

# *Wireless LAN + Bluetooth<sup>®</sup> Module*

WYSAAVDXB-E  
(IEEE802.11a/b/g/n + Bluetooth<sup>®</sup> 3.0)

Data Report

Please note that this Data Report should not be provided to end-users.

In case you adopt this module and design some appliance, please ask for the latest specifications from the local sales office.

We wish the customer to request the Specification Report when the design for the mass production begins because the content of this Data Report might change without a previous notice to the customer.

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## **WYSAAVDXB-E**

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Rev. records

9-Jul.-2015> Ver.1.0 Released.

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## WYSAAVDXB-E

Control No. HD-AG-A140343	(1/2)	Control name General Items
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### Scope

This specification (“Specification”) applies to the hybrid IC for use Wireless LAN and **Bluetooth**<sup>®</sup> module (“Product”) manufacture by TAIYO YUDEN CO., LTD. (“TAIYO YUDEN”)

1. Function: Radio frequency transfer Module. (**IEEE802.11abgn** and **Bluetooth**<sup>®</sup> **3.0** standard conformity)
2. Application: PC peripheral, Handy terminal
3. Structure: Hybrid IC loaded with silicon monolithic and GaAs semiconductor  
Ability of lead free mounting at customer's assembly (Heat resistance of this Product): Yes  
Containment of hazardous substance in this Product  
\*This product conforms to RoHS Directive.
4. Outline: FPC Connector Type
5. Features:
  - IEEE802.11abgn** and **Bluetooth**<sup>®</sup> **3.0** standard conformity
  - Interface: SDIO, PCM
  - Embedded MPU for reducing loads on host processor
  - Built-in EEPROM (MAC address)
6. Terminal: Data input-output (20pin FPC Connector)  
RF input-output (Antenna)
7. Mount: with M1 screw
8. Notes:
  - a. Communication between this Product and others might not be established nor maintained depending upon radio environment or operating conditions of this Product and other ISM band at 2.4GHz and 5GHz products.
  - b. This Product operates in the unlicensed ISM band at 2.4GHz and 5GHz. In case this Product is used around the other wireless devices which operate in same frequency band of this Product, there is a possibility that interference occurs between this Product and such other devices. If such interference occurs, please stop the operation of other devices or relocate this Product before using this Product or do not use this Product around the other wireless devices.
  - c. Caution for Export Control  
This Product may be subject to governmental approvals, consents, licenses, authorizations, declarations, filings, and registrations for export or re-export of the Product, required by *Japanese Foreign Exchange and Foreign Trade Law* (including related laws and regulations) and/or any other country's applicable laws or regulations related to export control.  
In case you will export or re-export this Product, you are strongly recommended to check and confirm, before exporting or re-exporting, necessary procedures for export or re-export of this Product which is required by applicable laws and regulations, and if necessary, you have to obtain necessary and appropriate approvals or licenses from governmental authority at your own risk and expense.

**WYSAAVDXB-E**

Control No. HD-AG-A140343	(2/2)	Control name General Items
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## d. FCC Regulatory Information

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.

a) Please notify certified ID by either one of the following method.

-Contains Transmitter Module FCC ID: RYYWYSAAVDXB-E

-Contains FCC ID: RYYWYSAAVDXB-E

b) This product is only approved for use in Smart Headset; H725A.

c) Please use the specified supply voltage in "Recommendation operating range" when installing this product. The final products must contain a power supply regulator and must ensure the applied voltage to this product is adjusted to always be within the operating voltage range.

d) Please ensure and control your host product not to transmit on channels 12 and 13.

e) Data transmission is inevitably initiated by software of host devices with the exception that several special packets are transmitted by the MAC. However, data transmission is terminated by end of packets in any cases. Therefore, it is RF transmitted only while packets are being transmitted. This modular transmitter automatically discontinues transmission in case of either absence of information to transmit or operational failure because RF parts will not be ON in neither cases.

f) The device driver/firmware for this product is downloaded from a limited access web site provided by the device manufacturer and is implemented specifically for this product. The ID/password required to access the web site can be obtained after the conclusion of a contract with the device manufacturer.

g) CAUTION:

-Changes or modifications not expressly approved by the party responsible for compliance could void the use's authority to operate the equipment

-To maintain compliance with FCC's RF exposure guidelines, use only the supplied antenna.

Unauthorized antenna, modification, or attachments could damage the transmitter and may violate FCC regulations.

-This product is certified as type of the portable device with the FCC Rules. To maintain compliance with SAR requirement, please use within specification of this product.

