WLT8761M dual mode Bluetooth module

RTL 8761 BR/EDR/LE

MVsilicon BM5064

Spec

V1.1

Index

1 Summary

WLT8761M is a dual mode Bluetooth module, support for all Bluetooth profiles and BLE profiles.

WLT8761M is based on RTL 8761. It is a Bluetooth BR/EDR/BLE single chip solution. RTL8761 has best-in-class RF performance (TX power, RX sensitivity, blocking) and advanced power management for very low-power applications.

WLT8761M has a high efficiency audio SOC inside. It is BM5064 from MVSilicon which integrates ARM Cortex-M3 MCU, Bluetooth stack, MP3/WMA decoder, MP2 encoder, OTG, SD/MMC card controller, Audio DAC, Audio ADC, RTC in a single chip.

1.1 Functions

Bluetooth BR/EDR/LE
Support all Bluetooth profiles, such as SPP, SPPLE, HFP, MAP, PXP, A2DP, ANP, HID, AVRCP…
Embedded ARM Cortex-M3, running @ 96MHz
Built-in 128K byte SRAM
Support booting from SPI-flash and the firmware can be updated through SD or USB disk
Built-in MP2/MP3/WMA/FLAC(8/16/24bit)/WAV(IMA-ADPCM and raw PCM) decoder and MP2 encoder
Embedded 20-bit Audio DAC and 16-bit Audio ADC
Built-in Capless Earphone driver
Built-in MIC amplify block with AGC
Support audio input
Onboard 2.4GHz antenna，support external antenna optional
Support AT+Command Set for Configuration
Single power supply: 3.35V~5V
Smallest size: 18x35mm
Flexible Software Platform, customized software service

1.2 Application Field

Bluetooth Speaker
True wireless stereo Audio system
Bluetooth handsfree
Fitness
Wireless POS
Portable printer

2 Electrical characters

2.1 Basic characters

Absolute Maximum Ratings	Min	Max	Unit
Power supply Voltage (LDOIN)	**–0.5**	**+5.5**	**V**
Voltage of I/O pins	–0.5	+3.6	V
Storage Temperature	–55	+125	°C

Table 1. Absolute Maximum Ratings

Recommended Operating Conditions	Min	TYP	Max	Unit
Power supply Voltage (LDOIN)	**3.35**	**4.2**	**5.0**	**V**
Voltage of I/O pins	0	3.3	3.6	V
Operating Temperature	-20	25	75	°C

Table 2. Recommend Working Condition

Wireless Standard	Bluetooth BR/EDR/LE	
Frequency	2.402GHz～2.480GHz	
TX power	10dBm	
Antenna	external： RF_PIN	
	internal： PCB antenna	High gain as external antenna

Table 3. Bluetooth features

I/O pins	Test Conditions	Min	Max	Unit
Logic input low, V_{IL}		0	0.75	V
Logic input high, V_{IH}		2.1	3.6	V
Logic output low, V_{OL}	6mA	0	0.6	V
Logic output high, V_{OH}	6mA	2.7	3.3	V

Table 4. DC Characteristics of I/O pins

2.2 Power consumption

Characteristics	Min	Typ	Max	Unit
Current consumption in shut-down mode				uA
Current consumption in active mode				mA

Table 5. Static Current Consumption

2.3 Audio performance

Parameter	Test conditions	Min	Type	Max	Unit
Signal-to-Noise Ratio	No filter		88(L)/88(R)		dB
	20KHz filter		92(L)/92(R)		dB
THD+N	Peak		-72(L)/-72(R)		dB
Stereo Isolation	IPad as Player		80		dB

