Stream Unlimited Stream210 Hardware Modules For Audio Streaming and IoT Connectivity User Guide

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Contents

Document History

No.	Primary Author(s)	Description of Version	Date Completed
1.	C. Arnardi	Initial version	05/5/2024
1.1	C.Arnardi	SAR Update	21/08/202

Confidentiality Notice

Document Version Management Notice

Updates of this document will be done without notice. The latest document version is available on request.

Conditions for re-use of modular certification

Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products. Additional testing and certification may be necessary when multiple modules are used. To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier's Declaration of Conformity procedure without a transmitter-certified module and a module is added, the host manufacturer is responsible for ensuring that after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, (StreamUnlimited Engineering GmbH) will provide guidance to the host manufacturer for compliance with the Part 15B requirements. If any doubt about product compliance due to integration, StreamUnlimited provide via its customer portal software a documentation to re-check compliance. (see S210 Certification Guidelines.pdf)

The modular certifications may be re-used on product level under following conditions:

1. Recommended antennas specifications are followed (see S210_Generic_Antenna_Specification.pdf)
2. The WiFi output power configurations which are stored in "ameba_wifi_power_table_usrcfg.c" and "rtl8730_fw" remain unchanged
3. The Bluetooth output power which is hard-coded in firmware to 5dB remains unchanged
4. Product labelling requirements are met
5. Instructions for use requirements are met

For FCC Compliance, please refer to KDB Publication 996369 D04 for up-to-date information about module integration.

Additional notes:

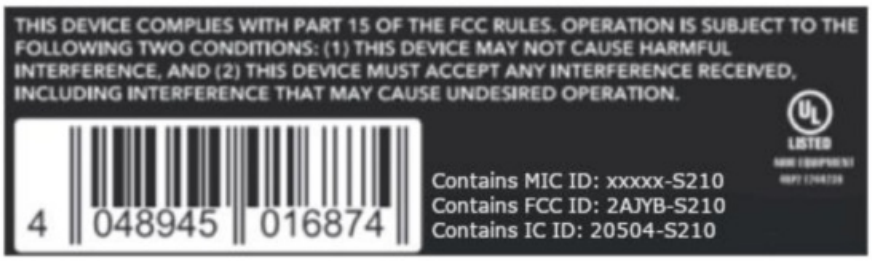
Ad 1):
StreamUnlimited provide specific PowerTable binaries for "SRRC" "CE" "FCC" and "MIC" configurations. Region is selected during end-product configuration prior to product encasing. In the same step, also the country which the product is intended for should be configured. In the case that no region is configured, the binary for "CE" will be selected as default and "worldwide" will be selected as country. This will result in the most restricted configuration.

Ad):
Firmware is field-upgradeable. A secure update mechanism is used by Stream Unlimited to prevent modification of the update image. The product is also protected against local access to the software. If not using software of StreamUnlimited, a similar approach must be taken to prevent tampering with the system either via direct access of by modification of the update software image.

Product labelling requirements

Product label must contain following text:
"contains FCC ID: 2AJYB-S210"
"contains IC: 20504- S210"
"Japan MIC: Certification number if applicable"

See below example for reference



Compliance Logos

FCC	
IC	

MIC	
CE	

Instruction for use requirements

Instructions for use must contain warnings and customer information, see next two pages for detailed tex

FCC statements:

The device for operation in the band 5150–5350 MHz band is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems. Federal Communication Commission (FCC) Radiation Exposure Statement :
The SAR limit of the USA (FCC) is 1.6 W/kg averaged over one gram of tissue. This device has also been tested against this SAR limit.

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.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes 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

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

1. The antenna must be installed such that 10 mm is maintained between the antenna and users.
2. The transmitter module may not be co-located with any other transmitter or antenna. As long as the two conditions above are met, additional transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required for the installed module.

Important Note: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Federal Communications Commission of the U.S. Government (FCC) and the Canadian Government authorizations are no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator shall be responsible for re-evaluating the end-product (including the transmitter) and obtaining a separate FCC authorization in the U.S. and Canada.

OEM Integrators – End Product Labeling Considerations: This transmitter module is authorized only for use in device where the antenna may be installed such that 10 mm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains, FCC ID: 2AJYB-S210". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

OEM Integrators – End Product Manual Provided to the End User: The OEM integrator shall not provide information to the end user regarding how to install or remove this RF module in end product user manual. The end user manual must include all required regulatory information and warnings as outlined in this document. Appropriate measurements (e.g. 15 B compliance) and if applicable additional equipment authorizations (e.g. SDoC) of the host product to be addressed by the integrator/manufacturer. This module is only FCC authorized for the specific rule parts 15.247, 15.407 listed on the grant, and the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host product as being Part 15 Subpart B compliant

For more detailed guidance, please refer to KDB 996369 D04 for OEM Integrators.

EMC Compliance Statement

Important: This device and its power adapter have demonstrated Electromagnetic Compatibility(EMC) compliance under conditions that included the use of compliant peripheral devices and shielded cables between system components. It is important that you use compliant peripheral devices and shielded cables between system components to reduce the possibility of causing interference to radios, televisions, and other electronic devices.

Canada:

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.

The device meets compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

The device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

1. the device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
2. for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz
3. for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate.

Caution!

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

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

"Contains FCC ID: 2AJYB-S210". "Contains IC: 20504- S210".