## WYSAAVDXB-E

Control No. HD-AM-A140343	(1/1)	Control name Absolute maximum ratings
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### Absolute maximum ratings

Item	Symbol	Rating			Unit	Remark
		Min.	Typ.	Max.		
Supply voltage 1	VDD3.3	-0.3		4.0	V	
Supply voltage 2	VIO	-		4.0	V	

### Recommendation operating range

Item	Symbol	Rating			Unit	Remark
		Min.	Typ.	Max.		
Supply voltage 1	VDD3.3	3.0	3.3	3.6	V	
Supply voltage 2	VIO	1.7/2.97	1.8/3.3	1.98/3.63	V	
Storage temperature range	Tstg	-30	25	85	Degrees C	
Operating temperature range (Shielding case surface temperature)	Topr	-30	25	85	Degrees C	

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## WYSAAVDXB-E

Control No. HD-AE-A140343	(1/8)	Control name Electrical characteristics
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### DC Specifications

Peak Current / Power consumption (IEEE802.11a/b/g/n)

The Specification applies for Topr.= 25 degrees C, Supply voltage=Typical voltage (3.3V). RF output power = Typ.

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit
1	Normal supply voltage 1		VDD3.3	3.0	3.3	3.6	V
2	Normal supply voltage 2		VIO	1.7/2.97	1.8/3.3	1.98/3.63	V
3	Input Low Voltage		VIL	-0.3		0.3 x VIO	V
4	Input High Voltage		VIH	0.8 x VIO		VIO + 0.3	V
5	Output Low Voltage		VOL	-		0.4	V
6	Output High voltage		VOH	VIO - 0.4		-	V
7	Peak current 1	VDD3.3	Iccp1			400	mA
8	Peak current 2	VIO	Iccp2			30	mA
9	Power consumption1	Burst Tx (2G, 11n/ 150Mbps)	Pc1		270		mW
10	Power consumption2	Continuous Rx (2G, 11n/ 150Mbps)	Pc2		325		mW
11	Power consumption3	Burst Tx (2G, 11n/ 72.2Mbps)	Pc3		280		mW
12	Power consumption4	Continuous Rx (2G, 11n/ 72.2Mbps)	Pc4		305		mW
13	Power consumption5	Burst Tx (11g/ 54Mbps)	Pc5		340		mW
14	Power consumption6	Continuous Rx (11g/ 54Mbps)	Pc6		300		mW
15	Power consumption7	Burst Tx (11b/ 11Mbps)	Pc7		475		mW
16	Power consumption8	Continuous Rx (11b/ 11Mbps)	Pc8		295		mW
17	Power consumption9	Burst Tx (5G, 11n/ 150Mbps)	Pc9		300		mW
18	Power consumption10	Continuous Rx (5G, 11n/ 150Mbps)	Pc10		355		mW
19	Power consumption11	Burst Tx (5G, 11n/ 72.2Mbps)	Pc11		305		mW
20	Power consumption12	Continuous Rx (5G, 11n/ 72.2Mbps)	Pc12		330		mW
21	Power consumption13	Burst Tx (11a/ 54Mbps)	Pc13		380		mW
22	Power consumption14	Continuous Rx (11a/ 54Mbps)	Pc14		325		mW
23	Power consumption15	Power save mode (DTIM=1, Beacon interval =100ms)	VIO=3.3V Pc15	-	10	-	mW
24	Power consumption16	Deep Sleep	VIO=3.3V Pc16	-	3	-	mW

