

**Software Embedded WLAN Module  
IEEE802.11b/g/n**

**WYSACVLXY-XX**

Data Sheet

# WYSACVLXY-XX

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***ATTENTION: This module has an API (Application Programming Interface) Specification that is under Japan export control. Depending on the customer's country and application (e.g. weapons), Taiyo Yuden may not be able to provide the API Specification 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).***

**WYSACVLXY-XX****Document constituent list**

Control name	Control No.	Document Page
General Items	HD-AG-A150096	1/2 - 2/2
Absolute maximum ratings	HD-AM-A150096	1/1
Electrical characteristics	HD-AE-A150096	1/4 - 4/4
Circuit schematic	HD-MC-A150096	1/2 - 2/2
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Pin Layout	HD-BA-A150096	1/3 - 3/3
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## Rev. record

19-Jan.-2016> Ver.0.1 Release tentative version

19-Feb.-2016>Ver.0.2

Revised Electrical characteristics – Revised power consumption

Revised Outline/Appearance – Added indications of shield case

18-Mar.-2016>Ver.0.21

Revised description of cover page

24-Mar.-2016>Ver.0.9 Official release Candidate

Revised description of cover page

31-Mar.2016>Ver.1.0 Official release

**WYSACVLXY-XX**

TAIYO YUDEN CO., LTD.

Control No. HD-AG-A150096	(1/2)	Control name General Items
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## Scope

This specification ("Specification") applies to the hybrid IC for use **Wireless LAN** module ("Product") manufacture by TAIYO YUDEN Co., Ltd. ("TAIYO YUDEN")

1. Part Number: WYSACVLXY-XX
2. Function: Radio frequency transfer Module. (**IEEE802.11b/g/n** standard conformity)
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 (2011/65/EU).
4. Outline: 44-pin leadless chip carrier
5. Marking: Japan ID, IC ID, FCC ID, Manufacture, Model, Lot number, Part number
6. Features:
  - IEEE802.11b/g/n** standard conformity
  - Transmit speed: WLAN11n (72.2/65/58.5/57.8/52/43.3/39/28.9/26/21.7/19.5/14.4/13.0/7.2/6.5),  
WLAN11g (54/48/36/24/18/12/9/6Mbps), WLAN11b (11/5.5/2/1 Mbps),
  - Channel Number: 1 to 11 channel
  - Host interface: UART
  - Built-in WLAN front end, Flash Memory, Xtal, Power circuits
  - Embedded TAIYO YUDEN standard application software
7. Security: WPA-2 using AES/CCMP along with legacy security features
8. Packing:
  - Packaging method: Tray
  - Packaging unit: 84pcs/Tray  
840pcs/Box
9. Notes:
  - a. Any question arising from this Specification shall be solved through mutual discussion by the parties hereof.
  - b. This Product is not designed for radiation durable and should not be used under the circumstance of radiation.
  - c. The operating conditions of this Product are as shown in this Specification. Please note that TAIYO YUDEN shall not be liable for a failure and/or abnormality which is caused by use under the conditions other than the operating conditions hereof.
  - d. This Product mentioned in this Specification is manufactured for use in consumer products. Before using this Product in any special equipment (such as medical equipment, space equipment, air craft, disaster prevention equipment), where higher safety and reliability are duly required, the applicability and suitability of this Product must be fully evaluated by the customer at its sole risk to ensure correct and safety operation of those special equipments. Also, evaluation of the safety function of this Product even for use in general electronics equipment shall be thoroughly made and when necessary, a protective circuit shall be added at design stage, all at the customer's sole risk.

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**WYSACVLXY-XX**

TAIYO YUDEN CO., LTD.

Control No. HD-AG-A150096	(2/2)	Control name General Items
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- e. i) You are requested to fully check and confirm by the start of mass production of this Product that (1) no bug, defect or other failure is included in firmware incorporated in this Product (“Incorporated Software”), (2) no bug defect or other failure is caused by installation of this Product with Incorporated Software into customer’s products, and that Incorporated Software fully meets customer’s intended use, although TAIYO YUDEN sufficiently inspects or verifies quality of Incorporated Software.  
ii) Please note that TAIYO YUDEN is not responsible for any failure arising out of bugs or defects in Incorporated Software.
- f. 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.
- g. 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 products.
- h. In order to take tests for getting the certification of each country’s Radio Law with a device incorporating this module, it is necessary to make the software in Host to put the module into test condition. Please contact TAIYO YUDEN for further details.
- i. This Product operates in the unlicensed ISM band at 2.4GHz. 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.
- j. Please evaluate adequately our module incorporated to your products before mass production.
- k. Part Number Modification Notice  
Part numbers for sample modules or part numbers you see in this Specification are TAIYO YUDEN standard part numbers. When any modification is made to modules to meet requested specifications, the part number will carry a different part number, due to forfeit originality. Additionally, part numbers may be modified based on mass production stage or other related stages. Please contact TAIYO YUDEN to confirm whether your part number needs to be modified.  
Please see the following examples for cases that part numbers are modified:  
- for specific firmware version (our standard item firmware will be upgraded occasionally)  
- for specific MAC address (our standard item MAC address is owned by TAIYO YUDEN )  
- for other relevant cases (specific or different setting, form, sizes, or display etc..)
- m. 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.

TAIYO YUDEN CO., LTD.

**WYSACVLXY-XX**

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Control No. HD-AM-A150096	(1/1)	Control name Absolute maximum ratings
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**Absolute maximum ratings**

Item	Symbol	Rating				Remark
		Min.	Typ.	Max.	Unit	
Supply voltage 1	VIO	-		3.63	V	
Supply voltage 2	VIOH	-		3.63	V	
Supply voltage 3	VIOF	-		3.63	V	
Supply voltage 4	V33	-		3.63	V	
Storage temperature range	Tstg	-40		85	Degrees C	
Operation temperature range	Topr	-30	25	85	Degrees C	

**Recommendation operating range**

Item	Symbol	Rating				Remark
		Min.	Typ.	Max.	Unit	
Supply voltage 1	VIO	3.0	3.3	3.6	V	
Supply voltage 2	VIOH	3.0	3.3	3.6	V	
Supply voltage 3	VIOF	3.0	3.3	3.6	V	
Supply voltage 4	V33	3.0	3.3	3.6	V	

**WYSACVLXY-XX**

TAIYO YUDEN CO., LTD.

Control No. HD-AE-A150096	(1/4)	Control name Electrical characteristics
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**DC Specifications**

Peak Current / Power consumption

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

No.	Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit	Remark
1	Peak Current	V33I	Ip1	-		400	mA	
2	Power consumption3	Burst Tx (72.2Mbps)	Pc3	-	267	-	mW	Duty 4.2%
3	Power consumption4	Continuous Rx (72.2Mbps)	Pc4	-	271	-	mW	
4	Power consumption5	Burst Tx (54Mbps)	Pc5	-	347	-	mW	Duty 25.4%
5	Power consumption6	Continuous Rx (54Mbps)	Pc6	-	267	-	mW	
6	Power consumption7	Burst Tx (11Mbps)	Pc7	-	545	-	mW	Duty 46.8%
7	Power consumption8	Continuous Rx (11Mbps)	Pc8	-	267	-	mW	
8	Power consumption9	WLAN: Deep sleep and MPU: Stand By	Pc9	-	2	-	mW	Note1

Note1: Executed by embedded software's commands which are "WDPS1" followed by "WSBY0".

