



## **2.4G Proprietary/BLE Module**

# **MPRFMODULE2 Manual**

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### Revision history

Version	Date	Description
1.0	2025/4/21	First release

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# Index

<b>1</b>	<b>PRODUCT INTRODUCTION .....</b>	<b>4</b>
1.1	INTRODUCTION .....	4
1.2	FEATHER .....	4
1.3	CERTIFICATION.....	4
<b>2</b>	<b>PRODUCT DESCRIPTIONS .....</b>	<b>5</b>
2.1	DIMENSION.....	5
2.2	PIN DEFINITION .....	6
2.3	FOOTPRINT .....	9
<b>3</b>	<b>ELECTRICAL SPECIFICATION .....</b>	<b>10</b>
3.1	ABSOLUTE MAXIMUM RATINGS .....	10
3.2	RECOMMENDED OPERATING CONDITIONS.....	10
3.3	GENERAL RADIO CHARACTERISTICS .....	11
3.4	RADIO CURRENT CONSUMPTION (TRANSMITTER) .....	11
3.5	RADIO CURRENT CONSUMPTION (RECEIVER).....	11
3.6	TRANSMITTER SPECIFICATION .....	11
3.7	RECEIVER OPERATION .....	11
3.8	RX SELECTIVITY .....	12
3.9	RX INTERMODULATION .....	13
3.10	RECEIVED SIGNAL STRENGTH INDICATOR (RSSI) SPECIFICATIONS .....	13
<b>4</b>	<b>ANTENNA.....</b>	<b>14</b>
4.1	ANTENNA TYPE AND GAINS .....	14
4.2	ANTENNA PLACEMENT WITHIN THE HOST PLATFORM .....	14
4.3	RECOMMENDED METHOD FOR RETENTION OF CABLE .....	14
<b>5</b>	<b>RF WARNING MESSAGE .....</b>	<b>14</b>
5.1	RF EXPOSURE INFORMATION (SAR) .....	14
5.2	CLASS B DEVICE INTERFERENCE STATEMENT .....	14
5.3	INFORMATION FOR OEMs AND HOST INTEGRATORS .....	15
5.4	SIMULTANEOUS TRANSMISSION OF ASUS WIRELESS MODULE WITH OTHER INTEGRATED OR PLUG-IN TRANSMITTERS .....	15

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# Product Introduction

## Introduction

MPRFMODULE2 is a BLE 5.4/ 2.4G proprietary module based on Nordic nRF54H20 SoC with a 320 MHz ARM® Cortex® M33 CPU, 2MB of non-volatile MRAM and 1MB of static RAM. The module comes with a coaxial connector for an external PIFA antenna.

## Feather

- ARM® Cortex® M33 up to 320MHz
- 2 MB of non-volatile MRAM and 1MB of static RAM
- Bluetooth®5.4 & 2.4 GHz transceiver
- BLE 5.4 data rate: 2 Mbps
- 2.4G proprietary data rate: 2 Mbps
- Flexible power mangement:
  - 1.7V to 5.5V supply voltage range
  - On-chip DC/DC and LDO regulators with automated low current modes
  - 1.8V to 3.3V regulated supply for external components

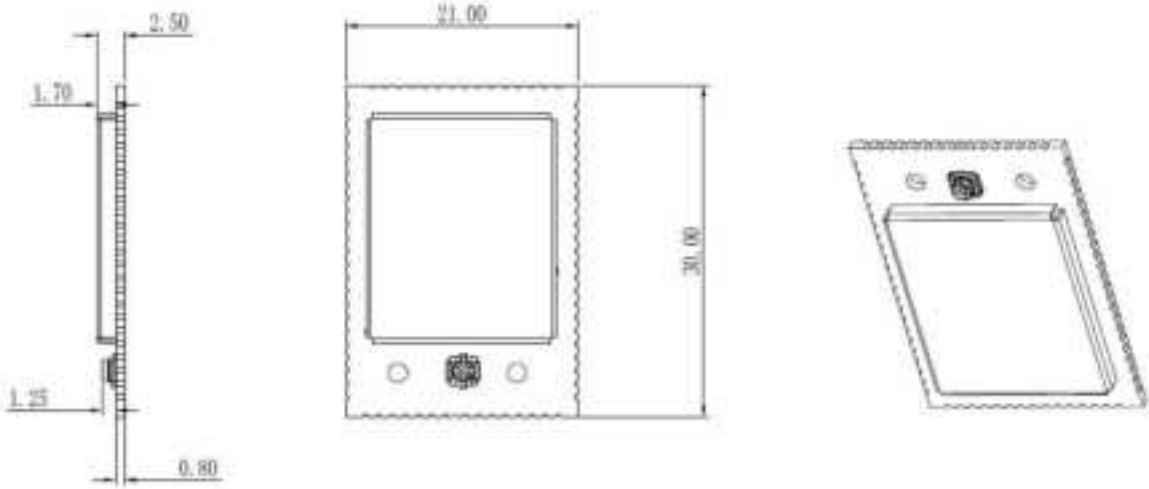
## Certification

- FCC ID:
- CE IDL:
- DID:

# Product Descriptions

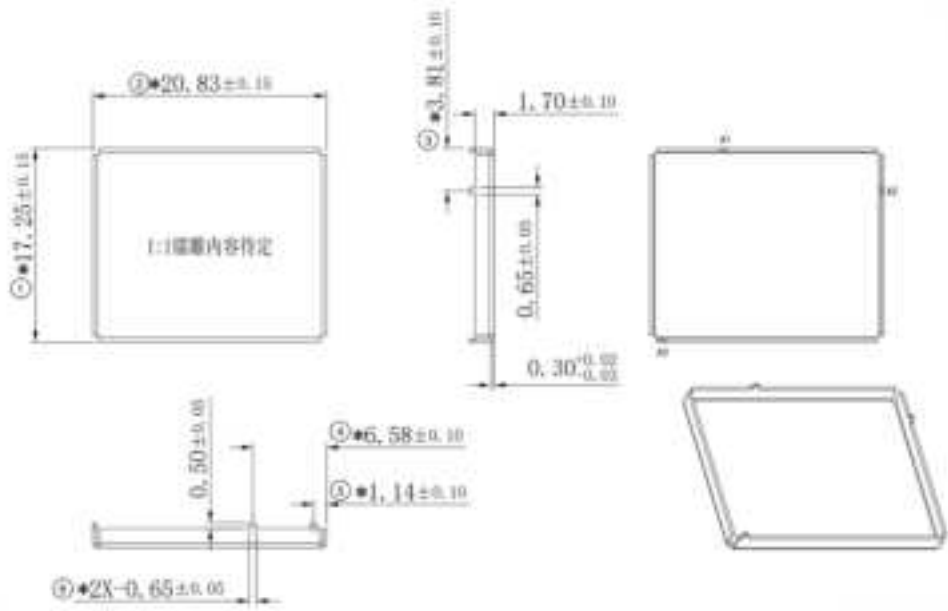
## Dimension

- PCB Size: 21 x 30 x 0.8mm

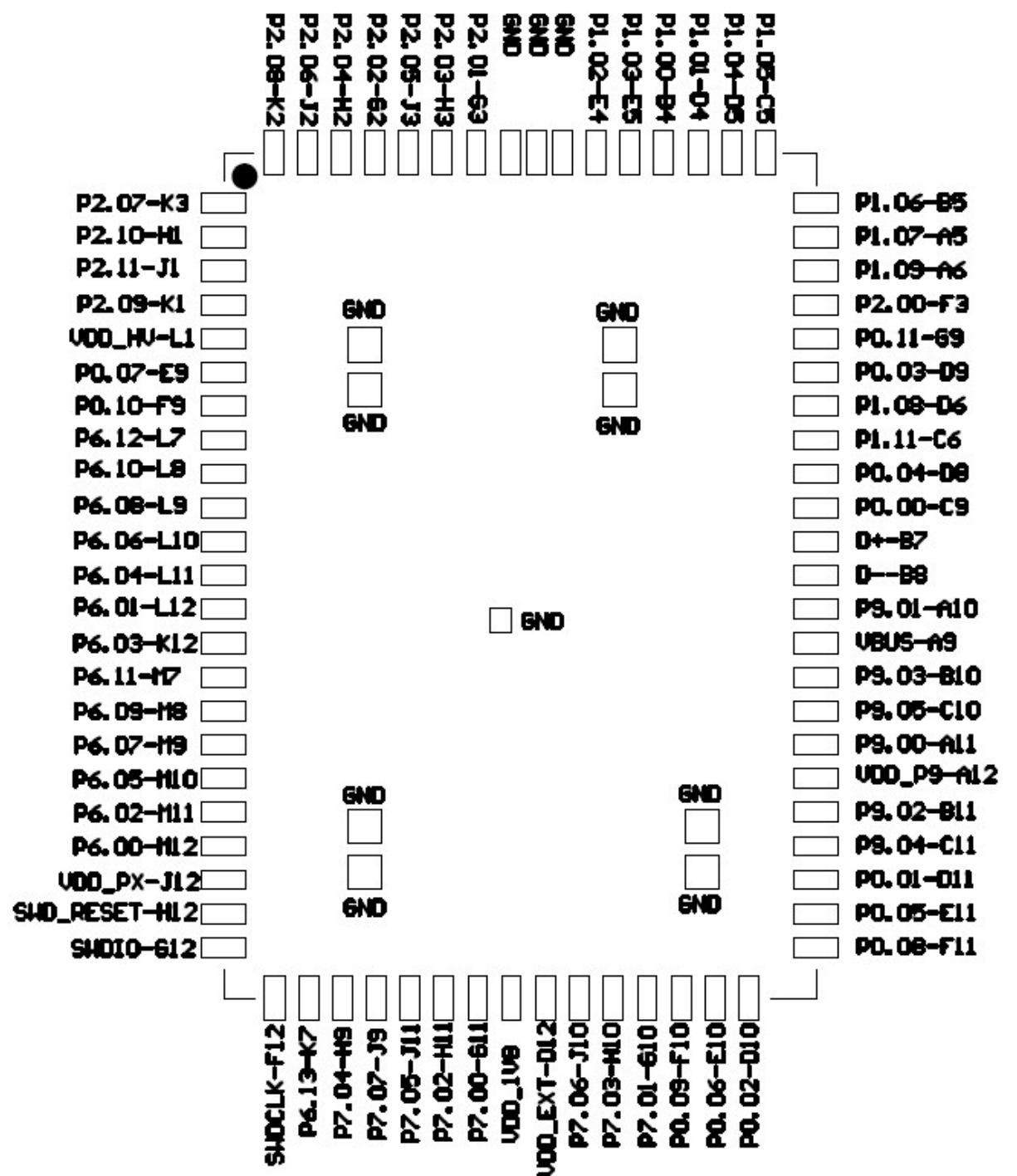


Unit (mm)

