WB-2833/2833PB Bluetooth Module SPEC

Latest Version: 1.1

BT V5.2

2020-11-22

Model Name: WB-2833PB
FCC ID:2AZ4G-WB2833PB
IC:27369-WB2833PB

List of Contents

List of Contents 2
Features 3
Applications 3
Application Diagram 4
Specifications 4
Electrical Characteristics 5
AUDIO Features 6
RF Characteristics 10
Module Pin definitions 13
Pin Configurations 14
Document History 17

Features

- 240MHz RISC-32 CPU processor Core
- 400MHz CEVA DSP core
- Internal 336KB RAM for data and program
- Internal 32KB CPU ICache for SPI serial flash
- Internal 32KB Cache for SPI PSRAM
- Internal 16M bits SPI serial Flash for custom defined software
- Up to 16M bytes extensional PSRAM to support rich and flexible software feature
- Supports 24MHz OSC with on-chip PLL
- Operating voltage: I/O 3.1V, Core 1.2V
- Fully configurable PEQ
- Actions' super voice technology for voice connections
- Supports for echo cancellation and noise reduction
- Supports for wind noise reduction
- Supports for packet loss concealment
- Supports for multiple sound effect, such as MDRC, bass enhancement, virtual surround effects
- Supports for voice prompt
- Built-in stereo 24 bit input sigma-delta DAC
- DAC supports sample rate 8k/12k/11.025k/16k/22.05k/24k/32k/44.1/48/96kHz
- Built-in stereo 20mW PA for headphone. PA output supports traditional mode and direct drive mode (for earphone)
- Supports differential audio output for speaker PA
- Built-in stereo 24 bit input sigma-delta ADCs
- ADC supports sample rate 8k/12k/11.025k/16k/22.05k/24k/32k/44.1k/48/96kHz
- Supports 2 stereo single-ended analog input or 1 stereo fully differential analog input
- Supports Digital microphones
- Supports stereo single-ended Analog microphones and stereo fully differential microphone
- Audio Interfaces: I2S TX and I2S RX, SPDIF TX, sampling rate up to 192KHz

Applications

- Portable stereo speakers and speakerphones
- Bluetooth car audio unit
- Stereo headsets and headphones
- Other Bluetooth audio applications

Bluetooth

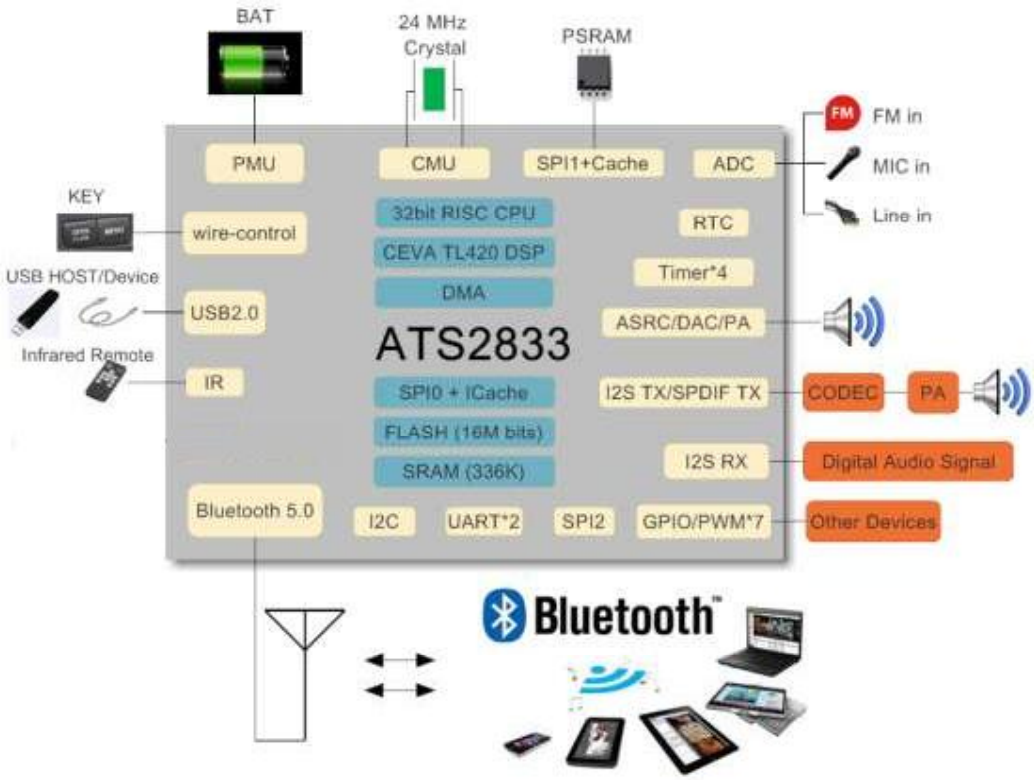
- Support Bluetooth V5.2
- Compatible with Bluetooth V4.2/V4.2 LE/V4.0/V3.0/V2.1 + EDR systems
- Compatible with AVRCP Profile V1.6
- Compatible with A2DP Profile V1.3
- Compatible with HFP Profile V1.7
- Supports all packet types in basic rate and enhanced data rate
- Supports SCO/eSCO link
- Supports Secure Simple Pairing
- Supports Low Power Mode (Sniff / Sniff Sub-rating / Hold / Park)
- Bluetooth Dual Mode support: Simultaneous LE and BR / EDR
- Supports multiple Low Energy states
- Fast AGC control to improve receiving dynamic range
- Supports AFH to dynamically detect channel quality to improve transmission quality
- Integrated Class2 PA
- Supports Power / Enhanced Power Control