**Digital Pad Ratings**

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	I <sub>OH</sub> =3mA	VOH	VIO-0.5V	-	-	V	
4	Output low voltage	I <sub>OL</sub> =4mA	VOL	-	-	0.4	V	

# WYSACVLXY-XX

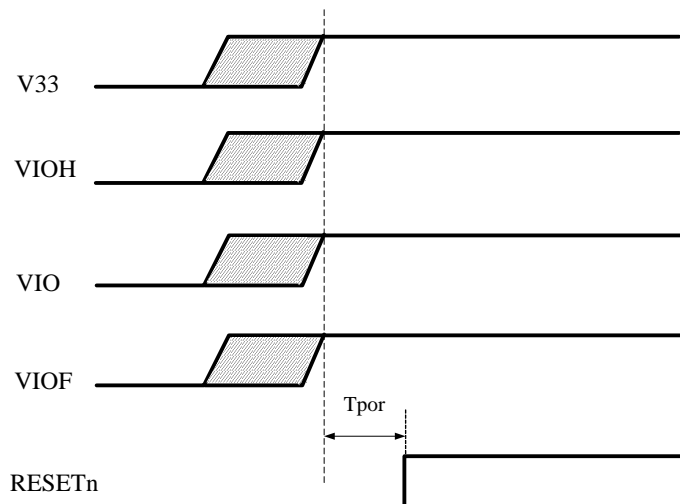
Control No. HD-AE-A150096	(2/4)	Control name Electrical characteristics
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## AC Specifications

Power on sequence

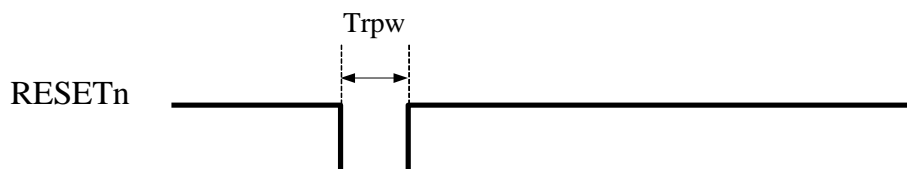
	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	Valid Power to RESETN de-asserted		Tpor	300	-	-	mS	

RESETn must remain asserted for minimum of Tpor after V33 and VIOH, VIO, VIOF are stable.



## RESETn Pulse Width

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Minimum reset pulse width on RESETn pin	-	Trpw	300			ms





**WYSACVLXY-XX**

TAIYO YUDEN CO., LTD.

Control No. HD-AE-A150096	(3/4)	Control name Electrical characteristics
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**RF Specifications (WLAN 11n/72.2Mbps, OFDM)**

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

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	2412		2462	MHz	
2	TX Power		Po		9		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	TX Out of band spurious1	30MHz to 1GHz	TOS1	-		-36	dBm	
8	TX Out of band spurious2	1GHz to 12.75GHz	TOS2	-		-30	dBm	
9	TX Out of band spurious3	1.8GHz to 1.9GHz 5.15GHz to 5.3GHz	TOS3			-47	dBm	
10	Rx sensitivity	PER<10%	SEN	-	-68	-64	dBm	
11	Maximum Input Level	PER<10%	MIL	-20		-	dBm	
12	RX Out of band spurious1	30MHz to 1GHz	ROS1	-		-57	dBm	
13	RX Out of band spurious2	1GHz to 12.75GHz	ROS2	-		-47	dBm	

**RF Specifications (WLAN 11g/54Mbps, OFDM)**

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

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	2412		2462	MHz	
2	TX Power		Po		9		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	TX Out of band spurious1	30MHz to 1GHz	TOS1	-		-36	dBm	
8	TX Out of band spurious2	1GHz to 12.75GHz	TOS2	-		-30	dBm	
9	TX Out of band spurious3	1.8GHz to 1.9GHz 5.15GHz to 5.3GHz	TOS3			-47	dBm	
10	Rx sensitivity	PER<10%	SEN	-	-71	-65	dBm	
11	Maximum Input Level	PER<10%	MIL	-20		-	dBm	
12	RX Out of band spurious1	30MHz to 1GHz	ROS1	-		-57	dBm	
13	RX Out of band spurious2	1GHz to 12.75GHz	ROS2	-		-47	dBm	

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**WYSACVLXY-XX**

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Control No. HD-AE-A150096	(4/4)	Control name Electrical characteristics
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**RF Specifications (WLAN 11b/11Mbps, CCK)**

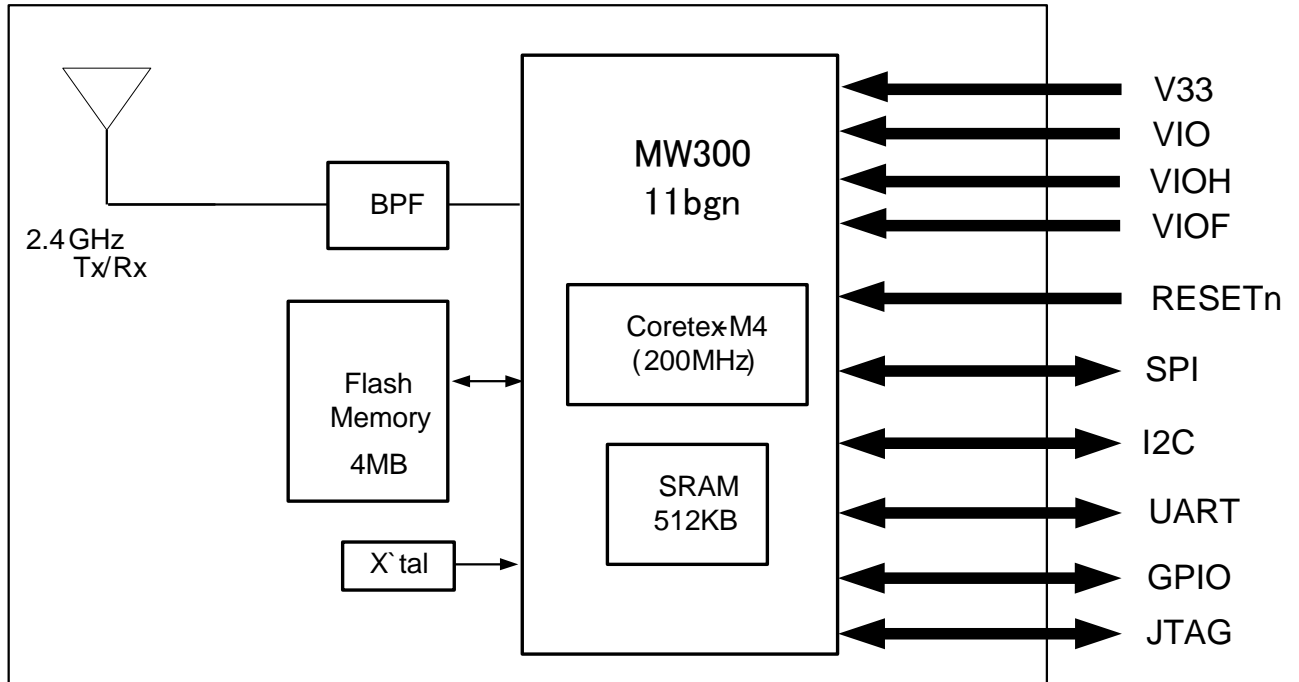
The Specification applies for Ta=25 degrees C, Supply voltage=Typical voltage

