T50

Multimedia Player

Specifications

Change History

Document Version	Release Date	Description
V1.3.3	2026-01-05	• Updated the playback performance. • Updated the indicator status description. • Updated the media decoding specifications.
V1.3.2	2025-08-29	• Updated the feature description. • Updated the connector description. • Updated the media decoding specifications.
V1.3.1	2024-10-20	Updated the feature description.
V1.3.0	2024-07-24	• Updated the feature description. • Updated the RUN indicator description. • Added the recommended supply power. • Updated the packing information. • Updated the media decoding specifications.
V1.2.0	2024-05-30	• Updated the introduction. • Updated the feature description. • Updated the connector description. • Updated the media decoding specifications.

Introduction

The T50 is a new generation of multimedia player created by NovaStar for full-color LED displays. This multimedia player integrates playback and sending capabilities, allowing users to publish content and control LED displays with a computer, mobile phone, or tablet. Working with our superior cloud-based publishing and monitoring platforms, the T50 enables users to manage LED displays from an Internet-connected device anywhere, anytime.

Support for multi-screen synchronous playback and synchronous and asynchronous modes makes this multimedia player a perfect fit for a wide range of applications.

Thanks to its reliability, ease of use, and intelligent control, the T50 becomes a winning choice for commercial LED displays and smart city applications such as fixed displays, lamp-post displays, chain store displays, advertisement players, retail store displays, door head displays, shelf displays, and much more.

Certifications

MIC, FCC, IC, CE

If the product does not have the relevant certifications required by the countries or regions where it is to be sold, please contact NovaStar to confirm or address the problem. Otherwise, the customer shall be responsible for the legal risks caused or NovaStar has the right to claim compensation.

Features

Output

- Loading capacity up to 1,300,000 pixels
  - Maximum width: 4096 pixels, maximum height: 4096 pixels
  - Non-standard resolutions are supported in both asynchronous and synchronous modes and the pixel clock of the custom resolutions cannot exceed 153 MHz.
- 2x Gigabit Ethernet ports

  All these two ports serve as primary by default. Users can also set one as primary and the other as backup.
- 1x Stereo audio connector

  The audio sample rate is fixed at 48 kHz. If NovaStar's multifunction card is used for audio output, audio with a sample rate of 48 kHz is required.
- 1x HDMI 1.3 connector

  Maximum output: 1920×1200@60Hz and support for HDMI loop

Input

- 1x HDMI 1.3 connector

  In synchronous mode, this connector is used as the video source which can be scaled to fit the entire screen automatically.
- 2x Sensor connectors

  Connect to the brightness sensor or temperature and humidity sensor.

Control

- 1x USB 3.0 (Type A) port allowing for USB playback, firmware upgrade and storage expansion
- 1x USB (Type B) port connecting to the control computer for content publishing and screen control
- 1x Gigabit Ethernet port connecting to the control computer, a LAN or public network for content publishing and screen control

Performance

- Powerful processing capacity
  - Quad-core ARM A55 processor @1.8 GHz
  - Support for 4K video decoding
  - 1 GB of onboard RAM
  - 32 GB of internal storage
- Flawless playback

  Support for playback of 1x 4K, 2x 1080p, 5x 720p, 6x 480p, or 6x 360p videos

  Note: Videos with resolutions between 2K and 4K will be converted into 4K videos.

Functionality

- All-round control plans
  - Enables users to publish content and control screens from a computer, mobile phone, or tablet.
  - Allows users to publish content and control screens from anywhere, anytime.
  - Allows users to monitor screens from anywhere, anytime.
- Wi-Fi AP and Wi-Fi Sta can be turned on at the same time
  - Wi-Fi AP

    User terminal devices can be connected to the built-in Wi-Fi hotspot of the multimedia player. The default SSID is “Model+Last 8 digits of SN” and the default password is printed on the SSID label.
  - Wi-Fi AP+Wi-Fi Sta