WB-2833 Bluetooth Module

WB-2833PB Bluetooth Module

More Information please visit:
http://www.worldelite.net.cn

Application Diagram



-1 ATS2833

Physical Interfaces

- USB 2.0 device and host controllers
- Serial Interface: SPI*3, UART*2
- Support Remote Control with the internal IRC for decoding
- 7 PWM drivers independent of MCU

Specifications

Operating Frequency Band	2.4GHz ~ 2.48GHz unlicensed ISM band
Bluetooth Specification	V2.1+EDR/V3.0/V4.0/ V4.2/V5.2
Bluetooth Protocol	A2DP,AVRCP,HFP,SPP BAS,DIS,FMP,HRP,HRS,HTP,HTS,IAS,LLS
Output Power Class	Class 2
Operating Voltage	Core :1.2V, IO:3.3V, BAT:3.4V~4.2V
Operating temperate range	-10 ℃ ~ +70 ℃
External Interface	UART,SPI,IR, DMIC, SPDIF TX

Electrical Characteristics

Supply Voltage	Min	Typ	Max	Unit
BAT (Li)	3.4	3.8	4.3	V
DC5V	4.5	5.0	7.0	V
VCC/SVCC/AVCC	2.8	3.1	3.4	V
VDD/RTCVDD	1.08	1.2	1.32	V
VREF	--	1.5	--	V
ONOFF	--	--	1.32	V

Parameter	Symbol	Min.	Max.	Unit	Condition
Schmitt trigger positive-going threshold	VT+	-	1.9	V	VCC=3.1V Tamb = -10 to 70 °C
Schmitt trigger negative-going threshold	VT-	1.2	-	V	

	VCC/SVCC/AVCC	-0.3	3.6	V
	VDD	-0.3	1.32	V
Input Voltage	3.3V IO	-0.3	3.6	V
	1.2V IO	-0.3	1.32	V

VDD = 1.2V @ 25°C unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
A2DP	Ct	Peak Current	-	14	-	mA
HFP	Cr	Receive Current	-	15	-	mA
Sniff Mode	Cs	500ms	-	-	600	µA
Deep Sleep	Cd	Vbat = 3.8V	35	-	50	µA

Note: The output voltages are precisely within ±2%, providing large currents with a significantly small dropout voltage within ±5%.

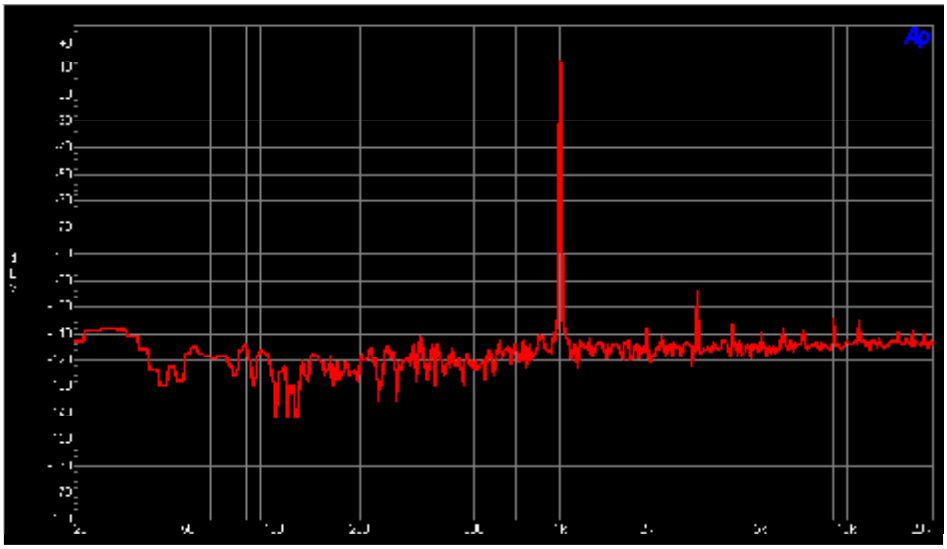
AUDIO Features

Test Condition: Power BAT=3.8V, Analog audio output AOUTL/R, Load = 10K ohm, BW=20Hz ~ 20 KHz, A-Weight. Test equipment: AP2700.