No.	Parameter	Condition	Symbol	Min	Typ	Max	Unit	Remark
1	RF frequency range		FREQ	2412		2462	MHz	
2	TX Power		Po		15		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	TX Out of band spurious1	30MHz to 1GHz	TOS1	-		-36	dBm	
8	TX Out of band spurious2	1GHz to 12.75GHz	TOS2	-		-30	dBm	
9	TX Out of band spurious3	1.8GHz to 1.9GHz 5.15GHz to 5.3GHz	TOS3			-47	dBm	
10	Rx sensitivity	PER<8%	SEN		-86	-76	dBm	
11	Maximum Input Level	PER<8%	MIL	-10			dBm	
12	RX Out of band spurious1	30MHz to 1GHz	ROS1	-		-57	dBm	
13	RX Out of band spurious2	1GHz to 12.75GHz	ROS2	-		-47	dBm	

# WYSACVLXY-XX

Control No. HD-MC-A150096	(1/2)	Control name Circuit Schematic
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## Block Diagram

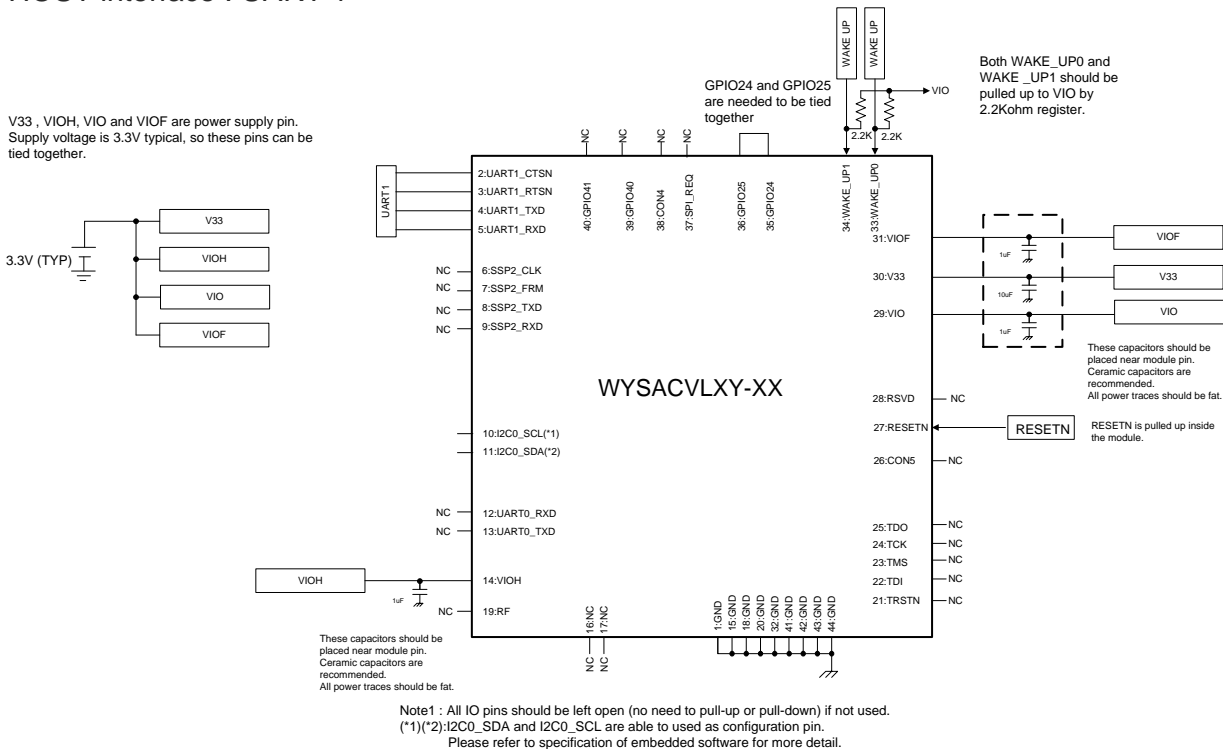


# WYSACVLXY-XX

Control No. HD-MC-A150096	(2/2)	Control name Circuit Schematic
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## Recommended peripheral circuit schematics