# WYSAAVDXB-E

Control No. HD-AE-A140343	(2/8)	Control name Electrical characteristics
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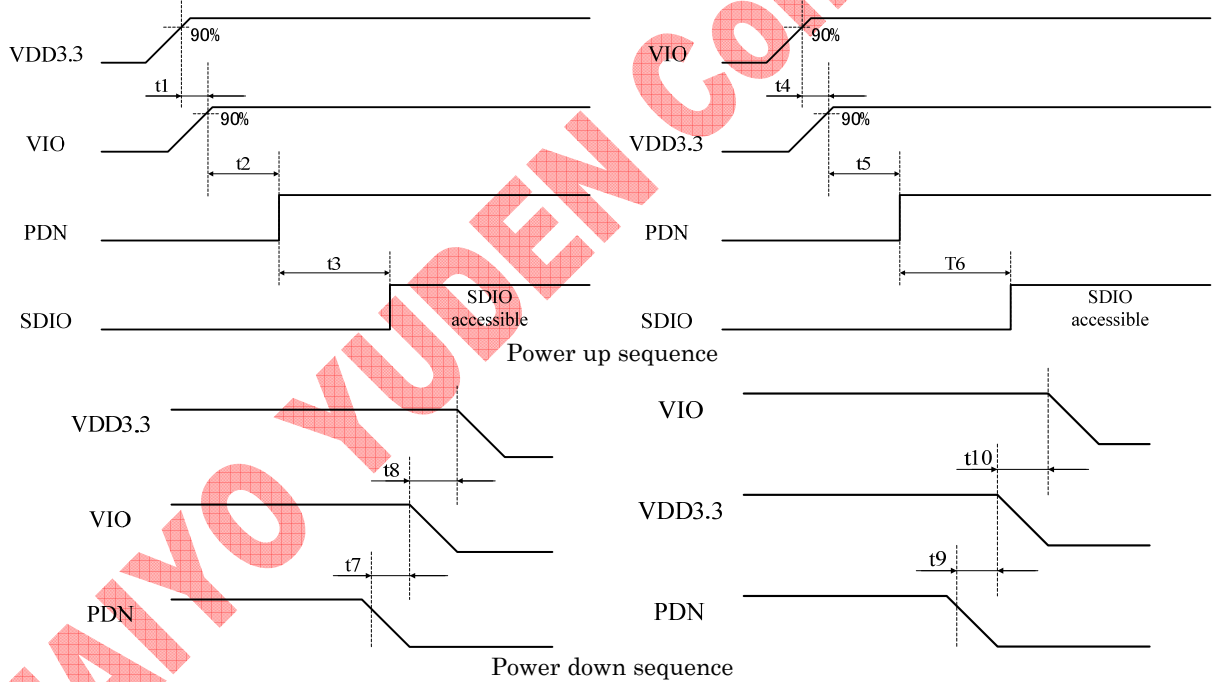
## AC Specifications

The Specification applies for Topr=25 degrees C, Supply voltage=Typical voltage (3.3V)

	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	Time from VDD3.3 ramp up to VIO ramp up		t1	0			ms	
2	PDN asserting time from VIO ramp up		t2	1000			ms	Notes1, 2
3	PDN high to SDIO accessible		t3	10			ms	Note1
4	Time from VIO ramp up to VDD3.3 ramp up		t4	0			ms	
5	PDN asserting time from VDD3.3 ramp up		t5	1000			ms	Notes1, 2
6	PDN high to SDIO accessible		t6	10			ms	Note1
7	PDN down to VIO fall		t7	0			ms	
8	VIO fall to VDD3.3 fall		t8	0			ms	
9	PDN down to VDD3.3 fall		t9	0			ms	
10	VDD3.3 fall to VIO fall		t10	0			ms	

Notes:

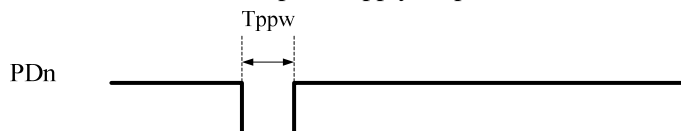
1. PDN is pulled down to GND internally.
2. PDN must remain asserted for minimum of t2/t5 after VDD3.3 and VIO are stable.



### External power down (PDn)

	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	PDn pulse width		Tppw	300			ms	Notes1, 2

1. PDn should be asserted while VDD3.3 and VIO are stable.
3. For lowest current consumption, apply all power rails to WYSAAVDXB-E during the assertion of PDn pin.



# WYSAAVDXB-E

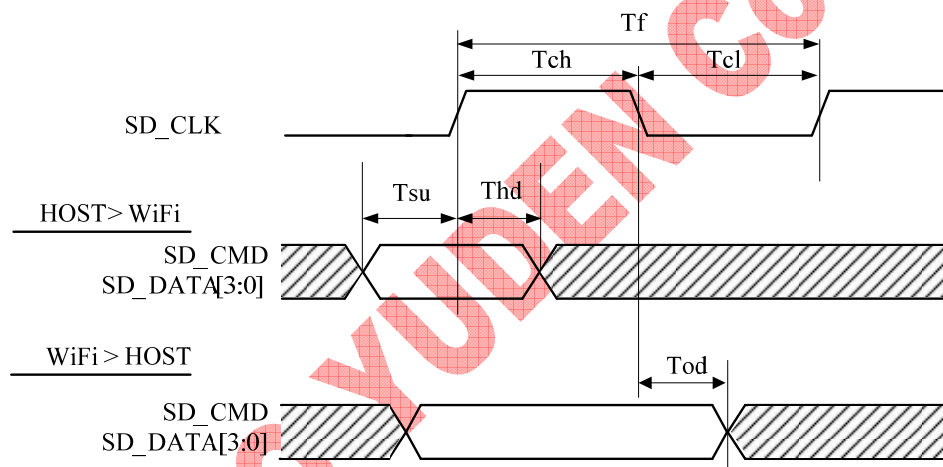
Control No. HD-AE-A140343	(3/8)	Control name Electrical characteristics
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## SDIO Interface Specifications

