
Radxa ROCK 5T Product Brief

8K Industrial-Grade Single Board Computer

Revision 1.3

2026-06-05



Radxa Computer



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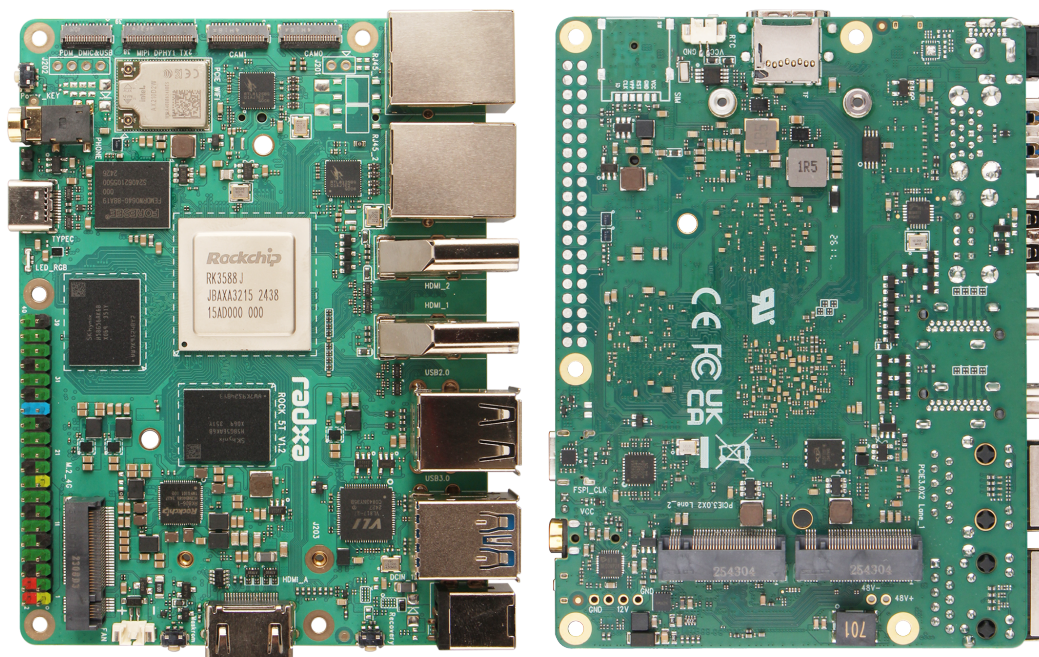
1 Revision Control Table

Version	Date	Changes from previous version
1.0	2025-01-07	First Version
1.1	2025-04-25	Change PDF fonts to avoid CJK characters
1.2	2026-02-03	Update mechanical specification

2 Introduction

The ROCK 5T from Radxa is a remarkable high-performance Single Board Computer. Armed with the potent Rockchip RK3588/RK3588J processor, it combines powerful computing with rich features. It excels in multimedia processing and offers diverse interfaces, perfectly handling complex data and high-res video output. Ideal for edge computing and embedded systems, its standout feature is flexibility. Users can self-select configurations to fit industrial-grade wide-temp or consumer-grade needs. Radxa offers various options for LPDDR5 memory configurations on the ROCK 5T board:

- 4GB
- 8GB
- 16GB
- 24GB
- 32GB



Note: The actual board layout or components' location may change during the time but the main connectors type and location will remain the same

3 Features

3.1 Hardware

- Rockchip RK3588 / RK3588J SoC
- Quad Cortex®-A76 @ 2.2/2.4GHz and a quad Cortex®-A55 @ 1.8GHz based on Arm® DynamIQ™ configuration
- Arm® Mali™ G610MC4 GPU supporting:
 - OpenGL® ES1.1, ES2.0, and ES3.2
 - OpenCL® 1.1, 1.2 and 2.2
 - Vulkan® 1.1 and 1.2
 - Embedded high performance 2D image acceleration module
- NPU supporting INT4 / INT8 / INT16 / FP16 / BF16 and TF32 acceleration and computing power is up to 6TOPs
- 64bit LPDDR5 RAM 5500MT/S options:
 - 4GB
 - 8GB
 - 16GB
 - 24GB
 - 32GB
- Onboard eMMC options:
 - 16GB
 - 32GB
 - 64GB
 - 128GB
 - 256GB
- Able to provide 4 display outputs via two HDMI, one DP (type C) and one MIPI DSI
- H.265 / H.264 / VP9 / AV1 / AVS2 video decoder up to 8K@60fps
- H.264 / H.265 video decoder up to 8K@30fps