### HOST interface : UART 1



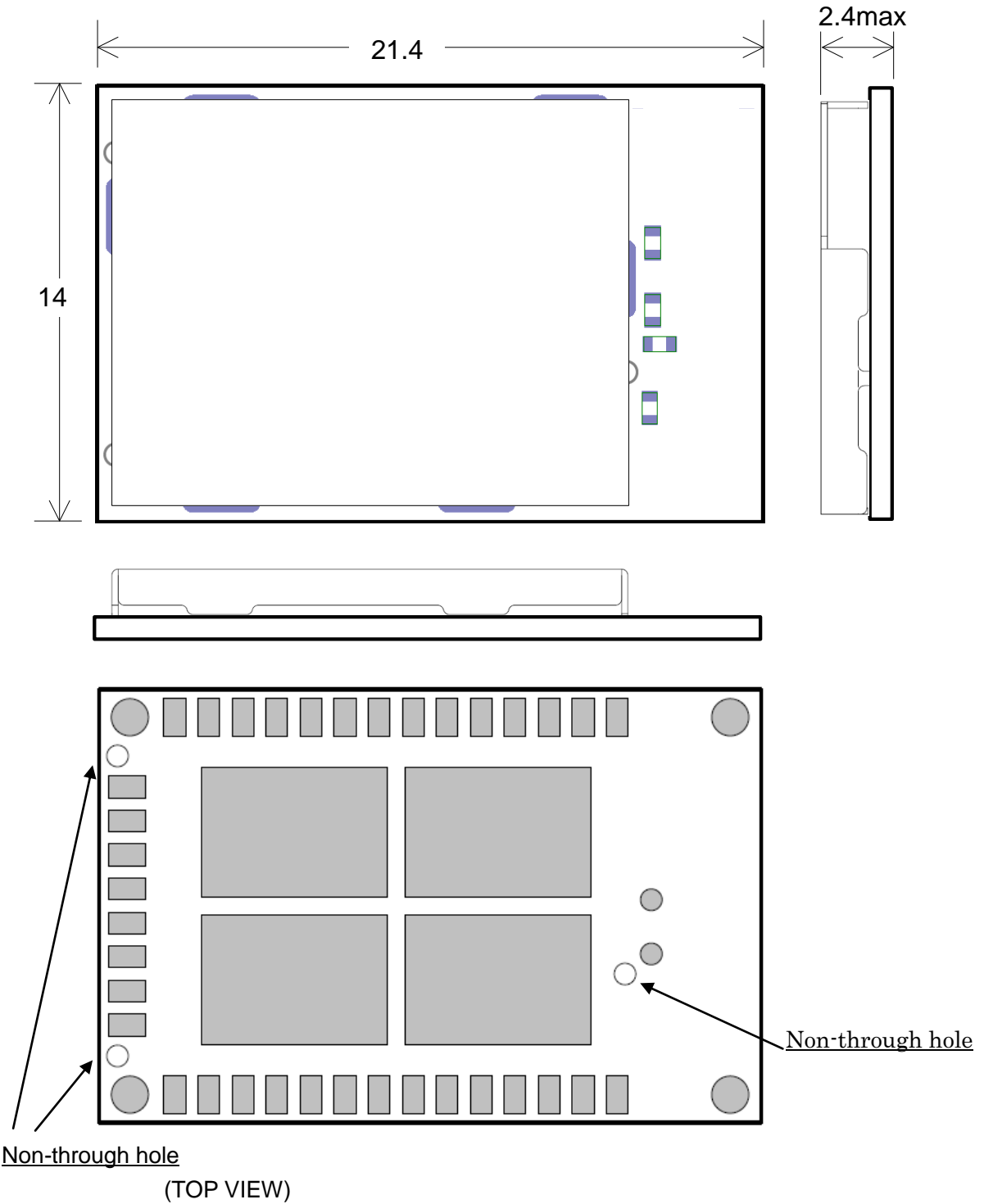
**Preliminary**

# WYSACVLXY-XX

Control No. HD-AD-A150096	(1/5)	Control name Outline/Appearance
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**OUTLINE**

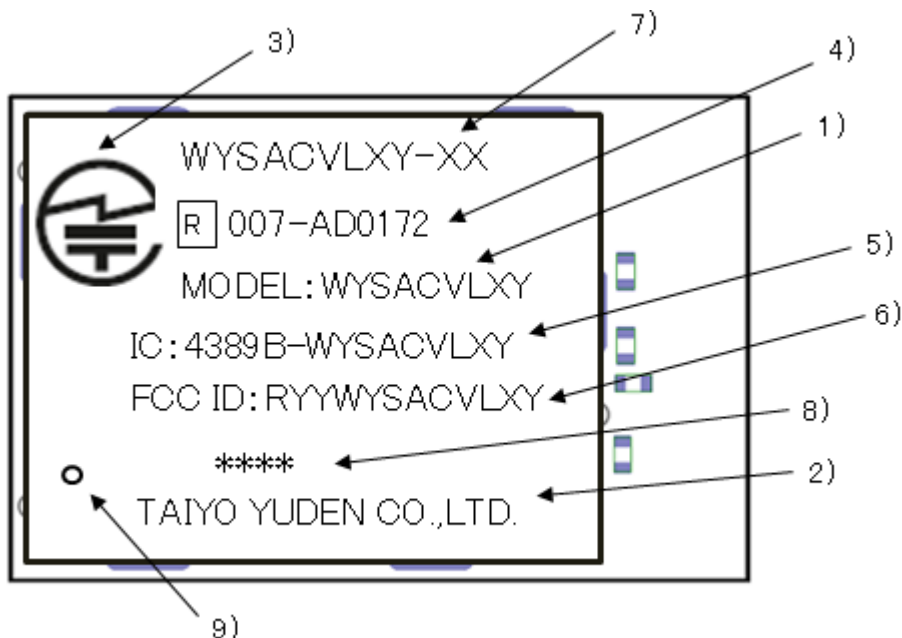
Unit: mm, Tolerances unless otherwise specified:



# WYSACVLXY-XX

Control No. HD-AD- A150096	(2/5)	Control name Outline/Appearance
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Indication of Shield Case



- 1) Model : WYSACVLXY
- 2) Manufacture : TAIYO YUDEN CO.,LTD.
- 3) Japan logo mark : Specified logo mark
- 4) Japan ID : 007-AD0172
- 5) IC ID : 4389B-WYSACVLXY
- 6) FCC ID : RYYWYSACVLXY
- 7) Part Number : WYSACVLXY-XX
- 8) Lot number : Four digits
- 9) 1pin mark : φ0.6mm hole on the shield case

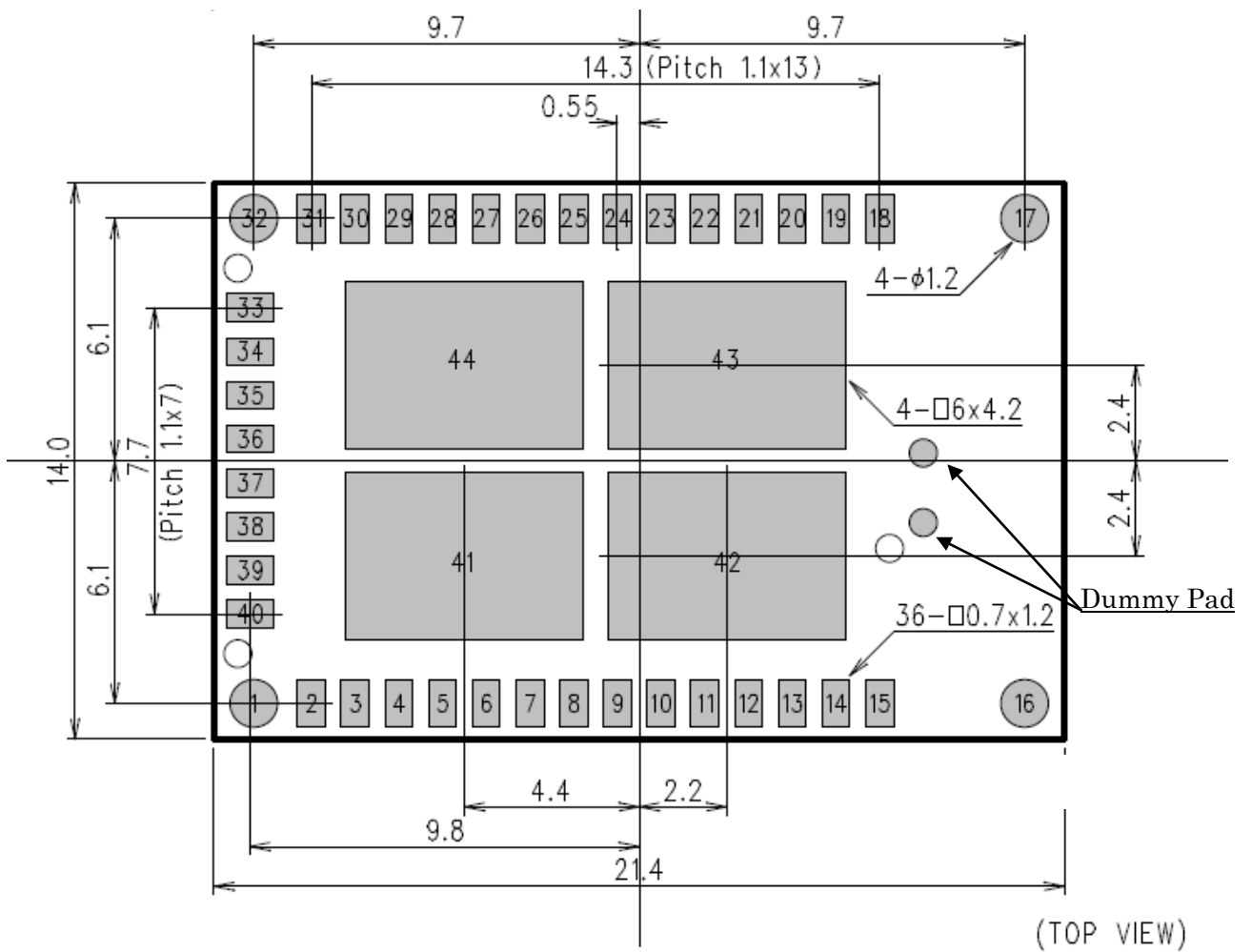
# WYSACVLXY-XX

TAIYO YUDEN CO., LTD.

