

# User manual for WIDA10

## 1. Introduction

This features an embedded 8052 MCU, new low-power modes and support for the 5 GHz dual-band RF receivers. This supports up to 4 stereo audio streams and comes together with additional features such as: data encryption, pairing functionality, bi-directional control data messages, full autonomy for receivers, low-power audio snooze mode, WLAN detection and automatic frequency allocation. This module itself provides the basic functions of audio processing and buffering, Data Link Layer and Physical Layer. This enables the module to provide the digital interfaces on one side and the radio interfaces on the other side.

## 2. Hardware Architecture

### 2.1 Main chipset information

| Item | vender | Part number |
|------|--------|-------------|
| BBIC | SMSC   | DARR 83     |
| RFIC | Airoha | AL7230      |

### 2.2 Circuit block diagram

The major internal and external block diagram of Samsung 5GHz dual-band wireless audio module is illustrated in Figure 1-1.

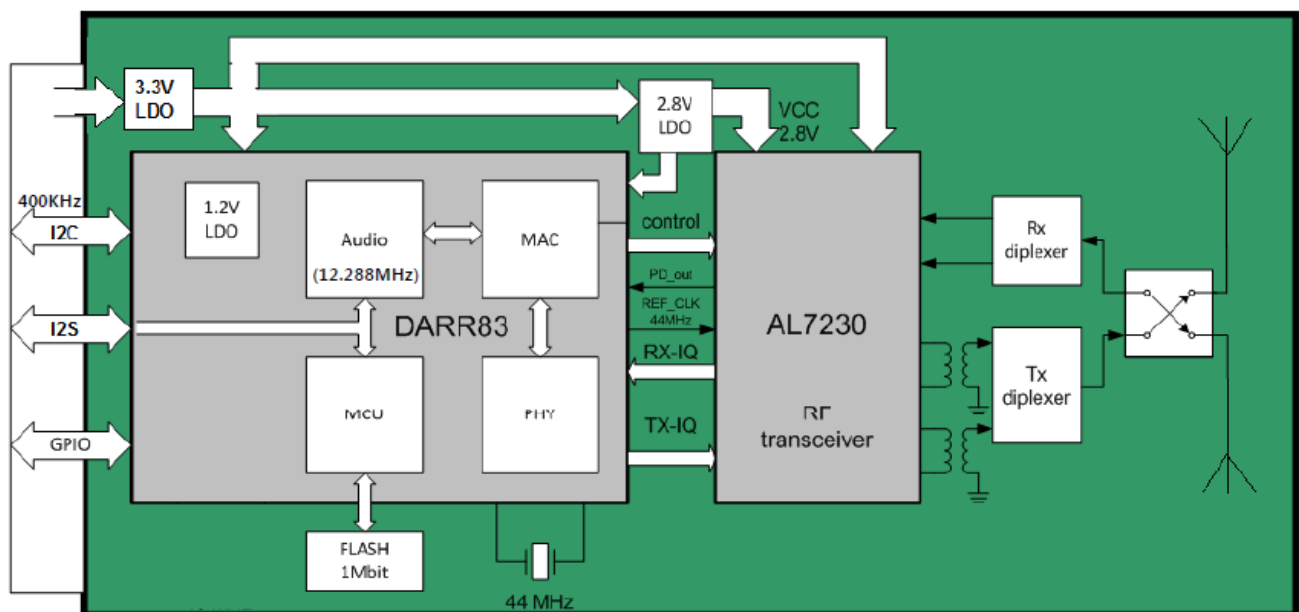


Figure 1-1 WIDA10 Block diagram

### 3. Operation description

#### 3.1 Operating Conditions

| Symbol | Parameter             | Min. | Typ | Max  | Unit |
|--------|-----------------------|------|-----|------|------|
| VCC    | Supply Voltage        | 4.7  | 5.0 | 5.25 | V    |
| Temp   | Operating Temperature | - 10 | 25  | 50   | °C   |

#### 3.2 RF Information

| Parameter                 | Value                                                                                                                      | Unit |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------|------|
| Modulation                | QPSK                                                                                                                       |      |
| RF Frequency range (band) | 2400 – 2483.5<br>5150 – 5250<br>5725 – 5875                                                                                | MHz  |
| RF Frequency              | Ch1 – 2412<br>Ch2 – 2436<br>Ch3 – 2464<br>Ch4 – 5180<br>Ch5 – 5210<br>Ch6 – 5240<br>Ch7 – 5736<br>Ch8 – 5726<br>Ch9 – 5814 | MHz  |

Note: Country/ Region dependent.

#### 3.3 Receive Mode

In receive mode, antenna diversity is supported. The single ended output of the TR switch is connected to the RF LNA input through a matching network. Filtering and amplification is all performed by the radio transceiver. The gain setting is controlled by the BB. The analog IQ outputs are sampled by the BB by its integrated 22 Msps dual channel 8bit ADC. This received data is demodulated and fed to the audio processing engine controlling the I2S connections.