3.2 Interfaces

- IEEE 802.11a/b/g/n/ac/ax Wireless LAN (Wi-Fi 6)
- BT 5.2 with BLE
- 1x 5525 DC Jack port for power input
- 1x USB Type-C™ port supporting:
 - DP display up to 4Kp60

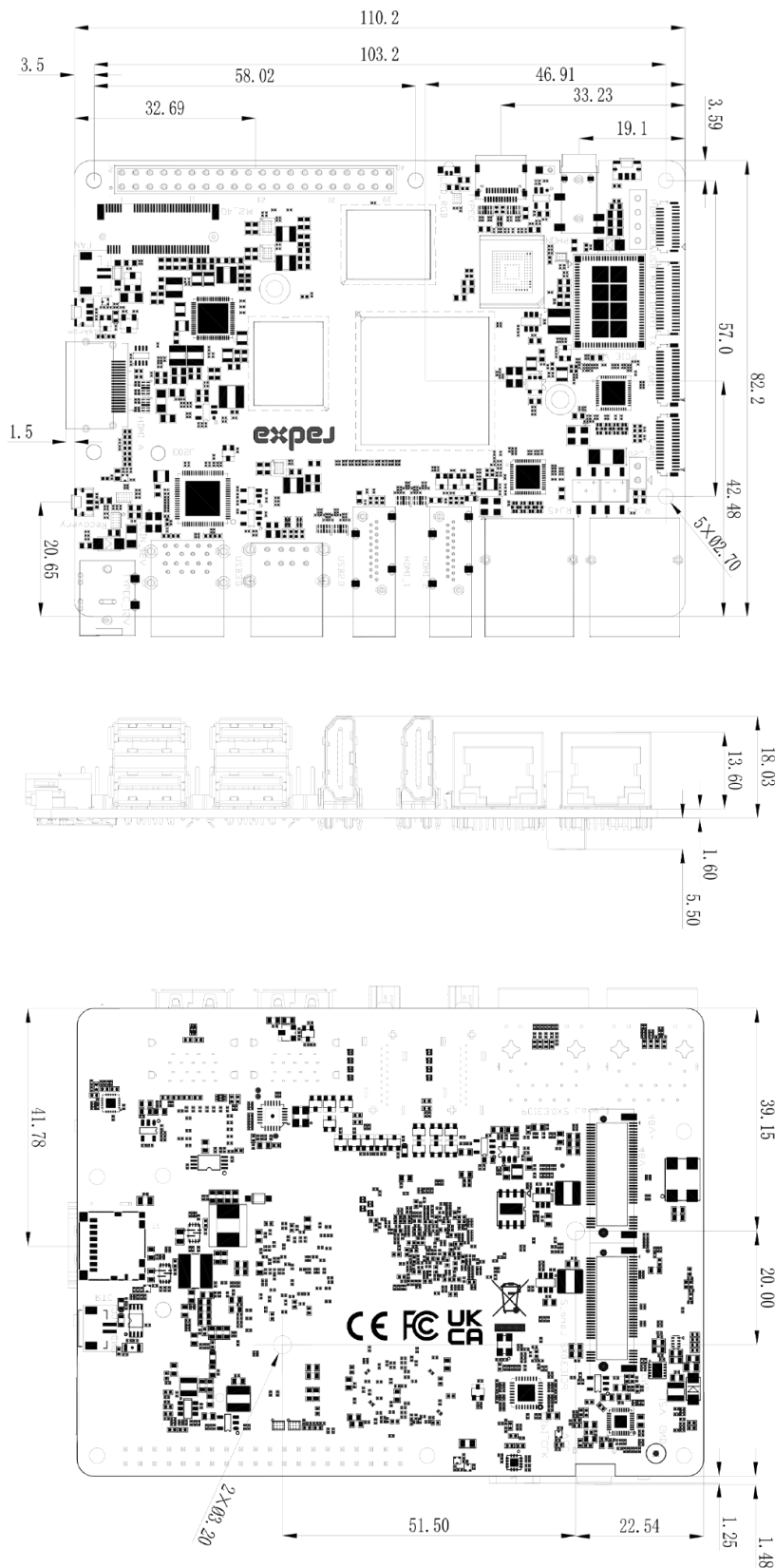
- USB 3.0 OTG / HOST
- 1x Micro SD Card Slot
- 2x Standard HDMI output ports, one supporting displays up to 8Kp60 resolution, one supporting up to 4Kp60
- 1x Standard HDMI input port, supporting up to 4Kp60 display input
- 2x USB2 Type A HOST ports
- 2x USB3 Type A HOST ports
- 1x 2.5 Gigabit Ethernet port with PoE support(Additional PoE Module Required)
- 1x 2.5 Gigabit Ethernet port without PoE support(Near the HDMI interface side)
- 2x M.2 M Key Connectors with PCIe 3.0 2-lane support
- 2x Camera Interface (2x four-lane MIPI CSI or 2x two-lane MIPI CSI)
- 1x MIPI LCD Interface (four-lane MIPI DSI)
- 1x Headphone Jack with Microphone Input
- 1x 25-Pin FPC Interface with PDM and USB for Digital Microphone
- Miscellaneous
 - 1x RTC Battery Connector
 - 1x Fan Socket with PWM Control
 - 1x Power button
 - 1x Recovery button
 - 1x Maskrom button
 - 1x RGB power/status/user LED
 - 2x Heatsink Mounting Holes
- 40 pin 0.1" (2.54mm) header supporting a wide range of interface options:
 - 2 x UART
 - 2 x SPI bus
 - 2 x I2C bus
 - 1 x PCM/I2S
 - 1 x SPDIF
 - 1 x PWM
 - 1 x ADC
 - 6 x GPIO
 - 2 x 5V DC power in/out
 - 2 x 3.3V power out