Control No. HD-AD- A150096	(3/5)	Control name Outline/Appearance
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## Module Pad Dimension

Unit: mm



# WYSACVLXY-XX

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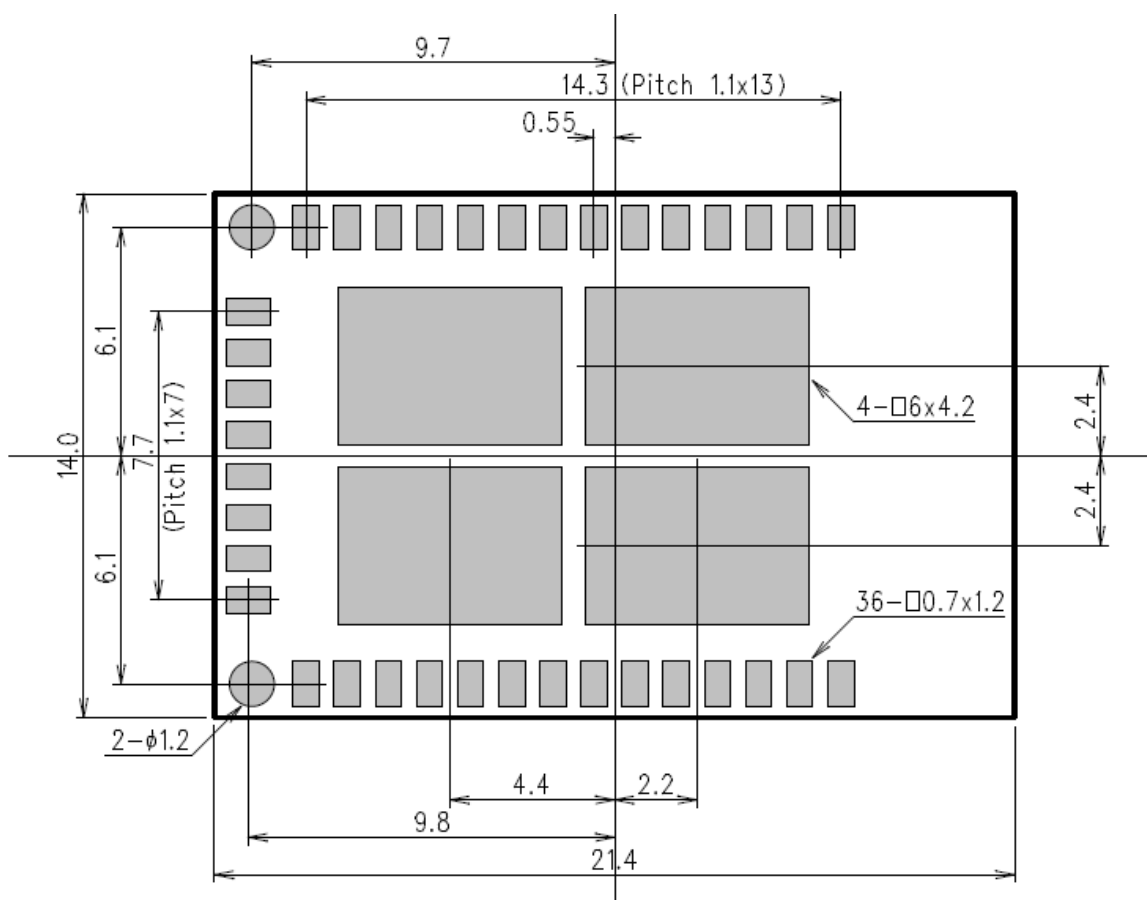
Control No. HD-AD- A150096	(4/5)	Control name Outline/Appearance
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### Recommended Land Pattern Dimension

We recommend that pad sizes on mother board and pad sizes on module should be the same except for Pad-16 and Pad-17. Pad-16 and Pad-17 are not needed to solder on mother board and Land patterns for these pads are not needed.

Unit: mm

(Top View)