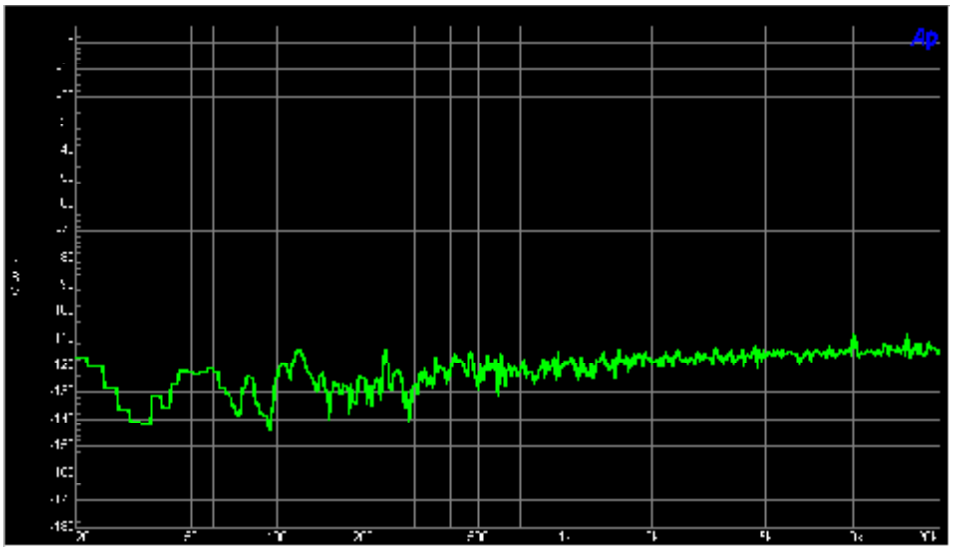
Digital to Analogue Converter						
Parameter	**Conditions**		**Min**	**Typ**	**Max**	**Unit**
Resolution	-		-	-	20	Bits
Output Sample Rate	-		8	-	96	kHz
SNR	fin = 1kHz@0dBFS input B/W = 22Hz~22kHz Fs=48kHz,Load=16Ω	-	-	97	-	dB
		A-Weighting	-	100	-	dB
Dynamic Range	fin = 1kHz@-48dBFS input B/W = 22Hz~22kHz Fs=48kHz,Load=16Ω	-	-	96	-	dB
		A-Weighting	-	100	-	dB
THD+N	fin = 1kHz@0dBFS input B/W = 22Hz~22kHz Fs=48kHz,Load=16Ω	-	-	-87	-	dB
Digital gain	-		<-98	-	24	dB
Stereo crosstalk	fin = 1kHz@0dBFS input	-	-	-78	-	dB
PWR Amplifier						
Analogue gain	-		-96	-	0	dB
Max Amplitude/PWR	fin = 1kHz@0dBFS input Fs=48kHz,Load=16Ω	Single Ended Output	-	-	550	mVrms
			-	-	18.5	mW
	fin = 1kHz@0dBFS input Fs=48kHz,Load=16Ω	Full Differential Output	-	-	60	mW
	fin = 1kHz@0dBFS input Fs=48kHz,Load=10KΩ	Full Differential Output	-	-	1.9	Vrms

DAC/ADC audio output performance chart:

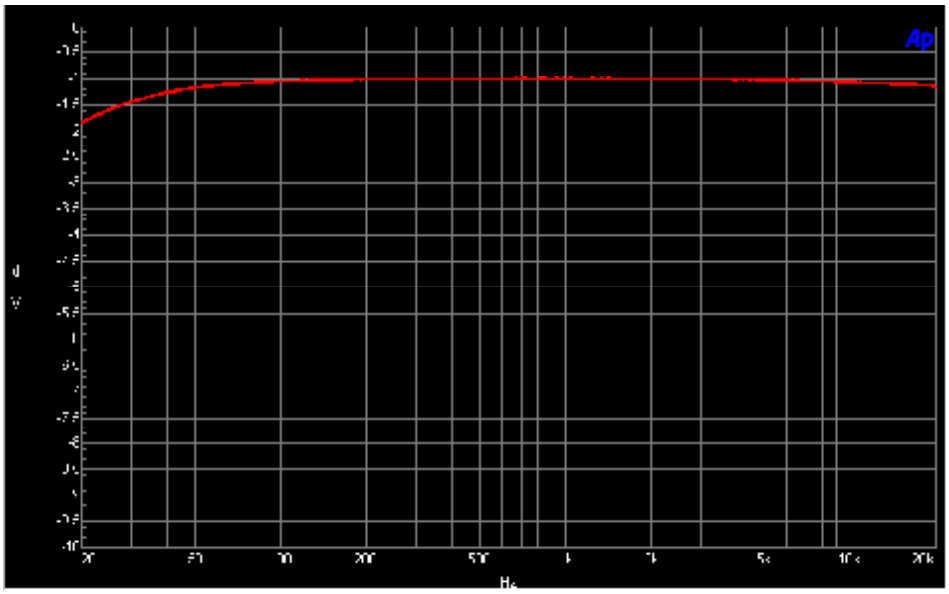
Line in Input Mode:



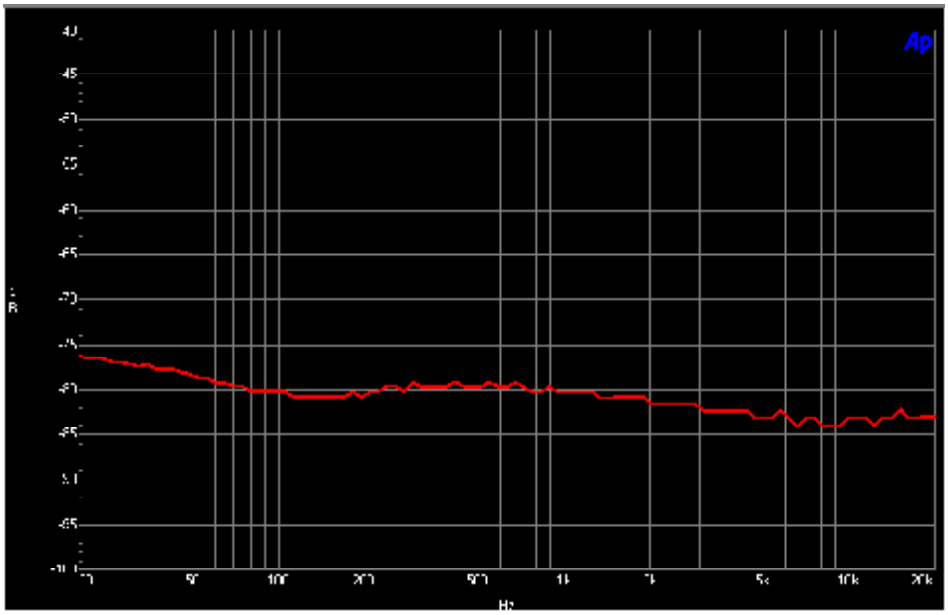
Line in Input player: 1KHz Sin wave FFT 20Hz ~ 20 KHz