3.3 Software

- ArmV8 Instruction Set
- Debian/Ubuntu Linux support
- Android 12 support

- OpenFyde OS(Chromium OS fork) support
- RKNPU2 NPU software stack
- Hardware access/control library for Linux/Android

4 Mechanical Specification



5 Electrical Specification

5.1 Power Requirements

The ROCK 5T supports fixed voltage power supply technologies, specifically:

- 5525 DC Jack Port with 12V Input Support.
- 5V Power that can be applied to the GPIO PIN 2 & 4.

The recommended power source for it should be capable of producing at least 36W (that is, 12V / 3A or larger).

5.2 GPIO Voltage

GPIO	Voltage Level	Tolerance
All GPIO	3.3V	3.63V
SARADC_IN4	1.8V	1.98V

6 Peripherals

6.1 GPIO Interface

The ROCK 5T offers a 40 pin GPIO expansion header which provides extensive compatibility with a wide range of accessories developed for the SBC market.

6.1.1 GPIO Alternate Functions

Function5	Function4	Function3	Function2	Function1	Pin#	Pin#	Function1	Function2	Function3	Function4	Function5
				+3.3V	1	2	+5.0V				
I2S1_SDO2_M0	I2C7_SDA_M3	PWM15_IR_M1	CAN1_TX_M1	GPIO4_B3	3	4	+5.0V				
I2S1_SDO1_M0	I2C7_SCL_M3	PWM14_M1	CAN1_RX_M1	GPIO4_B2	5	6	GND				
SPI1_CS1_M1	I2C8_SDA_M4	UART7_CTSN_M1	PWM15_IR_M0	GPIO3_C3	7	8	GPIO0_B5	UART2_TX_M0	I2S1_MCLK_M1	I2C1_SCL_M0	
				GND	9	10	GPIO0_B6	UART2_RX_M0	I2S1_SCLK_M1	I2C1_SDA_M0	
		SPI1_CLK_M1	UART7_RX_M1	GPIO3_C1	11	12	GPIO3_B5	PWM12_M0	CAN1_RX_M0	UART3_TX_M1	I2S2_SCL_M1
		SPI1_MOSI_M1	I2C3_SCL_M1	GPIO3_B7	13	14	GND				
	SPI1_MISO_M1	I2C3_SDA_M1	UART7_TX_M1	GPIO3_C0	15	16	GPIO3_A4	SPI4_CS1_M1	UART8_RTSN_M2	S3_SDI	
				+3.3V	17	18	GPIO4_C4	I2C7_SDA_M1	UART9_RTSN_M0	I2S3_MISO_M0	PWM5_M2
	UART4_RX_M2	PDM1_SDI3_M1	SPI0_MOSI_M2	GPIO1_B2	19	20	GND				
		PDM1_SDI2_M1	SPI0_MISO_M2	GPIO1_B1	21	22	SARADC_IN4				
	UART4_TX_M2	PDM1_CLK1_M1	SPI0_CLK_M2	GPIO1_B3	23	24	GPIO1_B4	SPI0_CS0_M2	PDM1_CLK0_M1	UART7_RX_M2	

Function5	Function4	Function3	Function2	Function1	Pin#	Pin#	Function1	Function2	Function3	Function4	Function5
				GND	25	26	GPIO1_B5	SPI0_CS1_M2	UART7_TX_M2		
PWM7_IR_M3	SPI3_CLK_M0	UART7_CTSN_M2	I2C0_SDA_M1	GPIO4_C6	27	28	GPIO4_C5	I2C0_SCL_M1	UART9_CTSN_M3	GPIO3_MOSI_M0	PWM6_M2