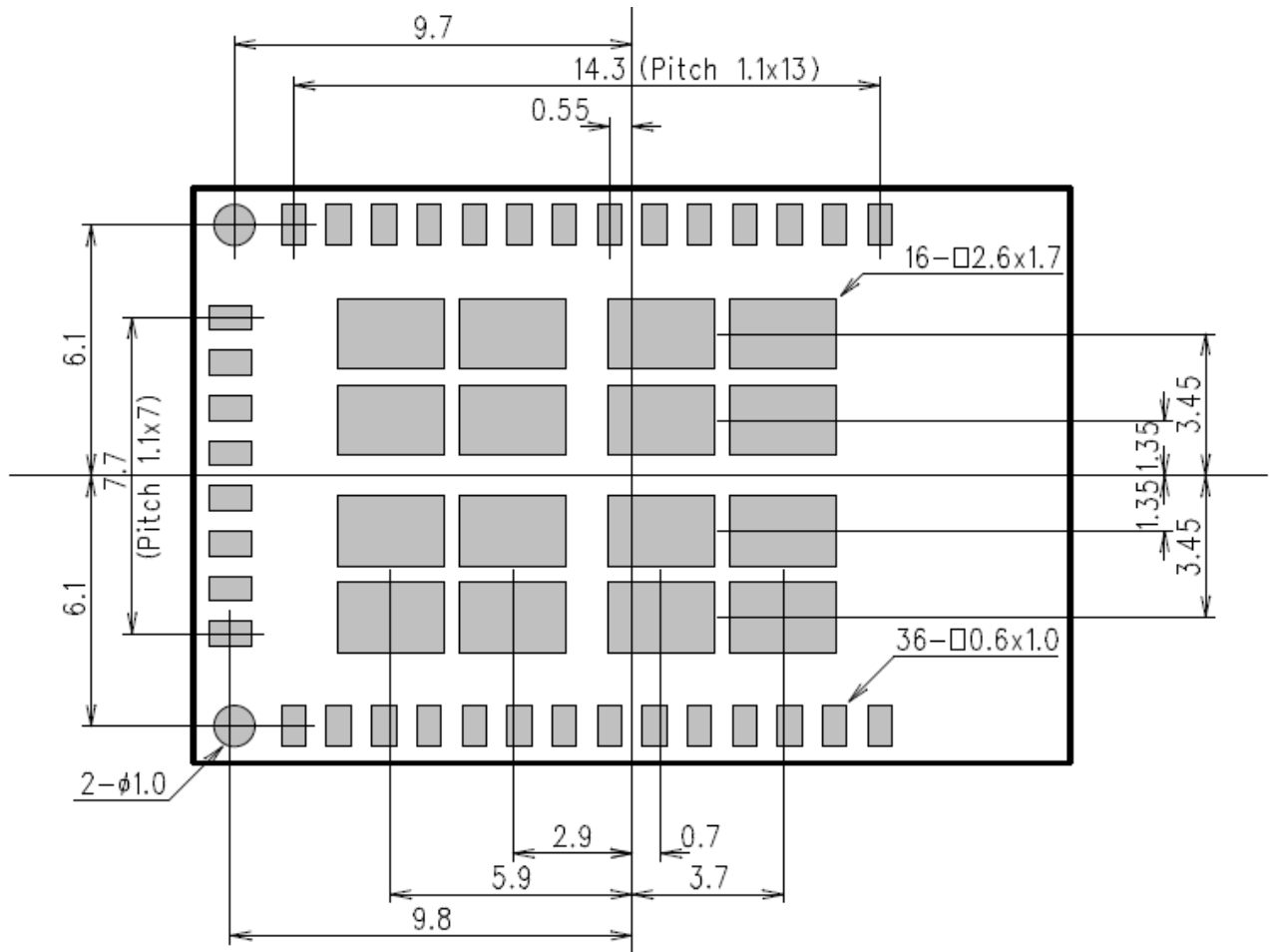
# WYSACVLXY-XX

Control No. HD-AD-A150096	(5/5)	Control name Outline/Appearance
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## Recommended Metal Mask (Solder Mask) Conditions

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

Unit: mm



**WYSACVLXY-XX**

TAIYO YUDEN CO., LTD.

Control No. HD-BA-A150096	(1/3)	Control name Pin Layout
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Pin No	module pin name	type	power domain	Description	88MW300 GPIO No	Note
1	GND	-	Ground	GND	-	
2	UART1_CTSn	I	VIO	UART1 CTSn (L:Clear to send, H:Not clear to send)	GPIO42	
3	UART1_RTSn	O	VIO	UART1 RTSn(L:Request to send, H:Not request to send)	GPIO43	
4	UART1_TXD	O	VIO	UART1 TXD	GPIO44	
5	UART1_RXD	I	VIO	UART1 RXD	GPIO45	
6	SSP2_CLK	I/O	VIO	Synchronous Serial Interface (SPI_CLK)	GPIO46	Not used
7	SSP2_FRM	I/O	VIO	Synchronous Serial Interface (SPI_CSN)	GPIO47	Not used
8	SSP2_TXD	O	VIO	Synchronous Serial Interface (SPI_DO)	GPIO48	Not used
9	SSP2_RXD	I	VIO	Synchronous Serial Interface (SPI_DI)	GPIO49	Not used
10	I2C0_SCL	I/O	VIOH	I2C0 SCL. Pull up to VIOH with 1Kohm register if use this pin as I2C.	GPIO5	Used to select start mode <sup>(*)</sup>
11	I2C0_SDA	I/O	VIOH	I2C0 SDA. Pull up to VIOH with 1Kohm register if use this pin as I2C.	GPIO4	Used to force initialization <sup>(*)</sup>
12	UART0_RXD	I	VIOH	UART0 RXD	GPIO3	Not used
13	UART0_TXD	O	VIOH	UART0 TXD	GPIO2	Not used
14	VIOH	I	VIOH	I/O Digital Power Supply	-	
15	GND	-	Ground	GND	-	
16	N.C	-	-	Dummy pad. No connect and do not solder.	-	
17	N.C	-	-	Dummy pad. No connect and do not solder.	-	
18	GND	-	Ground	GND	-	
19	RF	I/O	-	WLAN RF Interface (2.4 GHz Transmit/Receive) Should be left open and do not trace longer than land pattern.	-	

**WYSACVLXY-XX**

TAIYO YUDEN CO., LTD.

Control No. HD-BA-A150096	(2/3)	Control name Pin Layout
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Pin No	module pin name	type	power domain	Description	88MW300 GPIO No	Note
20	GND	-	Ground	GND	-	
21	TRSTn	I	VIOH	JTAG-TRSTN (Active L)	GPIO10	Not used
22	TDI	I	VIOH	JTAG-TDI	GPIO9	Not used
23	TMS	I	VIOH	JTAG-TMS	GPIO8	Not used
24	TCK	I	VIOH	JTAG-TCK	GPIO7	Not used
25	TDO	O	VIOH	JTAG-TDO	GPIO6	Not used
26	CON5	I/O	VIO	Configuration Pin. Should be left open.	GPIO16	Not used
27	RESETn	I	VIO	RESET signal (Active low)	-	
28	RSVD	-	-	No Connect. Should be left open.	-	
29	VIO	I	VIO	I/O Digital Power Supply	-	
30	V33	I	V33	3.3V Power Supply	-	
31	VIOF	I	VIO_F	I/O Digital Power Supply	-	
32	GND	-	Ground	GND	-	
33	WAKE_UP0	I	VIO	Wakeup-0 signal (Active L). Should be pulled up to VIO with 2.2K ohm register outside the module.	GPIO22	
34	WAKE_UP1	I	VIO	Wakeup-1 signal (Active L). Should be pulled up to VIO with 2.2K ohm register outside the module.	GPIO23	
35	GPIO24	I/O	VIO	GPIO24 and GPIO25 are used to calibrate RC32k inside the module. Tie GPIO24 and GPIO25 outside the module and do not tie other signal.	GPIO24	
36	GPIO25	I/O	VIO	GPIO24 and GPIO25 are used to calibrate RC32k inside the module. Tie GPIO24 and GPIO25 outside the module and do not tie other signal.	GPIO25	
37	SPI_REQ	I/O	VIO	Interrupt for SPI	GPIO26	Not used

**WYSACVLXY-XX**

TAIYO YUDEN CO., LTD.

Control No. HD-BA-A150096 (3/3)	Control name Pin Layout
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Pin No	module pin name	type	power domain	Description	88MW300 GPIO No	Note
38	CON4	I/O	VIO	Configuration Pin. Should be left open	GPIO27	Not used
39	GPIO40	I/O	VIO	General Purpose I/O 40.	GPIO40	Not used
40	GPIO41	I/O	VIO	General Purpose I/O 41.	GPIO41	Not used
41	GND	-	Ground	GND	-	
42	GND	-	Ground	GND	-	
43	GND	-	Ground	GND	-	
44	GND	-	Ground	GND	-	

Note: IO pins should be left open if not used, unless otherwise noted.