- Shielding Case



Unit (mm)



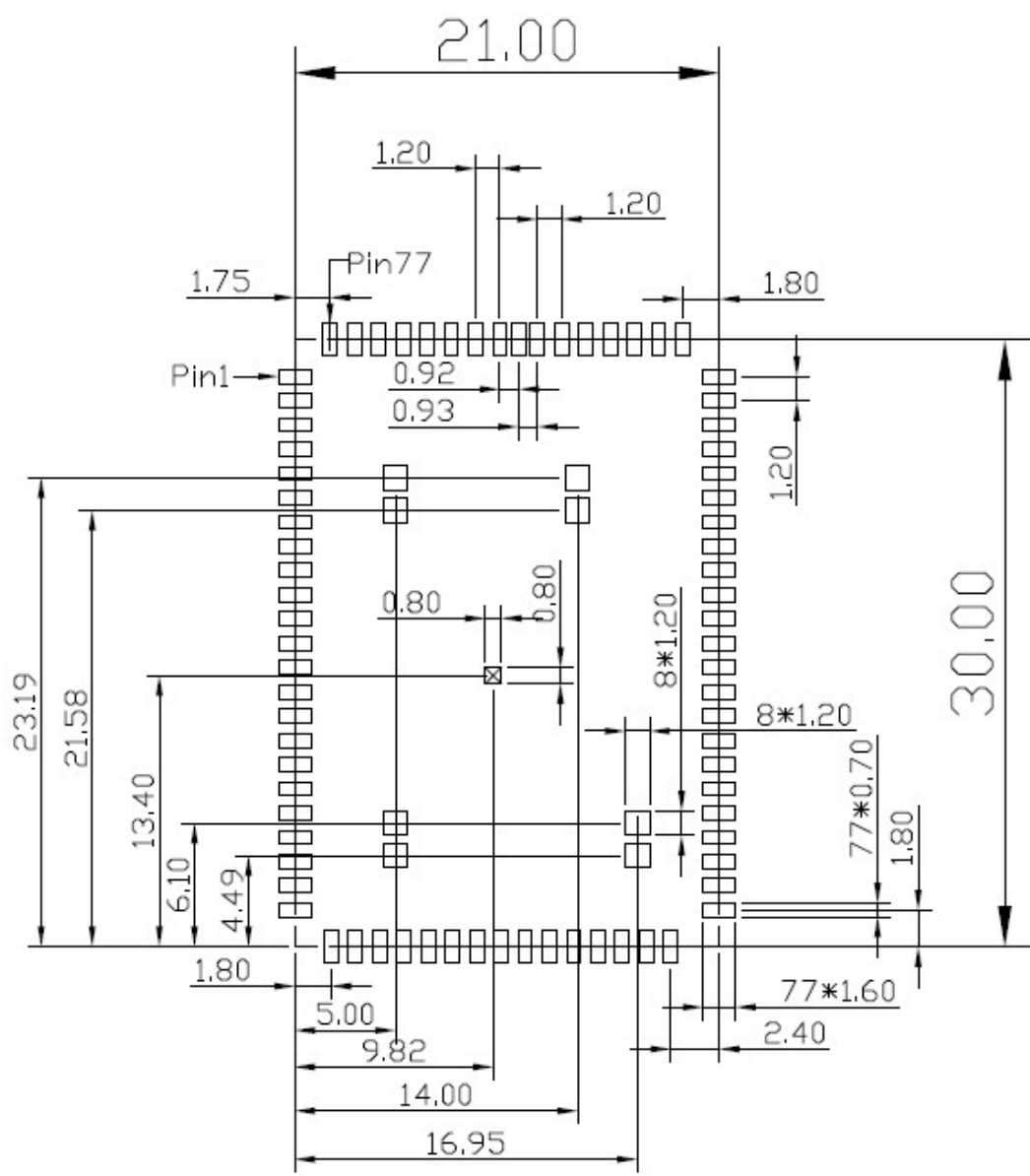
Pin No.	Name	Function	Description	Recommended usage
K3	P2.07	Digital I/O	General purpose I/O	
H1	P2.10 NFC_N	Digital I/O NFC input	General purpose I/O NFC antenna connection	
J1	P2.11	Digital I/O	General purpose I/O	