	UART1_CTSN_M2	I2C8_SDA_M2	PWM15_IR_M3	GPIO1_D7	29	30	GND				
UART1_RX_M1	I2C5_SDA_M3	SPDIF_TX_M0	PWM13_M2	GPIO1_B7	31	32	GPIO3_C2	PWM14_M0	UART7_RTSN_M2	I2C8_SCL_M4	SPI1_CS0_M1
			PWM8_M0	GPIO3_A7	33	34	GND				
I2S2_LRCK_M1	UART3_RX_M1	CAN1_TX_M0	PWM13_M0	GPIO3_B6	35	36	GPIO3_B1	PWM2_M1	UART2_TX_M2		
			REFCLK_OUT	GPIO0_A0	37	38	GPIO3_B2	PWM3_IR_M1	UART2_RX_M2	I2S2_SDI_M1	
				GND	39	40	GPIO3_B3	UART2_RTSN	I2S2_SDO_M1		

6.2 Network

The ROCK 5T is equipped with two 2.5G Ethernet ports. One port supports Power over Ethernet (PoE), allowing the device to be powered through the network cable when connected to a PoE-enabled switch or router with an appropriate PoE Module. The other port, situated near the HDMI interface, does not support PoE.

6.3 Camera and Display Interfaces

The ROCK 5T is equipped with two four-channel MIPI CSI camera connectors and one four-channel MIPI DSI connector. These connectors are specifically designed for Radxa camera and monitor accessories. Moreover, they offer backward compatibility, allowing the use of standard industrial camera and monitor peripherals through Radxa's adapter FPC cables.

6.4 USB

The ROCK 5T is equipped with a USB 3.0 OTG Type-C port and supports a DP interface, which allows for a maximum resolution of 4Kp60.

Furthermore, the ROCK 5T features two USB 2.0 HOST ports and two USB 3.0 HOST ports, all of which are Type-A connectors. The combined output power for these four ports is 2A.

6.5 HDMI Output

The ROCK 5T is equipped with two standard HDMI output ports, both featuring CEC support and HDMI 2.1 compatibility. These ports offer impressive resolutions, delivering 8Kp60 and 4Kp60, respectively.

6.6 HDMI Input

The ROCK 5T features a single standard HDMI input port, supporting HDMI 2.1 input with a resolution of 4Kp60.

6.7 Audio Jack

The ROCK 5T supports high quality analogue audio output via a 4-ring 3.5mm headphone jack. The analog audio output can drive 32 Ohm headphones directly. The audio jack also supports microphone input as default.

