

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

**IEEE802.11ax/ac/a/b/g/n (2x2) + Bluetooth<sup>®</sup> 5.0**

**WYSBHVDXP**

**( Under Development )**

Data Report

By purchase of any of products described in this document, the customer is deemed to understand and accept contents of this document.

*The Bluetooth<sup>®</sup> word mark and logos are owned by the Bluetooth SIG, Inc. and any use of such marks by TAIYO YUDEN CO., LTD. is under license.*

# WYSBHVDXP : 11ax (2x2) +BT5.0

---

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

***ATTENTION: This module requires device drivers that are under Japan export control. Depending on the customer's country and application (e.g. weapons), Taiyo Yuden may not be able to provide these drivers to all customers. Please contact your local Taiyo Yuden sales office for additional information.***

To contact your local sales office and for additional product information, please visit [www.ty-top.com](http://www.ty-top.com).

For Zebra Technologies

## Document constituent list

Control name	Control No.	Document Page
General Items	HD-AG-A191094	1/3 - 3/3
Absolute maximum ratings	HD-AM-A191094	1/1
Electrical characteristics	HD-AE-A191094	1/8 - 8/8
Circuit schematic	HD-MC-A191094	1/1
Outline / Appearance	HD-AD-A191094	1/4 - 4/4
Pin Layout	HD-BA-A191094	1/3 - 3/3
Handling Precaution	HQ-BA-537	1/3 - 3/3
Precautions	HQ-BK-002_02	1/2 - 2/2

### Rev. records

Sep.-06-2019>Ver.0.1	Release
Sep.-18-2019>Ver.0.2	Updated Electrical characteristics (SDIO Interface), Outline/Appearance and Pin Layout
Nov.-15-2019>Ver.0.3	Updated Electrical characteristics (Power on Sequence, RF specifications) and Outline/Appearance (Recommended Metal Mask (Solder Mask) Conditions)
Dec.-10-2019>Ver.0.4	Updated Outline/ Appearance (Module Pad Dimension)
Jun.-5-2020>Ver.0.5	Updated Outline/ Appearance (Module Pad Dimension)

# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-AG-A191094 (1/3)	Control name General Items
---------------------------------------	-------------------------------

## 1. Scope

This specification ("Specification") applies to the hybrid IC "WYSBHVDXP" for use Wireless LAN and Bluetooth® module ("Product") manufactured by TAIYO YUDEN CO., LTD. ("TAIYO YUDEN")

## 2. Description

### ① Model: WYSBHVDXP

Note: Please let us know the model (WYSBHVDXP) to order this product.

### ② Chip: NXP 88W9098

### ③ Function: Radio frequency transceiver Module. (IEEE802.11ax/ac/a/b/g/n 2x2 and Bluetooth®5.0 conformity)

### ④ Application: Mobile printer, portable audio/ video device, wireless home audio/ video entertainment, handy terminal

### ⑤ Structure: Hybrid IC loaded with silicon and Gallium arsenide compound monolithic semiconductor

Containment of hazardous substance in this Product:

\* This product conforms to RoHS Directive.

### ⑥ Outline: 150 pin leadless chip carrier

### ⑦ Marking: Part Number, Lot Number and manufacturer on Shielding Case

### ⑧ Features:

-**IEEE802.11ax/ac/a/b/g/n** 2x2 and **Bluetooth®5.0** standard

-Interface: SDIO3.0, PCM

-Embedded MPU for reducing loads on host processor

### ⑨ Security: TKIP, WEP, AES, CCMP, CMAC, WAPI, WPA/WPA2(64bit/128bit)

### ⑩ Country of origin: Japan or Thailand

### ⑪ Packing:

-Packaging method: Tray

-Packaging unit: TBD

-Standard order quantity: TBD

### ⑫ Mount: SMD Type

Control No. HD-AG-A191094	(2/3)	Control name General Items
------------------------------	-------	-------------------------------

⑬ Notes

a. Limitation of Warranty

- i) TAIYO YUDEN provide warranties only if the product is operated under the condition set forth in this specification. Please note that TAIYO YUDEN shall not be liable for any defect and/or malfunction arising from use of the product under the terms and conditions other than the operating conditions hereof. In addition, when this product is used under environmental conditions such as over voltage which is not guaranteed, it may be destroyed in short mode. To ensure the security of customer's product, please add an extra fuse or/and a protection circuit for over voltage.
- ii) In some cases, TAIYO YUDEN may use replacements as component parts of products. Such replacement shall apply only to component part of products, which TAIYO YUDEN deems it possible to replace or substitute according to (i) scope of warranty provided in this specification (e.g. electric characteristics, outline, dimension, conditions of use, reliability tests, official standard (type approvals etc.)) and (ii) quality of products. TAIYO YUDEN also ensures traceability of such replacement on production lot basis.
- iii) The products listed in this specification are intended for use in general electronic equipment (e.g., AV equipment, OA equipment, home electric appliances, office equipment, information and communication equipment including, without limitation, mobile phone, and PC). Please be sure to contact TAIYO YUDEN for further information before using the products for any equipment which may directly cause loss of human life or bodily injury (e.g., transportation equipment including, without limitation, automotive powertrain control system, train control system, and ship control system, traffic signal equipment, disaster prevention equipment, medical equipment, highly public information network equipment including, without limitation, telephone exchange, and base station). Please do not incorporate our products into any equipment requiring high levels of safety and/or reliability (e.g., aerospace equipment, aviation equipment, nuclear control equipment, undersea equipment, military equipment. When our products are used even for high safety and/or reliability-required devices or circuits of general electronic equipment, it is strongly recommended to perform a thorough safety evaluation prior to use of our products and to install a protection circuit as necessary. Please note that unless you obtain prior written consent of TAIYO YUDEN, TAIYO YUDEN shall not be in any way responsible for any damages incurred by you or third parties arising from use of the products listed in this specification for any equipment requiring inquiry to TAIYO YUDEN or prohibited for use by TAIYO YUDEN as described above
- iv) Please note that TAIYO YUDEN shall have no responsibility for any controversies or disputes that may occur in connection with a third party's intellectual property rights and other related rights arising from use of our products. TAIYO YUDEN grants no license for such rights.

Control No. HD-AG-A191094	(3/3)	Control name General Items
------------------------------	-------	-------------------------------

b. Instruction for Use (CAUTION)

- i) Because product is not designed for radiation durability, please refrain from exposing product to radiation in the use.
- ii) Communication between this product and other might not be established nor maintained depending upon radio environment or operating condition of this product and other products with wireless technology.
- iii) This product operates in the unlicensed ISM band at 2.4GHz/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. Term of Support

- i) In the case that customer requests TAIYO YUDEN to customize the hardware of this Product in order to meet such customer's specific needs, TAIYO YUDEN will make commercially reasonable effort to modify such hardware or software at customer's expense; provide however, the customer is kindly requested to agrees it doesn't mean that TAIYO YUDEN has obligations to do so even in the case it is technically difficult for TAIYO YUDEN.
- ii) Any failure arising out of this Product will be examined by TAIYO YUDEN regardless of before or after mass production. Customer agrees that once such failure is turned out not to be responsible for TAIYO YUDEN after aforesaid examination, some of the technical support shall be conducted by TAIYO YUDEN at customer's expense; provided however, exact cost of this technical support can be agreed through the negotiation by the parties.
- iii) Do not alter hardware and/or software of this Product. Please note that TAIYO YUDEN shall not be liable for any problem if it is caused by customer's alteration of Hardware without Taiyo Yuden's prior approvals.
- iv) TAIYO YUDEN does not guarantee functions and performances which depend on the customer's firmware. TAIYO YUDEN does not assume liabilities for defects and failures (i) in functions, performances and quality of the Customer's product incorporating the Products and (ii) which may occur as the Product is incorporated in the Customer's product.

d. Term of Warranty

TAIYO YUDEN warrants only that this Product is in conformity with this Specification for one year after purchase and shall in no event give any other warranty

e. Items of the Specification

Any question arising from the Specification shall be solved in good faith through mutual discussion by the parties hereof.

# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-AM-A191094	(1/1)	Control name Absolute maximum ratings
------------------------------	-------	--

## Absolute maximum ratings

Item	Symbol	Rating			Unit	Remark
		Min.	Typ.	Max.		
Supply voltage 1	VDD33	-	3.3	3.96	V	
Supply voltage 2	VDD18	-	1.8	2.16	V	
Supply voltage 3	VIO	-	1.8	1.98	V	
		-	2.5	2.75	V	
		-	3.3	3.63	V	
Supply voltage 4	VIO_SD	-	1.8	1.98	V	
		-	3.3	3.63	V	

## Recommendation operating range

Item	Symbol	Rating			Unit	Remark
		Min.	Typ.	Max.		
Supply voltage 1	VDD33	3.14	3.3	3.46	V	
Supply voltage 2	VDD18	1.71	1.8	1.89	V	
Supply voltage 3	VIO	1.71	1.8	1.89	V	
		2.38	2.5	2.62	V	
		3.14	3.3	3.46	V	
Supply voltage 4	VIO_SD	1.71	1.8	1.89	V	
		3.14	3.3	3.46	V	
Operation temperature range	Taopr	-30	25	85	Degrees C	
Storage temperature range	Tstg	-40		85	Degrees C	

# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-AE-A191094	(1/8)	Control name Electrical characteristics
------------------------------	-------	--

## DC Specifications

Digital Pad Ratings (SDIO, PCM, GPIO) (VIO=1.8/ 2.5/ 3.3V)

No.	Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit	Remark
1	Input High Voltage		VIH	0.7*VIO		VIO+0.4	V	
2	Input Low Voltage		VIL	-0.4		0.3*VIO	V	
3	Output High Voltage		VOH	VIO-0.4		-	V	
4	Output Low Voltage		VOL	-		0.4	V	

## Power consumption

The Specification applies for Topr.= 25 degrees C, Supply voltage=Typical voltage

TBD



# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

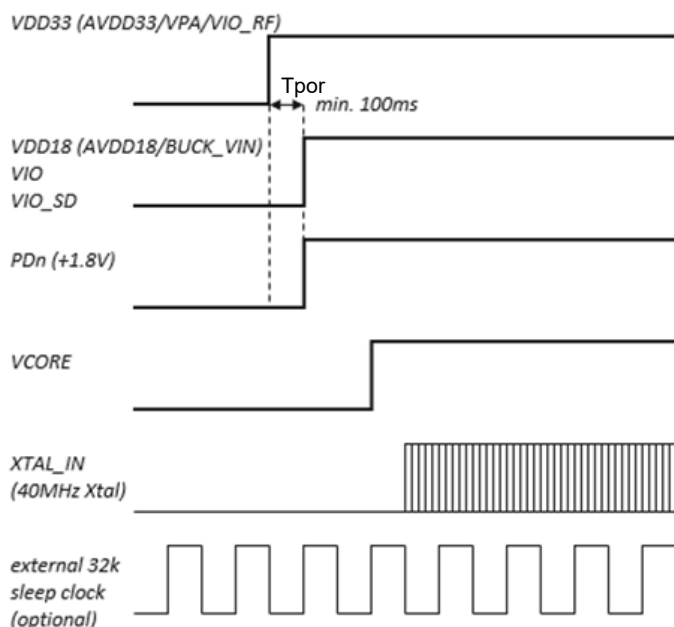
Control No. HD-AE-A191094	(2/8)	Control name Electrical characteristics
------------------------------	-------	--

## AC Specifications

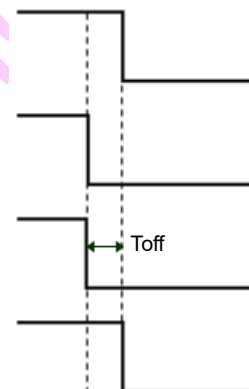
Power-on timing / External sleep clock

	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	Valid Power/ Clock to PDn de-asserted		Tpor	100			ms	
2	Input SLP_CLK frequency (Accuracy: +/-250ppm)		Tf	-	32.768	-	KHz	
3	Input SLP_CLK phase noise requirement		PN	-	-125	-	dBc/Hz	@100KHz
4	Input SLP_CLK slew rate limit (10-90%)		SR	-	-	100	ns	
5	Input SLP_CLK duty cycle tolerance		DC	20	-	80	%	
6	PDN down to Power off		Toff	0			ms	

<Power-on sequence>



Power up sequence.

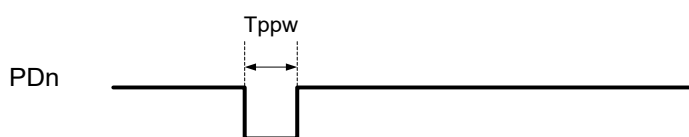


Power down sequence.

External power down (PDn)

	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	PDn pulse width		Tppw	1			ms	

1. PDn should be asserted while VDD33/VDD18/VIO/VIO\_SD are stable.

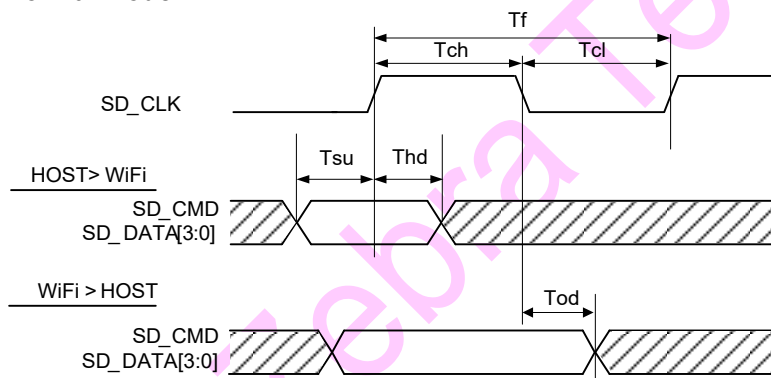


Control No. HD-AE-A191094	(3/8)	Control name Electrical characteristics
------------------------------	-------	--

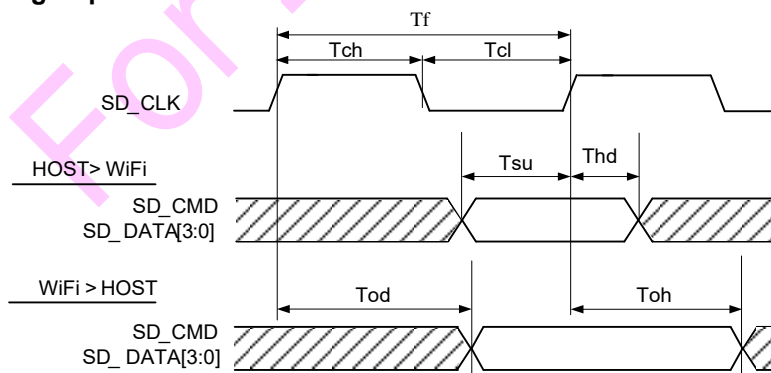
### SDIO Interface Specifications -Default Speed, High Speed Modes