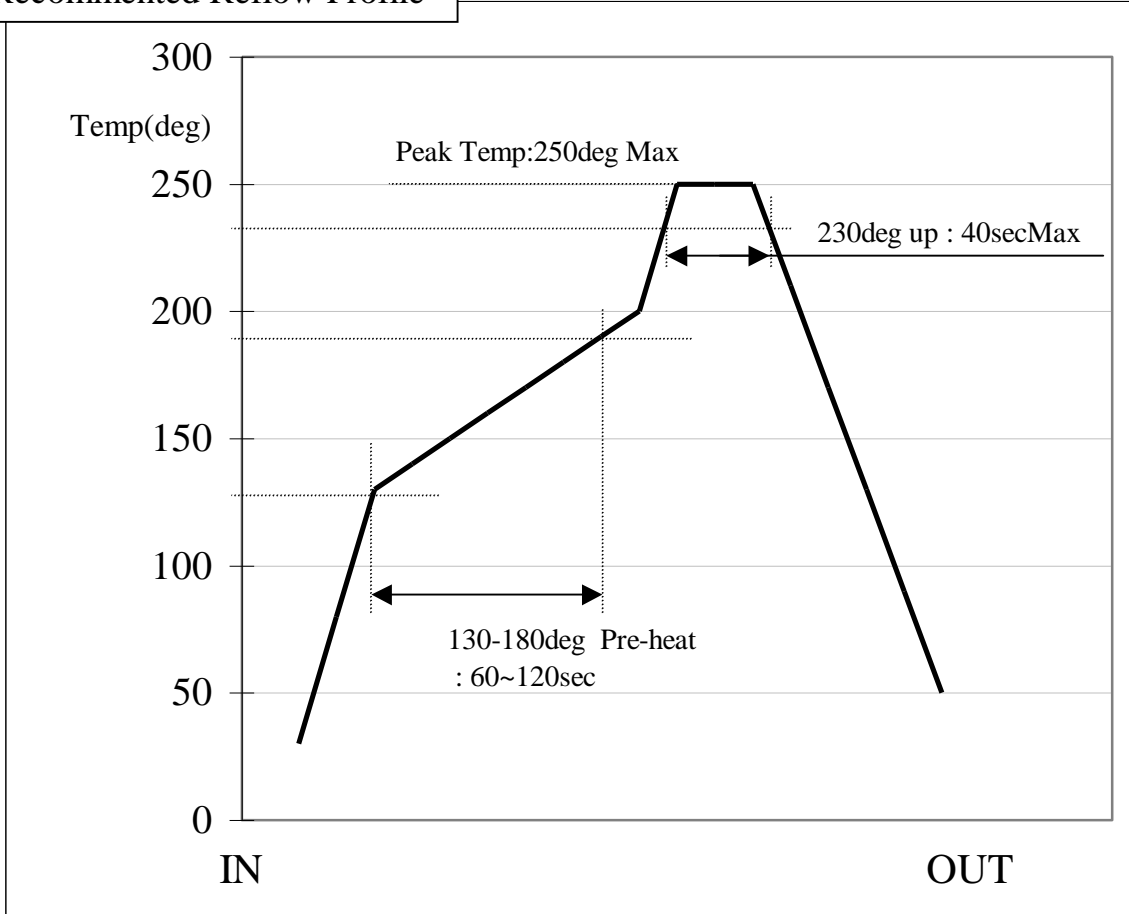
(\*1) Please refer to the specification of embedded software for more detail.

# WYSACVLXY-XX

TAIYO YUDEN CO., LTD.

Control No.  (1/1)	Control name Reflow profile
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## Recommended Reflow Profile



# WLAN Embedded Software Specification (Simplified Version)

## TAIYO YUDEN Standard Application for WLAN For WYSACVLXY-XX

This document is simplified version of specification document. Some of features and commands are not explained.  
In case you adopt this module and design some appliance, please ask for the complete version of it to the local sales office.

**WYSACVLXY-XX**

TAIYO YUDEN CO., LTD.

Control No.  (1/8)	Control name Software Specification
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Copyright Information:

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You are requested to fully check and confirm the following by the start of mass production, although TAIYO YUDEN Co., Ltd. sufficiently inspects or verifies quality of the Embedded Software.

- (1) No bug, defect or other failure is included in the Embedded Software
- (2) No bug, defect or other failure arising from installation of the Module into your product
- (3) Software fully meets your intended use

Copyright Year 2014-2016

**Firmware Version is 2.00.01 (Build3.2.12)****There is a possibility of changing a software specification.**

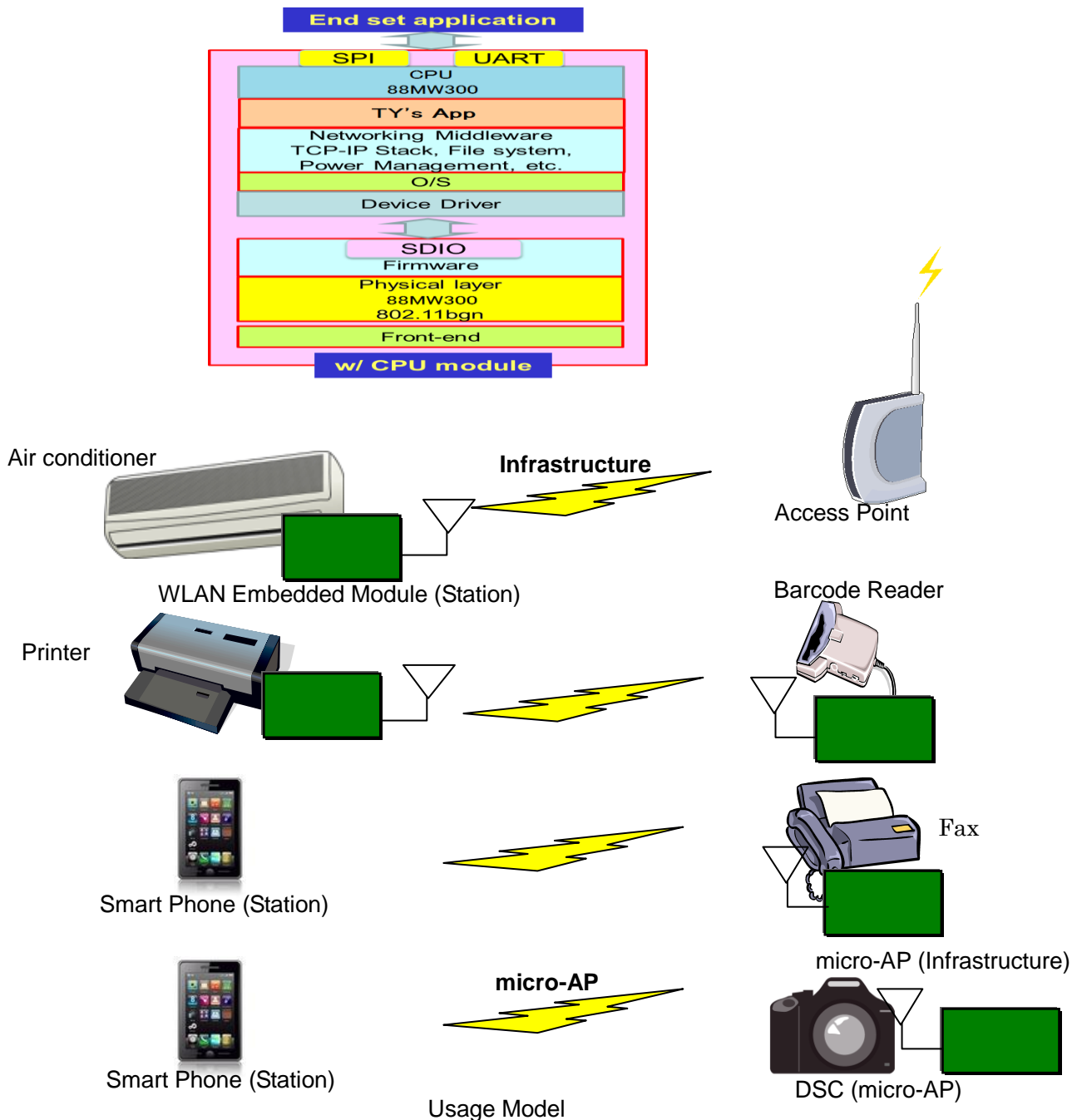
TAIYO YUDEN CO., LTD.

