

2CX User Manual for FCC

Model Name: **2CX**

FCC ID: **VPYLBEE5QG2CX**

For the details about this module, please refer to the specification sheet of module.

This module should be installed in the host device according to the interface specification (installation procedure)

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 end 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 User manual.

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.

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

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

This device complies with below part 15 of the FCC Rules.

Part 15 Subpart C

Part 15 Subpart E

Since there is no space which indicates FCC ID on this module, FCC ID is indicated in a manual. If the module is installed inside another device, then the device must also display a label referring to the enclosed module.

For example : [Contains FCC ID: VPYLBEE5QG2CX] or [Contains Transmitter Module FCC ID: VPYLBEE5QG2CX]

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The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and 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.

The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

This module does not meet the antenna and transmission system requirements of §15.203.

This module need to be integrated inside a host so that the end user cannot readily change or alter the antenna.

Since there is no space which indicates FCC ID on this module, FCC ID is indicated in a manual. If the module is installed inside another device, then the device must also display a label referring to the enclosed module.

For example : [Contains FCC ID: VPYLBEE5QG2CX] or [Contains Transmitter Module FCC ID: VPYLBEE5QG2CX]

When the 6GHz capability built in,

FCC regulations restrict operation of this device to indoor use only.

The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet.

Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

This manual is based on KDB 996369, which is designed to ensure that module manufacturer correctly communication the necessary information to host manufacturers that incorporate their modules.

INTEGRATION INSTRUCTIONS

1. General: Applicable

Sections 2 through 10 describe the items that must be provided in the integration instructions for host product manufacturers (e.g., OEM instruction manual) to use when integrating a module in a host product. This Modular transmitter applicant(muRata) should include information in their instructions for all these items indicating clearly when they are not applicable.

2. List of applicable FCC rules: Applicable

This device complies with below part 15 of FCC Rules.
Part 15 Subpart C
Part 15 Subpart E

3. Summarize the specific operational use conditions : Applicable

This module designed for mounting inside of the end product by OEM.
Antenna, antenna cable and antenna connectors of this module should be installed inside the end product so end users Cannot change these setting.
Other than supported frequencies of the attached antenna should be controlled not to be transmitted by the host software.
This module is a dedicated module for OEM customers and must not be sold to the general public.
Therefore, it complies with the antenna and transmission system requirements of §15.203.

When the 6GHz capability built in,

FCC regulations restrict operation of this device to indoor use only.
The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet.
Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

4. Limited module procedures : Applicable

This module needs to supply a regulated voltage from host device.
Refer to section 3 of the 2CX Installation Manual.

Since there is no space which indicates FCC ID on this module, FCC ID is indicated in a manual. If the module is installed inside another device, then the device must also display a label referring to the enclosed module.
For example : [Contains FCC ID: VPYLBEE5QG2CX] or [Contains Transmitter Module FCC ID: VPYLBEE5QG2CX]

This module needs to be installed in such a way that the end user does not have access to change the antenna since the device does not make use of a unique connector.

5. Trace antenna designs : Applicable

■ Please perform the antenna design that followed the specifications of the antenna.

■ About the signal line between an antenna and a module

It is a 50-ohm line design.

Fine tuning of return loss etc. can be performed using a matching network.

However, it is required to check "Class1 change" and "Class2 change" which the authorities define then.

The concrete contents of a check are the following three points.

- 1)It is the same type as the antenna type of antenna specifications.
- 2)An antenna gain is lower than a gain given in antenna specifications.*
- 3)The emission level is not getting worse.

*For the 6GHz band, CBP test is required when using antennas with antenna gains lower than -6.32dBi.

■ Please refer to the Antenna section of the Installation Manual.

6. RF exposure considerations : Applicable

This equipment is only authorized for use in devices that are used at a distance of at least 20 centimeters between the RF source's radiating structure(s) and the body of the user or nearby persons.

When installing it in a portable equipment, it is necessary to take a SAR test with your set mounting this module (except to use only Bluetooth).

Class II permissive change application is necessary using the SAR report. Please contact Murata.

And an application for a Class II permissive change from a Mobile equipment to a Portable equipment is also required.

Note)

Portable equipment : Equipment for which the spaces between human body and antenna are used within 20cm.

Mobile equipment : Equipment used at position in which the spaces between human body and antenna exceeded 20cm.