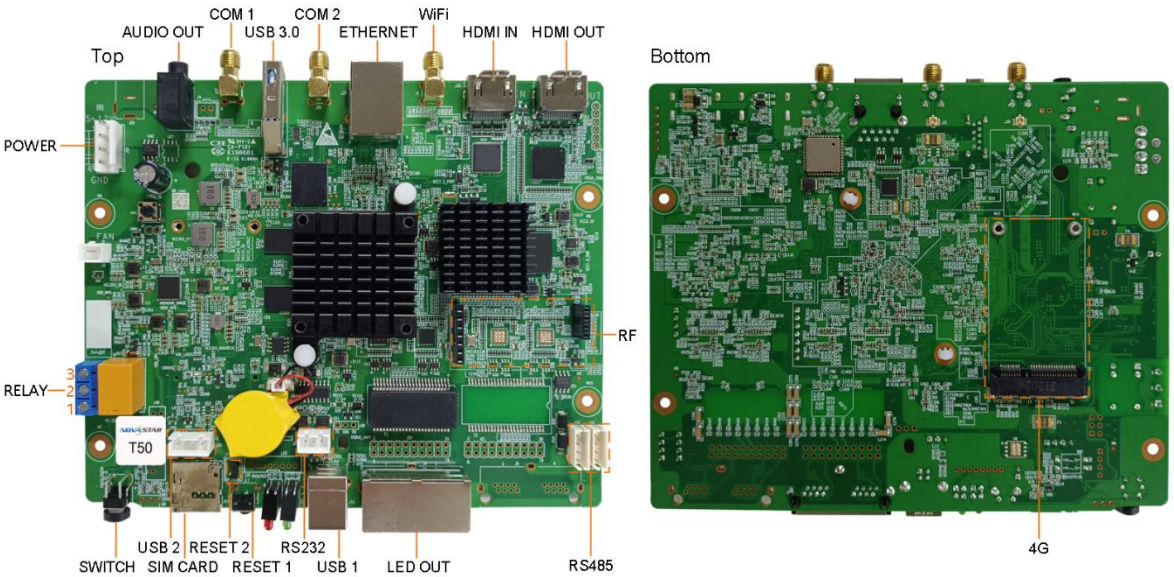
Users can connect the multimedia player to a Wi-Fi network and turn on the Wi-Fi hotspot at the same time.

- Synchronous and asynchronous modes
  - In asynchronous mode, the internal video source works.
  - In synchronous mode, the HDMI video source works.
- Synchronous playback across multiple screens

  Enabling synchronous playback halves the number of videos that can be played simultaneously within the decoding capability of the device.
  - NTP time synchronization
  - GPS time synchronization (The specified 4G module must be installed.)
  - RF time synchronization (The specified RF module must be installed.)
- Support for 4G modules
  - The device ships without a 4G module. Users have to purchase 4G modules separately if needed.
  - Network connection priority: Wired network > Wi-Fi network > 4G network

    When multiple networks are available, the device will choose a network according to the priority order.
- Support for relays (maximum DC 30 V, 3 A)

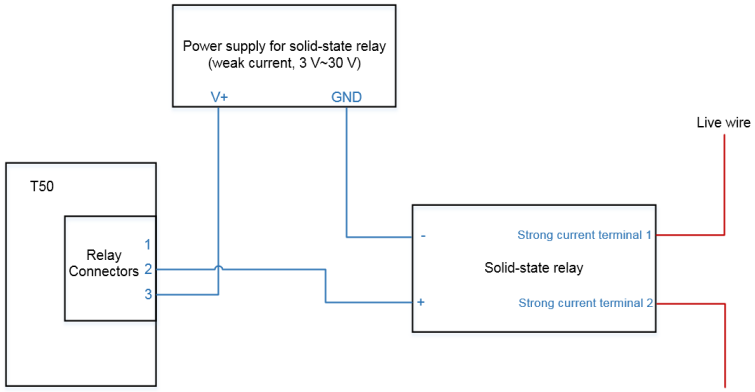
Appearance



Note: All product pictures shown in this document are for illustration purpose only. Actual product may vary.

Name	Description
SWITCH	Switches between synchronous and asynchronous modes • Staying on: Synchronous mode • Off: Asynchronous mode
USB 2	Reserved USB port
SIM CARD	SIM card slot Capable of preventing users from inserting a SIM card in the wrong orientation.
RESET 2	Reset connector used to reset the product to its factory settings
RESET 1	Reset button Press and hold this button for 5 seconds to reset the product to its factory settings.
RS232	External expansion connector
USB 1	USB (Type B) port Connects to the control computer for content publishing and screen control.
LED OUT	Gigabit Ethernet outputs
RS485	Sensor connectors Connect to the brightness sensor or temperature and humidity sensor.
RF	RF module connector
HDMI OUT	1x HDMI 1.3 OUT • Support for HDMI loop • The pixel clock cannot exceed 153 MHz. • Maximum output resolution: 1920×1200@60Hz • In asynchronous mode, output resolutions support 400×4096@60Hz and 480×4096@60Hz. • Support for custom resolutions: – Custom pixel width range: 512~4096 (512×512@60Hz~4096×560@60Hz) – Custom pixel height range: 512~4096 (512×512@60Hz~560×4096@60Hz) • HDCP 1.4 compliant • No support for interlaced signal output
HDMI IN	1x HDMI 1.3 IN • The pixel clock cannot exceed 153 MHz. • Maximum input resolution: 1920×1200@60Hz