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

EU Declaration of Conformity

Frequency band: 5150 – 5250 MHz:

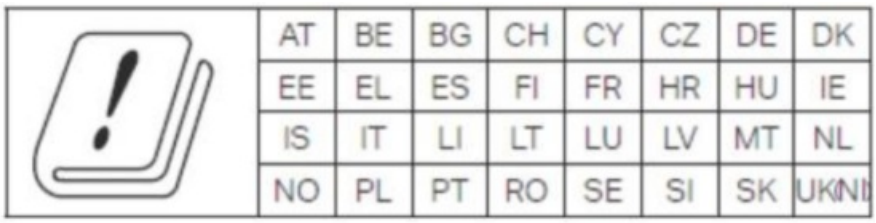
Indoor use: Inside buildings only. Installations and use inside road vehicles and train carriages are not permitted. Limited outdoor use: If used outdoors, equipment shall not be attached to a fixed installation or to the external body of road vehicles, a fixed infrastructure or a fixed outdoor antenna. Use by unmanned aircraft systems (UAS) is limited to within the 5170 – 5250 MHz band.

Frequency band: 5250 – 5350 MHz:
Indoor use: Inside buildings only. Installations and use in road vehicles, trains and aircraft are not permitted.

Outdoor use is not permitted.

Frequency band: 5470 – 5725 MHz:
Installations and use in road vehicles, trains and aircraft and use for unmanned aircraft systems (UAS) are not permitted.

5G Restriction diagram :



Maximum output power per frequency bands (EU)

WLAN 2.4G
2402 MHz -2472 MHz (20dBm)

WLAN 5G
5150 MHz ~5250 MHz 23 dBm
5250 MHz~5350 MHz 20 dBm
5470 MHz ~5725 MHz 20 dBm
5725 MHz~5850 MHz 14 dBm
5945 MHz ~ 6425 MHz 23 dBm

BT/BLE
2402 MHz -2480 MHz (10dBm)

Note for Japan

- Please notify the user through manual of the following : W52/W53 should be only used indoor
- UNIT 3-4 are disabled in Japan according to local regulations

EU Packaging requirements

- CE logo needs to be on the product labelling (must not be smaller than 5 mm).
- Trademark and model name/ number needs to be stated.
- Manufacturer full address (if not possible in manual).
- Importer full address (if not possible in manual).
- 5G restriction diagram

- If there is no FCC 15 warning on the label, please add it to the outer packaging :

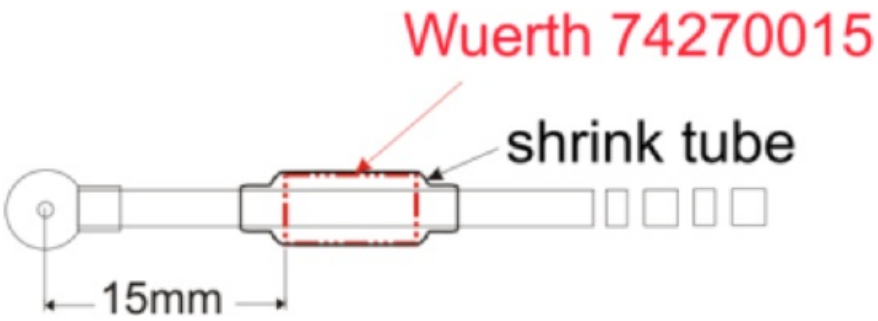
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

EMC application notes

tream210 is optimized for low radiation. Consider following recommendations when designing application boards:

- Use a GND plane underneath the module
- Use series resistors in all low speed interface lines, values need to be chosen depending on signal frequency and length of signal lines on application board
- Use common mode signal filters in USB data lines, e.g. Wuerth 744232161.
- Prevent using vias in high speed interface lines such as MIPI, USB and Ethernet
- Route high speed interface lines differentially and leave several mm gap to other signal lines when possible
- Make sure any interface which is not needed for your application is disabled in software
- Type and orientation of antennas and routing of antenna cables will influence spurious emission. A compliance test w.r.t. EN301 893 is recommended on product level earliest possible in the development phase
- in case the WLAN antennas radiate undesired disturbances originating from either the module itself or other parts of the product, using a ferrite on the antenna cables may help to improve EMC (see below picture for reference). No ferrite was required to pass modular certifications of Stream 210



Other application hints

- Decouple the module supply from functional blocks, which are sensitive to supply ripple. The WLAN subsystem will draw up to 1200mA (Peak) while transmitting at high data rate but switch to low power mode rapidly whenever idle. A large low-ESR capacitor (100uF) is recommended to be placed close to the module with a ferrite bead or inductor towards sensitive circuitry such as audio ADCs or DACs. Using 3×47µF ceramic capacitors in parallel will reduce disturbance currents further
- Use of an external 5V AC/DC adapter is not recommended, since current peaks of WLAN subsystem would cause high voltage drops across the D.C. cable and connector which may cause malfunction of USB ports. It is recommended to use a 12V AC/DC adapter and local 5V DC/DC converter or internal SMPS.

Customer Support

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Documents / Resources

	**Stream Unlimited Stream210 Hardware Modules For Audio Streaming and IoT Connectivity** [pdf] User Guide Stream210 Hardware Modules For Audio Streaming and IoT Connectivity, Stream210, Hardware Modules For Audio Streaming and IoT Connectivity, For Audio Streaming and IoT Connectivity, Audio Streaming and IoT Connectivity, Streaming and IoT Connectivity, and IoT Connectivity, IoT Connectivity, Connectivity

References

- User Manual