	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	Normal	-	-	14	ns	
			High-Speed	-	-	14		
7	Output SDIO_CMD, DATA[3:0] Hold time	Toh	High Speed	2.5	-	-	ns	

#### Normal Mode



#### High Speed Mode

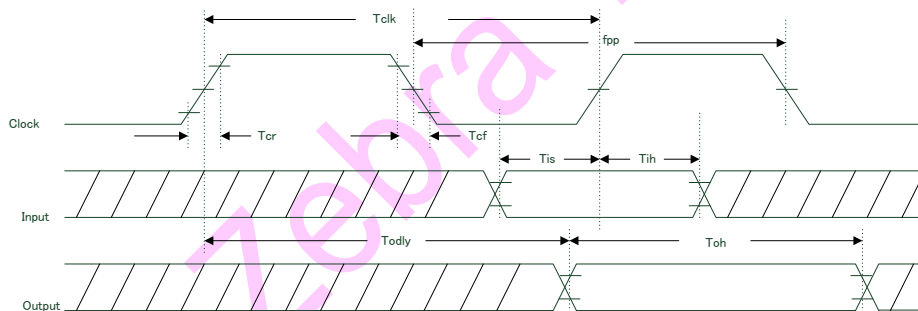


Control No. HD-AE-A191094	(4/8)	Control name Electrical characteristics
------------------------------	-------	--

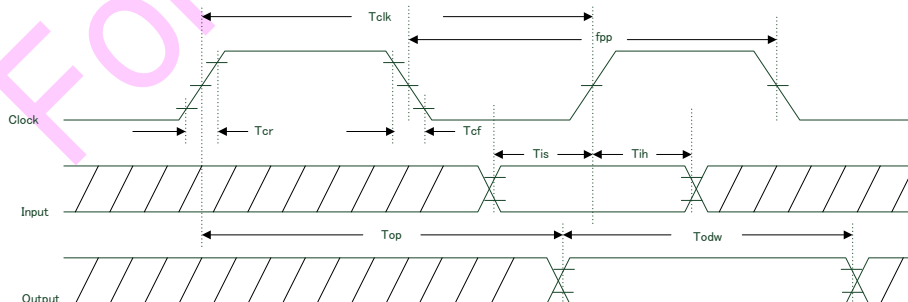
### SDIO Interface Specifications -SDR12, SDR25, SDR50 (up to 100MHz), SDR104 Modes (208MHz)

	Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
1	Clock Frequency	fpp	SDR12/25/50	25	-	100	MHz	
			SDR104	0	-	208		
2	Input setup time	Tis	SDR12/25/50	3	-	-	ns	
			SDR104	1.4	-	-		
3	Input hold time	Tih	SDR12/25/50	0.8	-	-	ns	
			SDR104	0.8	-	-		
4	Clock time	Tclk	SDR12/25/50	10	-	40	ns	
			SDR104	4.8	-	-		
5	Rise time,fall time Tcr,Tcfs < 2ns(max)at100MHz Ccard=10pF	Tcr,Tcf	SDR12/25/50	-	-	0.2*Tclk	ns	
			SDR104	-	-	0.2*Tclk		
6	Output delay time CI ≤ 30pF	Todly	SDR12/25/50	-	-	7.5	ns	
7	Output hold time CI=15pF	Toh	SDR12/25/50	1.5	-	-	ns	
8	Card output phase	Top	SDR104	0	-	10	ns	
9	Output timing of variable data window	Todw	SDR104	2.88	-	-	ns	

#### SDIO Protocol Timing Diagram-SDR12,SDR25,SDR50



#### SDIO Protocol Timing Diagram-SDR104

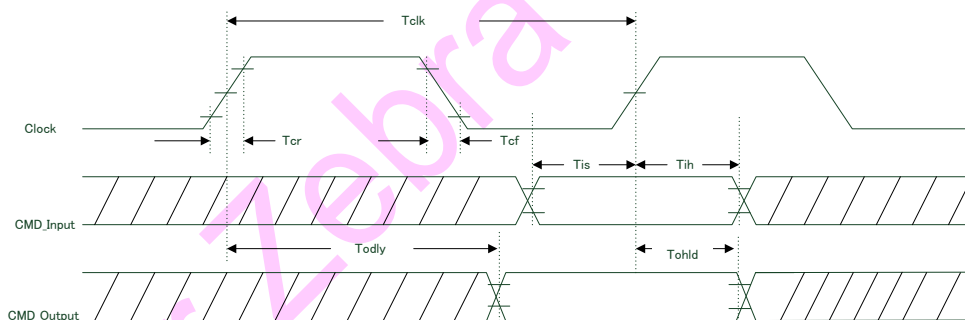


Control No. HD-AE-A191094	(5/8)	Control name Electrical characteristics
------------------------------	-------	--

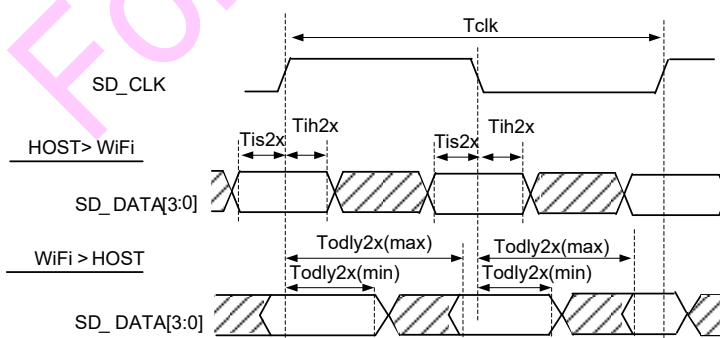
## SDIO Interface Specifications -DDR50 Mode (50MHz)

No.	Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
Clock								
1	Clock time, 50MHz (max) between rising edges	Tclk	DDR50	20	-	-	ns	
2	Rise time and fall time Tcr, Tcf<4.0ns (max) at 50MHz Ccard+10pF	Tcr, Tcf	DDR50	-	-	0.2*Tclk	ns	
3	Clock Duty	-	DDR50	45	-	55	%	
CMD Input (Referenced to clock rising edge)								
4	Input setup time, Ccard<10pF (1card)	Tis	DDR50	6	-	-	ns	
5	Input hold time, Ccard<10pF (1card)	Tih	DDR50	0.8	-	-	ns	
CMD Output (Referenced to clock rising edge)								
6	Output delay time during data transfer mode Cl<30pF (1card)	Todly	DDR50	-	-	13.7	ns	
7	Output hold time, Ccard>15pF (1card)	Tohld	DDR50	1.5	-	-	ns	
DAT[3:0] Input (Referenced to clock rising and falling edges)								
8	Input setup time, Ccard<10pF (1card)	Tis	DDR50	3	-	-	ns	
9	Input hold time, Ccard<10pF (1card)	Tih	DDR50	0.8	-	-	ns	
DAT[3:0] Output (Referenced to clock rising and falling edges)								
10	Output delay time during data transfer mode Cl<25pF (1card)	Todly2x(max)	DDR50	-	-	7.0	ns	
11	Output hold time, Ccard>15pF (1card)	Todly2x(min)	DDR50	1.5	-	-	ns	

### SDIO CMD Timing Diagram



### SDIO DAT[3:0] Timing Diagram



Control No. HD-AE-A191094	(6/8)	Control name Electrical characteristics
------------------------------	-------	--