Name	Description
	• HDCP 1.4 compliant • No support for interlaced signal input • Support for custom resolutions: – Custom pixel width range: 800~4096 (800×600@60Hz~4096×560@60Hz) – Custom pixel height range: 600~4096 (800×600@60Hz~560×4096@60Hz) Note: The resolution of HDMI IN can be customized by changing the preset EDID, so the external source must support custom resolutions. • In synchronous mode, HDMI is used for video input and users can enable full-screen scaling to make the image to fit the screen automatically. Requirements for full-screen scaling in synchronous mode: • 512 pixels ≤ video source width ≤ 2048 pixels • 512 pixels ≤ video source height ≤ 2048 pixels • Maximum resolution: 1920×1080 • The image can only be scaled down and cannot be scaled up. Note: The pixel width and height of the video source must be greater than or equal to the pixel width and height of the screen, respectively.
WiFi	Wi-Fi antenna connector (2.4 GHz Wi-Fi supported) Support for switching between Wi-Fi AP and Wi-Fi Sta
ETHERNET	Gigabit Ethernet port Connects to the control computer, a LAN or public network for content publishing and screen control.
COM 2	GPS antenna connector
USB 3.0	USB 3.0 (Type A) port Allows for USB playback, firmware upgrade and storage expansion. • Supported file systems: FAT32/NTFS • USB drive capacity range: 2 GB to 128 GB • The size of a single file must be greater than 0 KB and less than 4 GB.
COM 1	4G antenna connector
AUDIO OUT	3.5 mm audio output connector Three-pole audio jacks can be connected.
POWER	Power input connector
RELAY	3-pin relay control switch • DC: Maximum voltage and current: 30 V, 3 A • AC: Maximum voltage and current: 250 V, 3 A

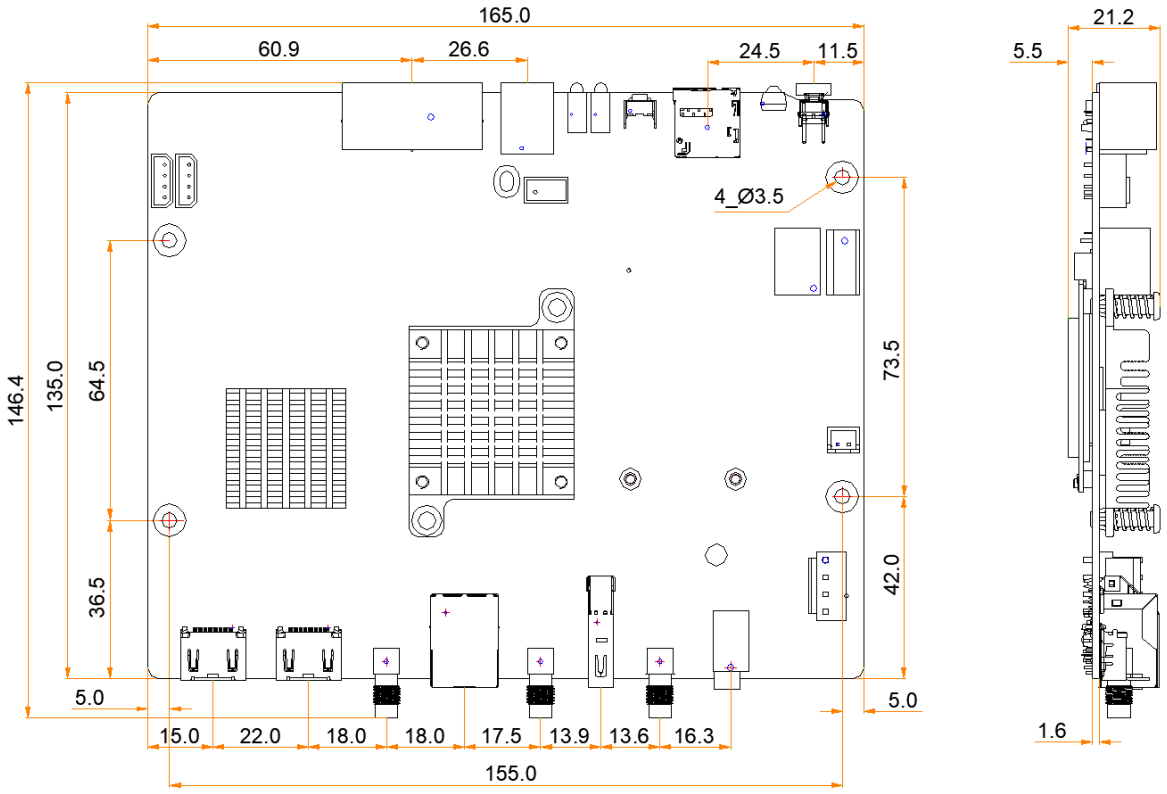
Name	Description
	Two connection methods: • Common switch: The connection method of pins 2 and 3 is not fixed. Pin 1 is not connected to the wire. On the power control page of ViPlex Express, turn on the circuit to connect pin 2 to pin 3, and turn off the circuit to disconnect pin 2 from pin 3. • Single pole double throw switch: The connection method is fixed. Connect pin 2 to the pole. Connect pin 1 to the turn-off wire and pin 3 to turn-on wire. On the power control page of ViPlex Express, turn on the circuit to connect pin 2 to pin 3 and disconnect pin 1 form pin 2, or turn off the circuit to disconnect pin 3 from pin 2 and connect pin 2 to pin 1. Note: The device uses DC power supply. Using the relay to directly control AC is not recommended. If it is required to control AC, the following connection method is recommended. 
4G	4G module slot