Table 6. Audio performance

3 Hardware Description

3.1 Module size and Pin assignment

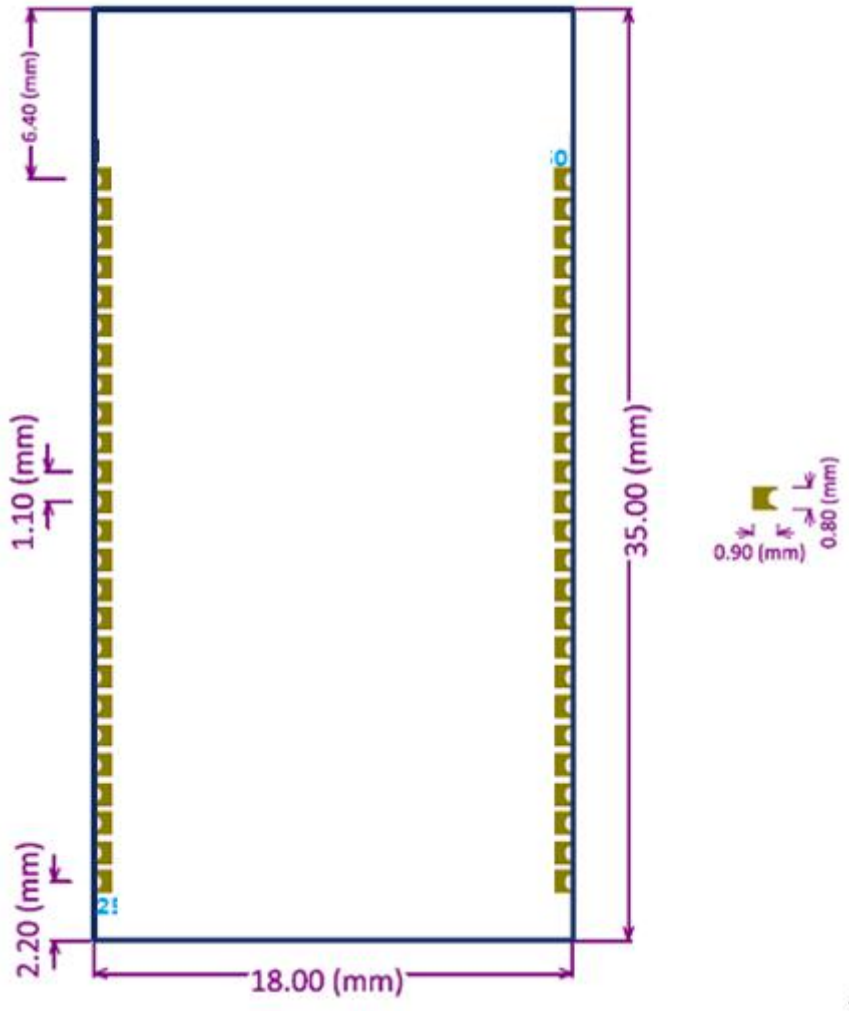

Figure 2. WLT8761M module size

4 PCB Design and RF Layout

4.1 Example Board Layout

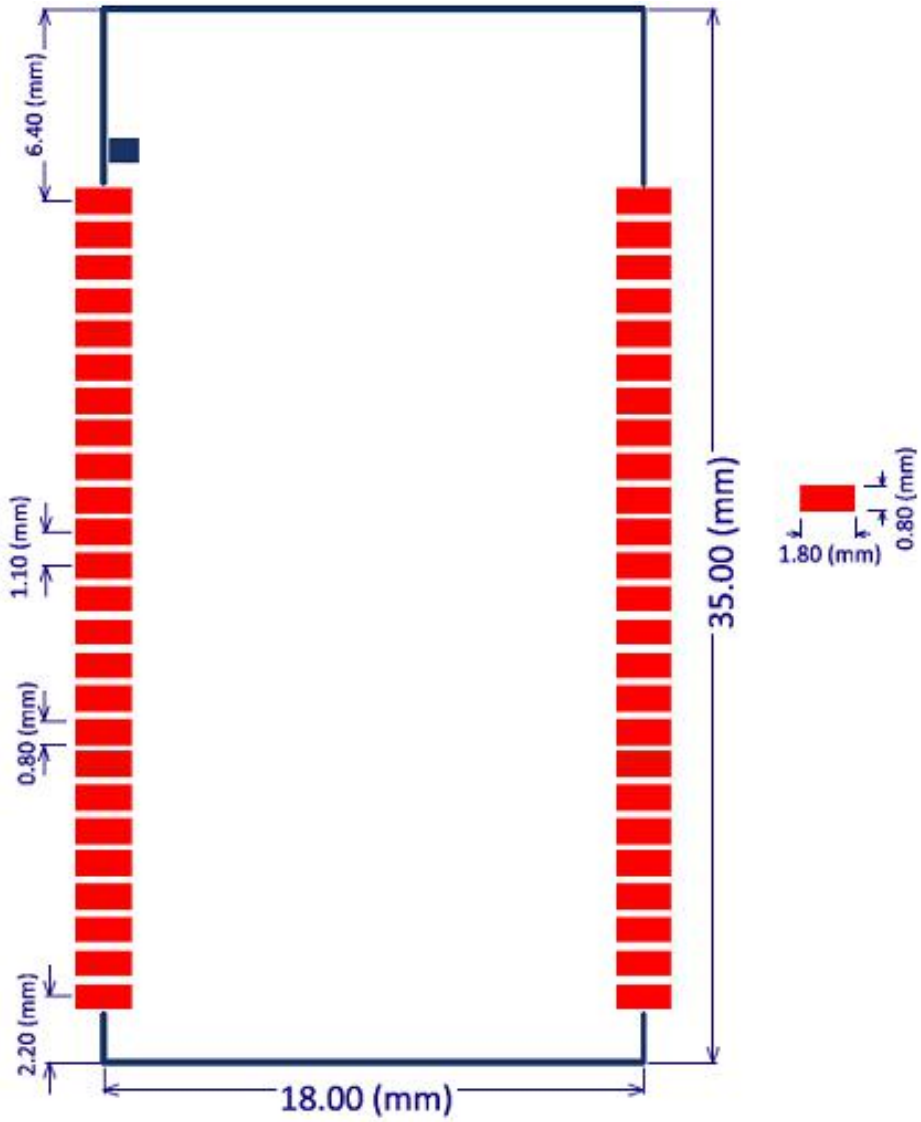

Figure 4. Footprint dimensions

4.2 PCB Layout Guide

Bluetooth works in a frequency of 2.4GHz, the design of PCB and Mechanical should be careful to avoid the impact of various factors on the RF performance. Please note the following:

1. Outer casing surrounding WLT8761M module should avoid using metal materials. If the casing is metal, it is recommended to use an external 2.4GHz antenna.
2. Metal screws should be far away from RF part of module.

3. Module should be placed on the edge of motherboard, ensure the antenna towards outside. Please make sure that all layers have no trace or copper under the Antenna region.

5 Recommended Reflow Profile(Number of Times : ≤2 times)

Parameter setting of reflow soldering can refer to the following requirements :

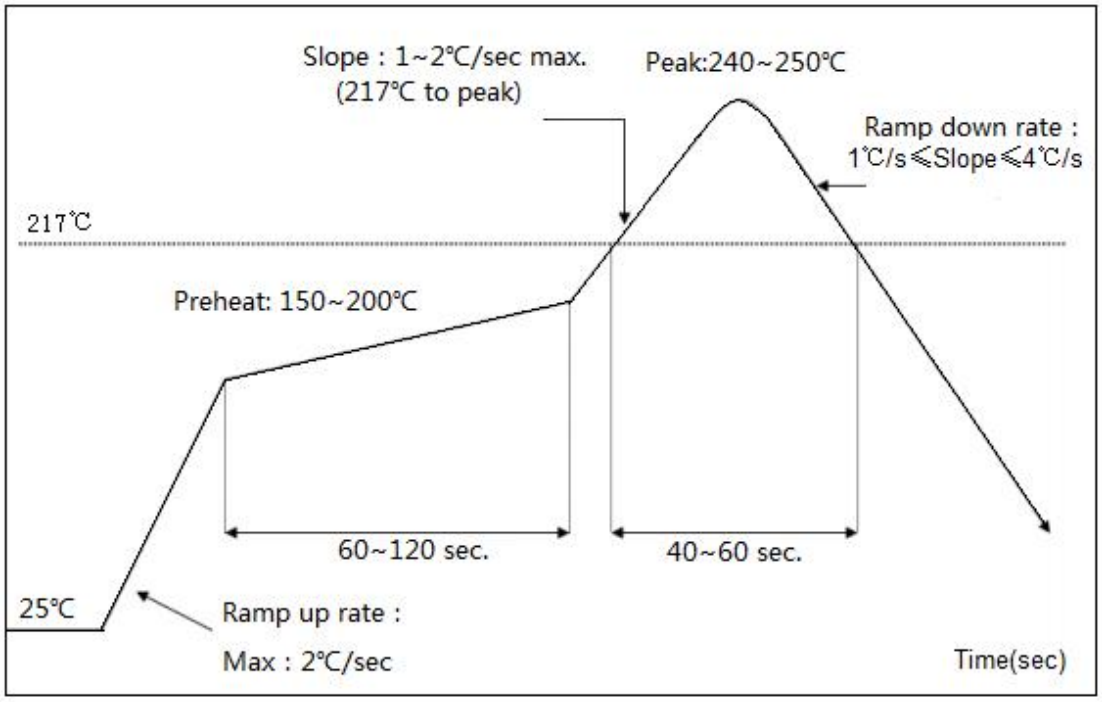

Figure 5. Reflow profile

Temperature range	Time	Key parameters
Preheat zone(<150℃)	60-120S	Ramp up rate:≤2S
Uniform temperature zone(150-200℃)	60-120S	Ramp up rate:<1S
Recirculation zone(>217℃)	40-60S	Peak:240-250℃
Cooling zone	Ramp down rate:1℃/s≤Slope≤4℃/s	

Table 8. Reflow process parameter

6. Storage

1. Calculated shelf life in sealed bag： 12 months at <40℃ and <90% relative humidity(RH).
2. After bag is opened , devices that will be subjected to reflow solder or other high temperature process must be:
   1). Check the humidity card :Normal at ≦ 30%RH. If :30%~40%(pink) or greater than 40%(red),labeling module has moisture absorption. Module require bake before mounting.
   2). Mounted within 168 hours of factory conditions <30℃/60%RH.OR
   3). Module apart packing after 168 hours，need to bake before SMT, to remove the module hygroscopic.
3. If baking is required ,devices may be baked for 8 hours at 125℃. After baking, put proper amount of desiccant to seal packages.
4. Module vacuum packing 600PCS per bag.

