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# ESSYS BWR-YSP88459-SMA Class2 Bluetooth Module User Manual

**Contents**

**ESSYS BWR-YSP88459-SMA Class2 Bluetooth Module**

## Product Information

The BWR-YSP88459-SMA is a Class2 Bluetooth Module designed for automotive audio/video systems. It is a 62 pin LGA type module that is RoHS compliant. The module has deployed parts that are AEC-Q100 qualified. However, it is important to note that the module does not have its own power supply regulation.

## Product Usage Instructions

1. **Host Interface for Bluetooth:** Connect the BT_UART_TXD, BT_UART_RXD, BT_UART_CTS, and BT_UART_RTS pins to the corresponding pins of the host device.
2. **WiFi On/Off and Reset:** Connect the WL_REG_ON pin to control the Wi-Fi module's power state and reset the module as needed.
3. **WiFi Host Wake Up:** Implement wake-up functionality in the host device to wake up the Wi-Fi module.
4. **Audio Interface for Bluetooth:** Connect the BT_PCM_CLK, BT_PCM_SYNC, BT_PCM_IN, and BT_PCM_OUT pins to enable audio communication with the Bluetooth module.
5. **Bluetooth On/Off and Reset:** Connect the BT_REG_ON pin to control the Bluetooth module's power state and perform a reset if required.
6. **Host Interface for WiFi:** Connect the PCIE_REFCLK_P, PCIE_REFCLK_N, PCIE_TDN, PCIE_TDP, PCIE_RDN, PCIE_RDP, PCIE_CLKREQ_L, PCIE_PERST, and PCIE_PME_L pins to the corresponding pins of the host device for WiFi communication.

- It is important to note that the BWR-YSP88459-SMA module operates within a temperature range of -40°C to +85°C. The operating voltage for the module is VBAT 3.3V, and VIO can be either 3.3V or 1.8V.
- Please ensure compliance with the FCC Rules and regulations regarding the use of this device. Any modifications or changes to the device, including the antennas, must be approved by the manufacturer to maintain the user's authority to operate the equipment. Additionally, maintain a minimum distance of 20 cm between the radiator and your body during installation and operation.
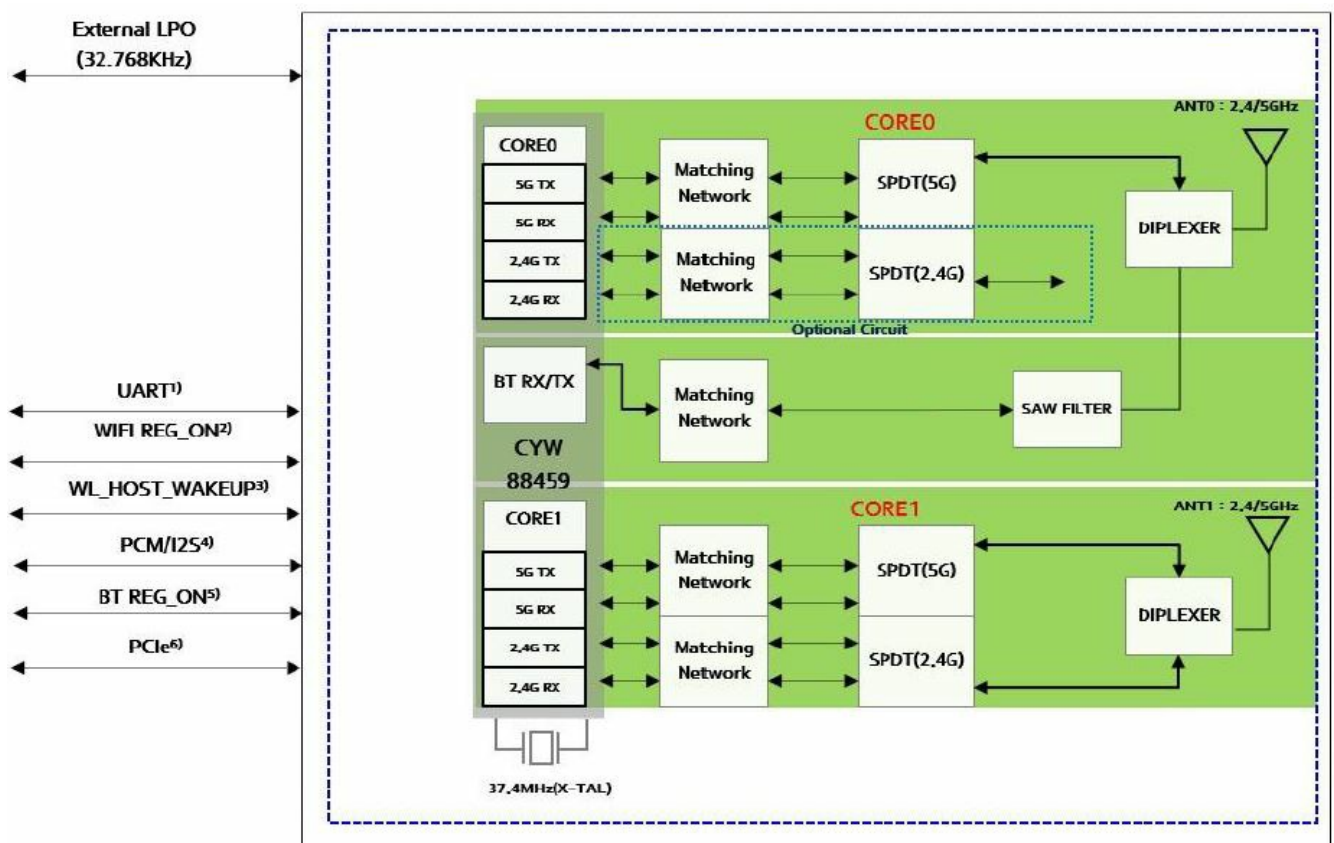
- For integration into OEM systems, refer to the applicable FCC Rules (CFR 47 Part 15.247). The OEM integrator is responsible for ensuring that there are no manual instructions for end-users to remove or install the module. The host product manufacturer must design the host product to provide a constant voltage of 3.3V to the BWR-YSP88459-SMA module.