### 3.4 Transmit Mode

In transmit mode, the audio engine controlled I2S, transforms the audio data into packetized digital IQ signals. These are in turn pulse-shaped before conversion by a 10 bits 44Msps DAC to match to the analog IQ inputs of the radio IC. The radio IC has programmable baseband filters to lower the RF spectrum side lobes and to suppress the DAC image and the DAC spurious. The output power is programmable. A power detector (PD\_out) on the radio IC enables close-loop TX power control. The differential RF PA outputs are connected via a balun and low pass filter to a transmit/receive switch with TX diversity option to the antenna outputs.

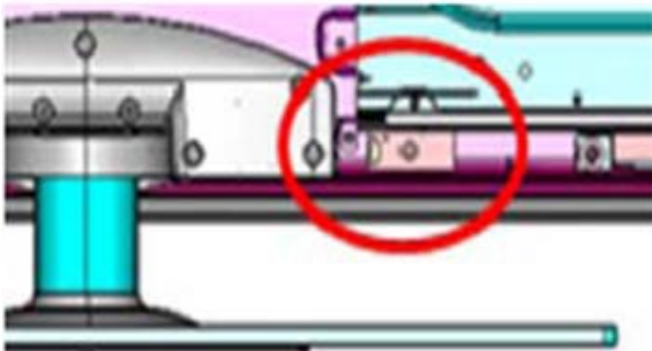
## 4. Pin description

| Pin Number | Pin Name                 | I/O | Description                              |
|------------|--------------------------|-----|------------------------------------------|
| 1          | 5V                       | PWR | Regulated 4.7V to 5.2V input             |
| 2          | 5V                       | PWR | Regulated 4.7V to 5.2V input             |
| 3          | GPIO_4                   | I/O | PWM RESET                                |
| 4          | GND                      | GND | GND                                      |
| 5          | I <sup>2</sup> C_SCL_SLV | I/O | I <sup>2</sup> C serial clock Slave      |
| 6          | I <sup>2</sup> C_SDA_SLV | I/O | I <sup>2</sup> C serial data Slave       |
| 7          | /RESET(DARR_RST)         | I   | Reset Darr83                             |
| 8          | MCLK                     | I/O | 12.288MHz audio clock I/O                |
| 9          | GND                      | GND | Ground                                   |
| 10         | BCK_X                    | I/O | I <sup>2</sup> S port X Bit Clock        |
| 11         | GPIO_7                   | I/O | POWER_CTL                                |
| 12         | LRCK_X                   | I/O | I <sup>2</sup> S port X Left Right Clock |
| 13         | MON_TXD                  | I/O | Serial Async Data, for test purposes     |
| 14         | SDIO_X(DATA1)            | I/O | I <sup>2</sup> S port X serial data      |
| 15         | GND                      | GND | GND                                      |
| 16         | SDIO_W(DATA0)            | I/O | I <sup>2</sup> S port W serial data      |
| 17         | GPIO_3                   | I/O | Normal GPIO                              |
| 18         | BCK_W                    | I/O | I <sup>2</sup> S port W Bit Clock        |
| 19         | GPIO_23                  | I/O | Red LED                                  |
| 20         | LRCK_W                   | I/O | I <sup>2</sup> S port W Left Right Clock |
| 21         | GND                      | GND | Ground                                   |
| 22         | GND                      | GND | Ground                                   |

## 5. Installation

This module must be installed in a device and not allow the user to replace nor modify it.

And the location of installation is as follows Figure 5-1.



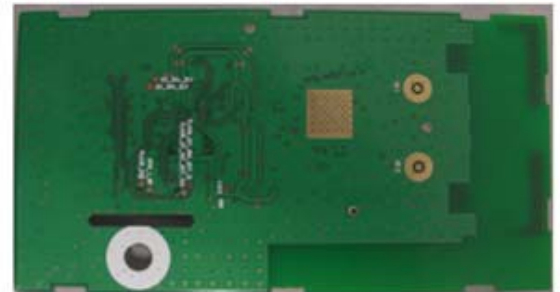
**The location of installation**



**Module case**



**PBA TOP side**



**PBA bottom side**

Figure 5-1

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## 6. Notice

### FCC Statement

#### Federal Communication Commission Interference 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 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 Caution:

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

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.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

This device is going to be operated in 5.15~5.25GHz frequency range, it is restricted in indoor environment only.

**IMPORTANT NOTE:****FCC 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 20cm between the radiator & your body.

**IMPORTANT NOTE:**

This module is intended for OEM integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for a population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

**USERS MANUAL OF THE END PRODUCT:**

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

**LABEL OF THE END PRODUCT:**

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: A3LWIDA10 ". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

**IC Statement**

This Class B digital apparatus complies with Industry Canada licence-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.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

The device could automatically discontinue transmission in case of absence of information to transmit, or operational failure. Note that this is not intended to prohibit transmission of control or signaling information or the use of repetitive codes where required by the technology.

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

**IMPORTANT NOTE:****IC Radiation Exposure Statement:**

This equipment complies with IC RSS-102 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.

**IMPORTANT NOTE:**

This module is intended for OEM integrator. The OEM integrator is still responsible for the IC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the IC RSS-102 radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

**USERS MANUAL OF THE END PRODUCT:**

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. IC statement is required to be available in the users manual: This Class B digital apparatus complies with Industry Canada Licence-exempt RSS standard(s). 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.

**LABEL OF THE END PRODUCT:**

The final end product must be labeled in a visible area with the following " Contains TX IC : 649E-WIDA10".