

TX520-GL Hardware Guide_Generic

V1.0.0

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Trademark

ThingsX The trademark is registered and owned by Fibocom Wireless Inc.

1 Overview

1.1 Introduction

TX520-GL(hereinafter referred to as TX520) is a highly integrated IOT wireless communication module which uses M.2 form factor interface. That support multi-mode such as LTE (LTE FDD Cat.M1), GSM (GSM, GPRS, EGPRS) and GNSS (GPS, GLONASS, Galileo, BEIDOU).

1.2 specification

Specification		
Operating Band	LTE FDD CatM1: Band 1, 2, 3, 4, 5, 8, 12, 13, 14,18, 19, 20, 25, 26, 27, 28, 66, 85	
	GSM/GPRS/EGPRS: 850, 900, 1800, 1900 MHz	
	GNSS: Support GPS, GLONASS, Galileo, BEIDOU	
Data Transmission	LTE FDD	Cat M1 Rel. 14: UL 1119 Kbps, DL 375 Kbps
	GSM	GPRS (Class12): UL 85.6 Kbps, DL 107 Kbps
		EGPRS (Class12): UL 236.8kbps, DL 296 Kbps
Power Supply	DC 3.135V~3.63V, Typical 3.3V	
Temperature	Normal operating temperature: −30°C to +75°C	
	Extended operating temperature: −40°C to +85°C ¹	
	Storage temperature: −40°C to +90°C	
Physical characteristics	Interface: M.2 Key-B	
	Dimension: 22.0 mm × 42.0 mm × 2.3 mm	
	Weight: about 5.5 g	
Interface		
Antenna Connector	WWAN Antenna × 1	
	GNSS Antenna × 1	
Function Interface	I2C (Master Mode)	
	USB 2.0 (For debug)	
	eSIM(Internal)	

Specification	
	W_DISABLE1# (Reserved)
	W_DISABLE2# (Reserved)
	WOWWAN# (Reserved)
	DPR
	LED
	Tunable antenna (Reserved)
Software	
AT commands	3GPP TS 27.007 and 27.005, Fibocom AT Commands
Firmware update	1. DFOTA (for after marketing firmware update) 2. USB Flashing (for Factory firmware update & Diagnostic firmware update).
OS	Windows10

**Note:**

When temperature goes beyond normal operating temperature range of -30°C to $+75^{\circ}\text{C}$, RF performance of module may be slightly off 3GPP specifications.

1.3 M.2 Interface

The TX520-GL module applies standard M.2 Key-B interface, with a total of 75 pins.

1.3.1 Pin Map

74	+3.3V	CONFIG_2	75
72	+3.3V	VIO_CFG(GND)	73
70	+3.3V	GND	71
68	NC	CONFIG_1	69
66	NC	NC	67
64	NC	NC	65
62	NC	NC	63
60	NC	NC	61
58	NC	NC	59
56	NC	GND	57
54	NC	NC	55
52	NC	NC	53
50	NC	GND	51
48	NC	NC	49
46	NC	NC	47
44	I2C1_IRQ#(1.8V)	GND	45
42	I2C1_SDA(1.8V,I2C Master)	NC	43
40	I2C1_SCL(1.8V,I2C Master)	NC	41
38	NC	GND	39
36	NC	NC	37
34	NC	NC	35
32	NC	GND	33
30	NC	NC	31
28	NC	NC	29
26	W_DISABLE2#(3.3/1.8V)	GND	27
24	NC	DPR(3.3/1.8V),internal pull High	25
22	NC	WOWWAN#(1.8V)	23
20	NC	CONFIG_0	21
	Notch	Notch	
	Notch	Notch	
	Notch	Notch	
	Notch	Notch	
10	LED1#(3.3V OD)	GND	11
8	W_DISABLE1#(3.3/1.8V)	USB D-	9
6	FULL_CARD_POWER_OFF#(3.3/1.8V)	USB D+	7
4	+3.3V	GND	5
2	+3.3V	GND	3
		CONFIG_3	1