## Overview

- BWR-YSP88459-SMA is a Class2 Bluetooth Module for automotive audio/video system
- Module type : 62 pin LGA type
- RoHS compliant
- This module has deployed part which are AEC-Q100 qualified
- BWR-YSP88459-SMA is limited Module. The module doesn't have its own power supply regulation.
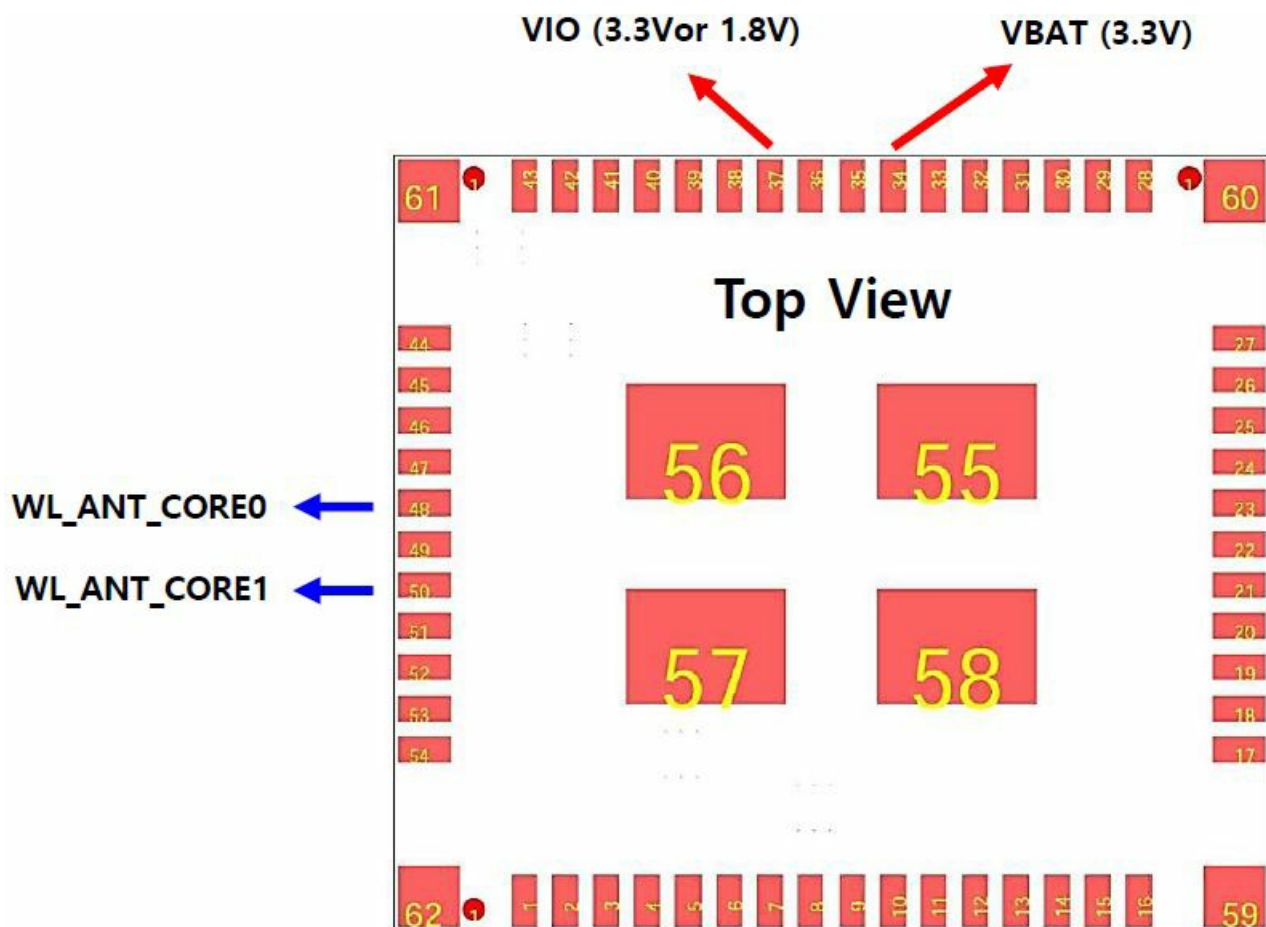
## Configration

1.



Host Interface for Bluetooth: 4 Pins (BT_UART_TXD, BT_UART_RXD, BT_UART_CTS, BT_UART_RTS)

2. WiFiOn/Off and Reset: 1Pins (WL_REG_ON for Wi-Fi)

3. WiFiHost wake up

4. Audio Interface for Bluetooth: 4 Pins (BT_PCM_CLK, BT_PCM_SYNC, BT_PCM_IN, BT_PCM_OUT)

5. Bluetooth On/Off and Reset: 1Pins (BT_REG_ON for Bluetooth)