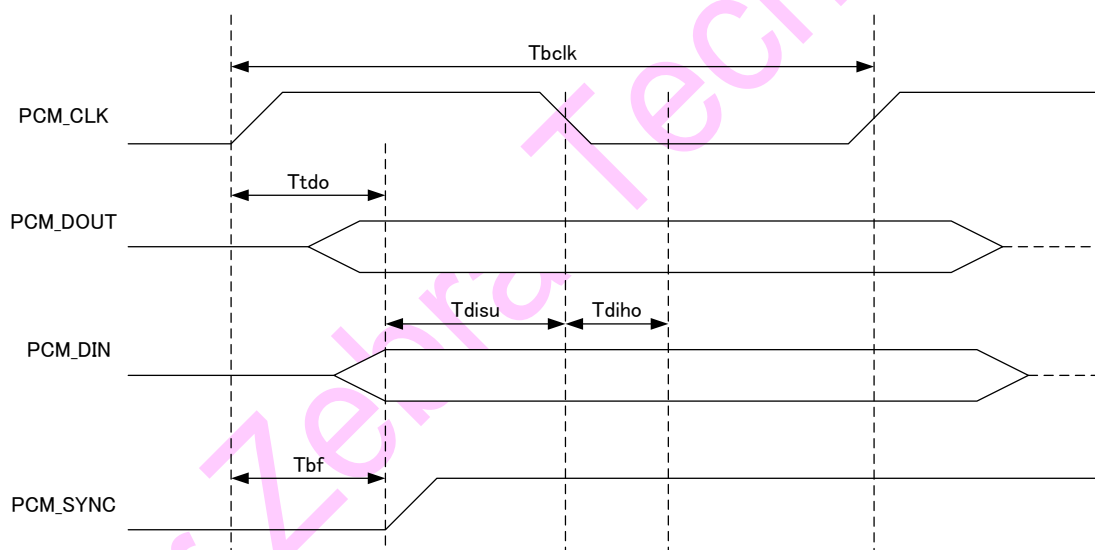
## AC Specifications

### PCM Interface

The Specification applies for Topr.= 25 degrees C, Supply voltage=Typical voltage.

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	PCM_CLK Frequency		Tbclk	-	2 / 2.048	-	MHz	
2	Delay time from PCM_CLK High to valid PCM_OUT		Ttdo	-	-	15	ns	
4	Setup time for PCM_IN valid to PCM_CLK Low		Tdisu	20	-	-	ns	
5	Hold time for PCM_CLK Low to PCM_IN valid		Tdiho	15	-	-	ns	
6	Delay time from PCM_CLK High to PCM_SYNC High		Tbf	-	-	15	ns	

### Master Mode



# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-AE-A191094	(7/8)	Control name Electrical characteristics
------------------------------	-------	--

## 2.4GHz Band RF Specifications

The Specification applies for Topr.= 25 degrees C, Supply voltage=Typical voltage

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	TX Power	11Mbps, 11b	Po2-1		17		dBm	
		54Mbps, 11g	Po2-2		15			
		MCS7, 20MHz BW, 11n	Po2-3		14			
		MCS15, 20MHz BW, 11n	Po2-4		11 (per chain)			
		MCS7, 40MHz BW, 11n	Po2-5		13			
		MCS15, 40MHz BW, 11n	Po2-6		10 (per chain)			
2	Rx sensitivity	11Mbps, 11b	SEN2-1		TBD		dBm	
		54Mbps, 11g	SEN2-2		TBD			
		MCS7, 20MHz BW, 11n	SEN2-3		TBD			
		MCS7, 40MHz BW, 11n	SEN2-4		TBD			

## 5GHz Band RF Specifications

The Specification applies for Topr.= 25 degrees C, Supply voltage=Typical voltage

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	TX Power	54Mbps, 11a	Po5-1		14		dBm	
		MCS7, 20MHz BW, 11n	Po5-2		13			
		MCS15, 20MHz BW, 11n	Po5-3		10 (per chain)			
		MCS7,40MHz BW, 11n	Po5-4		12			
		MCS15, 40MHz BW, 11n	Po5-5		9 (per chain)			
		MCS9, 80MHz BW, 11ac NSS=1	Po5-6		9			
		MCS9, 80MHz BW, 11ac NSS=2	Po5-7		6 (per chain)			
		MCS11, 80MHz BW, 11ax NSS=1	Po5-8		5			
		MCS11, 80MHz BW, 11ax NSS=2	Po5-9		2 (per chain)			
2	Rx sensitivity	54Mbps, OFDM	SEN5-1		TBD		dBm	
		MCS7,20MHz BW, OFDM	SEN5-2		TBD			
		MCS7,40MHz BW, OFDM	SEN5-3		TBD			
		MCS9,80MHz BW, OFDM	SEN5-4		TBD			
		MCS11, 80MHz BW	SEN5-5		TBD			

# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-AE-A191094	(8/8)	Control name Electrical characteristics
------------------------------	-------	--

## RF Specifications (Bluetooth®)

The Specification applies for Topr.= 25 degrees C, Supply voltage =Typical voltage.

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	Tx Power	BDR 1DH5	Pob-1		10		dBm	Class1
		EDR 2DH5 / 3DH5	Pob-2		5			
		LE1M	Pob-3		10			
2	Sensitivity	Basic	SENB		TBD	-70	dBm	

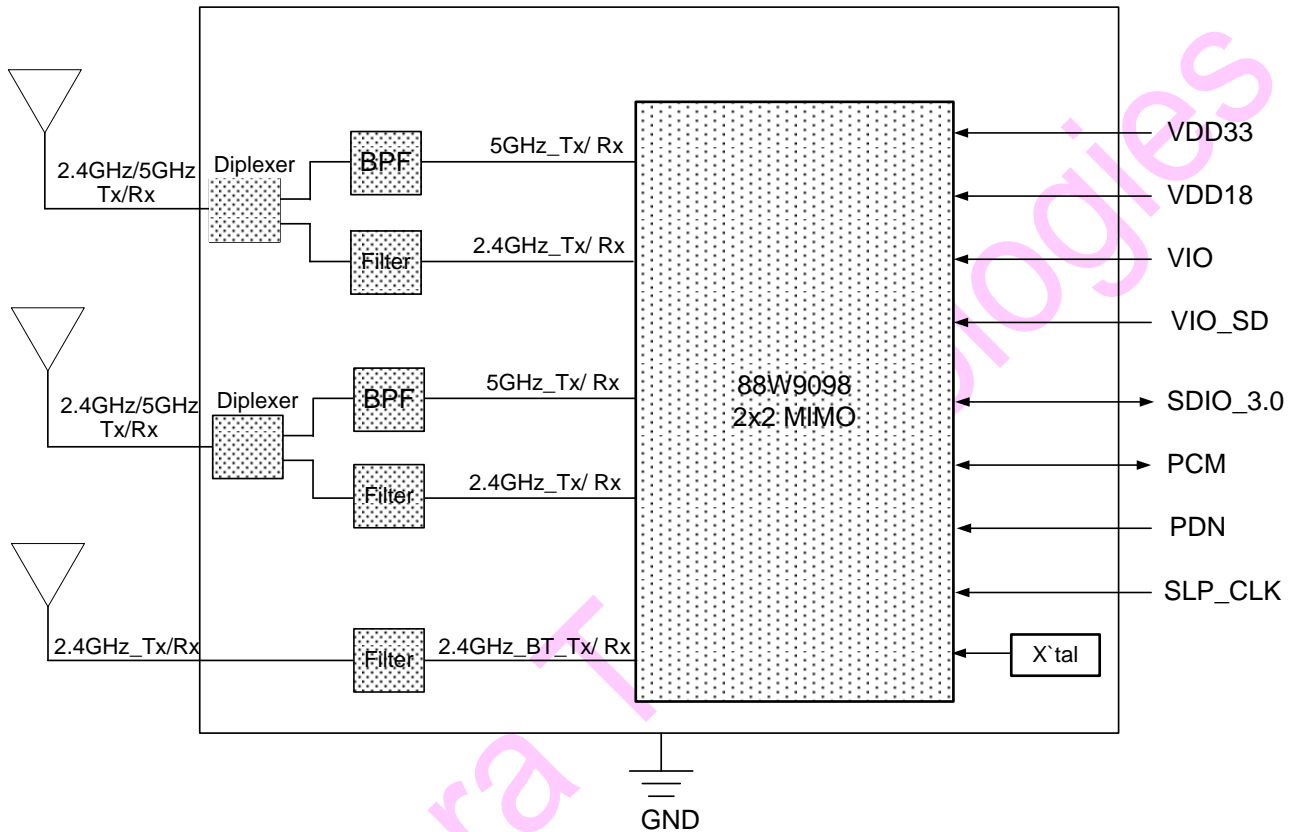
For Zebra Technologies

# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-MC-A191094	(1/1)	Control name Circuit Schematic
------------------------------	-------	-----------------------------------