6.8 FPC Interface

The ROCK 5T is equipped with a 25-pin FPC interface that supports USB 2.0, I2C, PWM, and PDM signals, offering extensive expansion options and is particularly suitable for connecting digital microphones.

6.9 M.2 Connector

The ROCK 5T offers three M.2 interfaces:

At the back of the circuit board, there are two M.2 M Key connectors, offering a total of two dual-channel PCIe 3.0 interfaces. Each M.2 M Key connector on the board features a standard M.2 2280 mounting hole, allowing the installation of M.2 2280 NVMe solid-state drives. It's important to note that M.2 SATA solid-state drives are not supported.

6.10 Fan Connector

The ROCK 5T has a 2pin 1.25mm header that enables users to connect a 5V fan (or other peripheral). The fan can be PWM controlled without speed feedback.

7 Order Info and SKU

To meet the customization needs of our clients, Radxa has prepared the following options for customer customization. The following SKU numbers are available for users to choose from, and their meanings are as follows:

Example SKU code:

RS139-D8E32P2J0W16

SKU Code Explanation Table:

D	DRAM	D4	4GB RAM
		D8	8GB RAM
		D16	16GB RAM
		D24	24GB RAM
		D32	32GB RAM
E	eMMC	E0	eMMC chip not soldered
		E16	16GB eMMC
		E32	32GB eMMC
		E64	64GB eMMC
		E128	128GB eMMC
J	Industrial Grade	J0	Commercial Grade(0 ~60)
		J1	Industrial Grade(-40 ~85)
P	PoE support	P0	RJ45 do not support PoE
		P2	with PoE Module built-in
W	WiFi Module	W16	AW-XM548NF WiFi
		W18	AX210 Industrial Grade WiFi

8 Availability

Radxa guarantees availability of the Radxa ROCK 5T until at least September 2032.

9 Support

For support please see the hardware documentation section of the [Radxa Website](#) and post questions to the [Radxa Forum](#).



FCC WARNING

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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 device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: 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 or more 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.

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 and your body.

Radiation Exposure Statement:

This equipment 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.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

The final end product must be labelled in a visible area with the following:

“Contains Transmitter Module 2BC6T-D16E128”

Requirement per KDB996369 D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See also Section 2.10 below concerning the need to notify host manufacturers that further testing is required.³

Explanation: This module meets the requirements of FCC part 15C(15.247), FCC Part 15 15.407.

2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: Yes, the module contains 2 IPEX connected antenna with a maximum antenna gain of 2.4GHz:2.1dBi, 5.1GHz:1.93dBi, 5.8GHz:1.88dBi .

2.4 Limited module procedures

If a modular transmitter is approved as a “limited module,” then the module manufacturer is responsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited module,

a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.

Explanation: The module is a single module.

2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.

- a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);
- b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);
- c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;
- d) Appropriate parts by manufacturer and specifications;
- e) Test procedures for design verification; and
- f) Production test procedures for ensuring compliance.

The module grantee shall provide a 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 the module grantee 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 grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

Explanation: Yes, The module with FPC antenna designs.

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: This module complies with FCC RF radiation exposure limits set forth for an uncontrolled environment, This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body." This module is designed to comply with the FCC statement, FCC ID is: 2BC6T-D16E128.

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an “omni-directional antenna” is not considered to be a specific “antenna type”)). For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product. The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: Yes, the module contains 2 IPEX connected antenna with a maximum antenna gain of 2.4GHz:2.1dBi, 5.1GHz:1.93dBi, 5.8GHz:1.88dBi .

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This includes advising host product manufacturers that they need to provide a physical or e-label stating “Contains FCC ID” with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2BC6T-D16E128"

2.9 Information on test modes and additional testing requirements⁵

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer's determination that a module as installed in a host complies with FCC requirements.

Explanation: Can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: The module is only FCC authorized for the specific rule parts listed on the grant. The OEM integrator is responsible for testing their end-product for any additional compliance requirements required with this module installed. If the final product contains circuits of other FCC PART 15 Subparts, the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.