	NFC_P	NFC input	NFC antenna connection	
K1	P2.09	Digital I/O	General purpose I/O	
L1	VDDH	Power	Power supply	
E9	P0.07	Digital I/O	General purpose I/O	
F9	P0.10	Digital I/O	General purpose I/O	
L7	P6.12 RESETN	Digital I/O	General purpose I/O	EXMIF RESETN
L8	P6.10 DQ2	Digital I/O	General purpose I/O	EXMIF DQ2
L9	P6.08 DQ5	Digital I/O	General purpose I/O	EXMIF DQ5
L10	P6.06 DQ6	Digital I/O	General purpose I/O	EXMIF DQ6
L11	P6.04 DQ7	Digital I/O	General purpose I/O	EXMIF DQ7
L12	P6.01 CKN	Digital I/O	General purpose I/O	EXMIF CKN
K12	P6.03 CS0	Digital I/O	General purpose I/O	EXMIF CS0
M7	P6.11 DQ4	Digital I/O	General purpose I/O	EXMIF DQ4
M8	P6.09 DQ3	Digital I/O	General purpose I/O	EXMIF DQ3
M9	P6.07 DQ0	Digital I/O	General purpose I/O	EXMIF DQ0
M10	P6.05 DQ1	Digital I/O	General purpose I/O	EXMIF DQ1
M11	P6.02 RWDS	Digital I/O	General purpose I/O	EXMIF RWDS
M12	P6.00 CK	Digital I/O	General purpose I/O	EXMIF CK
J12	VDDIO_P7	Power	Power supply	
H12	NRESET	Reset	Pin RESET with internal pull-up resistor	
G12	SWDIO	Debug	Serial wire debug I/O for debug and programming	
F12	SWDCLK	Debug	Serial wire debug clock input for debug and programming	
K7	P6.13 CS1	Digital I/O	General purpose I/O	EXMIF CS1
H9	P7.04	Digital I/O	General purpose I/O	
J9	P7.07	Digital I/O	General purpose I/O	
J11	P7.05	Digital I/O	General purpose I/O	
H11	P7.02	Digital I/O	General purpose I/O	
G11	P7.00	Digital I/O	General purpose I/O	
D12	VDD_EXT	Power	Power output	
J10	P7.06	Digital I/O	General purpose I/O	
H10	P7.03	Digital I/O	General purpose I/O	
G10	P7.01	Digital I/O	General purpose I/O	
F10	P0.09	Digital I/O	General purpose I/O	
E10	P0.06	Digital I/O	General purpose I/O	
D10	P0.02	Digital I/O	General purpose I/O	
F11	P0.08	Digital I/O	General purpose I/O	
E11	P0.05	Digital I/O	General purpose I/O	
D11	P0.01	Digital I/O	General purpose I/O	
C11	P9.04	Digital I/O	General purpose I/O	
B11	P9.02	Digital I/O	General purpose I/O	
A12	VDDIO_P9	Power	Power supply	

<b>A11</b>	P9.00	Digital I/O	General purpose I/O	
<b>C10</b>	P9.05	Digital I/O	General purpose I/O	
<b>B10</b>	P9.03	Digital I/O	General purpose I/O	
<b>A9</b>	VBUS	Power	Power input to VREGUSB	
<b>A10</b>	P9.01	Digital I/O	General purpose I/O	
<b>B8</b>	D-	USB	USB D-	
<b>B7</b>	D+	USB	USB D+	
<b>C9</b>	P0.00	Digital I/O	General purpose I/O	
<b>D8</b>	P0.04	Digital I/O	General purpose I/O	
<b>C6</b>	P1.11	Digital I/O	General purpose I/O	
<b>D6</b>	P1.08	Digital I/O	General purpose I/O with analog functionality	
<b>D9</b>	P0.03	Digital I/O	General purpose I/O	
<b>G9</b>	P0.11	Digital I/O	General purpose I/O	
<b>F3</b>	P2.00	Digital I/O	General purpose I/O	
<b>A6</b>	P1.09	Digital I/O	General purpose I/O with analog functionality	
<b>A5</b>	P1.07	Digital I/O	General purpose I/O with analog functionality	
<b>B5</b>	P1.06	Digital I/O	General purpose I/O	
<b>C5</b>	P1.05	Digital I/O	General purpose I/O	
<b>D5</b>	P1.04	Digital I/O	General purpose I/O with analog functionality	
<b>D4</b>	P1.01	Digital I/O	General purpose I/O with analog functionality	
<b>B4</b>	P1.00	Digital I/O	General purpose I/O	
<b>E5</b>	P1.03	Digital I/O	General purpose I/O with analog functionality	
<b>E4</b>	P1.02	Digital I/O	General purpose I/O with analog functionality	
<b>G3</b>	P2.01	Digital I/O	General purpose I/O	
<b>H3</b>	P2.03	Digital I/O	General purpose I/O	
<b>J3</b>	P2.05	Digital I/O	General purpose I/O	
<b>G2</b>	P2.02	Digital I/O	General purpose I/O	
<b>H2</b>	P2.04	Digital I/O	General purpose I/O	
<b>J2</b>	P2.06	Digital I/O	General purpose I/O	
<b>K2</b>	P2.08	Digital I/O	General purpose I/O	