# WYSACVLXY-XX

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## 1. Overview

This specification is for TAIYO YUDEN Standard Application for WLAN (referred to as TY's App). Target applications are POS, Handy Terminal, Telemetry, FA, etc. This is explained only Wireless LAN Station feature and http connectivity. But the software has other feature such as micro AP mode, TCP, UDP, https connectivity and etc.





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**2. PIN configuration****2.1. UART**

Port : UART1

Baud rate : 115200 bps (default)

Parity : none

Stop bit : 1

Flow control : hardware

Baud rate can be configured by STC command.

**3. Control Command Syntax**

Control commands which the host sends are based on character strings that start with "W"(ASCII code: 0x57, 87 decimal), and that end with <CR><LF> (ASCII code: 0x0D 0x0A) (decimal values 13, 10).

Response event which host receives are started with <CR><LF> and ended <CR><LF>. Please note that this specification / application does not allow for multiple commands to be sent to the host. The application is not responsible for parsing of packets / command sequences.

Command Mode – Control Command:

**"W"{*command characters*}[*Parameter1Parameter2:: Parameter(N)*]<CR><LF>**

Response Event:

**<CR><LF>{*command characters*}[*Parameter1,Parameter2,::Parameter(N)*]<CR><LF>**

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**4. Command List****Configuration Commands**

Command Character	Function	Parameter	Response
<b>Configuration</b>			
<b>STC</b>	Set common setting value  <i>For instance</i> <i>WSTC0100</i> <i>No.: 01 (UART baud rate)</i> <i>Value: 00 (115.2kbps)</i>	<u>Parameter 0:</u> 01 : UART baud rate  <u>Parameter 1:</u> Value 00 : 115200 (default) 01 : 9600 02 : 19200 03 : 38400 04 : 57600 05 : 115200 06 : 230400 07 : 250000 08 : 500000 09 : 1000000 10 : 1500000 11 : 2000000 * Baud rate setting will be updated after reboot.	Successful: ACK  Failed: NAK##
<b>STI</b>	Set infrastructure configuration.  <i>For instance</i> <i>WSTI101ACCESS POINTA</i> <i>List: 1</i> <i>No.: 01 (SSID)</i> <i>Value: ACCESS POINTA</i>  <i>WSTI10312345678</i> <i>List: 1</i> <i>No.: 03 (PSK)</i> <i>Value: 12345678</i>	<u>Parameter 0</u> List Index "1" ~ "4"  <u>Parameter 1</u> Item No. "01" ~ "99" Refer STI Profile Table  <u>Parameter 2</u> Value Refer STI Profile Table	Successful: ACK Failed: NAK##

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**Infrastructure Control Commands**

Command Character	Function	Parameter	Response
<b>Link Control</b>			
<b>ISC</b>	Scan for wireless networks  * up to 30 <sup>th</sup> Access Point		Successful: SCR, ACK (ACK is termination)  Failed: NAK##
<b>ICO</b>	Connect to a network  For instance WICO1  Before this command is issued, List Index corresponding to AP information must be set using STI command.	Parameter: List Index '0' - '4' '1' - '4' : Profile Index	Successful: CON  Failed: NAK##
<b>HTG</b>	Start an HTTP session and read data (http_open_session, http_get_response_hdr, http_read_content, http_close_session)  For instance WHTG02http://www.google.co.jp/	Parameter 0: Handle "01" ~ "99"  Parameter 1: URI contained Host Name or IP address (Max length 1024)	Successful: RCS, RCT  Failed: NAK##  * NAK31 is followed by RCT response.

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Command Character	Function	Parameter	Response
<b>HPS</b>	<p>HTTP Post</p> <p>For instance WHPSh<code>http://www.test.org/index.html*abc=1234&amp;def=5678</code></p> <p>* HTML is as follows. &lt;BODY&gt;  &lt;FORM ACTION='index.html'  METHOD='POST'&gt;  &lt;INPUT TYPE='hidden' NAME='abc'  VALUE='1234'&gt;  &lt;INPUT TYPE='hidden' NAME='def'  VALUE='5678'&gt;  &lt;INPUT TYPE='submit' VALUE='Click!'&gt;  &lt;/BODY&gt;</p>	<p>Parameter 0: URI (Put a '*' in the edge of the URI.) (Max length 1024 without '*')</p> <p>Parameter 1: Content (up to 3072byte , ASCII data)</p>	<p>Successful: POK, RCT</p> <p>Failed: NAK##</p> <p>* NAK31 is followed by RCT response.</p>

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**STI Profile Table**

Item No.	Item Name	Value
01	ssid	Max 32characters
02	security type	'0' : No security '1' : WEP with open key. '2' : WEP with shared key '3' : WPA/WPA2 with PSK mixed '4' : WPA2 with PSK  In STU/GTU, only '0' or '4' can be accepted.
03	security key	Max 64 characters <i>WEP : ASCII (5 or 13byte) / HEX (10 or 26byte)</i> <i>WPA/WPA2 : ASCII</i>
04	addr_type '0' in STU/GTU	'0' : Static '1' : DHCP
05	IP address (static addr type)	"XXX.XXX.XXX.XXX"
06	subnet mask (static addr type)	"XXX.XXX.XXX.XXX"
07	default gateway (static addr type)	"XXX.XXX.XXX.XXX"
08	primary DNS server (static addr type)	"XXX.XXX.XXX.XXX"
09	secondary DNS server (static addr type)	"XXX.XXX.XXX.XXX"

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**5. Error Codes**

#	Error Name	Program Logic Cause	Action taken by host
FF	<b>System Error</b>	There is the possibility that the hardware is out of order.	Please inquire Taiyo Yuden.
00	<b>Command Not Recognized</b>	It confirms whether or not the command is correct.	Send the command once again.
01	<b>Bad Parameter</b>	It confirms whether or not the parameter is correct.	Send the command once again.
04	<b>Connection Error</b>	General connection error	Check parameter and retry. Reconnect or reboot.
05	<b>Profile Error</b>	UAP / ICO command is called with invalid profile setting.	Set micro-AP / Infrastructure profile
10	<b>Network Not Found</b>	Access Point is not exist.	Check Access Point setting.
11	<b>Authentication Failed</b>	Authentication error occurs in association to Access Point.	Check parameter and retry.
12	<b>DHCP Failed</b>	IP address is not assigned after association to Access Point.	Check Access Point setting.
14	<b>Other Infrastructure Connection error</b>	Other error occurs in connection to Access Point.	Check Access Point setting.
15	<b>Infrastructure is connected</b>	ICO / WPS command is called while infrastructure is connected.	Disconnect infrastructure with IDC command.
30	<b>HTTP connection error</b>	Can not access HTTP server	Check WLAN connection and HTTP address. In HTTPS, check whether the server's certificate is installed.
31	<b>HTTP status code Error</b>	HTTP status code is not 200 (OK). Status code will be added after a comma. For instance NAK31,301 NAK31,404	Check HTTP status code.
32	<b>Invalid User certificates</b>	There is one or more invalid user certificates.	Check User certificates.

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