## Block Diagram





# WYSBHVDXP : 11ax (2x2) +BT5.0

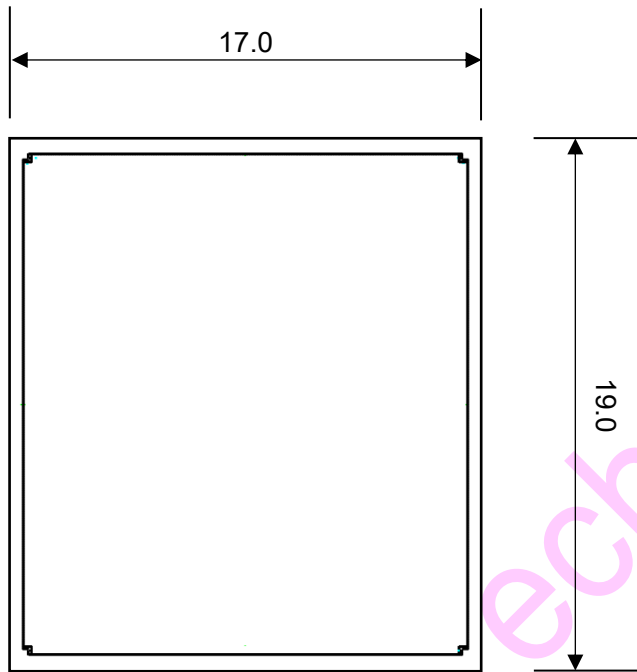
5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-AD-A191094	(1/4)	Control name Outline/Appearance
------------------------------	-------	------------------------------------

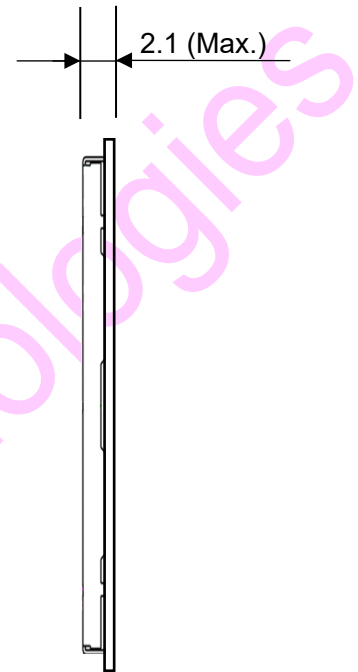
## OUTLINE

Unit: mm, Tolerances unless otherwise specified: ±0.2mm

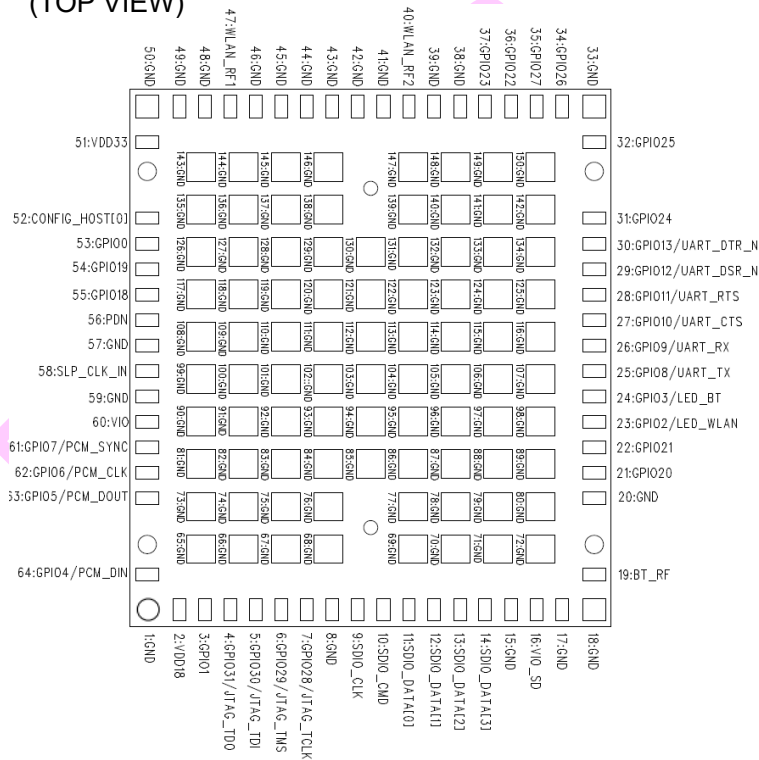
(TOP VIEW)



(SIDE VIEW)



(TOP VIEW)



# WYSBHVDXP : 11ax (2x2) +BT5.0

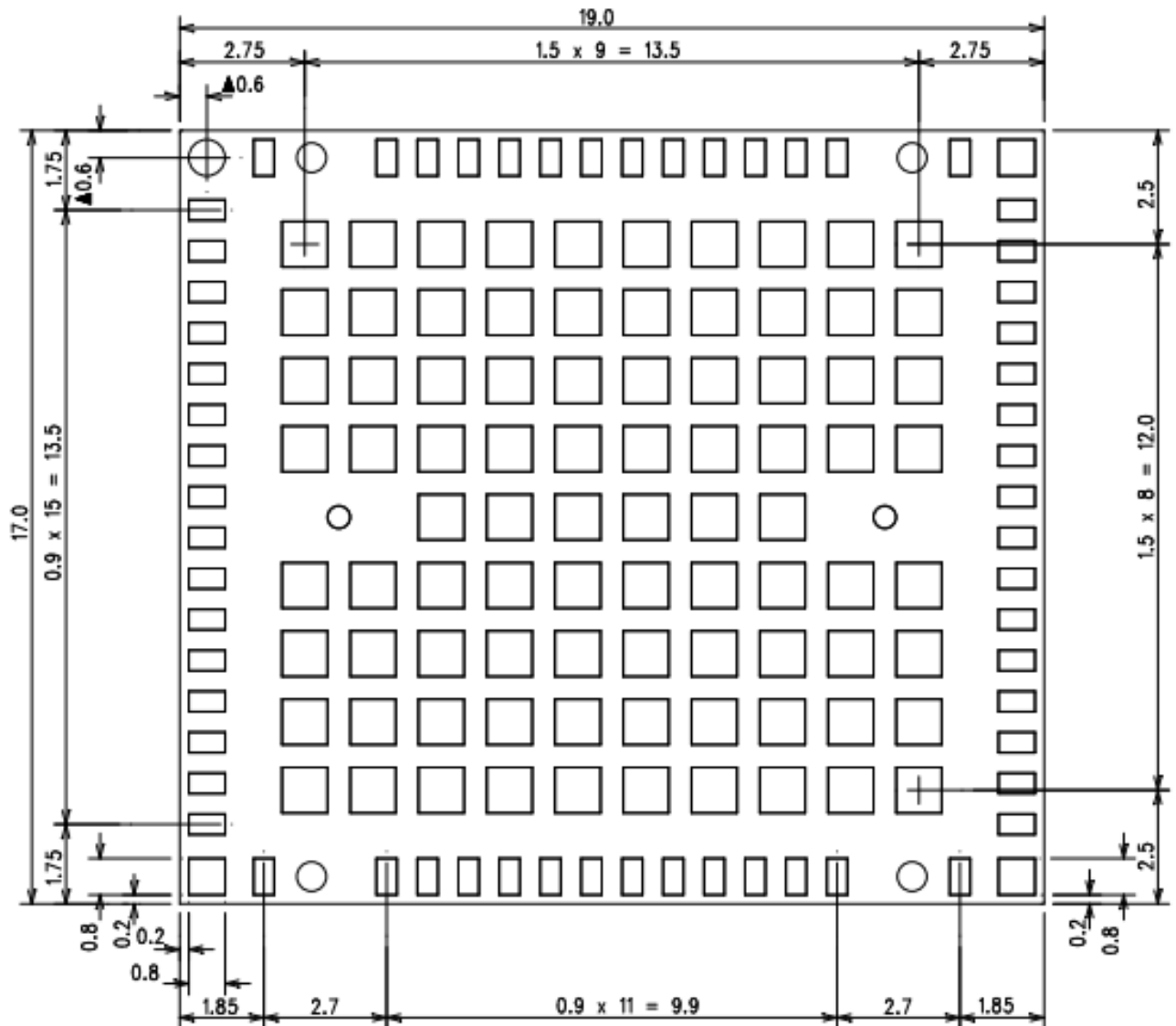
5<sup>th</sup>-Jun.2020 Ver.0.5  
 TAIYO YUDEN CO., LTD.