Line in Input player: 0KHz FFT 20Hz ~ 20 KHz

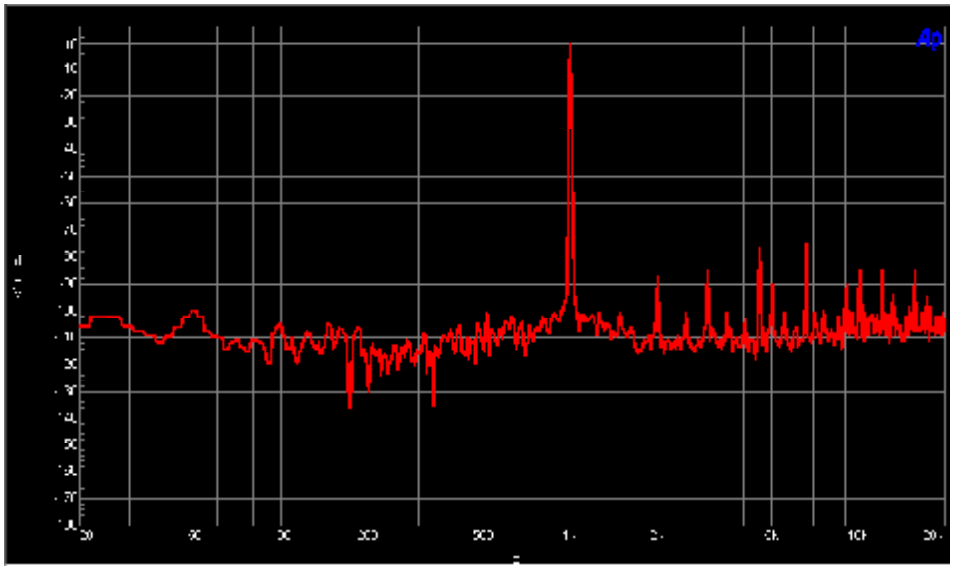


Line in Input Player: Frequency Response 20Hz ~ 20 KHz

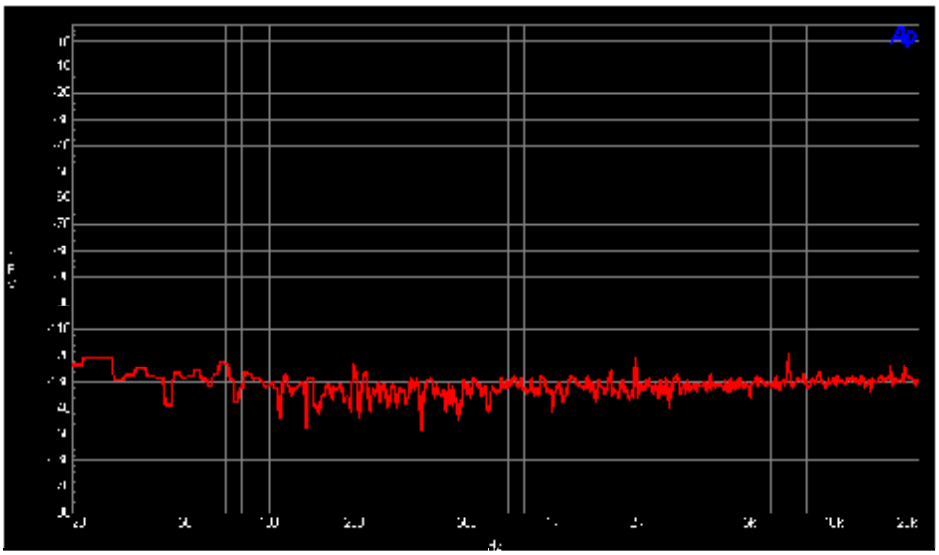


Line in Input player: THD+N Distortion 20Hz ~ 20 KHz

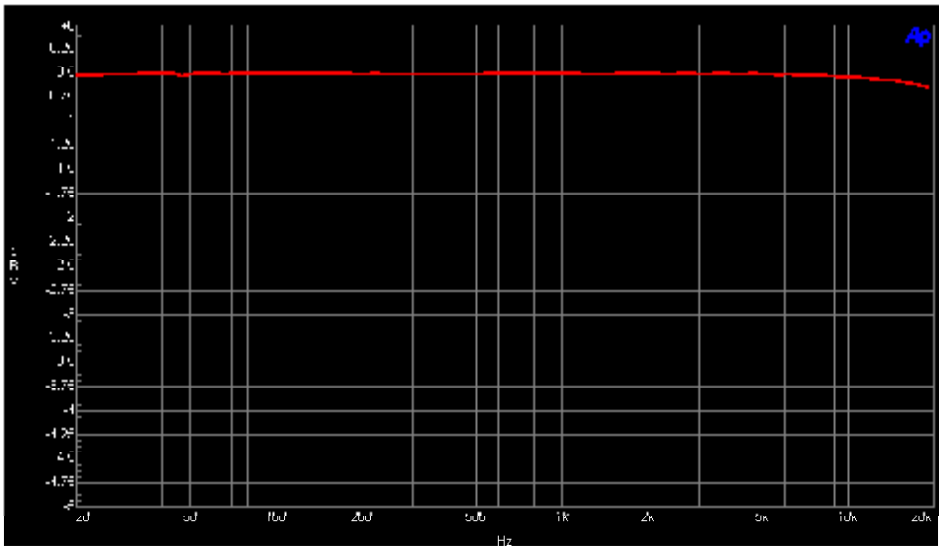
Bluetooth Player Music Mode:



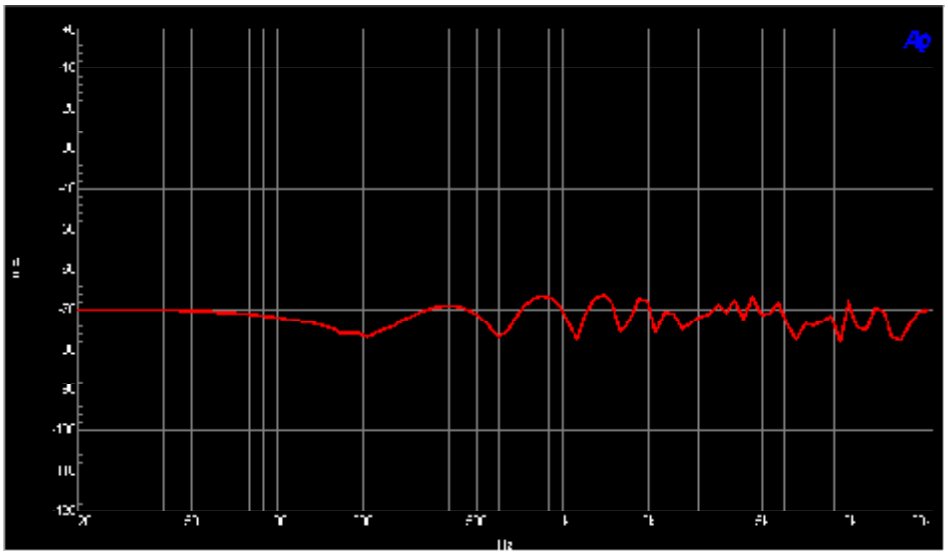
Bluetooth A2DP Player: 1KHz Sin wave FFT 20Hz ~ 20 KHz