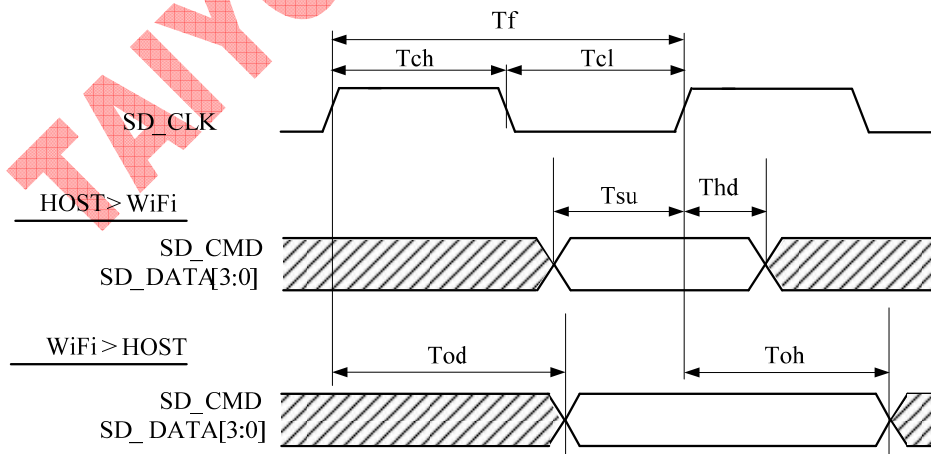
The Specification applies for Topr.= 25degrees C , Supply voltage=Typical voltage (3.3V).

	Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
1	Input SDIO_CLK Frequency	Tf	Normal	0	-	25	MHz	
			High Speed	0	-	50		
2	Input SDIO_CLK High Time	Tch	Normal	10	-	-	ns	
			High Speed	7	-	-		
3	Input SDIO_CLK Low Time	Tcl	Normal	10	-	-	ns	
			High Speed	7	-	-		
4	Input SDIO_CMD, DATA[3:0] Setup time	Tsu	Normal	5	-	-	ns	
			High Speed	6	-	-		
5	Input SDIO_CMD, DATA[3:0] Hold time	Thd	Normal	5	-	-	ns	
			High Speed	2	-	-		
6	Output SDIO_CMD, DATA[3:0] Delay time	Tod	-	-	-	7.33	ns	
7	Output SDIO_CMD, DATA[3:0] Hold time	Toh	High Speed	2.5	-	-	ns	

### Normal Mode



### High Speed Mode





# WYSAAVDXB-E

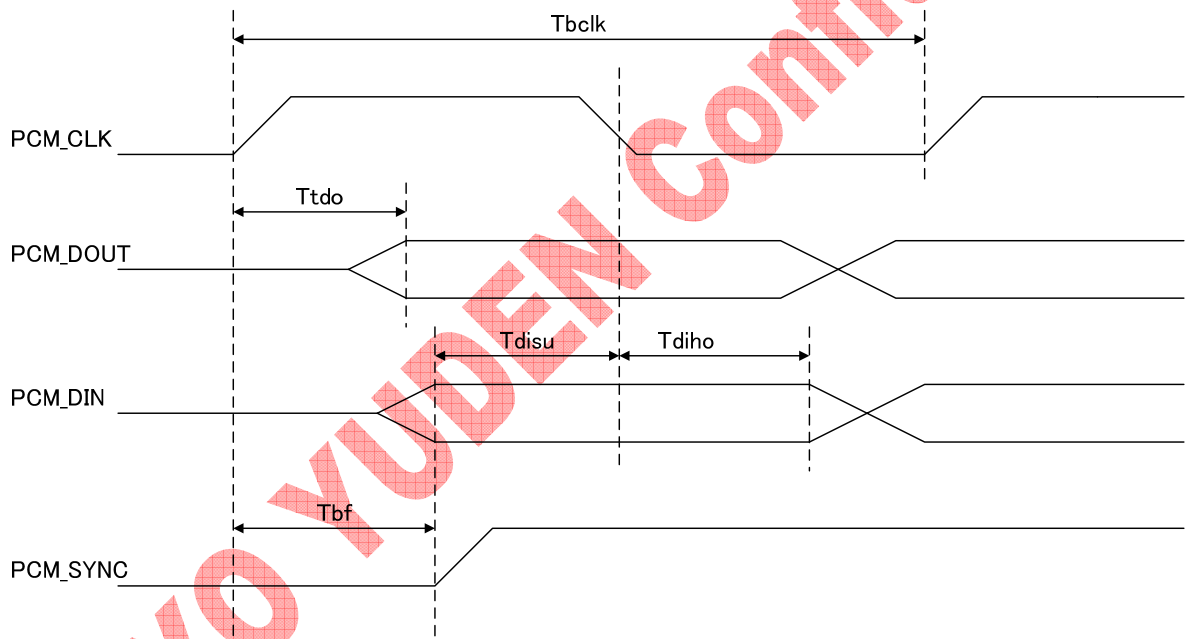
Control No. HD-AE-A140343	(4/8)	Control name Electrical characteristics
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## PCM Interface Specifications