Figure 2-1. Pin map

1.3.2 Pin Definition

The pin definition is list out in Table 1 as follows:

Table 1 Pin definition

Pin	Pin Name	I/O	Default Value	Pin Description	Level
1	CONFIG_3	DO	-	GND	-
2	+3.3V	PI	-	Power input	Power Supply
3	GND	-	-	GND	Power Supply
4	+3.3V	PI	-	Power input	Power Supply
5	GND	-	-	GND	Power Supply
6	FULL_CARD_POWER_OFF#	DI	High-Z	Power enable, module power on input.	3.3/1.8V
7	USB D+	AIO	-	USB data plus	0.3---3V
8	W_DISABLE1#	I	PU	WWAN disable, active low, reserved.	3.3/1.8V
9	USB D-	AIO	-	USB data minus	0.3---3V
10	LED1#	O	High-Z	System status LED, reserved	3.3V
11	GND	-	-	GND	Power Supply

Pin	Pin Name	I/O	Default Value	Pin Description	Level
12	Notch			Notch	
13	Notch			Notch	
14	Notch			Notch	
15	Notch			Notch	
16	Notch			Notch	
17	Notch			Notch	
18	Notch			Notch	
19	Notch			Notch	
20	NC	-	-	-	-
21	CONFIG_0	O	-	GND	-
22	NC	-	-	-	-
23	WOWWAN#(1.8V)	DO	PU	Wake up host, reserved.	1.8V
24	NC	-	-	-	-

Pin	Pin Name	I/O	Default Value	Pin Description	Level
25	DPR(3.3/1.8V)	DI	PU	Body SAR Detect, internal pull high, reserved.	3.3/1.8V
26	W_DISABLE2#	DI	PU	GNSS disable, active low, reserved.	3.3/1.8V
27	GND	-	-	GND	Power Supply
28	NC	-	-	-	-
29	NC	-	-	-	-
30	NC	-	-	-	-
31	NC	-	-	-	-
32	NC	-	-	-	-
33	GND	-	-	GND	Power Supply
34	NC	-	-	-	-
35	NC	-	-	-	-
36	NC	-	-	-	-
37	NC	-	-	-	-

Pin	Pin Name	I/O	Default Value	Pin Description	Level
38	NC		-	-	-
39	GND	-	-	GND	Power Supply
40	I2C_SCL	DO	PU	I2C master clock	1.8V
41	NC	-	-	-	-
42	I2C_SDA	DIO	PU	I2C master data	1.8V
43	NC	-	-	-	-
44	I2C_IRQ#	DI	PU	I2C interrupt request	1.8V
45	GND	-	-	GND	Power Supply
46	NC	-	-	-	-
47	NC	-	-	-	-
48	NC	-	-	-	-
49	NC	-	-	-	-
50	NC	-	-	-	-
51	GND	-	-	GND	Power Supply

Pin	Pin Name	I/O	Default Value	Pin Description	Level
52	NC	-	-	-	-
53	NC	-	-	-	-
54	NC	-	-	-	-
55	NC	-	-	-	-
56	NC	-	-	-	-
57	GND			GND	Power Supply
58	NC	-	-	-	-
59	NC	-	-	-	-
60	NC	-	-	-	-
61	NC	-	-	-	-
62	NC	-	-	-	-
63	NC	-	-	-	-
64	NC	-	-	-	-
65	NC	-	-	-	-

Pin	Pin Name	I/O	Default Value	Pin Description	Level
66	NC	-	-	-	-
67	NC	-	-	-	-
68	NC	-	-	-	-
69	CONFIG_1	DO	-	GND	-
70	+3.3V	PI	-	Power input	Power Supply
71	GND	-	-	GND	Power Supply
72	+3.3V	PI	-	Power input	Power Supply
73	VIO_CFG(GND)	-	-	GND	Power Supply
74	+3.3V	PI	-	Power input	Power Supply
75	CONFIG_2	DO	-	NC	-

2 FCC Conformance information

Federal Communication Commission Interference Statement

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.