Bluetooth A2DP Player: 0Hz FFT 20Hz ~ 20 KHz



Bluetooth A2DP Player: Frequency Response 20Hz ~ 20 KHz



Bluetooth A2DP Player: THD+N Distortion 20Hz ~ 20 KHz

RF Characteristics

BT Protocols	A2DP/AVRCP/HFP /SPP	A2DP1.3
		AVRCP1.6
		HFP1.7
		SPP1.2
Power Consumption	A2DP	Typical : 14mA
	HFP	Typical : 15mA
	Sniff	Typical : 0.6mA
	Standby	Typical : 38uA
Distance	A2DP	Max:30M Typical : 20M
	HFP	Max : 20M Typical : 10M

Transmitter

Parameter	Condition	Min.	Typ.	Max.	Unit
Maximum RF Transmit PWR	-	-	4	6	dBm
RF PWR Control Range	-	2	4	8	dB
20dB Bandwidth for Modulated Carrier	-	-	914	1500	KHz
Adjacent Channel Transmit	+2 MHz	-	-52	-20	dBm
	-2 MHz	-	-52	-20	dBm
	+3 MHz	-	-56	-40	dBm
	-3 MHz	-	-55	-40	dBm
Frequency Deviation	Δf1avg Maximum Modulation	140	165	175	KHz
	Δf2max Maximum Modulation	115	142		KHz
	Δf1avg/Δf2avg	0.8	0.88		
Initial Carrier Frequency Tolerance	-	-75	-32	75	KHz
Frequency Drift	HD1 Packet	-25	7.5	25	KHz
	HD3 Packet	-40	9.4	40	KHz
	HD5 Packet	-40	9.4	40	KHz
Frequency Drift Rate	-	-20	3	20	KHz/50us
Harmonic Content	-	-	-50	-	dBm

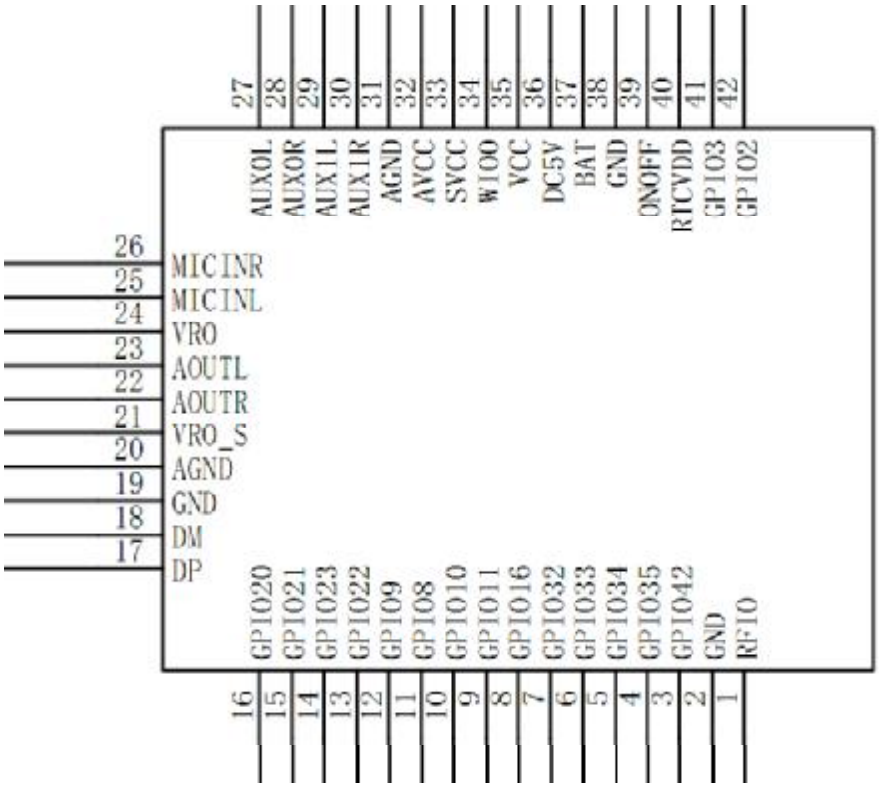
Parameter	Condition	Min.	Typ.	Max.	Unit
Relative Transmit PWR(EDR)	P_{DPSK}-P_{GFSK}	-4	-2.5	1	dB
π/4 DQPSK max carrier frequency stability $\|\omega_0\|$	-	-10	1.2	10	KHz
π/4 DQPSK max carrier frequency stability $\|\omega_i\|$	-	-75	-5	75	KHz
π/4 DQPSK max carrier frequency stability $\|\omega_0+\omega_i\|$	-	-75	-3	75	KHz
8DPSK max carrier frequency stability $\|\omega_0\|$	-	-10	5	10	KHz
8DPSK max carrier frequency stability $\|\omega_i\|$	-	-75	-3	75	KHz
8DPSK max carrier frequency stability $\|\omega_0+\omega_i\|$	-	-75	-3	75	KHz
π/4 DQPSK Modulation Accuracy	RMS DEVIN	-	5	20	%
	99% DEVM	99	100	-	%
	Peak DEVM	-	15	35	%
8DPSK Modulation Accuracy	RMS DEVIN	-	4.9	13	%
	99% DEVM	99	100	-	%
	Peak DEVM	-	12.5	25	%
In-band spurious emissions	F > F0 + 3MHz	-	-55	-40	dBm
	F < F0 - 3MHz	-	-52	-40	dBm
	F = F0 + 3MHz	-	-49	-40	dBm
	F = F0 - 3MHz	-	-48	-40	dBm
	F = F0 + 2MHz	-	-39	-20	dBm
	F = F0 - 2MHz	-	-40	-20	dBm
	F = F0 + 1MHz	-	-40	-26	dB
	F = F0 - 1MHz	-	-40	-26	dB
EDR Differential Phase Encoding	-	99	100	-	%