The Specification applies for Topr.= 25degrees C , Supply voltage=Typical voltage (3.3V).

	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	PCM_CLK Frequency		Tblk	-	2	-	MHz	
2	PCM_CLK Duty Cycle		-	0.4	0.5	0.6		
3	PCM_CLK Rise Time		-	-	3	-	ns	
4	PCM_CLK Fall Time		-	-	3	-	ns	
5	Delay time from PCM_CLK High to valid PCM_OUT		Tdo	-	-	15	ns	
6	Setup Time for PCM_DIN valid to PCM_CLK Low		Tdisu	20	-	-	ns	
7	Hold time for PCM_CLK Low to PCM_DIN valid		Tdiho	15	-	-	ns	
8	Delay time from PCM_CLK High to PCM_SYNC High		Tbf	15	-	-	ms	

## Master Mode



## WYSAAVDXB-E

Control No. HD-AE-A140343	(5/8)	Control name Electrical characteristics
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### RF Specifications (WLAN 11n/150Mbps, OFDM)

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage (3.3V).

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	2422		2452	MHz	
2	TX Power		Po	10	12	14	dBm	
3	Spectrum Mask	1 <sup>st</sup> Side Lobe	M1	-		-20	dBc	
		2 <sup>nd</sup> Side Lobe	M2	-		-28	dBc	
		3 <sup>rd</sup> Side Lobe	M3	-		-45	dBc	
4	Symbol clock tolerance		Ft	-25		25	ppm	
5	Frequency tolerance		Ft	-25		25	ppm	
6	EVM	Rms	EVM	-		-28	dB	
7	Rx sensitivity	PER<10%	SEN	-	-67	-61	dBm	
8	Maximum Input Level	PER<10%	MIL	-20		-	dBm	

### RF Specifications (WLAN 11n/72.2Mbps, OFDM)

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage (3.3V).

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	2412		2462	MHz	
2	TX Power		Po	10	12	14	dBm	
3	Spectrum Mask	1 <sup>st</sup> Side Lobe	M1	-		-20	dBc	
		2 <sup>nd</sup> Side Lobe	M2	-		-28	dBc	
		3 <sup>rd</sup> Side Lobe	M3	-		-45	dBc	
4	Symbol clock tolerance		Ft	-25		25	ppm	
5	Frequency tolerance		Ft	-25		25	ppm	
6	EVM	Rms	EVM	-		-28	dB	
7	Rx sensitivity	PER<10%	SEN	-	-70	-64	dBm	
8	Maximum Input Level	PER<10%	MIL	-20		-	dBm	

**WYSAAVDXB-E**

Control No. HD-AE-A140343	(6/8)	Control name Electrical characteristics
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**RF Specifications (WLAN 11g/54Mbps, OFDM)**

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage (3.3V).

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	2412		2462	MHz	
2	TX Power		Po	10	12	14	dBm	
3	Spectrum Mask	1 <sup>st</sup> Side Lobe	M1	-		-20	dBc	
		2 <sup>nd</sup> Side Lobe	M2	-		-28	dBc	
		3 <sup>rd</sup> Side Lobe	M3	-		-40	dBc	
4	Symbol clock tolerance		Ft	-25		25	ppm	
5	Frequency tolerance		Ft	-25		25	ppm	
6	EVM	Rms	EVM	-		-25	dB	
7	Rx sensitivity	PER<10%	SEN	-	-73	-65	dBm	
8	Maximum Input Level	PER<10%	MIL	-20		-	dBm	

**RF Specifications (WLAN 11b/11Mbps, CCK)**

The Specification applies for Ta=25 degrees C, Supply voltage=Typical voltage (3.3V).

