195mm

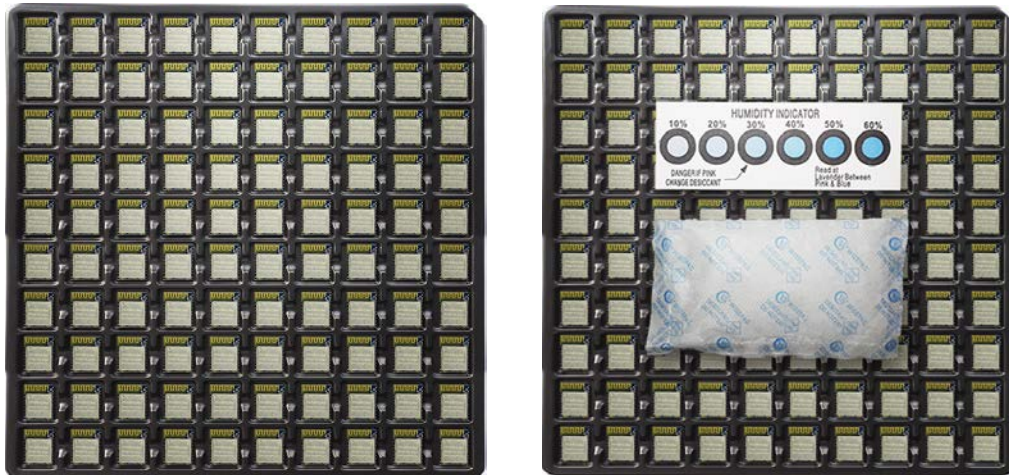
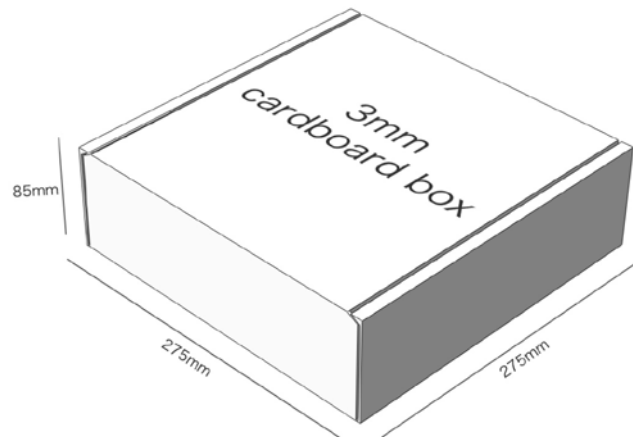


Figure 11: Tray vacuum

## 11.2 Packing box(For reference only)



\* If require any other packing, must be confirmed with customer

\* Package: 2000PCS Per Carton (Min Carton Package)

**Figure 12:** Packing Box

## 12. APPLICATION SCHEMATIC