6. Host Interface for WiFi: 9 Pin (PCIE_REFCLK_P, PCIE_REFCLK_N, PCIE_TDN, PCIE_TDP, PCIE_RDN,PCIE_RDP,PCIE_CLKREQ_L, PCIE_PERST, PCIE_PME_L)

## Pin map

1. OperatingTemperature: -40 ~ +85℃
2. Operating Voltage: VBAT 3.3V
   VIO 3.3V or 1.8V



| 1 | BT_UART_RXD | 22 | SDIO_DATA2 | 43 | LPO |
|---|---|---|---|---|---|
| 2 | BT_UART_TXD | 23 | SDIO_CLK | 44 | WL_HOST_WAKE |
| 3 | BT_PCM_SYNC | 24 | SDIO_PAD | 45 | BT_HOST_WAKE |
| 4 | BT_PCM_CLK | 25 | SDIO_DATA1 | 46 | GND |
| 5 | BT_PCM_IN | 26 | SDIO_DATA0 | 47 | GND |
| 6 | BT_PCM_OUT | 27 | SDIO_CMD | 48 | ANT_CORE0 |
| 7 | GND | 28 | GND | 49 | GND |
| 8 | PCIE_PERST_L | 29 | CO_EX_OUT1 | 50 | ANT_CORE1 |
| 9 | PCIE_PME_L | 30 | CO_EX_OUT0 | 51 | GND |