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	2412		2462	MHz	
2	TX Power		Po	10	12	14	dBm	
3	Spectrum Mask	1 <sup>st</sup> Side Lobe	M1	-		-30	dBc	
		2 <sup>nd</sup> Side Lobe	M2	-		-50	dBc	
4	Power up-down rump	Power up	TU	-		2	us	
		Power down	TD	-		2	us	
5	Frequency tolerance		Ft	-25		25	ppm	
6	EVM	Peak	EVM	-		35	%	
7	Rx sensitivity	PER<8%	SEN		-87	-76	dBm	
8	Maximum Input Level	PER<8%	MIL	-10			dBm	

## WYSAAVDXB-E

Control No. HD-AE-A140343 (7/8)	Control name Electrical characteristics
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### RF Specifications (WLAN 11a/54Mbps, OFDM)

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage (3.3V).

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	5180		5825	MHz	
2	TX Power		Po	10	12	14	dBm	
3	Spectrum Mask	1 <sup>st</sup> Side Lobe	M1	-		-20	dBc	
		2 <sup>nd</sup> Side Lobe	M2	-		-28	dBc	
		3 <sup>rd</sup> Side Lobe	M3	-		-40	dBc	
4	Symbol clock tolerance		Ft	-20		20	ppm	
5	Frequency tolerance		Ft	-20		20	ppm	
6	EVM	rms	EVM	-		-25	dB	
7	Rx sensitivity	PER<10%	SEN	-	-74	-65	dBm	
8	Maximum Input Level	PER<10%	MIL	-30		-	dBm	

### RF Specifications (WLAN 11a/150Mbps, OFDM)

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage (3.3V).

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	5190		5795	MHz	
2	TX Power		Po	10	12	14	dBm	
3	Spectrum Mask	1 <sup>st</sup> Side Lobe	M1	-		-20	dBc	
		2 <sup>nd</sup> Side Lobe	M2	-		-28	dBc	
		3 <sup>rd</sup> Side Lobe	M3	-		-45	dBc	
4	Symbol clock tolerance		Ft	-20		20	ppm	
5	Frequency tolerance		Ft	-20		20	ppm	
6	EVM	rms	EVM	-		-28	dB	
7	Rx sensitivity	PER<10%	SEN	-	-68	-61	dBm	
8	Maximum Input Level	PER<10%	MIL	-30		-	dBm	

### RF Specifications (WLAN 11a/72.2Mbps, OFDM)

The Specification applies for Ta=25 degrees C, Supply voltage =Typical voltage (3.3V).

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	5180		5825	MHz	
2	TX Power		Po	10	12	14	dBm	
3	Spectrum Mask	1 <sup>st</sup> Side Lobe	M1	-		-20	dBc	
		2 <sup>nd</sup> Side Lobe	M2	-		-28	dBc	
		3 <sup>rd</sup> Side Lobe	M3	-		-45	dBc	
4	Symbol clock tolerance		Ft	-20		20	ppm	
5	Frequency tolerance		Ft	-20		20	ppm	
6	EVM	rms	EVM	-		-28	dB	
7	Rx sensitivity	PER<10%	SEN	-	-72	-64	dBm	
8	Maximum Input Level	PER<10%	MIL	-30		-	dBm	

## WYSAAVDXB-E

Control No. HD-AE-A140343	(8/8)	Control name Electrical characteristics
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### RF Specifications (Bluetooth®)

The Specification applies for Ta=25 degrees C, Supply voltage=Typical voltage (3.3V).