Receiver

Parameter	Condition	Min.	Typ.	Max.	Unit
Sensitivity at 0.1% BER	2.404GHz	-	-92	-	dBm
	2.441GHz	-	-92	-	dBm
	2.480GHz	-	-92	-	dBm
Maximum Input PWR at 0.1% BER	-	-20	-	-	dBm
Co-Channel Interface	-	-	-70	-60	dB
Adjacent Channel Selectivity C/I	$F = F_0 + 1MHz$	-	-53	-60	dB
	$F = F_0 - 1MHz$	-	-53	-60	dB
	$F = F_0 + 2MHz$	-	-27	-60	dB
	$F = F_0 - 2MHz$	-	-28	-60	dB
	$F = F_0 + 3MHz$	-	-23	-67	dB
	$F = F_{image}$	-	-40	-67	dB

Parameter	Condition	Min.	Typ.	Max.	Unit
Sensitivity at 0.01% BER	π/4 DQPSK	-70	-92		dBm
	8DPSK	-65	-86		dBm
Maximum Input PWR at 0.1% BER	π/4 DQPSK	-20	0		dBm
	8DPSK	-20	0		dBm
Co-Channel Interference	π/4 DQPSK		3	13	dB
	8DPSK		5	21	dB

Module Pin definitions



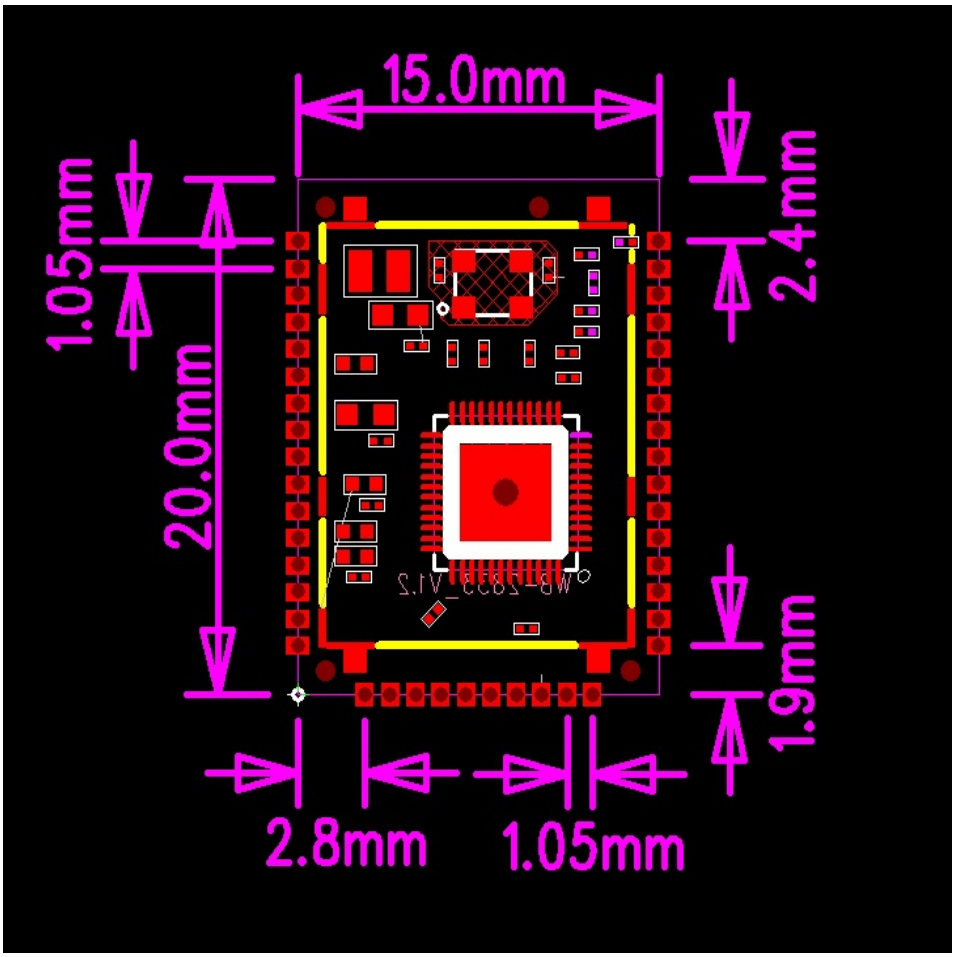
Pin Configurations

PIN NO.	NAME	TYPE	FUNCTION
1	BT_ANT	Bi-directional	Bluetooth antenna junction
2	GND	Power ground	Ground
3	GPIO42	Bi-directional	General Purpose Input Output: 42
4	GPIO35	Bi-directional	General Purpose Input Output: 35
5	GPIO34	Bi-directional	General Purpose Input Output: 34
6	GPIO33	Bi-directional	General Purpose Input Output: 33
7	GPIO32	Bi-directional	General Purpose Input Output: 32
8	GPIO16	Bi-directional	General Purpose Input Output: 16
9	GPIO11	Bi-directional	General Purpose Input Output: 11
10	GPIO10	Bi-directional	General Purpose Input Output: 10
11	GPIO8	Bi-directional	General Purpose Input Output: 8
12	GPIO9	Bi-directional	General Purpose Input Output: 9
13	GPIO22	Bi-directional	General Purpose Input Output: 22
14	GPIO23	Bi-directional	General Purpose Input Output:23
15	GPIO21	Bi-directional	General Purpose Input Output:21
16	GPIO20	Bi-directional	General Purpose Input Output:20
17	HSDP	AIO	USB Data plus
18	HSDM	AIO	USB Data Minus
19	GND	Power ground	Ground
20	AGND	Power ground	Analog ground
21	VRO_S	Analog input	VRO Sense for PA
22	AOUTR	Analog output	Right channel of PA
23	AOUTL	Analog output	Left channel of PA
24	VRO	Analog output	Virtual Ground for PA
25	MICINL	Analog input	MIC left channel input
26	MICINR	Analog input	MIC right channel input
27	AUX0L	Analog input	AUX0 left channel input
28	AUX0R	Analog input	AUX0 right channel input
29	AUX1L	Analog input	AUX1 left channel input
30	AUX1R	Analog input	AUX1 right channel input
31	AGND	Power ground	Analog ground