Control No. HD-AD-A191094	(2/4)	Control name Outline/Appearance
------------------------------	-------	------------------------------------

## Module Pad Dimension

Unit: mm

(TOP VIEW)



- Signal pad (60): ▲0.45 x ▲0.8
- Corner pad (3) : ▲□0.8
- Corner pad (1) : ▲φ 0.8
- Center pad (86): ▲□1.0

# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-AD-A191094	(3/4)	Control name Outline/Appearance
------------------------------	-------	------------------------------------

## Recommended Land Pattern Dimension

Pad sizes on the motherboard should be the same size as the module pad sizes.

## Recommended Metal Mask (Solder Mask) Conditions

Mask size see below. Thickness of the Metal Mask should be in the range of 0.1 mm

(TOP VIEW) Unit: mm

TBD

For Zebra Technologies

# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-AD-A191094	(4/4)	Control name Outline/Appearance
------------------------------	-------	------------------------------------

Marking Information

**TBD**



- 1) MODEL : WYSBHVDXP
- 2) Product Lot number : Four digits (Refer to 「Instruction for lot number」)
- 3) Manufacture : TAIYO YUDEN CO., LTD.

TAIYO YUDEN CO., LTD.

# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-BA-191094	(1/3)	Control name Pin Layout
-----------------------------	-------	----------------------------

## Pin Descriptions

Terminal No.	Terminal Name	I/O	Pwr Domain	Description	Function	Internal PU
1	GND	-	GND	Ground	PWR	-
2	VDD18	I	VDD18	1.8V analog and Buck Power Supply	PWR	-
3	GPIO1	I/O	VIO	GPIO[1]	CTRL	Enable
4	GPIO31	I/O	VIO	GPIO[31]	CTRL	Enable
5	GPIO30	I/O	VIO	GPIO[30]	CTRL	Enable
6	GPIO29	I/O	VIO	GPIO[29]	CTRL	-
7	GPIO28	I/O	VIO	GPIO[28]	CTRL	Enable
8	GND	-	GND	Ground	PWR	-
9	SDIO_CLK	I	VIO_SD	SDIO Clock	SDIO	Enable
10	SDIO_CMD	I/O	VIO_SD	SDIO Command/ Response	SDIO	Enable
11	SDIO_DATA[0]	I/O	VIO_SD	SDIO Data line Bit[0]	SDIO	Enable
12	SDIO_DATA[1]	I/O	VIO_SD	SDIO Data line Bit[1]	SDIO	Enable
13	SDIO_DATA[2]	I/O	VIO_SD	SDIO Data line Bit[2]	SDIO	Enable
14	SDIO_DATA[3]	I/O	VIO_SD	SDIO Data line Bit[3]	SDIO	Enable
15	GND	-	GND	Ground	PWR	-
16	VIO_SD	I	VIO_SD	Digital SDIO Power Supply	PWR	-
17	GND	-	GND	Ground	PWR	-
18	GND	-	GND	Ground	PWR	-
19	BT_RF	I/O	VDD18	2.4GHz for Bluetooth	RF	-
20	GND	-	GND	Ground	PWR	-
21	GPIO20	I/O	VIO	GPIO[20]	CTRL	Enable
22	GPIO21	I/O	VIO	GPIO[21]	CTRL	Enable
23	GPIO2	I/O	VIO	GPIO[2]	CTRL	Enable
24	GPIO3	I/O	VIO	GPIO[3]	CTRL	Enable
25	GPIO8	I/O	VIO	GPIO[8]	CTRL	Enable
26	GPIO9	I/O	VIO	GPIO[9]	CTRL	Enable
27	GPIO10	I/O	VIO	GPIO[10]	CTRL	Enable
28	GPIO11	I/O	VIO	GPIO[11]	CTRL	Enable
29	GPIO12	I/O	VIO	GPIO[12]	CTRL	Enable
30	GPIO13	I/O	VIO	GPIO[13]	CTRL	Enable
31	GPIO24	I/O	VIO	GPIO[24]	CTRL	Enable
32	GPIO25	I/O	VIO	GPIO[25]	CTRL	Enable
33	GND	-	GND	Ground	PWR	-
34	GPIO26	I/O	VIO	GPIO[26]	CTRL	Enable
35	GPIO27	I/O	VIO	GPIO[27]	CTRL	Enable
36	GPIO22	I/O	VIO	GPIO[22]	CTRL	Enable

# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-BA-A191094	(2/3)	Control name Pin Layout
------------------------------	-------	----------------------------

Terminal No.	Terminal Name	I/O	Pwr Domain	Description	Function	Internal PU
37	GPIO23	I/O	VIO	GPIO[23]	CTRL	Enable
38	GND	-	GND	Ground	PWR	-
39	GND	-	GND	Ground	PWR	-
40	WLAN_RF2	I/O	VDD18	2.4/ 5GHz RF for Wi-Fi	RF	-
41	GND	-	GND	Ground	PWR	-
42	GND	-	GND	Ground	PWR	-
43	GND	-	GND	Ground	PWR	-
44	GND	-	GND	Ground	PWR	-
45	GND	-	GND	Ground	PWR	-
46	GND	-	GND	Ground	PWR	-
47	WLAN_RF1	I/O	VDD18	2.4/ 5GHz RF for Wi-Fi	RF	-
48	GND	-	GND	Ground	PWR	-
49	GND	-	GND	Ground	PWR	-
50	GND	-	GND	Ground	PWR	-
51	VDD33	I	VDD33	3.3V analog and RF Power Supply	PWR	-
52	CONFIG_HOST[0]	I	VDD18	Configuration pin. See Table1	CTRL	Enable
53	GPIO0	I/O	VIO	GPIO[0]	CTRL	Enable
54	GPIO19	I/O	VIO	GPIO[19]	CTRL	Enable
55	GPIO18	I/O	VIO	GPIO[18]	CTRL	-
56	PDN	O	VDD18	Power Down (0: Full Power Down, 1: Normal Operation)	CTRL	-
57	GND	-	GND	Ground	PWR	-
58	SLP_CLK	I	VIO	32.768kHz sleep clock input. Used for lower power operation in sleep mode.	CLOCK	Enable
59	GND	-	GND	Ground	PWR	-
60	VIO	I	VIO	Digital I/O Power Supply	PWR	-
61	GPIO7/PCM_SYNC	I/O	VIO	GPIO[7]/ PCM_SYNC	CTRL	Enable
62	GPIO6/PCM_CLK	I/O	VIO	GPIO[6]/ PCM_CLK	CTRL	Enable
63	GPIO5/PCM_DOUT	I/O	VIO	GPIO[5]/ PCM_DOUT	CTRL	Enable
64	GPIO4_PCM_DIN	I/O	VIO	GPIO[4]/ PCM_DIN	CTRL	Enable
65 to 150	GND	-	GND	Ground	PWR	-