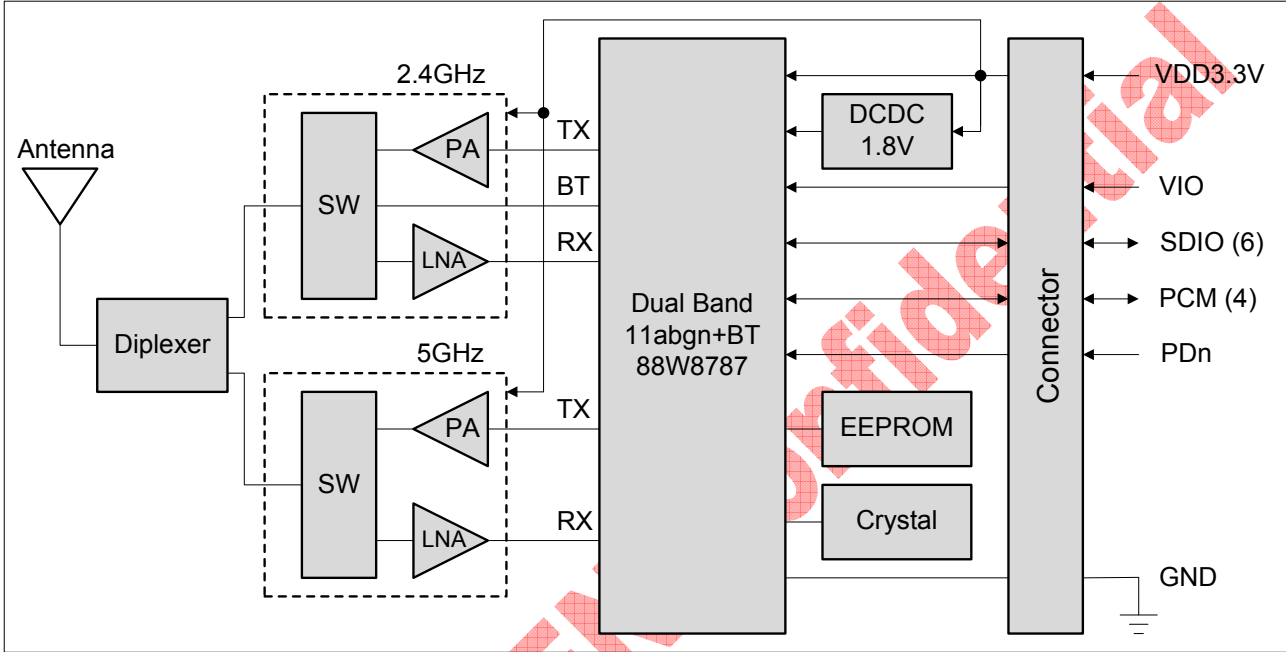
No.	Parameter	Condition	Sym	Min	Typ	Max	Unit	Remark
1	Frequency Range		FREQ	2402		2480	MHz	
2	Initial Carrier Frequency Tolerance	Packet : DH5	IFT	-75	0	75	kHz	
3	Tx Power		PO	-6	0	4	dBm	
4	Modulation Characteristics	Payload : 11110000	MC1	140	162	175	kHz	
		Payload : 10101010	MC4	115	150			
5	Sensitivity	Basic	SENB		-86	-70	dBm	BER < 0.1%
		2-DH5	SENE1		-	-70		BER < 0.01%
		3-DH5	SENE2		-	-70		BER < 0.01%

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# WYSAAVDXB-E

Control No. HD-MC-A140343	(1/1)	Control name Circuit Schematic
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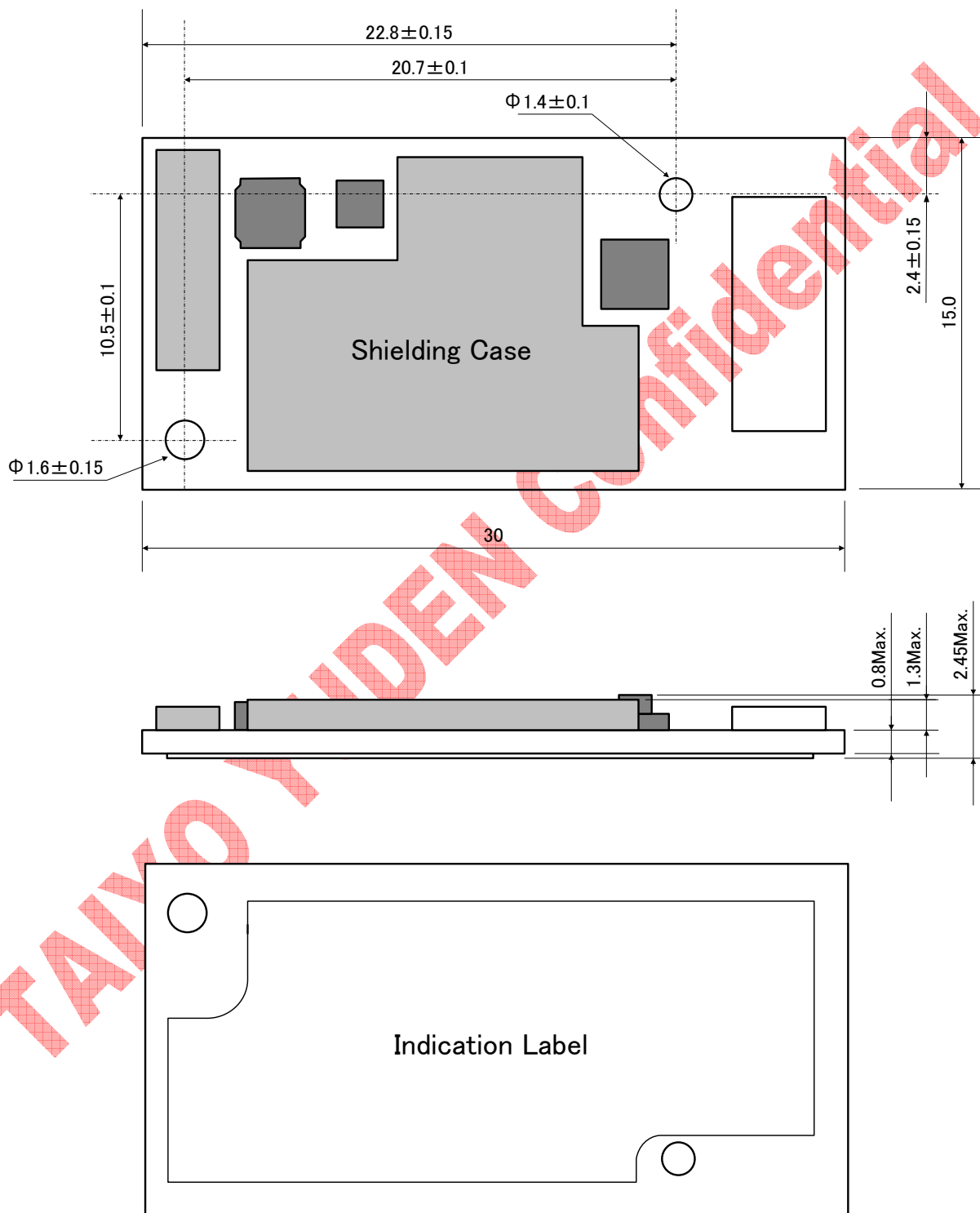
### Block Diagram