Indicators

Name	Color	Status	Description
PWR	Red	Staying on	The power supply is working properly.
SYS	Green	Flashing once every 2s	The operating system is functioning normally.
		Staying on/off	The operating system is malfunctioning.
CLOUD	Green	Off	The device is not connected to the Internet.

Name	Color	Status	Description
		Staying on	The device is connected to the Internet and the connection is available.
		Flashing once every 2s	The device is connected to VNNOX and the connection is available.
		Flashing once every second	The device is upgrading the operating system.
		Flashing once every 0.5s	The device is copying the upgrade package or files from the USB drive.
RUN	Green	Flashing once every 4s	The FPGA has no video source.
		Flashing once every 0.5s	The FPGA is functioning normally.
		Staying on/off	The FPGA loading is abnormal.

Dimensions



Tolerance: ±0.3 Unit: mm

To make molds or trepan mounting holes, please contact NovaStar for a higher-precision structural drawing.

Specifications

Electrical Parameter	Power supply	DC 5 V~12 V
	Maximum power consumption	18 W
	Recommended supply power	25 W
Storage Capacity	RAM	1 GB
	Internal storage	32 GB
Operating Environment	Temperature	–20°C to +60°C
	Humidity	0% RH to 80% RH, non-condensing
Storage Environment	Temperature	–40°C to +80°C
	Humidity	0% RH to 80% RH, non-condensing
Physical Specifications	Dimensions	165.0 mm × 146.4 mm × 21.2 mm
	Net weight	184.5 g
	Gross weight	374.0 g Note: It is the total weight of the product, accessories and packing materials packed according to the packing specifications.
Packing Information	Dimensions	278.0 mm × 63.0 mm × 221.0 mm
	Accessories	• 1x Wi-Fi omnidirectional antenna • 1x Power connector • 2x IPex cables • 1x QR code • 1x Certificate of Approval
System Software	• Android 11 operating system software • Android terminal application software • FPGA program	

The amount of power consumption may vary depending on various factors such as product settings, usage, and environment.