# WYSBHVDXP : 11ax (2x2) +BT5.0

5<sup>th</sup>-Jun.2020 Ver.0.5  
TAIYO YUDEN CO., LTD.

Control No. HD-BA-A191094	(3/3)	Control name Pin Layout
------------------------------	-------	----------------------------

Table-1 HOST Interface / FW down load select

CON[0]	WLAN	BT/BLE
0	SDIO	UART
1	SDIO	SDIO

Note)

For Zebra Technologies

Control No. HQ-BA-537  (1/3)	Control name Handling Precaution  <b>取扱注意要領</b>	APPROVED	CHECKED	DRAWN	PREPARED
		24.Oct.2016 <i>S. Niwakuri</i>	21.Oct.2016 <i>H. Okado</i>		21.Oct.2016 <i>M. Aoki</i>

This specification describes desire and conditions especially for mounting.

本書類では特に実装時の 御願ひ・条件 について記載します。

Desire/Conditions

御願ひ・条件

(1) Environment conditions for use and storage

使用・保管環境の管理

1. Store the components in an environment of < **40°C/90%RH** if they are in a moisture barrier bag packed by TAIYO YUDEN.

弊社出荷時の防湿梱包状態で保管する場合、**40°C/90%RH** 以下の環境で保管してください。

2. Keep the factory ambient conditions at < **30°C/60%RH**.

工程の環境は **30°C/60%RH** 以下に管理してください。

3. Store the components in an environment of < **25±5°C/10%RH** after the bag is opened.

(The condition is also applied to a stay in the manufacture process).

モジュールを開梱状態で保管する(工程間の滞留含む)場合、**25±5°C/10%RH** 以下の環境で保管してください。

(2) Conditions for handling of products

製品取扱時の御願ひ・条件

Make sure all of the moisture barrier bags have no holes, cracks or damages at receiving. If an abnormality is found on the bag, its moisture level must be checked in accordance with 2 in (2).

防湿梱包品入庫後、防湿袋に穴、裂け、キズ等のない事を確認してください。万が一異常があった場合、(2)-2項に従い、処置をお願い致します。

Refer to the label on the bag.

梱包に貼付のラベルをご参照ください。

1. All of the surface mounting process (reflow process) must be completed **in 12 months** from the bag sea date.

梱包日から**12ヶ月以内**に**全ての**実装(リフロー)作業(リワーク含む)を終了してください。

2. Make sure humidity in the bag is less than **10%RH** immediately after open, using a humidity indicator card sealed with the components.

防湿梱包開梱後、直ちに湿度インジケータにて梱包内の環境が**<10%RH** であることを確認してください。



Control No. HQ-BA-537  (2/3)	Control name Handling Precaution  <b>取扱注意要領</b>	APPROVED	CHECKED	DRAWN	PREPARED
		24.Oct.2016 <i>S.Niikuni</i>	21.Oct.2016 <i>H.Okada</i>	/	21.Oct.2016 <i>M.Aoki</i>

3. **All** of the surface mounting process (reflow process including rework process) must be completed in **168 hours** after the bag is opened (inclusive of any other processes).

開封後**168時間以内**に**全て**の実装作業(リワーク含むリフロー作業)を終了してください。  
本モジュール以外の実装作業含みませ

4. If any conditions in (1) or condition 2 and 3 in (2) are not met, bake the components in accordance with the conditions at **125°C 24h**

(1)項、及び(2)-2・(2)-3の基準からはずれた場合、**125°C 24h**にてベーキングを行ってください。

5. As a rule, baking the components in accordance with conditions 4 in (2) shall be once.

(2)-4 項記載の条件によるベーキングは 1 回を原則とします。

6. Since semi-conductors are inside of the components, they must be free from static electricity while handled.(<100V) Use ESD protective floor mats, wrist straps, ESD protective footwear, air ionizers etc. , if necessary.

本モジュールは内部に半導体を有するため、取扱中には静電気に留意してください。(100V以下)

必要に応じて、導電マット・アースバンド・静電靴・イオナイザー等を用いて、静電気の対策を講じてください。

7. Please make sure that there are lessen mechanical vibration and shock for this module, and do not drop it.

機械的振動、衝撃を極力少なくし、落下させないでください。

8. Please recognize pads of back side at surface mount.

モジュールを実装する際には、裏面の電極を認識してください。

9. Washing the module is not recommended. If washing cannot be avoided, please test module functionality and performance after thoroughly drying the module. We cannot be held responsible for any failure due washing the module.

本製品の洗浄は推奨しません。洗浄を行う場合は、洗浄、乾燥後に本製品機能を十分に確認してからご使用ください。尚、本製品への洗浄における不具合に関しましては、当社は一切の責任を負いません。