Note: Product handling, storage, processing process must follow the J-STD-033 IPC/JEDEC

7 Software introduction

WLT8761M is a bluetooth dual mode module with embedded Bluetopia™ protocol stack, support for all Bluetooth profiles and BLE profiles. Such as SPP, SPPLE, HFP, MAP, PXP, A2DP, ANP, HID, AVRCP…

UART interface is used for data transmission and log information printing. Host MCU can use AT+Command set to control WLT8761M module through UART interface. For detail commands please refer to WLT8761M module SW application documents.

Regulatory Module Integration Instructions

List of applicable FCC rules

This device complies with part 15.247 of the FCC Rules.

Summarize the specific operational use conditions

This module can be applied in wireless POS, sports and fitness sensors , health sensors, mobile accessories as well as smart home. The input voltage to the module should be nominally 3.35-5.0 V DC ， typical value 4.2V DC and the ambient temperature of the module should not exceed 75℃.

This module using PCB antennas with maximum gain is 2.5 dBi .Other antenna arrangement is not covered by this certification.

If the antenna needs to be changed，the certification should be re-applied.

Limited module procedures

Not applicable

Trace antenna designs

Not applicable

RF exposure considerations

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 5mm between the radiator& your body. If the device built into a host as a portable usage， the additional RF exposure evaluation may be required as specified by 2.1093.

Antennas

This module using PCB antennas with maximum gain is 2.5 dBi .

Label and compliance information

The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording suchas:"Contains Transmitter Module FCC ID: 2AOO6-WLT8761M " ，or "Contains FCC ID: 2AOO6-WLT8761M "，Any similar wording that expresses the same meaning may be used.

Information on test modes and additional testing requirements

a) The modular transmitter has been fully tested by the module grantee on the required number of channels， modulation types， and modes， it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer， installing the modular transmitter， perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g.，where a different antenna may be causing additional emissions).

b) The testing should check for emissions that may occur due to the intermixing of emissions

with the other transmitters， digital circuitry， or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. It is important to note that host product manufacturers should not assume that because the modular transmitter is certified that they do not have any responsibility for final product compliance.

c) If the investigation indicates a compliance concern the host product manufacturer is obligated to mitigate the issue. Host products using a modular transmitter are subject to all the applicable individual technical rules as well as to the general conditions of operation in Sections 15.5， 15.15， and 15.29 to not cause interference. The operator of the host product will be obligated to stop operating the device until the interference has been corrected

The WLT8761M module is based on RTL8761BTV chip . For the testing module on your product, user can refer to specification of the Bluetooth system on how to configure and evaluate the module. This specification can also be found on the official Bluetooth website:

https://www.bluetooth.org/en‐us/specification/adopted‐specifications.

Additional testing， Part 15 subpart B disclaimer

The final host / module combination need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device .

The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules， including the transmitter operation and should refer to guidance in KDB 996369.

Frequency spectrum to be investigated

For host products with certified modular transmitter， the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a)(1) through (a)(3)， or the range applicable to the digital device， as shown in Section 15.33(b)(1)， whichever is the higher frequency range of investigation.

Operating the host product

When testing the host product， all the transmitters must be operating. The transmitters can be enabled by using publicly-available drivers and turned on，so the transmitters are active. In certain conditions it might be appropriate to use a technology-specific call box (test set) where accessory devices or drivers are not available.

When testing for emissions from the unintentional radiator， the transmitter shall be placed in the receive mode or idle mode， if possible. If receive mode only is not possible then， the radio shall be passive (preferred) and/or active scanning. In these

cases， this would need to enable activity on the communication BUS (i.e.， PCIe， SDIO， USB) to ensure the unintentional radiator circuitry is enabled. Testing laboratories may need to add attenuation or filters depending on the signal strength of any active beacons (if applicable) from the enabled radio(s). See ANSI C63.4， ANSI C63.10 and ANSI C63.26 for further general testing details.

The product under test is placed into a normal ‘paired' mode with another BLE device， as per the normal intended use of the product (for example， transferring data).

FCC Statement：
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 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 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.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.