Footprint



## Electrical specification

### Absolute maximum ratings

	Min.	Max.	Unit
<b>Supply voltages</b>			
VDDH	-0.3	5.5	V
VDD	-0.3	2	V
DVDD_A0	-0.3	0.9	V
DVDD	-0.3	0.9	V
VDDIO_P1	-0.3	2	V
VDDIO_P2	-0.3	2	V
VDDIO_P6	-0.3	2	V
VDDIO_P7	-0.3	2	V
VDDIO_P9, P9 configured as ExternalIVB or Shorted	-0.3	2	V
VDDIO_P9, P9 configured as ExternalFull or Unconfigured	-0.3	3.9	V
VDDIO_RF	-0.3	1.4	V
VBUS	-0.3	5.5	V
VSS	-0.3	0	V
<b>I/O pin voltages</b>			
V <sub>IO, P9</sub>	-0.3	VDD + 0.3	V
V <sub>IO, P1</sub> , Port supplied	-0.3	VDDIO_P1 + 0.3	V
V <sub>IO, P1</sub> , Port un supplied	-0.3	0.3	V
V <sub>IO, P2</sub> , Port supplied	-0.3	VDDIO_P2 + 0.3	V
V <sub>IO, P2</sub> , Port un supplied	-0.3	0.3	V
V <sub>IO, P6</sub> , Port supplied	-0.3	VDDIO_P6 + 0.3	V
V <sub>IO, P6</sub> , Port un supplied	-0.3	0.3	V
V <sub>IO, P7</sub> , Port supplied	-0.3	VDDIO_P7 + 0.3	V
V <sub>IO, P7</sub> , Port un supplied	-0.3	0.3	V
V <sub>IO, P9</sub> , Port supplied	-0.3	VDDIO_P9 + 0.3 or 3.9, whichever is lowest	V
V <sub>IO, P9</sub> , Port un supplied	-0.3	0.3	V
<b>Environmental WLCSP 4.7 x 4.3 mm package</b>			
Moisture Sensitivity Level (MPL)		1	

### Recommended operating conditions

Symbol	Parameter	Min.	Nom.	Max.	Units
VDDH	VDDH supply voltage (main supply input) <sup>23</sup>	2.05	3.0	5.5	V
VDD	VDD supply voltage	1.71	1.8	1.98	V
VDDIO_P1	External supply for GPIO	1.62	1.8	1.98	V
VDDIO_P2	External supply for GPIO	1.62	1.8	1.98	V
VDDIO_P6	External supply for GPIO	1.62	1.8	1.98	V
VDDIO_P7	External supply for GPIO	1.62	1.8	1.98	V
VDDIO_P9	External supply for GPIO, P9 configured as ExternalIVB or Shorted	1.62	1.8	1.98	V
VDDIO_P9	External supply for GPIO, P9 configured as ExternalFull or Unconfigured	1.62	3.3	3.6	V
VBUS	VBUS USB supply voltage	4.4	5.0	5.5	V
TA	Operating temperature	-40	25	85	°C

## General radio characteristics

Symbol	Description	Min.	Typ.	Max.	Units
$f_{OP}$	Operating frequencies	2402		2480	MHz
$f_{PLLCHIP}$	PLL channel spacing		1		MHz
$f_{DEV1M}$	Frequency deviation @ 1 Mbps		±170		kHz
$f_{DEVBLE1M}$	Frequency deviation @ Bluetooth LE 1 Mbps		±250		kHz
$f_{DEV2M}$	Frequency deviation @ 2 Mbps		±320		kHz
$f_{DEVBLE2M}$	Frequency deviation @ Bluetooth LE 2 Mbps		±500		kHz
$f_{DEV4M}$	Frequency deviation @ 4 Mbps		±1000		kHz
$f_{BRG}$	On-the-air data rate	125		4000	kbps
$f_{CHIP\_IEEE802.15.4}$	Chip rate in IEEE 802.15.4 mode		2000		ksymbols

## Radio current consumption (transmitter)

Symbol	Description	Min.	Typ.	Max.	Units
$I_{RX\_TX\_BLE\_1M\_DC}$	TX only run current DC/DC, 3 V, $P_{RF} = +10$ dBm		24		mA
$I_{RX\_TX\_BLE\_2M\_DC}$	TX only run current DC/DC, 3 V, $P_{RF} = +8$ dBm		19		mA
$I_{RX\_TX\_BLE\_4M\_DC}$	TX only run current DC/DC, 3 V, $P_{RF} = +4$ dBm		11		mA
$I_{RX\_TX\_DC\_0dBm}$	TX only run current DC/DC, 3 V, $P_{RF} = 0$ dBm		4.7		mA
$I_{RX\_TX\_2dBm\_DC}$	TX only run current DC/DC, 3 V, $P_{RF} = -4$ dBm		3.0		mA
$I_{RX\_TX\_4dBm\_DC}$	TX only run current DC/DC, 3 V, $P_{RF} = -8$ dBm		2.3		mA
$I_{RX\_TX\_6dBm\_DC}$	TX only run current DC/DC, 3 V, $P_{RF} = -12$ dBm		1.9		mA
$I_{RX\_TX\_8dBm\_DC}$	TX only run current DC/DC, 3 V, $P_{RF} = -16$ dBm		1.5		mA
$I_{RX\_TX\_10dBm\_DC}$	TX only run current DC/DC, 3 V, $P_{RF} = -20$ dBm		1.3		mA
$I_{RX\_TX\_12dBm\_DC}$	TX only run current DC/DC, 3 V, $P_{RF} = -40$ dBm		1.1		mA
$I_{RX\_TX\_14dBm\_DC}$	TX only run current DC/DC, 3 V, $P_{RF} = -70$ dBm		1.0		mA

## Radio current consumption (Receiver)

Symbol	Description	Min.	Typ.	Max.	Units
$I_{RX\_1M\_DC}$	RX only run current DC/DC, 3 V, 1 Mbps/1 Mbps Bluetooth LE mode		1.7		mA
$I_{RX\_2M\_DC}$	RX only run current DC/DC, 3 V, 2 Mbps/2 Mbps Bluetooth LE mode		1.8		mA
$I_{RX\_4M\_DC}$	RX only run current DC/DC, 3 V, 4 Mbps/4 Mbps Bluetooth LE mode		1.9		mA

