

User Manual (TM18FNROBM0)

History

Ver.	Date	Contents	Written by	Checked by	Approved by	Note
1.0	2024.03.19					

Contents

- 1. Product Introduction 4
 - 1.2 Environmental Specifications..... 5
 - 1.3 Electrical Specifications 5
 - 1.3.1 Absolute Maximum Rating and ESD Ratings 5
 - 1.3.2 Current Consumption 5
 - 1.4 Mechanical Specifications 6
 - 1.4.1 Physical Dimensions 6
 - 1.4.2 Mechanical Drawing 6
- 2. RF Specification 7
 - 2.1 Module support Band 7
 - 2.2 Module Support Power Level 8
- 3. Module Installation..... 9

1. Product Introduction

The TM18FNROBM0 are designed for the automotive industry. They support 5G NR, LTE and WCDMA air Interface standards. The TM18FNROBM0 are based on the MediaTek wireless chipsets and support the following bands.

Table 1. Supported Band

Region		US
Band	NR	n7/41/77/78
	LTE	B2/4/5/7/12/17/25/26/38/41/42
	WCDMA	B2/4/5
	GSM	B2/5

1.1 Block Diagram

Confidential

1.2 Environmental Specifications

The environmental specification for operating and storage of the TM18FNROBM0 are defined in the the table below.

Table 2. Environmental Specifications

Parameter	Temperature Range
Operating Temperature	-40°C to 90°C (ecall 95°C)
Storage Temperature	-40°C to +95°C
Humidity	95% or less

1.3 Electrical Specifications

This section provides details for some of the key electrical specifications of the TM18FNROBM0 embedded modules.

1.3.1 Absolute Maximum Rating and ESD Ratings

This section defines the Absolute Maximum and Electrostatic Discharge (ESD) Ratings of the TM18FNROBM0 embedded modules.

Warning: If these parameters are exceeded, even momentarily, damage may occur to the device.

Table 3. Absolute Maximum Ratings

Parameter		Min	Max	Units
VPH_PWR	Power Supply Input	-	6.0	V
VIN	Voltage on any digital input or output pin	-	1.98	V
ESD Ratings				
ESD ¹⁾	Primary, Diversity antenna pads - Contact		1	kV

1) The ESD Simulator configured with 330pF, 2000Ω.

Caution: The TM18FNROBM0 embedded modules are sensitive to Electrostatic Discharge. ESD countermeasures and handling methods must be used when handling the TM18FNROBM0 devices.

1.3.2 Current Consumption

Table 4. TM18FNROBM0 Current Consumption (@4.1V)

Mode	Parameter	Typical	Max	Units
LTE	Max TX Output /Full RB	650	TBD	mA
WCDMA	Max TX Output /Full RB	700	TBD	mA
LTE	Idle, Registered	5	-	mA

WCDMA	Idle, Registered	6.1	-	mA
-------	------------------	-----	---	----

1.4 Mechanical Specifications

1.4.1 Physical Dimensions

The TM18FNROBM0 embedded modules are a Land Grid Array (LGA) form factor device. The device does not have a System or RF connectors. All electrical and mechanical connections are made via the lga pad on the underside of the PCB.

Table5. TM18FNROBM0 Embedded Module Dimensions

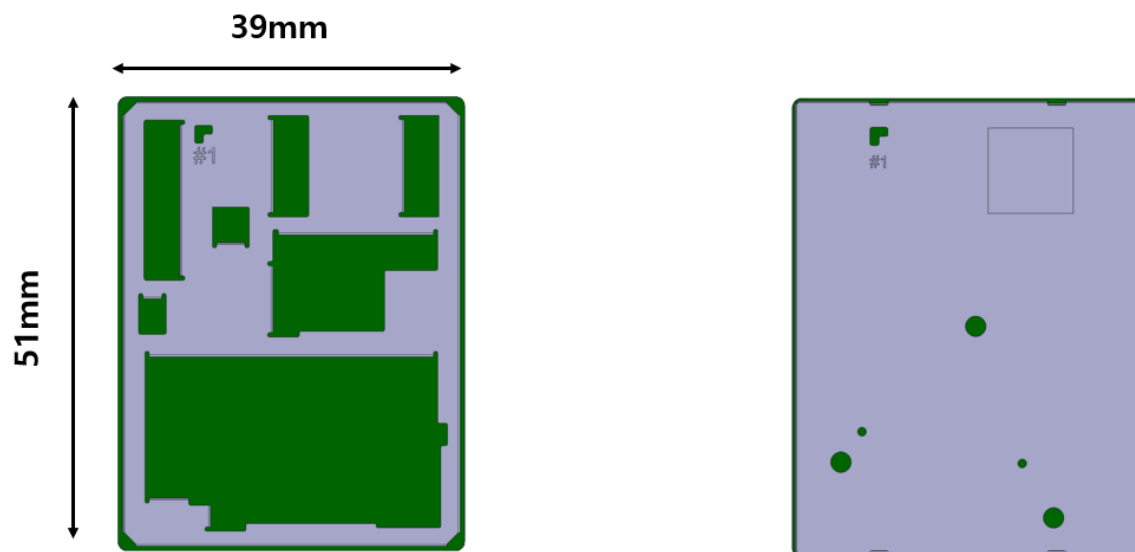
Parameter	Nominal	Max	Units
Overall Dimension	39 x 51	39.35 x 51.35	mm
Overall Module Height	3.55	3.65	mm
PCB Thickness	1.0	1.1	mm
Flatness Specification		0.1	mm
Weight	TBD		g