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 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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device is intended only for OEM integrators under the following conditions: (For module

device use)

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and

2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the

OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Important Notice to OEM integrators

1. This module is limited to OEM installation ONLY.

2. This module is limited to installation in mobile applications, according to Part 2.1091(b).

3. The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations

4. For FCC Part 15.31 (h) and (k): The host manufacturer is responsible for additional testing to verify compliance as a composite system. When testing the host device for compliance with Part 15 Subpart B, the host manufacturer is required to show compliance with Part 15 Subpart B while the transmitter module(s) are installed and operating. The modules should be transmitting and the evaluation should confirm that the module's intentional emissions are compliant (i.e. fundamental and out of band emissions). The host manufacturer must verify that there are no additional unintentional emissions other than what is permitted in Part 15 Subpart B or emissions are complaint with the transmitter(s) rule(s).

The Grantee will provide guidance to the host manufacturer for Part 15 B requirements if needed.

Important Note

notice that any deviation(s) from the defined parameters of the antenna trace, as described by the

instructions, require that the host product manufacturer must notify to ThingsX Inc. that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the USI, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

End Product Labeling

When the module is installed in the host device, the FCC label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: "Contains FCC ID: 2BF7TTX520GL"

The FCC ID can be used only when all FCC compliance requirements are met.

Antenna Installation

- (1) The antenna must be installed such that 20 cm is maintained between the antenna and users,
- (2) The transmitter module may not be co-located with any other transmitter or antenna.
- (3) Only antennas of the same type and with equal or less gains as shown below may be used with this module. Other types of antennas and/or higher gain antennas may require additional authorization for operation.

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Antenna information

Band	Gain(dBi)	Type
GSM 850	3	Molopole
GSM 1900	3	
LTE Band 2	3	
LTE Band 4	3	
LTE Band 5	3	
LTE Band 12	3	
LTE Band 13	3	
LTE Band 14	3	
LTE Band 25	3	
LTE Band 26	3	
LTE Band 66	3	
LTE Band 85	3	

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

47 CFR Part 22, 24, 27, 90

This module can be used in IOT devices, the input voltage to the module is nominally 3.3V.

This module is a single module.

The antenna is not a trace antenna.

3 IC Conformance information

Industry Canada Statement

This device complies with Industry Canada's licence-exempt RSSs. 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."

Radiation Exposure Statement

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

This device is intended only for OEM integrators under the following conditions:
(For module device use)

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna. As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)

- 1) L'antenne doit être installée de telle sorte qu'une distance de 20 cm est respectée entre l'antenne et les utilisateurs, et
- 2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne. Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE:

In the event that these conditions cannot be met (for example certain laptop configurations or colocation with another transmitter), then the Canada authorization is no longer considered valid and the IC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du

Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC:32406-TX520GL".

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC:32406-TX520GL".

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module. Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

4 CE Conformance information

The device could be used with a separation distance of 20cm to the human body.



Hereby, [ThingsX Inc.] declares that the radio equipment type [TX520-GL] is in compliance with Directive 2014/53/EU.

4.1 Transmitting Power of EU bands

The transmitting power for each band of the TX520 module is shown in the following table:

RAT	Band	Tx Power (dBm)
GSM	900MHz	32.5±2
	1800MHz	29.5±2
LTE	Band 1	21±1
	Band 3	21±1
	Band 5	21±1
	Band 8	21±1
	Band 20	21±1
	Band 28	21±1

5 NCC Conformance information

NCC Statement

減少電磁波影響，請妥適使用

Support GSM 900/LTE B1,B3,B8,B28

電波功率密度 MPE 標準值: _____ mW/cm², 送測產品實測值: _____mW/cm², 建議使用時設備天線至少距離人體 20 公分。