## Transmitter specification

Symbol	Description	Min.	Typ.	Max.	Units
$P_{RF}$	Maximum output power		6		dBm
$P_{ACC}$	RF power accuracy		±2		dB
$P_{AC1}$	1st Adjacent Channel Transmit Power 1 MHz (1 Mbps)		-24		dBc
$P_{AC2}$	2nd Adjacent Channel Transmit Power 2 MHz (1 Mbps)		-52		dBc
$P_{AC1}$	1st Adjacent Channel Transmit Power 2 MHz (2 Mbps)		-25		dBc
$P_{AC2}$	2nd Adjacent Channel Transmit Power 4 MHz (2 Mbps)		-50		dBc

## Receiver operation

Symbol	Description	Min.	Typ.	Max.	Units
$P_{RX\_MAX}$	Maximum received signal strength at < 0.1% PER		0		dBm
$P_{RX\_14M}$	Sensitivity 4 Mbps nRF mode ideal transmitter <sup>14</sup>		-92		dBm

$P_{RX\_S2M\_S1}$	Sensitivity, 1 Mbps Bluetooth LE ideal transmitter, packet length $\leq 37$ bytes BER = $1E-3^5$	-99	dBm
$P_{RX\_T2M\_S1}$	Sensitivity, 2 Mbps Bluetooth LE ideal transmitter, packet length $\leq 37$ bytes	-96	dBm
$P_{RX\_T2M\_nrf}$	Sensitivity, 2 Mbps nrf mode ideal transmitter, packet length $\leq 37$ bytes	-96	dBm

<sup>14</sup> Typical sensitivity applies when ADDR0 is used for receiver address correlation. When ADDR[1...7] are used for receiver address correlation, the typical sensitivity for this mode is degraded by 3 dB.

## RX selectivity

Symbol	Description	Min.	Typ.	Max.	Units
$C/I_{1MBLE\_co-channel}$	1 Mbps Bluetooth LE mode, co-channel interference		5		dB
$C/I_{1MBLE\_1MHz}$	1 Mbps Bluetooth LE mode, Adjacent (-1 MHz) interference		-3		dB
$C/I_{1MBLE\_1MHz}$	1 Mbps Bluetooth LE mode, Adjacent (+1 MHz) interference		-5		dB
$C/I_{1MBLE\_2MHz}$	1 Mbps Bluetooth LE mode, Adjacent (-2 MHz) interference		-30		dB
$C/I_{1MBLE\_2MHz}$	1 Mbps Bluetooth LE mode, Adjacent (+2 MHz) interference		-42		dB
$C/I_{1MBLE\_3MHz}$	1 Mbps Bluetooth LE mode, Adjacent ( $\geq 3$ MHz) interference		-40		dB
$C/I_{1MBLE\_image}$	Image frequency interference		-30		dB
$C/I_{1MBLE\_image\_1MHz}$	Adjacent (1 MHz) interference to in-band image frequency		-39		dB
$C/I_{2M\_2MHz}$	2 Mbps mode, Adjacent (-2 MHz) interference		-7		dB
$C/I_{2M\_2MHz}$	2 Mbps mode, Adjacent (+2 MHz) interference		-8		dB
$C/I_{2M\_4MHz}$	2 Mbps mode, Adjacent (-4 MHz) interference		-28		dB
$C/I_{2M\_4MHz}$	2 Mbps mode, Adjacent (+4 MHz) interference		-41		dB
$C/I_{2M\_6MHz}$	2 Mbps mode, Adjacent (-6 MHz) interference		-35		dB
$C/I_{2M\_6MHz}$	2 Mbps mode, Adjacent (+6 MHz) interference		-42		dB
$C/I_{2M\_12MHz}$	2 Mbps mode, Adjacent ( $\geq 12$ MHz) interference		-45		dB
$C/I_{2MBLE\_co-channel}$	2 Mbps Bluetooth LE mode, co-channel interference		6		dB
$C/I_{2MBLE\_2MHz}$	2 Mbps Bluetooth LE mode, Adjacent (-2 MHz) interference		-4		dB
$C/I_{2MBLE\_2MHz}$	2 Mbps Bluetooth LE mode, Adjacent (+2 MHz) interference		-5		dB
$C/I_{2MBLE\_4MHz}$	2 Mbps Bluetooth LE mode, Adjacent (-4 MHz) interference		-30		dB
$C/I_{2MBLE\_4MHz}$	2 Mbps Bluetooth LE mode, Adjacent (+4 MHz) interference		-42		dB
$C/I_{2MBLE\_6MHz}$	2 Mbps Bluetooth LE mode, Adjacent ( $\geq 6$ MHz) interference		-40		dB
$C/I_{2MBLE\_image}$	Image frequency interference		-30		dB
$C/I_{2MBLE\_image\_2MHz}$	Adjacent (2 MHz) interference to in-band image frequency		-36		dB
$C/I_{4M\_co-channel}$	4 Mbps mode, co-channel interference		6		dB
$C/I_{4M\_4MHz}$	4 Mbps mode, Adjacent (-4 MHz) interference		-6		dB

<sup>15</sup> As defined in the *Bluetooth Core Specification v5.4 Volume 6: Core System Package (Low Energy Controller Volume)*.

<sup>16</sup> Equivalent BER limit  $< 10E-04$ .