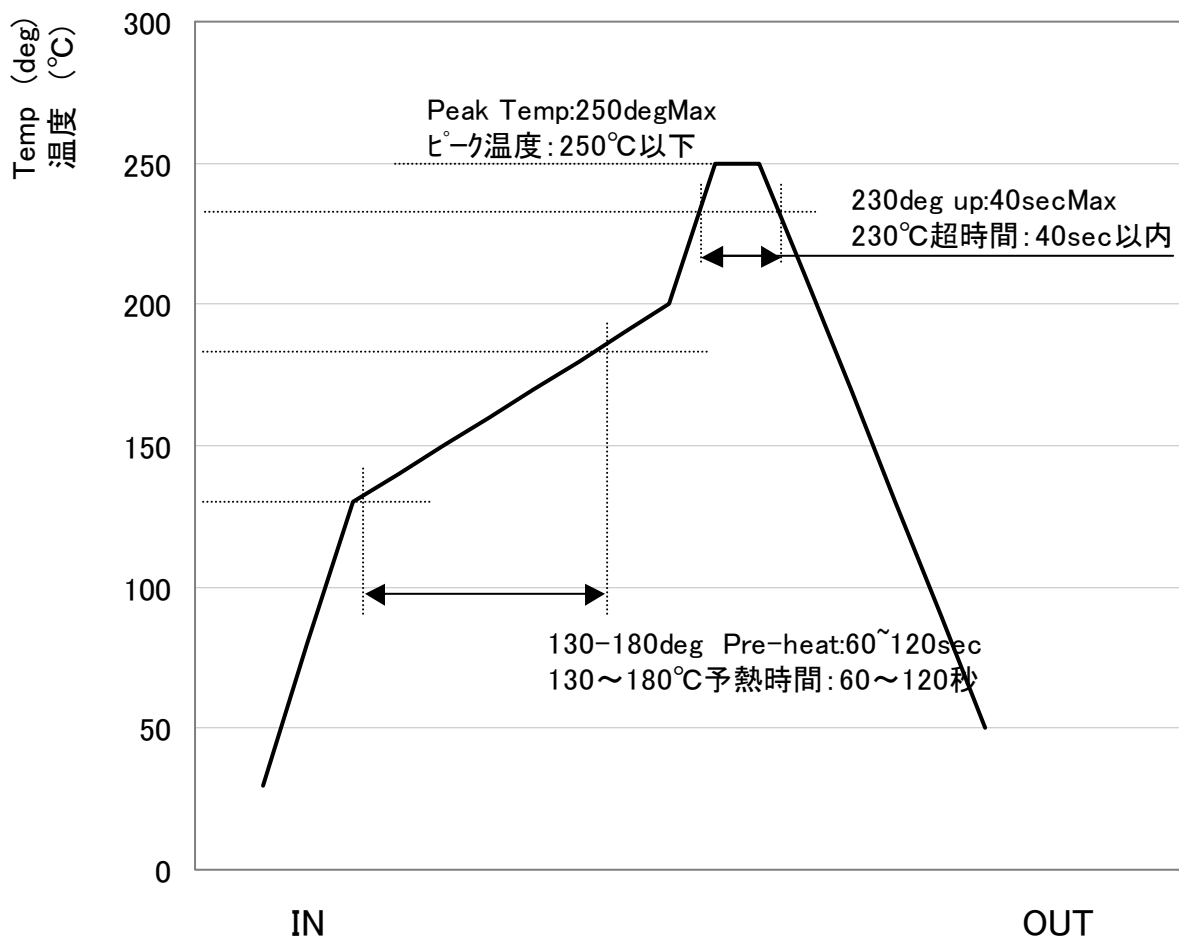
Control No. HQ-BA-537  (3/3)	Control name Handling Precaution  取扱注意要領	APPROVED	CHECKED	DRAWN	PREPARED
		24.Oct.2016 S.Niikuni	21.Oct.2016 H.Okada		21.Oct.2016 M.Abe

10. Please perform temperature conditions of module at reflow within the limits of the following.

モジュールのリフロー時温度条件は、下記の範囲内で行って下さい。

Please give the number of times of reflow as a maximum of 2 times.

リフロー回数は最大2回として下さい。



## その他、注意事項について (Precautions)

- 弊社製品のご使用に際しては、使用する機器に実装された状態および実際の使用環境での評価および確認を必ず行ってください。
- 当仕様書に記載の製品は、一般的な電子機器【AV 機器、OA 機器、家電製品、事務機器、情報・通信機器（携帯電話、パソコンなど）】で使用されることを意図されています。したがって、生命または身体に直接危害を及ぼす可能性のある機器【輸送用機器（自動車駆動制御装置、列車制御装置、船舶制御装置など）、交通用信号機器、防災機器、医療機器（国際分類クラスⅠ、Ⅱ、Ⅲ）、公共性の高い情報通信機器（電話交換機、電話・無線・放送などの基地局）】などへのご使用をご検討の場合は、必ず事前に弊社までお問い合わせをお願いします。

また、高度の安全性や信頼性が求められる機器【宇宙用機器、航空用機器、医療機器（国際分類クラスⅣ）、原子力用制御機器、海底用機器、軍事用機器など】につきましては、弊社製品をご使用されないようお願いします。

なお、一般的な電子機器においても安全性や信頼性の要求が高い機器、回路などに弊社製品をご使用になる場合には、十分な安全性評価を実施され、必要に応じて設計時に保護回路などを追加していただくことをお勧めします。

弊社の書面による事前の承諾を得ることなく、前述の弊社への問い合わせが必要な機器または弊社が使用を禁止する機器に当仕様書に記載の製品を使用したことによりお客様または第三者に生じた損害に関して、弊社は一切の責任を負いかねますのでご了承ください。
- 当仕様書に記載の情報は、製品の代表的動作・応用を説明するためのものであり、その使用に際して弊社および第三者の知的財産権その他の権利に対する保証または実施権の許諾を行うものではありません。
- 弊社製品の保証範囲につきましては、納入された弊社製品単体の保証に限られ、弊社製品の故障や瑕疵から誘発される損害に関して、弊社は一切の責任を負いかねますのでご了承ください。ただし、取引基本契約書、品質保証協定書など別途書面による契約が締結されている場合は、その内容にしたがって保証させていただきます。
- 当仕様書に記載内容につきましては、弊社の営業所・販売子会社・販売代理店（いわゆる「正規販売チャンネル」）からご購入いただいた弊社製品に適用します。上記以外からご購入いただいた弊社製品に関しては適用対象外とさせていただきますのでご了承ください。
- 輸出注意事項  
当仕様書に記載の製品の一部には、輸出の際に「外国為替及び外国貿易法」並びに米国の輸出管理関連法規などの規制をご確認の上、必要な手続きをお取りいただく必要のある製品があります。ご不明な場合には弊社までお問い合わせください。
- Please conduct validation and verification of our products in actual condition of mounting and operating environment before using our products.
- The products listed in this specification are intended for use in general electronic equipment (e.g., AV equipment, OA equipment, home electric appliances, office equipment, information and communication equipment including, without limitation, mobile phone, and PC). Please be sure to contact TAIYO YUDEN for further information before using the products for any equipment which may directly cause loss of human life or bodily injury (e.g., transportation equipment including, without limitation, automotive powertrain control system, train control system, and ship control system, traffic signal equipment, disaster prevention equipment, medical equipment classified as Class I, II or III by IMDRF, highly public information network equipment including, without limitation, telephone exchange, and base station).  
Please do not incorporate our products into any equipment requiring high levels of safety and/or reliability (e.g., aerospace equipment, aviation equipment, medical equipment classified as Class IV by IMDRF, nuclear control equipment, undersea equipment, military equipment).  
When our products are used even for high safety and/or reliability-required devices or circuits of general electronic equipment, it is strongly recommended to perform a thorough safety evaluation prior to use of our products and to install a protection circuit as necessary.  
Please note that unless you obtain prior written consent of TAIYO YUDEN, TAIYO YUDEN shall not be in any way responsible for any damages incurred by you or third parties arising from use of the products listed in this specification for any equipment requiring inquiry to TAIYO YUDEN or prohibited for use by TAIYO YUDEN as described above.
- Information contained in this specification is intended to convey examples of typical performances and/or applications of our products and is not intended to make any warranty with respect to the intellectual property rights or any other related rights of TAIYO YUDEN or any third parties nor grant any license under such rights.
- Please note that the scope of warranty for our products is limited to the delivered our products themselves and TAIYO YUDEN shall not be in any way responsible for any damages resulting from a fault or defect in our products. Notwithstanding the foregoing, if there is a written agreement (e.g., supply and purchase agreement, quality assurance agreement) signed by TAIYO YUDEN and your company, TAIYO YUDEN will warrant our products in accordance with such agreement.

## HQ-BK-002\_02

- The contents of this specification are applicable to our products which are purchased from our sales offices or authorized distributors (hereinafter "TAIYO YUDEN's official sales channel"). Please note that the contents of this specification are not applicable to our products purchased from any seller other than TAIYO YUDEN's official sales channel.
- Caution for Export  
Some of our products listed in this specification may require specific procedures for export according to "U.S. Export Administration Regulations", "Foreign Exchange and Foreign Trade Control Law" of Japan, and other applicable regulations. Should you have any questions on this matter, please contact our sales staff.