Media Decoding Specifications

Image

Category	Codec	Resolution	Format	Remarks
JPEG	JFIF file format 1.02	64×64 pixels to 4096×2304 pixels	JPG, JPEG	Support for interlaced scan only Support for SRGB JPEG Support for Adobe RGB JPEG
BMP	BMP	64×64 pixels to 4096×2304 pixels	BMP	N/A
GIF	GIF	64×64 pixels to 1920×1088 pixels	GIF	At a resolution of 1280×720, the supported frame rate range is 1fps to 30fps. At a resolution of 1920×1088, the supported frame rate range is 1fps to 10fps.
PNG	PNG	64×64 pixels to 4096×2304 pixels	PNG	N/A
WEBP	WEBP	64×64 pixels to 4096×2304 pixels	WEBP	N/A

Video

Codec	Resolution	Max Frame Rate	Max Bit Rate (Ideal Case)	Format
H.264	64×64 pixels to 4096×2304 pixels	30fps	80Mbps	MP4, AVI, MKV, MOV
H.265/HEVC	64×64 pixels to 4096×2304 pixels	60fps	100Mbps	MP4, MKV, MOV
MPEG4	64×64 pixels to 1920×1088 pixels	30fps	38.4Mbps	MP4, AVI, MKV, MOV

Codec	Resolution	Max Frame Rate	Max Bit Rate (Ideal Case)	Format
VP8	64×64 pixels to 1920×1088 pixels	30fps	38.4Mbps	MKV, WEBM
VP9	64×64 pixels to 4096×2304 pixels	60fps	80Mbps	MKV, WEBM

Notes and Cautions

FCC Caution

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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

Important Note:

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 and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/Canada.

- The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- The transmitter module may not be co-located with any other transmitter or antenna.

As long as the three conditions above are met, further transmitter testing 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.

End Product Labeling:

The final end product must be labeled in a visible area with the following “Contains FCC ID:2AG8JT60”

If the FCC identification 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 Transmitter Module FCC ID: 2AG8JT60.

Manual Information to the End User:

The OEM integrator has to be aware not 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.

When the module is installed inside another device, the user manual of this device must contain below warning statements;

- This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:
  - This device may not cause harmful interference,
  - This device must accept any interference received, including interference that may cause undesired operation.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

ISED Statement

English: This device complies with Industry Canada license-exempt RSS standard(s). 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. The digital apparatus complies with Canadian CAN ICES-3 (B)/NMB-3(B).

French: Le présentappareilestconforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitationestautorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareildoit accepter tout brouillageradioélectriquesubi, mêmesi le brouillageest susceptible d'encompromettre le fonctionnement.

This radio transmitter (ISED certification number: 23873-T60) has been approved by Industry Canada to operate with the antenna types listed with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (ISED certification number: 23873-T60) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Radiation Exposure Statement

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

Déclaration d'exposition aux radiations

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

This device is intended only for OEM integrators under the following condition:

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

As long as the condition above is 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:

Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 1 condition 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 co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC 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' 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

The final end product must be labeled in a visible area with the following: Contains IC: 23873-T60.

Plaque signalétique du produit final

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: Contient des IC: 23873-T60

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.

Radiation Exposure Statement

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

Cetéquipementestconforme Canada limitesd'exposition aux radiations dans un environnement non contrôlé. Cetéquipementdoitêtreinstallé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

Integration Instructions for Host Product Manufacturers According to KDB 996369 D03 OEM Manual v01

- List of applicable FCC rules

  FCC Part 15 Subpart C 15.247 & 15.209

- Specific operational use conditions

  The module is a 2.4G WiFi module.

  Operation Frequency: 2412-2462 MHz

  Number of Channel: 11

  Modulation: DSSS, OFDM

  Type: Helix Antenna

  Gain: 5.03 dBi Max.

The module can be used for mobile or portable applications with a maximum 5.03dBi antenna. The host manufacturer installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation. The host manufacturer 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.

- Limited module procedures

  Not applicable. The module is a Single module and complies with the requirement of FCC Part 15.212.

- Trace antenna designs

  Not applicable. The module has its own antenna, and doesn't need a host's printed board micro strip trace antenna etc.

- RF exposure considerations

  The module must be installed in the host equipment such that at least 20cm is maintained between the antenna and users' body; and if RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

- Antennas

  Antenna Specification are as follows:

  Type: Helix Antenna

  Gain: 5.03 dBi

  This device is intended only for host manufacturers under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna; the module shall be only used with the internal antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a 'unique' antenna coupler.

  As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

- Label and compliance information

Host product manufacturers need to provide a physical or e-label stating “Contains FCC ID: 2AG8JT60” with their finished product.

- Information on test modes and additional testing requirements

  Operation Frequency: 2412-2462 MHz

  Number of Channel: 11

  Modulation: DSSS, OFDM

  Host manufacturer must perform test of radiated & conducted emission and spurious emission, etc. according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally. 2.10 Additional testing, Part 15 Subpart B disclaimer. The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 & 15.209 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 circuity), 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.

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