| | | | | | |
|---|---|---|---|---|---|
| 10 | PCIE_CLKREQ_N | 31 | CO_EX_IN | 52 | GND |
| 11 | PCIE_CLK_N | 32 | BT_RST_N | 53 | BT_UART_CTS_N |
| 12 | PCIE_CLK_P | 33 | GND | 54 | BT_UART_RTS_N |
| 13 | PCIE_TD_N | 34 | VBAT | 55 | GND |
| 14 | PCIE_TD_P | 35 | GND | 56 | GND |
| 15 | PCIE_RD_N | 36 | VER_VOLTAGE | 57 | GND |
| 16 | PCIE_RD_P | 37 | VIO | 58 | GND |
| 17 | PCIE_EN | 38 | GND | 59 | GND |
| 18 | WL_DEV_WAKE | 39 | NC | 60 | GND |
| 19 | BT_DEV_WAKE | 40 | GND | 61 | GND |
| 20 | SDIO_DIS | 41 | WL_REG_ON | 62 | GND |
| 21 | SDIO_DATA3 | 42 | BT_REG_ON | | |

## FCC STATEMENT

### Notice

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.

Any changes or modifications (including the antennas) to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.

- FCC RF Radiation Exposure Statement:
- This equipment complies with FCC RF Radiation exposure limits set forth for an uncontrolled environment.
- This device and its antenna 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 cm between the radiator and your body.

**Module Integration Guide**

1. Applicable FCC Rules
   - CFR 47 Part 15.247

2. Operational Condition

   The module is limited to OEM installation ONLY. The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

3. Limited Module Procedure

   BWR-YSP88459-SMA is limited Module. The module doesn't have its own power supply regulation. Therefore, the host product manufacturer must design the host product. so that a constant voltage of 3.3V is applied to the module.

4. Trace antenna desings : N/A

5. RF Exposure consideration (CFR 47 Part 1, 1.1307(b), 1.1310)This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum 20 cm between the radiator and human body.

6. Antenna This modular has PCB pattern antenna. Any changes of antenna designs might require additional assessment. The Host antenna type shall be same type and antenna gain shall be less or equal to below information.

| Item | | Contents |
|---|---|---|
| Antenna Type | | PCB Pattern Antenna |
| Antenna peak gain | Ant 1 | 2 400 MHz ~ 2 483.5 MHz: 2.28 dBi |
| | | 5 150 MHz ~ 5 250 MHz: 1.68 dBi |
| | | 5 250 MHz ~ 5 350 MHz: 1.68 dBi |
| | | 5 470 MHz ~ 5 725 MHz: 2.38 dBi |
| | | 5 725 MHz ~ 5 850 MHz: 3.04 dBi |
| | Ant 2 | 2 400 MHz ~ 2 483.5 MHz: 1.84 dBi |
| | | 5 150 MHz ~ 5 250 MHz: 1.90 dBi |
| | | 5 250 MHz ~ 5 350 MHz: 2.92 dBi |
| | | 5 470 MHz ~ 5 725 MHz: 3.55 dBi |
| | | 5 725 MHz ~ 5 850 MHz: 3.32 dBi |

7. Label and compliance information The end user manual shall include all required regulatory information/warningas shown in this manual. 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 FCC ID : 2ADQJ-YSP88459SM" any similar wording that expresses the same meaning may be used.

8. Information on test modes and additional testing requirements This modular was tested in standalone configuration. Integration of this modular into ahost equipment would require additional testing.

9. 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 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.

## Documents / Resources

| | |
|---|---|
|  | **ESSYS BWR-YSP88459-SMA Class2 Bluetooth Module** [pdf] User Manual<br>YSP88459SM, 2ADQJ-YSP88459SM, 2ADQJYSP88459SM, BWR-YSP88459-SMA Class2 Bluetooth Module, Class2 Bluetooth Module, Bluetooth Module, Module |