Instruction for FCC/IC/MIC/EU compliant use

Stream1832AE
Network Audio Streaming Module

Version:	1.3
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2. Document History

No.	Primary Author(s)	Description of Version	Date Completed
1.0	C. Arnardi	Initial version	23/4/2024
1.1	C. Arnardi	Typo , 1832AE replaced.	11/6/2024
1.2	C.Arnardi	Removed typo 6 GHz band	21/6/2024
1.3	C.Apel	Modified co-location statement	04/7/2024

Confidentiality Notice

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Document Version Management Notice

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3. 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 Stream1832AE Certification Guidelines.pdf)

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

1. Recommended antennas specifications are followed (see **Stream1832AE_Generic_Antenna_Specification.pdf)**
2. The WiFi output power configurations which are stored in "rgpower_XX.bin" remain unchanged
3. The Bluetooth output power which is hard-coded in firmware to 6dB 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 "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 StreamUnlimited 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.

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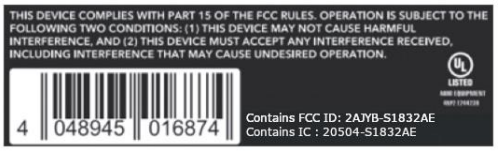
4. Product labelling requirements

If conditions for referring to modular certifications are met and no separate FCC authorization and IC authorization is applied for, the product label must contain following text:
“contains FCC ID: 2AJYB-S1832AE”
“contains IC: 20504- S1832AE”
“Japan MIC: Certification number if applicable”

See below example for reference



4.1 Compliance Logos

FCC	
IC	
MIC	
CE	

4.2 EU Packaging requirements

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- 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 :

5. Instruction for use requirements

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

FCC Statement

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.

FCC Radiation Exposure Statement

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment and it also complies with Part 15 of the FCC RF Rules. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and consider removing the no-collocation statement.

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

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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 party responsible for compliance could void the user's authority to operate the equipment.

This device is intended only for OEM integrators under the following conditions:
Condition 1 : The antenna must be installed such that 20 cm is maintained between the antenna and users.
Condition 2 : The transmitter module may not be co-located with any other transmitter or antenna.
As long as above two conditions 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 applicable to the installed module and the complete product.

Important Note:

If above conditions are not met (for example certain laptop configurations or co-location with another transmitter), then the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization and as well as a separate IC authorization.

6. OEM Integrators - end product labelling considerations

See section 2.1

7. OEM Integrators – operation manual for the end user

The OEM integrator has to be ware not to provide information to the end user regarding how to install or remove this RF module in the user manual of the end product which integrates this module. The end user manual must include all required regulatory information and warnings as outlined in this document.

8. OEM Integrators, host system manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the end product (host system including the module). The end product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it may be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMC 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.

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For more detailed guidance, please refer to KDB996369 D04 for OEM Integrators.

9. EMC Compliance Statement

Important: This device and its power adapter have demonstrated Electromagnetic Compatibility (EMC) compliance under conditions that include the use of compliant peripheral devices and shielded cables between system components. It is important that compliant peripheral devices and shielded cables are used 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.
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.

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.
Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 et la conformité à l'exposition de RSS-102 rf, utilisateurs peut obtenir l'information canadienne sur l'exposition et la conformité de rf.

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

les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

The final end product must be labelled in a visible area with the following:
"Contains FCC ID: 2AJYB-S1832AE". "Contains IC: 20504-S1832AE".
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.
Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ou émetteur.
Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres

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entre le radiateur et votre corps.

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 :

AT	BE	BG	CH	CY	CZ	DE	DK
EE	EL	ES	FI	FR	HR	HU	IE
IS	IT	LI	LT	LU	LV	MT	NL
NO	PL	PT	RO	SE	SI	SK	UKNI

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

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

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10. Certified Antennas

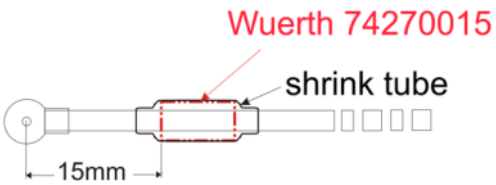
The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module. The antenna must be installed such that 20 cm can be maintained between the antenna and users.

Antenna Type: FPC	BT/WIFI 2.4G	3dBi
	WIFI 5G	4dBi

11. EMC application notes

Stream1832AE 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 Stream1832



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 3x47µF 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

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cause malfunction of USB ports. It is recommended to use a 12V AC/DC adapter and local 5V DC/DC converter or internal SMPS.

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