# WYSAAVDXB-E

Control No. HD-AD-A140343	(1/1)	Control name Outline/Appearance
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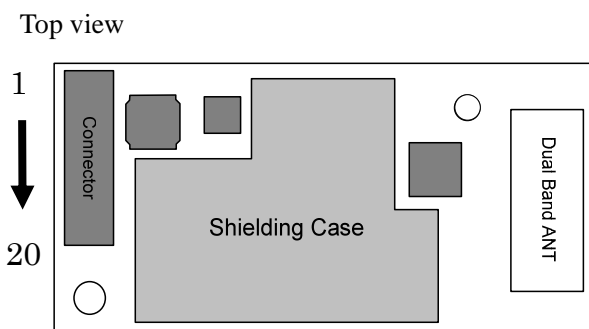
Unit: mm, Tolerances unless otherwise specified:  $\pm 0.2\text{mm}$



## WYSAAVDXB-E

Control No. HD-BA-A140343	(1/1)	Control name Pin Layout
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### Pin Descriptions



Terminal No.	Terminal Name	Input/ Output	Pwr Domain	Description	Function
1	GND	-	GND		Power
2	PCM_DIN	Input	VIO	PCM Data Input Signal.	PCM
3	PCM_DOUT	Output	VIO	PCM Data Output Signal.	PCM
4	PCM_SYNC	Input/Output	VIO	PCM Sync Pulse Signal. Master: Output, Slave: Input	PCM
5	GND	-	GND		Power
6	PCM_CLK	Input/Output	VIO	PCM Clock Signal. Master: Output, Slave: Input	PCM
7	GND	-	GND	Ground	Power
8	VDD3.3	Input	VBAT	3.3V Power Supply	Power
9	VDD3.3	Input	VBAT	3.3V Power Supply	Power
10	VIO	Input	VIO	1.8V/3.3V Digital I/O Power Supply	Power
11	SD_CMD	Input/Output	VIO	SDIO Command	SDIO
12	SD_DATA0	Input/Output	VIO	SDIO Data-0	SDIO
13	SD_DATA1	Input/Output	VIO	SDIO Data-1	SDIO
14	GND	-	GND	Ground	Power
15	SD_CLK	Input	VIO	SDIO Clock	SDIO
16	GND	-	GND	Ground	Power
17	SD_DATA2	Input/Output	VIO	SDIO data-2	SDIO
18	SD_DATA3	Input/Output	VIO	SDIO data-3	SDIO
19	PDn	Input	VIO	Power Down (active low) with internal pull-down.	System
20	GND	-	GND		Power