32	AVCC	Power output	Power for Analog module, typical voltage:2.95V
33	SVCC	Power output	Power for Standby
34	WIO0	DIO	Wake up I/O porty
35	VCC	Power output	3.3V power supply
36	DC5V	Power output	Charge power input ,typical voltage range:4.5V~7.0V

Pin Configurations

PIN NO.	NAME	TYPE	FUNCTION
37	BAT	Power input	Battery input, typical voltage range:3.4V~4.2V
38	GND	Power ground	Ground
39	ONOFF	Input	Power on/off
40	RTCVDD	Power output	power for RTC Module, typical voltage:1.2V
41	GPIO3	Bi-directional	General Purpose Input Output: IO3
42	GPIO2	Bi-directional	General Purpose Input Output:IO2

Module Package Information



Note:Shape tolerance +0.2mm/-0.1mm

Federal Communication Commission Interference Statement
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 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 transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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 device is intended only for OEM integrators under the following conditions:
1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.
As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling
This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm 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: 2AZ4G-WB2833PB". The grantee's FCC ID can be used only when all FCC compliance requirements are met. Manual Information To the End User
The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.
The end user manual shall include all required regulatory information/warning

IC statement
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:
This device may not cause interference.
This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avec Industrie Canada RSS exemptes de licence standard(s).
Son fonctionnement est soumis aux deux conditions suivantes:
(1) cet appareil ne peut pas provoquer d'interférences, et
(2) cet appareil doit accepter toute interférence, y compris celles pouvant causer un mauvais
fonctionnement de l'appareil.

Document History

Revision	Date	History
V1.0	2019/03/20	First release
V1.1	2020/11/22	Second release

Contact Information

SummySang Tel: 13590489275 0755-89980456 E-mail: summysang@worldelite.net.cn

http://www.worldelite.net.cn

Address: 2/F, Building, liyuan, No. 177, longchen Road, longgang, Shenzhen, China