7. Antennas : Applicable

	Type	BAND	Vender	Part number	Peak Gain
Chain1	Slot	6GHz	SONY	chain1_slot_6GHz	-1.14 dBi
		5GHz	SONY	chain1_slot_5GHz	+1.13 dBi
		2.4GHz	SONY	chain1_slot_2.4GHz	+1.65 dBi
	Mono	6GHz	SONY	chain1_monopole_6GHz	-1.25 dBi
		5GHz	SONY	chain1_monopole_5GHz	+0.57 dBi
		2.4GHz	SONY	chain1_monopole_2.4GHz	+1.60 dBi
Cahin0	Mono	6GHz	SONY	chain0_monopole_6GHz	-1.36 dBi
		5GHz	SONY	chain0_monopole_5GHz	+0.51 dBi
		2.4GHz	SONY	chain0_monopole_2.4GHz	-0.23 dBi

8. Label and compliance information : Applicable

The following statements must be described on the user manual of the host device of this module;

Contains Transmitter Module FCC ID: VPYLBEE5QG2CX

or

Contains FCC ID: VPYLBEE5QG2CX

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.

*If it is difficult to describe this statement on the host product due to the size, please describe in the User's manual.

FCC CAUTION

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

Compliance with FCC requirement 15.407(c)

Data transmission is always initiated by software, which is then passed down through the MAC, through the digital and analog baseband, and finally to the RF chip. Several special packets are initiated by the MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted. In other words, this device automatically discontinues transmission in case of either absence of information to transmit or operational failure.

Frequency Tolerance: ± 20 ppm

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

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When installing it in a mobile equipment. Please describe the following warning to the manual.

This equipment is only authorized for use in devices that are used at a distance of at least 20 centimeters between the RF source's radiating structure(s) and the body of the user or nearby persons.

This module is only approval as a mobile equipment.

Therefore, do not install it on portable equipment.

If you wish to use it as a portable equipment, please contact Murata in advance as Class II application accompanied by SAR testing using the final product are required.

Note)

Portable equipment : Equipment for which the spaces between human body and antenna are used within 20cm.

Mobile equipment : Equipment used at position in which the spaces between human body and antenna exceeded 20cm.

9. Information on test modes and additional testing requirements: Applicable

Please check the installation manual first.

Please contact Murata if you have any questions when conducting the RF certification test on the host.

We (Murata) are ready to present the control manual and others for the RF certification test.

10. Additional testing, Part 15 Subpart B disclaimer : Applicable

The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and 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.

The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

If the final product with this module is FCC Class A digital device, include the following in the manual of the final product:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

If the final product with this module is FCC Class B digital device, include the following in the manual of the final product:

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.

11. Note EMI Considerations : Applicable

Note that a host manufacture is recommended to use KDB 996369 D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

For standalone mode, reference the guidance in D04 Module Integration Guide and for simultaneous mode⁷; see D02 Module Q&A Question 12, which permits the host manufacturer to confirm compliance.

12. How to make changes: Applicable

When changing from the conditions of approval, please present technical documentation that it is equivalent to a Class I change. For example, when adding or changing an antenna, the following technical documents are required.

- 1)The document indicating the same type as the original antenna
- 2)Technical document showing that the gain is the same or lower than the gain at the time of the original approval *
- 3)Technical document showing that the spurious is no more than 3 dB worse than when it was originally certified

*For the 6GHz band, CBP test is required when using antennas with antenna gains lower than -6.32dBi.

About Power supply

This Module(2CX) have been approved as Limited Modular Approval.

VPH and VDD18_DIG_IO do not have a voltage stabilizing circuit in the power path to the internal RF circuitry.

Therefore, the Limited Condition must provide a stable power supply for the supply voltage to the module.

Please supply a stable power supply so that the voltage shown in the table below is applied.

2CX_PIN_Name	Min.	Typ.	Max.	unit
VPH	3.0	3.85	4.6	V
VDD18_DIG_IO	1.71	1.8	2.1	V
AON_RFACMN_LDO_IN	0.9	0.95	2.1	V
WLCX_BT_LDO_IN/ WLMX_LDO_IN	0.9	0.95	2.1	V
RFA0P8_LDO_IN	0.9	0.95	2.1	V
RFA12_LDO_IN	1.3	1.35	2.1	V
RFA17_LDO_IN	1.85	1.9	2.1	V
PCIE0P92_LDO_IN	1.28	1.35	2.1	V
PCIE18_LDO_IN	1.85	1.9	2.1	V

*VDD18_DIG_IO and PCIE0P92_LDO_IN and PCIE18_LDO_IN don't influence the RF characteristic.

About Software SECURITY

Updates must be systematized to be deployed by your device management system to qualify for this approval.

A condition for using this authorization is that the update package is systematized, managed by digital signatures, individual identification numbers, etc.

Inform our company that we have designed the FW and configuration files specified by Murata to be installed correctly when you are implemented in the final product.