<sup>17</sup> Desired signal level at  $P_{IN} = -67$  dBm. One interferer is used, having equal modulation as the desired signal. The input power of the interferer where the sensitivity equals BER =  $1E-4$  is presented.

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## RX intermodulation

Symbol	Description	Min.	Typ.	Max.	Units
$P_{IMD3LE1MBL}$	IMD performance, Bluetooth LE 1 Mbps, 5th offset channel, packet length $\leq$ 37 bytes		-24		dBm
$P_{IMD3LE2MBL}$	IMD performance, Bluetooth LE 2 Mbps, 5th offset channel, packet length $\leq$ 37 bytes		-21		dBm

RX intermodulation. Desired signal level at  $P_{IN} = -64$  dBm. Two interferers with equal input power are used. The interferer closest in frequency is not modulated, the other interferer is modulated equal with the desired signal. The input power of the interferers where the sensitivity equals  $BER = 1E-3$  is presented.

## Received signal strength indicator (RSSI) specifications

Symbol	Description	Min.	Typ.	Max.	Units
$RSSI_{ACC}$	RSSI accuracy <sup>1A</sup>		$\pm 2$		dB
$RSSI_{RESOLUTION}$	RSSI resolution		1		dB
$RSSI_{PERIOD}$	RSSI sampling time from $RSSI\_START$ task		0.25		$\mu s$
$RSSI_{SETTLE}$	RSSI settling time after signal level change		15		$\mu s$

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## Antenna

### Antenna Type and Gains

Only antennas of the same type and with equal or less gains as 3.88 dBi for the 2.4GHz band shall be used with the MPRFMODULE2. Other types of antennas and/or higher gain antennas may require additional authorization for operation. For testing purposes the following dual band antenna that approximates closely the above limits was used:

Antenna Type	Part No.	Peak Gain	Length
PIFA	20LT0-000UZ000	3.88 dBi for 2.4GHz	120mm
Note : The antenna gain include cable loss.			

### Antenna Placement Within the Host Platform

To ensure RF exposure compliance the antenna used with the ASUS wireless module must be installed in host platforms to provide a minimum separation distance from all persons, in all operating modes and orientations of the host platform, with strict adherence to the table below. The antenna separation distance applies to both horizontal and vertical orientation of the antenna when installed in the host system.

ASUS Wireless Module	Minimum required antenna-to-user separation distance
MPRFMODULE2	0 mm

### Recommended Method For Retention Of Cable

It is recommended to restrain the antenna cables of products of cable length leaving the RF connectors on the module.

It is recommended to use a robust tape or adhesive to secure the cables so they do not move or pull on the connector during shock and vibration of the system.

## RF warning message

### RF Exposure Information (SAR)

This device meets the government's requirements for exposure to radio waves. This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.

The exposure standard employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6 W/kg. Tests for SAR are conducted using standard operating positions accepted by the FCC with the EUT transmitting at the specified power level in different channels.

The FCC has granted an Equipment Authorization for this device with all reported SAR levels evaluated as in compliance with the FCC RF exposure guidelines. SAR information on this device is on file with the FCC and can be found under the Display Grant section of [www.fcc.gov/eot/ea/fccid](http://www.fcc.gov/eot/ea/fccid) after searching on FCC ID: MSQMPRFMODULE2

### Class B Device Interference Statement

This wireless module 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 wireless module generates, uses, and can radiate radio frequency energy. If the wireless module is not installed and used in accordance with the instructions, the

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wireless module may cause harmful interference to radio communications. There is no guarantee, however, that such interference will not occur in a particular installation. If this wireless module 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 taking one or more of the following measures:

- Reorient or relocate the receiving antenna of the equipment experiencing the interference.
- Increase the distance between the wireless module and the equipment experiencing the interference.
- Connect the computer with the wireless adapter to an outlet on a circuit different from that to which the equipment experiencing the interference is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE: The adapter must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. Any other installation or use will violate FCC Part 15 regulations.

## Information for OEMs and Host Integrators

The guidelines described within this document are provided to OEM integrators installing ASUS wireless module in keyboard and mouse devices. Adherence to these requirements is necessary to meet the conditions of compliance with FCC rules, including RF exposure. When all antenna type and placement guidelines described herein are fulfilled the ASUS wireless module may be incorporated into keyboard and mouse devices with no further restrictions. If any of the guidelines described herein are not satisfied it may be necessary for the OEM or integrator to perform additional testing and/or obtain additional approval. The OEM or integrator is responsible to determine the required host regulatory testing and/or obtaining the required host approvals for compliance.

- ASUS wireless module are intended for OEMs and host integrators only.
- The ASUS wireless module FCC Grant of Authorization describes any limited conditions of modular approval.
- The ASUS wireless module must be operated with an access point that has been approved for the country of operation.
- Changes or modification to ASUS wireless module by OEMs, integrators or other third parties is not permitted. Any changes or modification to ASUS wireless module by OEMs, integrators or other third parties will void authorization to operate the adapter.

## Simultaneous Transmission of ASUS Wireless Module with Other Integrated or Plug-In Transmitters

Based upon FCC Knowledge Database publication number 616217, when there are multiple transmitting devices installed in a host device, an RF exposure transmitting assessment shall be performed to determine the necessary application and test requirements. OEM integrators must identify all possible combinations of simultaneous transmission configurations for all transmitters and antennas installed in the host system. This includes transmitters installed in the host as mobile devices (>20 cm separation from user) and portable devices (<20 cm separation from user). OEM integrators should consult the actual FCC KDB 616217 document for all details in making this assessment to determine if any additional requirements for testing or FCC approval is necessary.