1.4.2 Mechanical Drawing

8.1 Module Dimension

Parameter	Nominal	Max	Units
Overall Dimension	39 x 51	39.35 x 51.35	mm
Overall Module Height	3.55	3.8	mm
PCB Thickness	1.0	1.1	mm
Flatness Specification		0.1	mm
Weight	TBD		g

Module Mechanical Design



[TOP View_Without shield Can cover]

[TOP View_With shield Can cover]



[SIDE View_With shield Can cover]

2. RF Specification

The specifications for the 5G NR, LTE and WCDMA interfaces are defined.

TM18FNROBM0 is designed to be compliant with the standard shown in the table below.

Table6. Standards Compliance

Technology	Standards
5G NR	• 3GPP Release 16
LTE	• 3GPP Release 15
WCDMA	• 3GPP Release 9
GSM	• 3GPP Release 9

2.1 Module support Band

UMTS/LTE	Frequency		FDD / TDD	Supported RAT
Band	Tx	Rx		RoW
B2	1850~1910	1930~1990	FDD	G,W,L
B4	1710~1755	2100~2155	FDD	W,L
B5	824~849	869~894	FDD	G,W,L
B7/n7	2500~2570	2620~2690	FDD	L,NR
B12	669~716	729~746	FDD	L
B17	704~716	734~746	FDD	L
B25	1850~1915	1930~1995	FDD	L
B26	814~849	859~894	FDD	L
B38	2570~2620		TDD	L

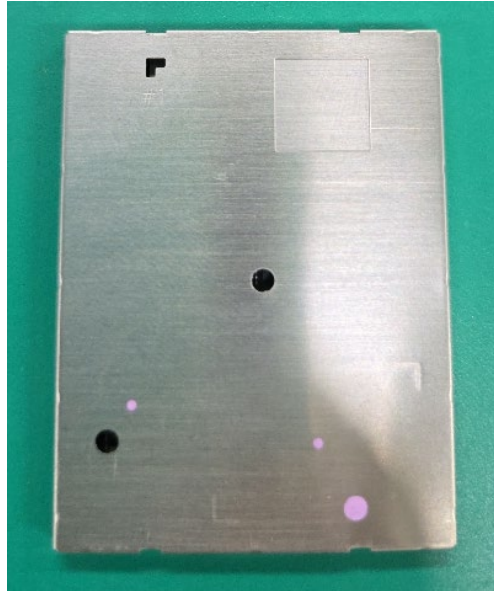
B41/n41	2496~2690	TDD	L,NR
B42	3400~3600	TDD	L
n77	3300~4200	TDD	NR
n78	3300~3800	TDD	NR

2.2 Module Support Power Level

Main Antenna	FUNCTION	BAND	TARGET (dBm)
MIMO1	GSM	B2	29.00
MIMO1	GSM	B5	33.00
MIMO1	WCDMA	B2/4/5	23.00
MIMO1	LTE	B2	23.00
MIMO1	LTE	B4	23.00
MIMO1	LTE	B5	23.00
MIMO1	LTE	B7	23.00
MIMO1	LTE	B12	23.00
MIMO1	LTE	B17	23.00
MIMO1	LTE	B25	23.00
MIMO1	LTE	B26	23.00
MIMO1	LTE	B38	23.00
MIMO1	LTE	B41	23.00
MIMO1	LTE	B42	21.00
MIMO1	NR	n7	23.00
MIMO1	NR	n41	23.00
MIMO1	NR	n77	21.00
MIMO1	NR	n78	21.00
MIMO2	LTE	B42	22.00
MIMO2	NR	n77	22.00
MIMO2	NR	n78	22.00
Int.BUA	GSM	B2	29.00
Int.BUA	GSM	B5	33.00
Int.BUA	WCDMA	B2/4/5	23.00
Int.BUA	LTE	B2	23.00
Int.BUA	LTE	B4	23.00
Int.BUA	LTE	B5	23.00
Int.BUA	LTE/NR	B7/n7	23.00
Int.BUA	LTE	B25	23.00
Int.BUA	LTE	B26	23.00
Int.BUA	LTE	B38	23.00
Int.BUA	LTE	B41/n41	23.00

3. Module Installation

Module should be covered its shield-can cover before operation. In case of modules were supplied separately with shield-can cover, it should be covered by shield-can before use. Shield-can can covers whole part of module as below picture.



Installation of Shield-can cover

Statement

<FCC Statement>

RF Exposure

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. [The shark antenna](#) of this device should be installed and operated with a minimum distance of [45mm](#) between the radiating element of the device and the user. [The Internal antenna\(BUA\)](#) should be installed and operated with a minimum distance of [22mm](#) between the radiating element of the device and the user.

Regulatory notice to host manufacturer according to KDB 996369 D03 OEM Manual

Modular Approval Statement

Regulatory notice to host manufacturer according to KDB 996369 D03 OEM Manual. This module has been granted modular approval as below listed FCC rule parts.

- FCC : Part 22, 24, 27, 90

Summarize the specific operational use conditions

The OEM integrator should use equivalent antennas which is the same type and equal or less gain than an antenna listed below this instruction manual.

Limited module Procedures (N/A)

This module is single modular approval.

Trace antenna designs

This module utilizes the trace antenna. Therefore the host manufacturer must follow the installation guidance which is provided [in operational description document](#).

Antennas list

The antenna certified with this module is listed following.

- [\(External Antenna\) BMW ICON SF26 ROW roof antenna 5A7F528 \(LTE/Sub-6\)](#)
- [\(Internal Antenna\) BMW ICON SF \(LTE/Sub6\)](#)

A host manufacturer must not use the other types of antenna and an antenna with a gain that exceeds the values listed in this document.

RF exposure considerations

-The module has been certified for integration into products only by OEM integrators under the following condition:

-The antenna(s) must be installed such that a minimum separation distance is maintained between the radiator (antenna) and all persons at all times:

- [External\(shark\) Antenna: 45mm](#)
- [Internal\(BUA\) Antenna: 22mm](#)

-The transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

-Portable use

As long as the three conditions above are met, further transmitter testing will not be required.

OEM integrators should provide the minimum separation distance to end users in their end-product manuals.

End Product Labeling

The module is labeled with its own FCC ID. If the FCC ID are not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. In that case, the final end product must be labeled in a visible area with the following:

Contains FCC ID: 2BO3LTM18FNROBM0

Information on test modes and additional testing requirements

OEM integrator should evaluate the final product with this module installed in a host to ensure FCC compliance. If the final product has any additional transmitters and those transmitter can be operating simultaneously, the simultaneous transmission mode should be evaluated to make sure there is no any additional emission generated during the operation of all transmitters.

Additional testing, Part 15 Subpart B disclaimer

The final host product requires Part 15 subpart B compliance testing with the modular transmitter installed to be properly authorized for operation as a Part 15 unintentional radiator.

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 or change RF related parameters in the user manual of the end product.

Note EMI Considerations

Note that a host manufacture is recommended to use D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional noncompliant limits due to module placement to host components or properties. For standalone mode, reference the guidance in D04 Module Integration Guide and for simultaneous mode; see D02 Module Q&A Question 12, which permits the host manufacturer to confirm compliance.

<ISED Statement>

RF Exposure

This device complies with ISED radiation exposure limits set forth for an uncontrolled environment. [The shark antenna](#) of this device should be installed and operated with a minimum distance of [45mm](#) between the radiating element of the device and the user. [The Internal antenna\(BUA\)](#) should be installed and operated with a minimum distance of [22mm](#) between the radiating element of the device and the user.

Cet équipement est conforme aux limites d'exposition aux radiations IC CNR-102 établies pour un environnement non contrôlé. L'antenne requin de cet appareil doit être installée et utilisée à une distance minimale de [45 mm](#) entre l'élément rayonnant de l'appareil et l'utilisateur. L'antenne interne (BUA) doit être installée et utilisée à une distance minimale de [22 mm](#) entre l'élément rayonnant de l'appareil et l'utilisateur.

End Product Labeling

The module is labeled with its own ISED Certification number. If the ISED Certification number are not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. In that case, the final end product must be labeled in a visible area with the following:

Contains IC: 2703H-TM18FNROBM0

L'étiquette d'homologation d'un module d'Innovation, Sciences et Développement économique Canada devra être posée sur le produit hôte à un endroit bien en vue, en tout temps. En l'absence d'étiquette, le produit hôte doit porter une étiquette sur laquelle figure le numéro d'homologation du module d'Innovation, Sciences et Développement économique Canada, précédé du mot « contient », ou d'une formulation similaire allant dans le même sens et qui va comme suit : **Contient IC : 2703H-TM18FNROBM0** est le numéro d'homologation du module.