## Canada, Innovation, Science and Economic Development Canada (ISED) Notices

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(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.

### Avis du Canada, Innovation, Sciences et Développement économique Canada (ISED)

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;

(2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Innovation, Science and Economic Development Canada (ISED) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has been evaluated for and shown compliant with the ISED Specific Absorption Rate ("SAR") limits when operated in portable exposure conditions.

### Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie rayonnée du dispositif sans fil est inférieure aux limites d'exposition aux radiofréquences d'Innovation, Sciences et Développement économique Canada (ISED). Le dispositif sans fil doit être utilisé de manière à minimiser le potentiel de contact humain pendant le fonctionnement normal.

Cet appareil a été évalué et montré conforme aux limites de DAS (Débit d'Absorption Spécifique) de l'ISED lorsqu'il est utilisé dans des conditions d'exposition portables.

### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	ASUS	20LT0-000UZ000	PIFA	3.88 dBi for 2.4 GHz

If the ISED certification number is 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. This exterior label can use wording such as the following: "Contains IC: 3568A-MPRFMODULE2".

Si le numéro de certification ISDE n'est pas visible lorsque le module est installé à l'intérieur d'un autre appareil, alors l'extérieur de l'appareil dans lequel le module est installé doit également afficher une étiquette faisant référence au module inclus. Cette étiquette extérieure peut utiliser un libellé comme celui-ci: "Contient IC: 3568A-MPRFMODULE2".

Plaque signalétique du produit final:

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 3568A-MPRFMODULE2".

## NCC: Taiwan Wireless Statement

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

本模組於取得認證後將依規定於模組本體標示審驗合格標籤，並要求最終產品平台廠商(OEM Integrator)於最終產品平台(End Product)上標示:

” 本產品內含射頻模組，其 NCC 型式認證號碼為: CCXXxxYYyyyZzW ”

### CE RED RF Output table (Directive 2014/53/EU)

Function	FREQUENCY	Maximum Output Power(EIRP)
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2.4GHz wireless	2402-2480MHz	10 dBm
BLE	2402-2480 MHz	10 dBm

**UKCA RF Output table (The Radio Equipment Regulations 2017)**

Function	FREQUENCY	Maximum Output Power(EIRP)
2.4GHz wireless	2402-2480 MHz	10 dBm
BLE	2402-2480 MHz	10 dBm

## KC RF Output Table

Function	Frequency	Power
2.4GHz wireless	2402-2480 MHz-Module 특정소출력 무선기기(무선데이터통신시스템용 무선기기)	10mW
BLE	2402-2480 MHz-Module 특정소출력 무선기기(무선데이터통신시스템용 무선기기)	10mW

<b>Manufacturer</b>	ASUSTek COMPUTER INC.
<b>Address, City</b>	1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
<b>Authorized Representative in Europe</b>	ASUS COMPUTER GmbH
<b>Address</b>	Harkortstrasse 21-23, 40880 Ratingen
<b>Country</b>	Germany
<b>Authorized Representative in United Kingdom</b>	ASUSTEK (UK) LIMITED
<b>Address</b>	1st Floor, Sackville House, 143-149 Fenchurch Street, London, EC3M 6BL, England
<b>Country</b>	United Kingdom

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.

**CAUTION:**

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

### 2.2 List of applicable FCC rules

This module has been tested for compliance to FCC Part 15 Subpart C (15.247).

### 2.3 Summarize the specific operational use conditions

The module is tested for standalone portable RF exposure use condition. Any other usage conditions such as co-location with other transmitter(s) will need a separate reassessment through a class II permissive change application or new certification.

### 2.4 Limited module procedures

Not applicable, this device is a single modular approval and meets FCC 47 CFR 15.212 requirement.

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## 2.5 Trace antenna designs

Not applicable. This module has its own antenna, and does not need a host's printed board micro strip trace antenna, etc.

## 2.6 RF exposure considerations

This device was tested for typical body operations. To comply with RF exposure requirements, a minimum separation distance of 0 mm must be maintained between the user's body and including the antenna. Accessories that do not meet these requirements may not comply with RF exposure requirements and should be avoided.

## 2.7 Antennas

This module has been approved to operate with the antenna types listed below, with the maximum permissible gain indicated.

No.	Manufacturer	Part No.	Antenna Type	Peak Gain (dBi)	Freq. Range (GHz)	Connector Type
1	ASUS	20LT0-000UZ000	PIFA	3.88	2.4~2.4835	i-pex (MHF)

**IMPORTANT:** The final host product must have an integral antenna which is not removable by the end-user.

## 2.8 Label and compliance information

Label of the end product:

The final end product must be labeled in a visible area with the following: "Contains FCC ID: MSQMRFMODULE2". The grantee's FCC ID can be used only when all FCC compliance requirements are met

## 2.9 Information on test modes and additional testing requirements

This transmitter is tested in a standalone portable RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) class II permissive change re-evaluation or new certification.

## 2.10 Additional testing, Part 15 Subpart B disclaimer

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B (unintentional radiator) rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule requirements if applicable. As long as all 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 NOTE:** 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.

## **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 shown in this manual.

## **OEM/Host manufacturer responsibilities**

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment.