
Title:

IEEE802.11n SDIO Wireless LAN Module
SX-SDMAN2-2830 / SX-SDCAN2-2830

Drawing Type : Product Specifications

Drawing No.: JW202160AJ

Date : August 26, 2016

Revision History

Rev.	Description	Date	Prepared	Checked	Approved
AX	1st release as official version	Aug.28,15	M.Ieda	K.Yoshikawa	Y.Shibuya
AA	§ 3.4 Added a comment. § 3.6 Corrected a typo. Modified Transmit power of US and Canada. Added Table of power uncertainty. § 4 Corrected reset states and description of bootstrap pins.	Nov.10,15	M.Ieda	K.Yoshikawa	Y.Shibuya
AB	§ 3.5 Changed the board data. § 3.6 Modified Table of power uncertainty. § 4.1 Added EXPGND pads to the figure.	Jan.25,16	M.Ieda	K.Yoshikawa	Y.Shibuya
AC	§ 3.5 Changed the board data. § 6 Changed the board data. § 9 Changed the Label specifications.	Apr.12,16	M.Ieda	K.Yoshikawa	Y.Shibuya
AD	§ 4.3 B2B type pin locations Remove Mating connector description	Apr.25,16	Y.Shibuya	K.Yoshikawa	Y.Shibuya
AE	§ 4. Signal pin specifications Corrected sentence of BT_PWD_L. BT_VDD from FFC connector is changed to +3.3V. § 5.3 Power on/off and reset timing Added NOTE1 and NOTE2. § 3.6 Changed typical power of 11ng HT20 MCS7.	Jun.22,16	M.Ieda	K.Yoshikawa	Y.Shibuya
AF	§ 4.3 B2B type pin locations Add mating connector part number § 9 Changed the Label specifications.	Jun.24,16	Y.Shibuya	K.Yoshikawa	T.Kometani
AG	§ 3.2 Added baking conditions § 4.2, § 4.4, § 4.8 Corrected typo of English. PCM signals: Pull-up→Pull-down § 6.2 Added two antennas for FCC/ETSI § 16 Added reference schematic	Jul.29,16	K.Yoshikawa	M.Ieda	Y.Shibuya
AH	§ 4.2.4.4.4.8 Changed requirement for BT_PWD_L. § 5.3 Changed requirement of NOTE1 and NOTE2. § 8 Added PCB version	Aug.07,16	K.Yoshikawa	M.Ieda	Y.Shibuya
AJ	§ 3.5 Added limitation in Canada (NOTE1). § 5.3 Updated timing chart. § 11 Updated Packing specifications	Aug.26,16	K.Yoshikawa	M.Ieda	Y.Shibuya

Table of Contents

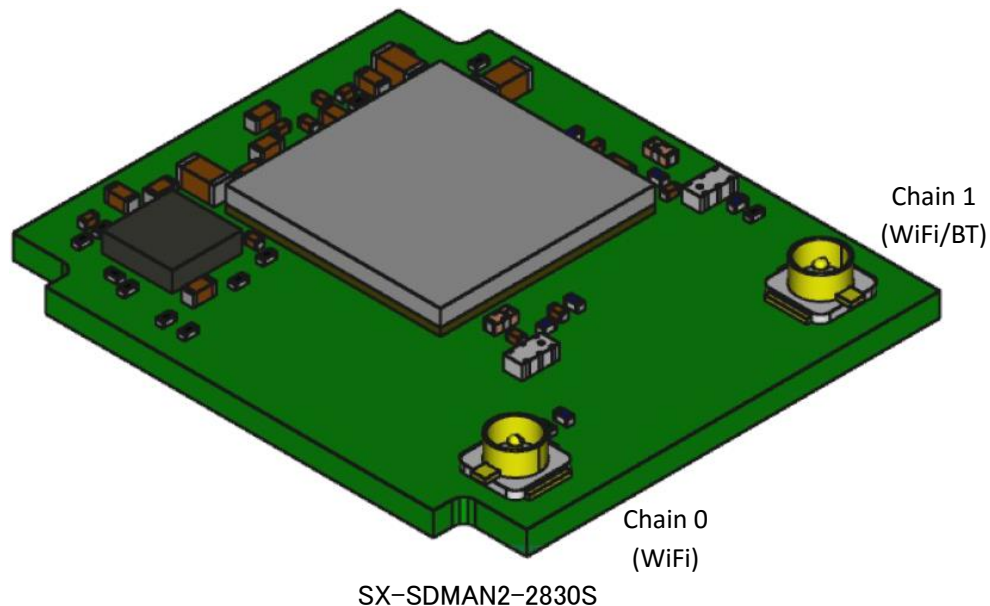
Revision History	2
Table of Contents	3
1. Product Introduction	5
2. Hardware Block Diagram	7
3. Board Specifications	10
3.1. General Specifications	10
3.2. Environmental Specifications	11
3.3. Electrical Specifications	12
3.4. Current Consumption Specifications	14
3.5. Wireless LAN General Specifications	16
3.6. Wireless LAN Transmitter Specifications	17
3.7. Wireless LAN Receiver Specifications	24
3.8. Bluetooth LAN General Specifications	26
3.9. Bluetooth Transmitter Specifications	27
3.10. Bluetooth Receiver Specifications	27
4. Signal Pin Specifications	28
4.1. SMT Type Pin Locations	28
4.2. SMT Type Signal Descriptions	29
4.3. B2B Type Pin Locations	36
4.4. B2B Type Signal Descriptions	37
4.5. SD Card Type Edge Pin Locations	41
4.6. SDCARD Type Edge Signal Descriptions	42
4.7. SD Card Type FFC Pin Locations	43
4.8. SDCARD Type FFC Signal Descriptions	44
4.9. I/O Domain Definitions	46
5. Interface / Timing Specifications	47
5.1. UART Interface Specifications for Bluetooth	49
5.2. PCM Interface Specifications for Bluetooth	50
5.3. Power On/Off and Reset Timing	51
6. Standards Compliance	58
6.1. Standard List	58
6.2. Recommended Antenna List	59
7. Mechanical Specifications	60
8. Marking Specifications	67
9. Label Specifications	70
10. Components Composition List	71

11.	Packing Specifications	72
11.1.	Packing.....	72
12.	Reliability Test.....	80
13.	Notifications.....	82
14.	Appendix-A SMT Reflow Profiles	84
15.	Appendix-B Operating Temperature Definition.....	85
16.	Appendix-C Reference Schematic.....	88

This document will cover the hardware specifications for the “SX-SDMAN2-2830S”, “SX-SDMAN2-2830C” and “SX-SDCAN2-2830” (SX-SDMAN2 and SX-SDCAN2).

1. Product Introduction

This is a Dual Band IEEE802.11abgn radio module, supporting Bluetooth 4.0+LE Dual mode and SDIO2.0. It has both the board to board (B2B) and direct solder mount (SMT) options for connections to the host board. This module complies with EU RoHS Directive 2011/65/EC(Lead Free). It features the QCA6234X SiP module which contains a MAC/BBP chipset, 2.4GHz and 5GHz RF front end circuits. Also this module supports high speed 2x2 MIMO and 40MHz band width mode for only 5GHz. Form factors are Surface mount version (SMT) SX-SDMAN2-2830S, Board to board version (B2B) SX-SDMAN2-2830C and SD card form factor SX-SDCAN2-2830.



Features

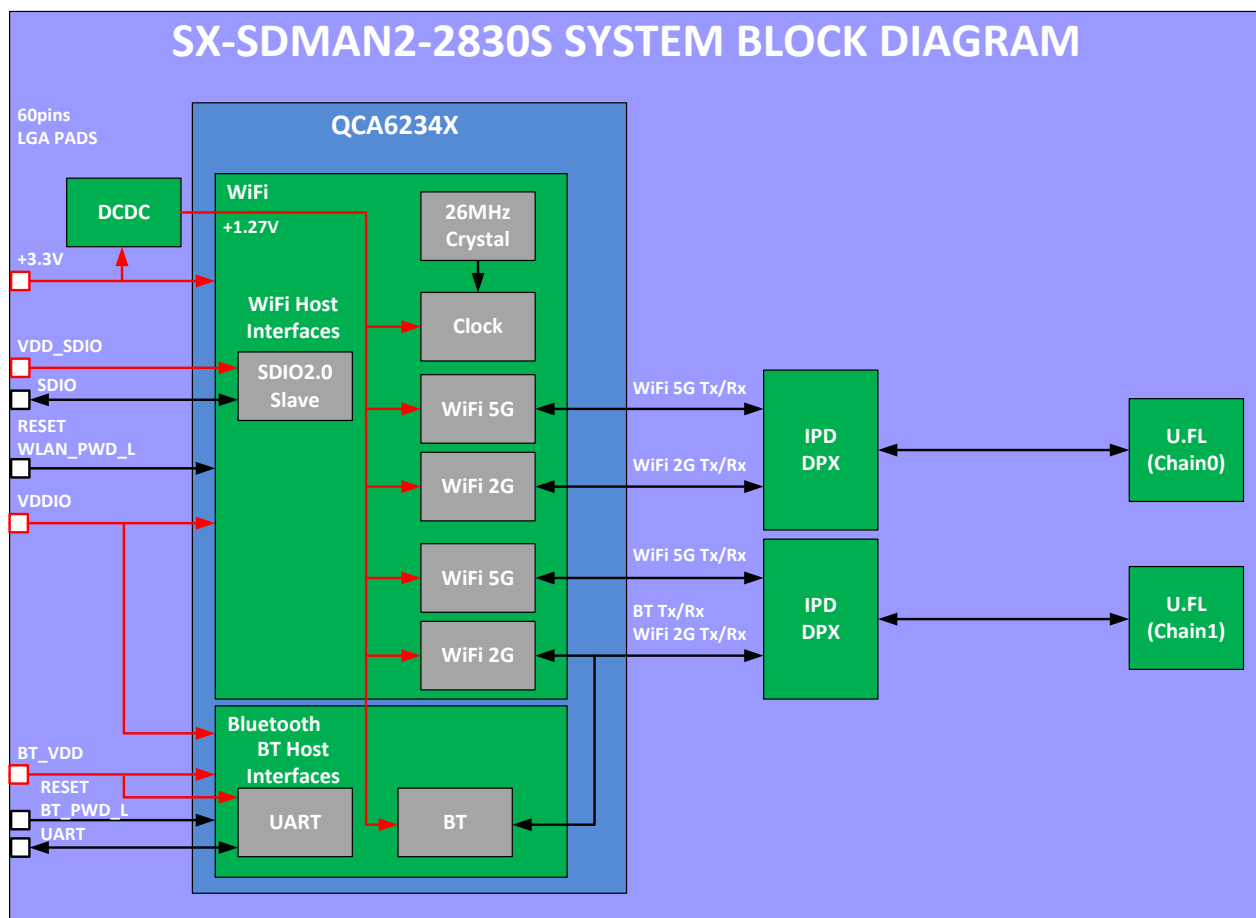
- IEEE 802.11a/b/g/n conformity (2.4GHz & 5GHz)
- Supports IEEE802.11e, IEEE802.11d and IEEE 802.11h
- 2 spatial data stream system (2T2R)
- 2.4 GHz : Support 20 MHz bandwidth mode (Link rate 150 Mbps)
5 GHz : Support 20/40 MHz bandwidth mode (Link rate 300 Mbps)

Link Data Rates

- 802.11b/g 1–54 Mbps
- 802.11a 6–54 Mbps
- 802.11n 2.4GHz MCS0–7
- 802.11n 5GHz MCS0/8–7/13
- Bluetooth 4.0 BR/EDR/LE Smart Ready compatible. Backward-compatible to 1.x, 2.x, 3.0.
- SDIO2.0 as the Wireless LAN host interface
- UART as the Bluetooth host interface
- +3.3V main power supply and selectable +1.8V/+3.3V IO power supply
- EU RoHS directive 2011/65/EC (Lead Free) compliant
- Selectable the ad-on antenna and the chip antenna (Option)

2. Hardware Block Diagram

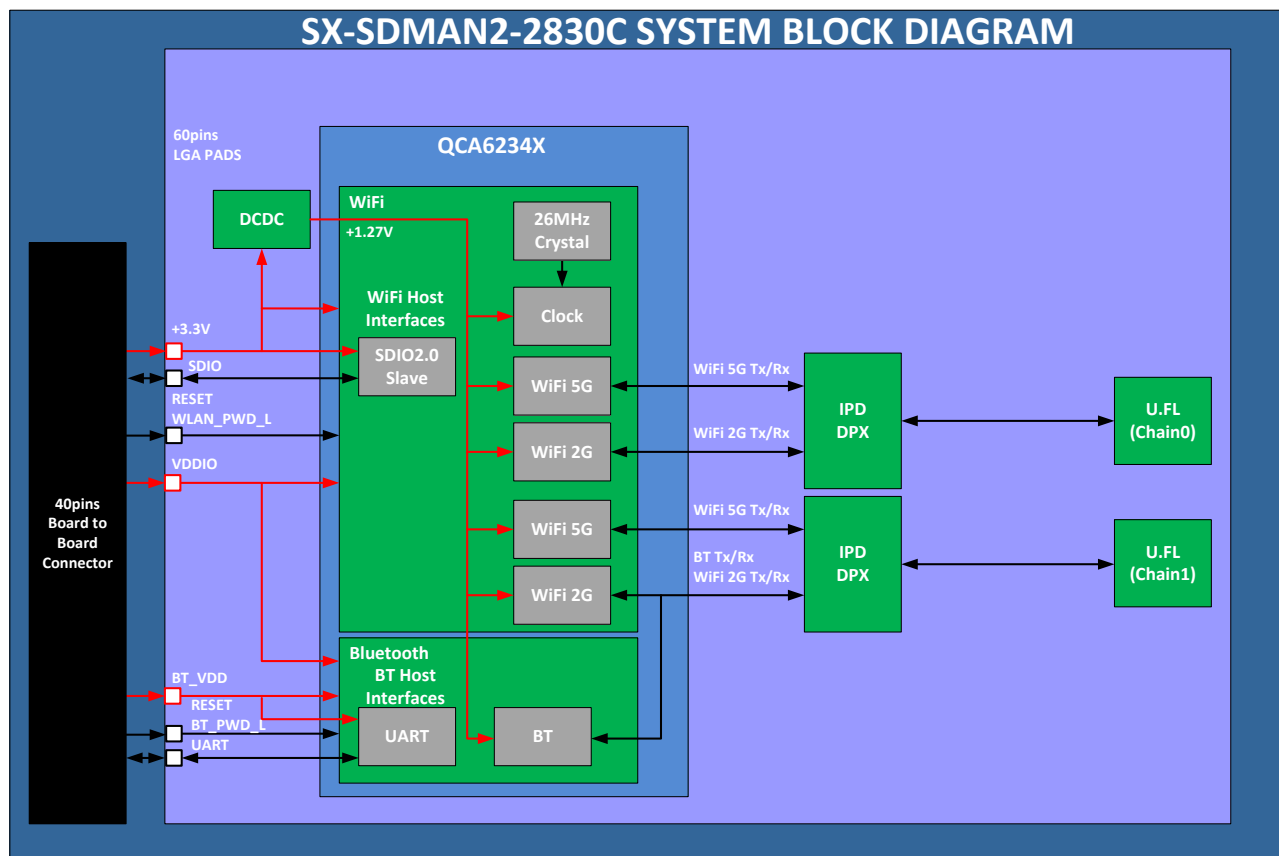
Surface Mount Type



Acronyms

DCDC	DC to DC convertor
IPD DPX	Integrated Passive Device type Diplexer
U.FL	U.FL compatible co-axial connector

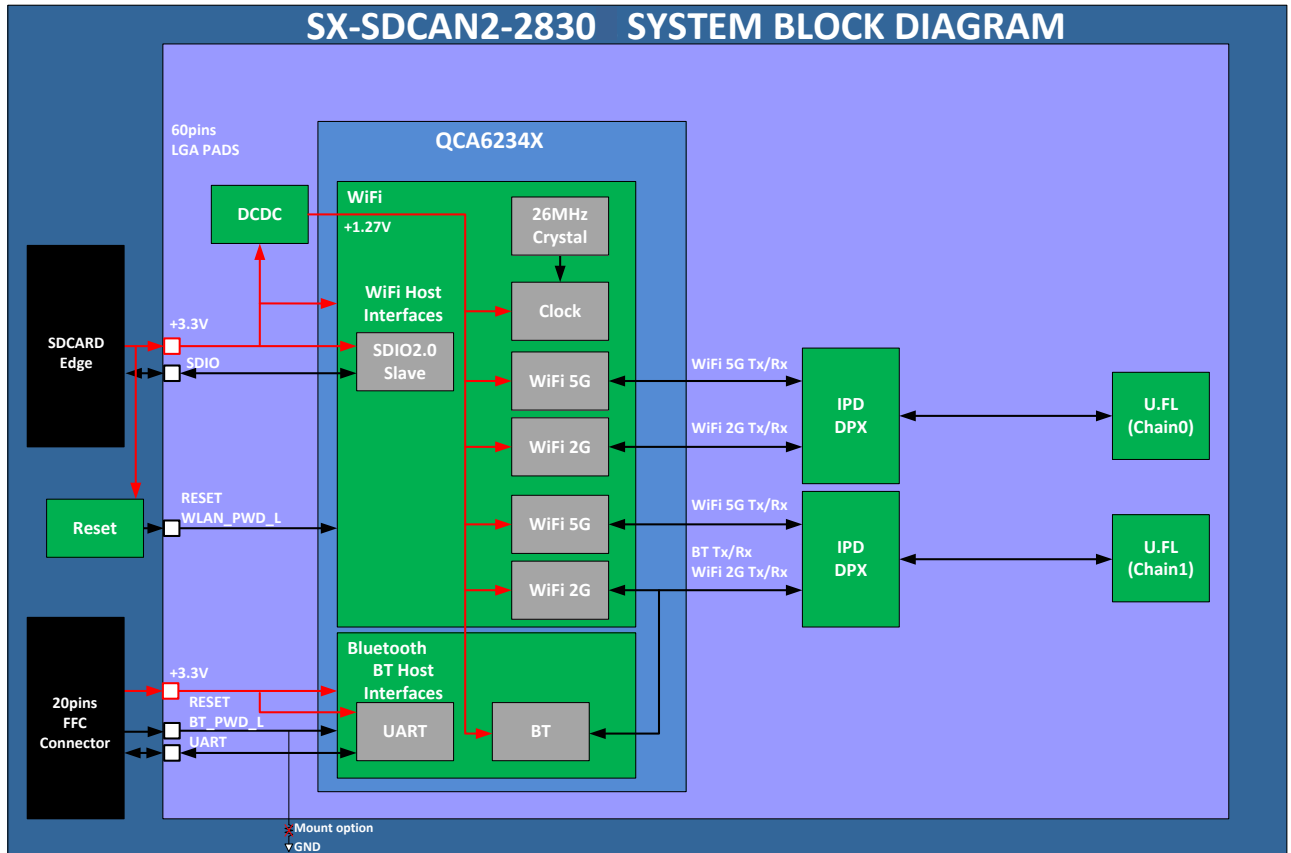
Board to Board Connector Type



Acronyms

DCDC	DC to DC convertor
IPD DPX	Integrated Passive Device type Diplexer
U.FL	U.FL compatible co-axial connector

SDCARD Type



Acronyms

DCDC	DC to DC convertor
IPD DPX	Integrated Passive Device type Diplexer
U.FL	U.FL compatible co-axial connector

3. Board Specifications

3.1. General Specifications

Items	Specifications		Units	Remarks
Connector Type	SMT:60 pins direct solder pads B2B:40 pins board to board connector SDCARD:WiFi — 9 pins SDCARD Edge BT/Misc — 20 pins FFC connector		—	B2B connector part number ⇒ 14 5602 040 000 829 H+ FFC connector part number ⇒ 08 6210 020 340 800+ (Kyocera Connector Products)
Antenna Connectors	U.FL Alternative connector x 2		—	
Antenna Port	50 +/- 20%		Ω	VSWR < 2.6
Device Interfaces	SDIO v2.0		—	For Wireless LAN
	UART		—	For Bluetooth, up to 4Mbps
RF Interface	IEEE802.11a/b/g/n/e/h		—	IEEE802.11-2012
	Bluetooth 4.0 + LE Smart Ready		—	Max antenna gain +5.0dBi@2.4GHz
Weight	SMT version	1.3 +/- 0.2	g	Typ.
	B2B version	2.7 +/- 0.2	g	Typ.
	SDCARD version	5.7 +/- 0.2	g	Typ.
Dimensions	SMT version	19.00 x 22.00 x 2.25	mm	W x H x D * See § 7
	B2B version	24.00 x 24.00 x 4.45	mm	
	SDCARD version	24.00 x 51.00 x 5.80	mm	
MTBF	90,000		h	Min.
Mating Number	10		Times	Max. SX-SDMAN2-2830C
	10		Times	Max. SX-SDCAN2-2830, FFC
	100		Times	Max. SX-SDCAN2-2830, SD edge
Reflow Number	1		Time	Max. SX-SDMAN2-2830S
ESD Resistance	General pins	1500	V	Max. Human Body Model at RF Port. JESD22-A114F (JS-001-2012) Class 2 device
	Antenna pins	4000		

3.2. Environmental Specifications

Items	Specifications			Units	Remarks
	Min.	Typ.	Max.		
Operating Temperature	-20	—	+85	°C	Case temperature ^{NOTE1} After assembled with powered
Operating Humidity	15	—	95	%RH	Non condensing After assembled with powered
Assembled Storage Temperature	-40	—	+85	°C	After assembled with no-powered
Assembled Storage Humidity	15	—	95	%RH	Non condensing After assembled with no-powered
Storage Temperature	5	—	+35	°C	Packaged. Apply MSL after unpackaged.
Storage Humidity	20	—	60	%RH	Non condensing Packaged. Apply MSL after unpackaged.
Moisture Sensitivity Level	3			—	IPC/JEDEC J-STD-020D See below standard for handling. IPC/JEDEC J-STD-033C *SX-SDMAN2-2830S only

NOTE1: Refer application note FX000030 for mitigating case temperature condition.

NOTE2: Recommended baking conditions

Board: $\leq 1.4\text{mm}$, $125^{\circ}\text{C}+10/-0^{\circ}\text{C}$ 9 hours

Reel: $\leq 1.4\text{mm}$, $40^{\circ}\text{C}+5/-0^{\circ}\text{C}$ $\leq 5\%\text{RH}$ 13 days

3.3. Electrical Specifications

Absolute Maximum Ratings

Items	Specifications			Units	Remarks
	Min.	Typ.	Max.		
Main Power supply voltage	-0.3	—	+3.6	V	
BT Power supply voltage	-0.3	—	+3.6	V	
IO Power supply voltage	-0.3	—	+3.6	V	
SDIO Power supply voltage	-0.3	—	+3.6	V	

Recommended Operating Conditions

Main Power Supply

Items	Specifications			Units	Remarks
	Min.	Typ.	Max.		
(VDD) Main Power supply voltage	+3.14	+3.30	+3.46	V	

IO Power Supply/Bluetooth Power Supply, +3.3V Operation

Items	Specifications			Units	Remarks
	Min.	Typ.	Max.		
(BT_VDD) BT Power supply voltage	+3.14	+3.30	+3.46	V	
(VDDIO) IO Power supply voltage	+3.14	+3.30	+3.46	V	
(VDD_SDIO) SDIO Power supply voltage	+3.14	+3.30	+3.46	V	

IO Power Supply/Bluetooth Power Supply, +1.8V Operation

Items	Specifications			Units	Remarks
	Min.	Typ.	Max.		
(BT_VDD) BT Power supply voltage	-1.71	+1.80	+1.89	V	
(VDDIO) IO Power supply voltage	-1.71	+1.80	+1.89	V	
(VDD_SDIO) SDIO Power supply voltage	-1.71	+1.80	+1.89	V	

Digital Logic Signal Level

1) For $V_{IO} = V_{DDSDIO} = +3.3V$ operation

Items	Parameters	Specifications				Units	Remarks
		Output/Input current	Min.	Typ.	Max.		
V_{IH}	Input High Voltage		$0.7 \times V_{IO}$	+3.3	$V_{IO} + 0.16$	V	
V_{IL}	Input Low Voltage		-0.3	—	$0.3 \times V_{IO}$	V	
V_{OH}	Output High Voltage	$I_{OH} = -4mA$	$0.9 \times V_{IO}$	—	—	V	
V_{OL}	Output Low Voltage	$I_{OL} = 4mA$	—	—	$0.1 \times V_{IO}$	V	

2) For $V_{IO} = V_{DDSDIO} = +1.8V$ operation

Items	Parameters	Specifications				Units	Remarks
		Output/Input current	Min.	Typ.	Max.		
V_{IH}	Input High Voltage		$0.7 \times V_{IO}$	+1.8	$V_{IO} + 0.09$	V	
V_{IL}	Input Low Voltage		-0.3	—	$0.3 \times V_{IO}$	V	
V_{OH}	Output High Voltage	$I_{OH} = -4mA$	$0.9 \times V_{IO}$	—	—	V	
V_{OL}	Output Low Voltage	$I_{OL} = 4mA$	—	—	$0.1 \times V_{IO}$	V	

3.4. Current Consumption Specifications

WLAN (VDD33) ^{NOTE1}

Items	Specifications				Units	Remarks
	Modes	Standards	Typ.	Max.		
Current Consumption 5GHz	Tx	11a (1T1R)	370	410	mA	
		11na HT20 1 chain (1T1R)	370	410	mA	
		11na HT20 2 chain (2T2R)	680	750	mA	
		11na HT40 1 chain (1T1R)	370	410	mA	
		11na HT40 2 chain (2T2R)	680	750	mA	
	Rx	All mode 1Chain (1T1R)	130	150	mA	
		11na HT20/HT40 mode 2Chain (2T2R)	140	160	mA	
Current Consumption 2.4GHz	Tx	11b (1T1R)	270	300	mA	
		11g (1T1R)	270	300	mA	
		11ng HT20 1 chain (1T1R)	270	300	mA	
		11ng HT20 2 chain (2T2R)	480	530	mA	
	Rx	All mode 1Chain (1T1R)	100	120	mA	
		11ng HT20 mode 2Chain (2T2R)	130	150	mA	

BT (BT_VDD) ^{NOTE1}

Items	Specifications			Units	Remarks
	Modes	Typ.	Max.		
Current Consumption	Tx	+1.8V operation	100	110	mA
		+3.3V operation	85	100	mA
	Rx	+1.8V operation	50	60	mA
		+3.3V operation	50	60	mA

IO (VDD_IO, VDD_SDIO) ^{NOTE1}

IO current is added to WLAN/BT current.

Items	Specifications			Units	Remarks
	Modes	Typ.	Max.		
Current Consumption	Tx	+1.8V operation	6	10	mA
		+3.3V operation	6	10	mA
	Rx	+1.8V operation	10	15	mA
		+3.3V operation	10	15	mA

NOTE1: Numbers are average current consumption of maximum duty cycle in the station mode. Numbers of Max.is maximum value of unit to unit variation.



3.5. Wireless LAN General Specifications

Items	Specifications				Units	Remarks
Chipset	QCA6234X, Core chip AR6004X CSP (Qualcomm Atheros)				—	
Country/Domain Code	0x0000				—	NOTE1
Operating Frequency Range	Bands	Modes	Min.	Max.		
	2.4GHz	11b	2412	2472	MHz	US : 2412—2462MHz
		11g/n 20MHz	2412	2472	MHz	EU : 2412—2472MHz JP : 2412—2472MHz
	5GHz	11a/n 20MHz	5180	5825	MHz	US : W52/W53/W56/W58
		11n 40MHz	5190	5795	MHz	EU : W52/W53/W56 JP : W52/W53/W56
Frequency Step	2.4GHz	11b/g/n	5		MHz	
	5GHz	11a/n 20MHz	20		MHz	
		11n 40MHz	40		MHz	
Link Data Rate	11b	1, 2, 5.5L, 5.5S, 11L, 11S			Mbps	
	11a/g	6, 9, 12, 18, 24, 36, 48, 54			Mbps	
	11n	MCS 0, 1, 2, 3, 4, 5, 6, 7			—	
Modulation Type	11b	DSSS(DBPSK,DQPSK,CCK)			—	
	11a/g/n	OFDM(BPSK,QPSK,16QAM,64QAM)			—	
Board Data 	File Name	bdata_SX-SDMAN2_20160314.bin			—	
	MD5 HASH	63dd182e83df7e95ee2caa2f90a602d5			—	
Encryption	RC4 128 bits				—	
	AES 128 bits				—	



NOTE1: 5600–5650MHz is disabled in Canada.



NOTE2: For Country / Region code

0x0000 is programed into the memory of the module as the default value. This code is assumed to be changed to the other code by driver when the module is loaded.

3.6. Wireless LAN Transmitter Specifications

Japan•EU 2.4GHz (+25°C)

Items	Specifications						Units	Remarks
	Modes			Min.	Typ.	Max.		
TX Power Japan,EU Typ.=Target Power	11b	Ch.1~Ch.13	1~11Mbps	+10.5	+13.0	+15.5	dBm	
	11g	Ch.1~Ch.13	6~24Mbps	+10.5	+13.0	+15.5	dBm	
			36Mbps	+10.0	+12.5	+15.0	dBm	
			48~54Mbps	+8.5	+11.0	+13.5	dBm	
	11ng HT20	Ch.1~Ch.13	MCS0~3 MCS8~11	+10.5	+13.0	+15.5	dBm	NOTE1
			MCS4 MCS12	+10.0	+12.5	+15.0	dBm	NOTE1
			MCS5~6 MCS13~14	+8.5	+11.0	+13.5	dBm	NOTE1
			MCS7 MCS15	+4.5	+7.0	+9.5	dBm	NOTE1

NOTE1: Transmit power is the value from each single chain.

When the device transmits 2 streams of data, total power can be +3.0dB.

Japan•EU 5GHz (+25°C)

Items	Specifications						Units	Remarks
	Modes			Min.	Typ.	Max.		
TX Power Japan,EU Typ.=Target Power	11a	Ch.36~Ch.64 W52/53	6~24Mbps	+9.0	+11.5	+14.0	dBm	
			36Mbps	+8.0	+10.5	+13.0	dBm	
			48Mbps	+6.5	+9.0	+11.5	dBm	
			54Mbps	+5.0	+7.5	+10.0	dBm	
		Ch.100~Ch.140 W56	6~24Mbps	+9.0	+11.5	+14.0	dBm	
			36Mbps	+7.0	+9.5	+12.0	dBm	
			48Mbps	+6.0	+8.5	+11.0	dBm	
			54Mbps	+5.0	+7.5	+10.0	dBm	
		Ch.149~Ch.165 W58	6~24Mbps	+8.0	+10.5	+13.0	dBm	
			36Mbps	+6.5	+9.0	+11.5	dBm	
			48Mbps	+5.0	+7.5	+10.0	dBm	
			54Mbps	+3.5	+6.0	+8.5	dBm	
	11na HT20	Ch.36~Ch.64 W52/53	MCS0~3 MCS8~11	+9.0	+11.5	+14.0	dBm	NOTE1
			MCS4 MCS12	+8.0	+10.5	+13.0	dBm	NOTE1
			MCS5 MCS13	+6.5	+9.0	+11.5	dBm	NOTE1
			MCS6 MCS14	+4.5	+7.0	+9.5	dBm	NOTE1
			MCS7 MCS15	+3.5	+6.0	+8.5	dBm	NOTE1
		Ch.100~Ch.140 W56	MCS0~3 MCS8~11	+9.0	+11.5	+14.0	dBm	NOTE1
			MCS4 MCS12	+7.0	+9.5	+12.0	dBm	NOTE1
			MCS5 MCS13	+6.5	+9.0	+11.5	dBm	NOTE1
			MCS6 MCS14	+4.5	+7.0	+9.5	dBm	NOTE1
			MCS7 MCS15	+3.5	+6.0	+8.5	dBm	NOTE1
		Ch.149~Ch.165 W58	MCS0~3 MCS8~11	+8.0	+10.5	+13.0	dBm	NOTE1
			MCS4 MCS12	+6.5	+9.0	+11.5	dBm	NOTE1
			MCS5 MCS13	+5.0	+7.5	+10.0	dBm	NOTE1
			MCS6 MCS14	+3.5	+6.0	+8.5	dBm	NOTE1
			MCS7 MCS15	+2.0	+4.5	+7.0	dBm	NOTE1

Items	Specifications						Units	Remarks
	Modes			Min.	Typ.	Max.		
TX Power Japan,EU Typ.=Target Power 	11na HT40	Ch.38~Ch.62	MCS0~3 MCS8~11	+9.0	+11.5	+14.0	dBm	NOTE1
			MCS4 MCS12	+8.0	+10.5	+13.0	dBm	NOTE1
		W52/53	MCS5 MCS13	+6.0	+8.5	+11.0	dBm	NOTE1
			MCS6 MCS14	+4.5	+7.0	+9.5	dBm	NOTE1
			MCS7 MCS15	+3.5	+6.0	+8.5	dBm	NOTE1
		Ch.102~Ch.134 W56	MCS0~3 MCS8~11	+9.0	+11.5	+14.0	dBm	NOTE1
			MCS4 MCS12	+7.5	+10.0	+12.5	dBm	NOTE1
			MCS5 MCS13	+6.0	+8.5	+11.0	dBm	NOTE1
			MCS6 MCS14	+4.5	+7.0	+9.5	dBm	NOTE1
			MCS7 MCS15	+3.5	+6.0	+8.5	dBm	NOTE1
		Ch.151~Ch.159 W58	MCS0~3 MCS8~11	+8.0	+10.5	+13.0	dBm	NOTE1
			MCS4 MCS12	+6.5	+9.0	+11.5	dBm	NOTE1
			MCS5 MCS13	+5.0	+7.5	+10.0	dBm	NOTE1
			MCS6 MCS14	+3.5	+6.0	+8.5	dBm	NOTE1
			MCS7 MCS15	+2.0	+4.5	+7.0	dBm	NOTE1

NOTE1: Transmit power is the value from each single chain.

When the device transmits 2 streams of data, total power can be +3.0dB.



US/Canada 2.4GHz (+25°C)

Items	Specifications						Units	Remarks
	Modes			Min.	Typ.	Max.		
TX Power US,Canada Typ.=Target 	11b	Ch.1-Ch.11	1-11Mbps	+10.0	+12.5	+15.0	dBm	
	11g	Ch.1-Ch.3	6-54Mbps	+5.0	+7.5	+10.0	dBm	
		Ch.4-Ch.8	6-36Mbps	+10.0	+12.5	+15.0	dBm	
			48-54Mbps	+8.5	+11.0	+13.5	dBm	
		Ch.9-Ch.11	6-54Mbps	+6.5	+9.0	+11.5	dBm	
	11ng HT20	Ch.1-Ch.3	MCS0-15	+3.0	+5.5	+8.0	dBm	NOTE1
		Ch.4-Ch.8	MCS0-4 MCS8-12	+10.0	+12.5	+15.0	dBm	NOTE1
			MCS5-6 MCS13-14	+8.5	+11.0	+13.5	dBm	NOTE1
			MCS7 MCS15	+4.5	+7.0	+9.5	dBm	NOTE1
		Ch.9 - Ch.11	MCS0-15	+3.5	+6.0	+8.5	dBm	NOTE1

NOTE1: Transmit power is the value from each single chain.

When the device transmits 2 streams of data, total power can be +3.0dB.

US • Canada 5GHz (+25°C)

Items	Specifications						Units	Remarks
	Modes			Min.	Typ.	Max.		
TX Power US, Canada Typ.=Target Power	11a	Ch.36–Ch.64 W52/53	6–36Mbps	+8.0	+10.5	+13.0	dBm	
			48Mbps	+6.5	+9.0	+11.5	dBm	
			54Mbps	+5.0	+7.5	+10.0	dBm	
		Ch.100–Ch.140 W56	6–24Mbps	+8.0	+10.5	+13.0	dBm	
			36Mbps	+7.0	+9.5	+12.0	dBm	
			48Mbps	+6.0	+8.5	+11.0	dBm	
			54Mbps	+5.0	+7.5	+10.0	dBm	
		Ch.149–Ch.165 W58	6–24Mbps	+7.5	+10.0	+12.5	dBm	
			36Mbps	+6.5	+9.0	+11.5	dBm	
			48Mbps	+5.0	+7.5	+10.0	dBm	
			54Mbps	+3.5	+6.0	+8.5	dBm	
	11na HT20	Ch.36–Ch.64 W52/53	MCS0–4 MCS8–12	+8.0	+10.5	+13.0	dBm	NOTE1
			MCS5 MCS13	+6.5	+9.0	+11.5	dBm	NOTE1
			MCS6 MCS14	+4.5	+7.0	+9.5	dBm	NOTE1
			MCS7 MCS15	+3.5	+6.0	+8.5	dBm	NOTE1
		Ch.100–Ch.140 W56	MCS0–3 MCS8–11	+8.0	+10.5	+13.0	dBm	NOTE1
			MCS4 MCS12	+7.0	+9.5	+12.0	dBm	NOTE1
			MCS5 MCS13	+6.5	+9.0	+11.5	dBm	NOTE1
			MCS6 MCS14	+4.5	+7.0	+9.5	dBm	NOTE1
			MCS7 MCS15	+3.5	+6.0	+8.5	dBm	NOTE1
		Ch.149–Ch.165 W58	MCS0–3 MCS8–11	+7.5	+10.0	+12.5	dBm	NOTE1
			MCS4 MCS12	+6.5	+9.0	+11.5	dBm	NOTE1
			MCS5 MCS13	+5.0	+7.5	+10.0	dBm	NOTE1
			MCS6 MCS14	+3.5	+6.0	+8.5	dBm	NOTE1
			MCS7 MCS15	+2.0	+4.5	+7.0	dBm	NOTE1

Items	Specifications						Units	Remarks
	Modes			Min.	Typ.	Max.		
TX Power US,Canada Typ.=Target	11na HT40	Ch.38	MCS0-6 MCS8-14	+4.5	+7.0	+9.5	dBm	NOTE1
			MCS7 MCS15	+3.5	+6.0	+8.5	dBm	NOTE1
		Ch.46-Ch.54	MCS0-4 MCS8-12	+8.0	+10.5	+13.0	dBm	NOTE1
			MCS5 MCS13	+6.0	+8.5	+11.0	dBm	NOTE1
			MCS6 MCS14	+4.5	+7.0	+9.5	dBm	NOTE1
			MCS7 MCS15	+3.5	+6.0	+8.5	dBm	NOTE1
		Ch.62	MCS0-5 MCS8-13	+5.5	+8.0	+10.5	dBm	NOTE1
			MCS6 MCS14	+4.5	+7.0	+9.5	dBm	NOTE1
			MCS7 MCS15	+3.5	+6.0	+8.5	dBm	NOTE1
		Ch.102	MCS0-4 MCS8-12	+7.0	+9.5	+12.0	dBm	NOTE1
			MCS5 MCS13	+6.0	+8.5	+11.0	dBm	NOTE1
			MCS6 MCS14	+4.5	+7.0	+9.5	dBm	NOTE1
			MCS7 MCS15	+3.5	+6.0	+8.5	dBm	NOTE1
		Ch.110-Ch.134 W56	MCS0-3 MCS8-11	+8.0	+10.5	+13.0	dBm	NOTE1
			MCS4 MCS12	+7.5	+10.0	+12.5	dBm	NOTE1
			MCS5 MCS13	+6.0	+8.5	+11.0	dBm	NOTE1
			MCS6 MCS14	+4.5	+7.0	+9.5	dBm	NOTE1
			MCS7 MCS15	+3.5	+6.0	+8.5	dBm	NOTE1
		Ch.151-Ch.159 W58	MCS0-3 MCS8-11	+7.5	+10.0	+12.5	dBm	NOTE1
			MCS4 MCS12	+6.5	+9.0	+11.5	dBm	NOTE1
			MCS5 MCS13	+5.0	+7.5	+10.0	dBm	NOTE1
			MCS6 MCS14	+3.5	+6.0	+8.5	dBm	NOTE1
			MCS7 MCS15	+2.0	+4.5	+7.0	dBm	NOTE1

NOTE1: Transmit power is the value from each single chain.

When the device transmits 2 streams of data, total power can be +3.0dB.



Item	Specification						Units	Note
	Mode			Min.	Typ.	Max.		
Power uncertainty due to environmental conditions ※ Temperature, Power Supply	802.11a	6-54Mbps	W52	-2.5	—	+2.5	dB	NOTE1
			W53	-2.5	—	+2.5	dB	NOTE1
			W56,W58	-2.5	—	+2.5	dB	NOTE1
	802.11na	MSC0-7	W52	-2.5	—	+2.5	dB	NOTE1
			W53	-2.5	—	+2.5	dB	NOTE1
		MCS8-15	W56,W58	-2.5	—	+2.5	dB	NOTE1
	802.11b	1-11Mbps		-2.5	—	+2.5	dB	NOTE1
	802.11g	6-54Mbps		-2.5	—	+2.5	dB	NOTE1
	802.11ng	MSC0-7,MCS8-15		-2.5	—	+2.5	dB	NOTE1

NOTE1: Operating Temperature

Frequency Accuracy (Operating Temperature)

Items	Specifications				Units	Remarks
	Standards		Min.	Typ.	Max.	
Frequency Accuracy	11a/11b/11g/11n		-20	0	+20	ppm

3.7. Wireless LAN Receiver Specifications

2.4GHz (Operating Temperature)

Items	Specifications					Units	Remarks
	Modes		Min.	Typ.	Max.		
Receiver Minimum Sensitivity	11b (FER<8%)	1Mbps	—	-88	-80	dBm	
		2Mbps	—	-85	-80	dBm	
		5.5Mbps	—	-84	-76	dBm	
		11Mbps	—	-82	-76	dBm	
	11g (PER<10%)	6Mbps	—	-87	-82	dBm	
		9Mbps	—	-86	-81	dBm	
		12Mbps	—	-84	-79	dBm	
		18Mbps	—	-83	-77	dBm	
		24Mbps	—	-79	-74	dBm	
		36Mbps	—	-75	-70	dBm	
		48Mbps	—	-71	-66	dBm	
		54Mbps	—	-70	-65	dBm	
	11ng HT20 (PER<10%)	MCS0/8	—	-87	-82	dBm	
		MCS1/9	—	-84	-79	dBm	
		MCS2/10	—	-82	-77	dBm	
		MCS3/11	—	-78	-74	dBm	
		MCS4/12	—	-74	-70	dBm	
		MCS5/13	—	-70	-66	dBm	
		MCS6/14	—	-69	-65	dBm	
		MCS7/15	—	-67	-64	dBm	

5GHz (Operating temperature)

Items	Specifications					Units	Remarks
	Modes		Min.	Typ.	Max.		
Receiver Minimum Sensitivity	11a (PER<10%)	6Mbps	—	-87	-82	dBm	
		9Mbps	—	-86	-81	dBm	
		12Mbps	—	-85	-79	dBm	
		18Mbps	—	-82	-77	dBm	
		24Mbps	—	-79	-74	dBm	
		36Mbps	—	-75	-70	dBm	
		48Mbps	—	-71	-66	dBm	
		54Mbps	—	-69	-65	dBm	
	11na HT20 (PER<10%)	MCS0/8	—	-87	-82	dBm	
		MCS1/9	—	-83	-79	dBm	
		MCS2/10	—	-80	-77	dBm	
		MCS3/11	—	-77	-74	dBm	
		MCS4/12	—	-73	-70	dBm	
		MCS5/13	—	-69	-66	dBm	
		MCS6/14	—	-66	-65	dBm	
		MCS7/15	—	-66	-64	dBm	
	11na HT40 (PER<10%)	MCS0/8	—	-84	-79	dBm	
		MCS1/9	—	-81	-76	dBm	
		MCS2/10	—	-78	-74	dBm	
		MCS3/11	—	-74	-71	dBm	
		MCS4/12	—	-70	-67	dBm	
		MCS5/13	—	-67	-63	dBm	
		MCS6/14	—	-64	-62	dBm	
		MCS7/15	—	-63	-61	dBm	

3.8. Bluetooth LAN General Specifications

Items	Specifications			Units	Remarks
Chipset	AR6234X, Core chip AR3002X CSP (Qualcomm Atheros)			—	V2.2.1
Core Specification	Bluetooth 4.0			—	
Operating Frequency Range	Mode	Min	Max		
	BR/EDR/LE	2402	2480	MHz	
Frequency Step	BR/EDR	1		MHz	Ch.1 — Ch.79
	LE	2		MHz	Ch.0 — Ch.39
Modulation Type	GFSK(1Mbps), $\Pi/4$ DQPSK(2Mbps), 8DQPSK(3Mbps)			—	
Packet Type	Common	NULL, POLL, FHS		—	
	ACL	DM1,DM3,DM5,AUX1, DH1,DH3,DH5,2DH1,2DH3,2DH5 3DH1,3DH3,3DH5		—	
	SCO	HV1,HV2,HV3,DV,EV3,2EV3		—	
Board Data	File Name	PS_ASIC_SDMAN2_20150806.pst		—	
	MD5 HASH	654E87D66EA880741752E37E18D08298		—	
Encryption	E0	128		bits	BR/EDR
	AES	128		bits	LE

3.9. Bluetooth Transmitter Specifications

Bluetooth BR/EDR/LE (+25°C)

Items	Specifications							Units	Remarks
	Standards				Min.	Typ.	Max.		
Maximum TX Power	BT_VD D	BR/ED R	Class1	Ch1-Ch79	+3.5	+7.0	+10.5	dBm	
	+3.3V	LE		Ch.0-Ch.39	-2.0	+1.5	+5.0	dBm	
	BT_VD D	BR/ED R	Class1	Ch1-Ch79	+3.0	+6.5	+10.0	dBm	
	+1.8V	LE		Ch.0-Ch.39	-2.5	+1.0	+4.5	dBm	
Tx Power Step	BDR/EDR (LE : Not support)			Ch1-Ch79	2.0	4.0	6.0	dB	8 steps

Frequency Accuracy (Operating Temperature)

Items	Specifications					Units	Remarks
	Standards		Min.	Typ.	Max.		
Center Frequency Accuracy	BR/EDR/LE		-20	—	+20	ppm	

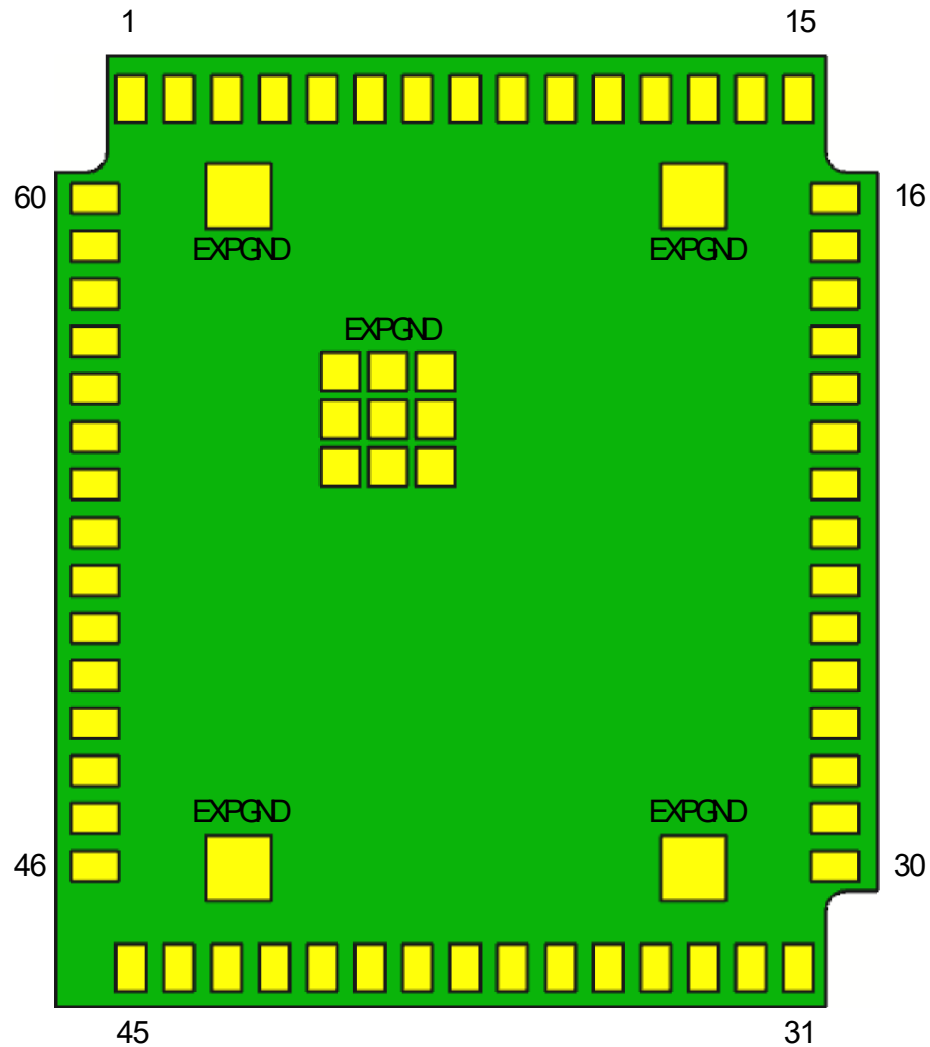
3.10. Bluetooth Receiver Specifications

Bluetooth BR/EDR/LE (Operating Temperature)

Items	Specifications					Units	Remarks
Receiver Minimum Sensitivity	Standards	Packet Types	Min.	Typ.	Max.		
	BR (BER<0.1%)	GFSK (1Mbps)	—	-83	-70	dBm	
	EDR (BER<0.01%)	Π /4 DQPSK (2Mbps)	—	-82	-70	dBm	
		8DQPSK (3Mbps)	—	-81	-70	dBm	
	LE (BER<0.1%)	GFSK (1Mbps)	—	-91	-70	dBm	

4. Signal Pin Specifications

4.1. SMT Type Pin Locations



BOTTOM VIEW

4.2. SMT Type Signal Descriptions



Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
1	NC	NA	NA	NA	NC pin.
2	NC	NA	NA	NA	NC pin.
3	GND	GND	NA	NA	Ground
4	NC	NA	NA	NA	NC pin.
5	BT_HOST_WKUP	DI,PU	High	BT_VDD	HOST Wake-Up BT. The Active mode is configurable by the driver. NC if not used. Internal 100kohm pull-up.
6	VDD	P	NA	NA	Main Power Supply +3.14V to +3.46V
7	WLAN_PWD_L	DI,PD	NA	VDD_SDIO	WLAN reset. (High=Reset,Low=WLAN awake). BT functionality is also disabled during WLAN_PWD_L is asserted because WLAN is sharing reference clock with Bluetooth.
8	RESERVED	NA	NA	NA	Reserved pin. Keep NC.
9	GND	GND	NA	NA	Ground
10	VDDIO	P	NA	NA	IO power supply +1.71 to +3.46V. Must be matched to BT_VDD and VDD_SDIO.

Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
11	VDD_SDIO	P	NA	NA	WLAN SDIO Power supply +1.71 to +3.46V. Must be matched to BT_VDD and VDD_IO.
12	VDD_SDIO	P	NA	NA	WLAN SDIO Power supply +1.71 to +3.46V. Must be matched to BT_VDD and VDD_IO.
13	BT_VDD	P	NA	NA	BT Power Supply +1.71 to +3.46V. Must supply even if not use BT. Must be matched to VDD_SDIO and VDD_IO.
14	BT_VDD	P	NA	NA	BT Power Supply +1.71 to +3.46V. Must supply even if not use BT. Must be matched to VDD_SDIO and VDD_IO.
15	BT_VDD	P	NA	NA	BT Power Supply +1.71 to +3.46V. Must supply even if not use BT. Must be matched to VDD_SDIO and VDD_IO.

Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
16	SD_CMD	D_IO,PU	High	VDD_SDIO	SDIO command for WLAN. Because this pin is used as Bootstrap option, must not be driven this pin till releasing the reset signal. Internal pull-up 10kohm.
17	SD_D3	D_IO,PU	High	VDD_SDIO	SDIO Data[3] for WLAN. Internal pull-up 10kohm.
18	SD_D2	D_IO,PU	High	VDD_SDIO	SDIO Data[2] for WLAN. Because this pin is used as Bootstrap option, must not be driven this pin till releasing the reset signal. Internal pull-up 10kohm.
19	SD_D1	D_IO,PU	High	VDD_SDIO	SDIO Data[1] for WLAN. Because this pin is used as Bootstrap option, must not be driven this pin till releasing the reset signal. Internal pull-up 10kohm.
20	SD_D0	D_IO,PU	High	VDD_SDIO	SDIO Data[0] for WLAN. Internal pull-up 10kohm.

Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
21	GND	GND	NA	NA	Ground
22	SD_CLK	DI	Hi-Z	VDD_SDIO	SDIO Clock for WLAN
23	GND	GND	NA	NA	Ground
24	BT_UART_RXD	DI	High	BT_VDD	UART RXD for BT. Tri-state after reset. NC if not use BT.
25	BT_UART_CTS	DI	High	BT_VDD	UART CTS for BT. NC if not use BT.
26	BT_UART_TXD	DO,PU	High	BT_VDD	UART TXD for BT. Internal pull-up 100kohm. NC if not use BT.
27	BT_UART_RTS	DO,PD	High	BT_VDD	UART RTS for BT. Internal pull-up 100kohm. NC if not use BT.
28	VDD	P	NA	NA	Main Power Supply +3.14V to +3.46V
29	VDD	P	NA	NA	Main Power Supply +3.14V to +3.46V
30	VDD	P	NA	NA	Main Power Supply +3.14V to +3.46V

Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
31	NC	NA	NA	NA	NC pin.
32	GND	GND	NA	NA	Ground
33	GND	GND	NA	NA	Ground
34	GND	GND	NA	NA	Ground
35	NC	NA	NA	NA	NC / Ground
36	NC	NA	NA	NA	NC / Ground
37	NC	NA	NA	NA	NC / Ground
38	NC	NA	NA	NA	NC / Ground
39	NC	NA	NA	NA	NC / Ground
40	NC	NA	NA	NA	NC / Ground
41	NC	NA	NA	NA	NC / Ground
42	NC	NA	NA	NA	NC / Ground
43	GND	GND	NA	NA	Ground
44	GND	GND	NA	NA	Ground
45	GND	GND	NA	NA	Ground

Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
46	RESERVED	NA	NA	NA	Recommended to connect to a test pad.(or NC)
47	WOW	D_IO,PD	Low	VDDIO	Wake on Wireless signal. Active High. (Keeps High until wake up indication from the host) Internal Pull-down 100kohm. NC if not used.
48	PCM_SYNC	D_IO,PD	High	BT_VDD	BT PCM SYNC. Internal pull-down 100kohm. NC if not use BT Audio. High state during reset.
49	PCM_BCK	D_IO,PD	High	BT_VDD	BT PCM BCK. Internal pull-down 100kohm. NC if not use BT Audio. High state during reset.
50	PCM_IN	DI,PD	High	BT_VDD	BT PCM IN. Internal pull-down 100kohm. NC if not use BT Audio. High state during reset.

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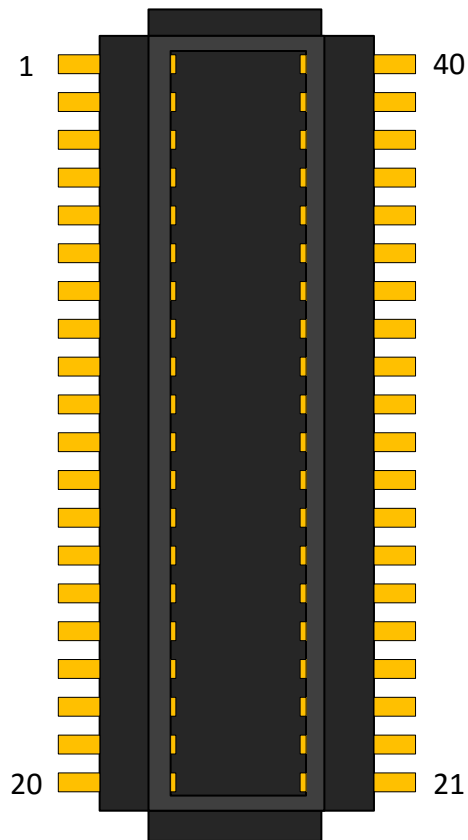
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Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
51	PCM_OUT	DO,PD	High	BT_VDD	BT PCM OUT. Internal pull-down 100kohm. NC if not use BT Audio. High state during reset.
52	GND	GND	NA	NA	Ground
53	BT_WKUP_HOST	DO	High	BT_VDD	BT wake-up HOST. The Active mode is configurable by the driver. NC if not use.
54	GND	GND	NA	NA	Ground
55	RESERVED	NA	NA	NA	Reserved pin. Keep NC.
56	RESERVED	NA	NA	NA	Reserved pin. Keep NC.
57	GND	GND	NA	NA	Ground
58	BT_PWD_L	DI	NA	BT_VDD	BT reset. (0=Reset, 1=BT awake) Pull-up in the out of module. <u>Must be de-asserted (High) before WLAN driver is loaded even if BT is not used.</u> <u>This signal can be Low after initial of WLAN driver is finished.</u>
59	RESERVED	NA	NA	NA	Reserved pin. Keep NC.
60	RESERVED	NA	NA	NA	Reserved pin. Keep NC.

NOTE1: In case using only Bluetooth and reducing current consumption, switch WLAN to deep sleep mode after initial of WLAN is finished.

NOTE2: Reset state conditions must be maintained during starting up because some of signal pins are used for boot strap option pins.(参考回路図を参照 / See the reference schematic.)

4.3. B2B Type Pin Locations



BOTTOM VIEW



Connector Part Number : 14 5602 040 000 829 H+ (Kyocera ELCO)
Mating connector : 24 5602 640 000 829 H+ (Kyocera ELCO)

4.4. B2B Type Signal Descriptions

AA

Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
1	VDD	P	NA	NA	Main Power Supply +3.14V to +3.46V
2	VDD	P	NA	NA	Main Power Supply +3.14V to +3.46V
3	BT_VDD	P	NA	NA	BT Power Supply +1.71 to +3.46V. Must supply even if not use BT. Must be matched to VDD_SDIO and VDD_IO.
4	BT_UART_RTS	DO,PD	High	BT_VDD	UART RTS for BT. Internal pull-up 100kohm. NC if not use BT.
5	BT_UART_TXD	DO,PU	High	BT_VDD	UART TXD for BT. Internal pull-up 100kohm. NC if not use BT.
6	BT_UART_CTS	DI	High	BT_VDD	UART CTS for BT. NC if not use BT.
7	BT_UART_RXD	DI	High	BT_VDD	UART RXD for BT. Tri-state after reset. NC if not use BT.
8	GND	GND	NA	NA	Ground
9	SD_CLK	DI	Hi-Z	VDD_SDIO	SDIO Clock for WLAN
10	GND	GND	NA	NA	Ground

Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
11	SD_D0	D_IO,PU	High	VDD_SDIO	SDIO Data[0] for WLAN. Internal pull-up 10kohm.
12	SD_D1	D_IO,PU	High	VDD_SDIO	SDIO Data[1] for WLAN. Because this pin is used as Bootstrap option, must not be driven this pin till releasing the reset signal. Internal pull-up 10kohm.
13	SD_D2	D_IO,PU	High	VDD_SDIO	SDIO Data[2] for WLAN. Because this pin is used as Bootstrap option, must not be driven this pin till releasing the reset signal. Internal pull-up 10kohm.
14	SD_D3	D_IO,PU	High	VDD_SDIO	SDIO Data[3] for WLAN. Internal pull-up 10kohm.
15	SD_CMD	D_IO,PU	High	VDD_SDIO	SDIO command for WLAN. Because this pin is used as Bootstrap option, must not be driven this pin till releasing the reset signal. Internal pull-up 10kohm.
16	GND	GND	NA	NA	Ground
17	RESERVED	NA	NA	NA	Reserved pin. Keep NC.
18	PCM_OUT	DO,PD	High	BT_VDD	BT PCM OUT. Internal pull-down 100kohm. NC if not use BT Audio.High state during reset.
19	NC	NA	NA	NA	NC pin.
20	VDD_SDIO	P	NA	NA	WLAN SDIO Power supply +1.71 to +3.46V. Must be matched to BT_VDD and VDD_IO.



Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
21	WLAN_PWD_L	DI,PD	NA	VDD_SDIO	WLAN reset. (High=Reset,Low=WLAN awake). BT functionality is also disabled during WLAN_PWD_L is asserted because WLAN is sharing reference clock with Bluetooth.
22	BT_HOST_WKUP	DI,PU	High	BT_VDD	HOST Wake-Up BT. The Active mode is configurable by the driver. NC if not used. Internal 100kohm pull-up.
23	NC	NA	NA	NA	NC pin.
24	NC	NA	NA	NA	NC pin.
25	NC	NA	NA	NA	NC pin.
26	GND	GND	NA	NA	Ground
27	PCM_IN	DI,PD	High	BT_VDD	BT PCM IN. Internal pull-down 100kohm. NC if not use BT Audio. High state during reset.
28	PCM_BCK	D_IO,PD	High	BT_VDD	BT PCM BCK. Internal pull-down 100kohm. NC if not use BT Audio. High state during reset.
29	GND	GND	NA	NA	Ground
30	RESERVED	NA	NA	NA	Reserved pin. Keep NC.



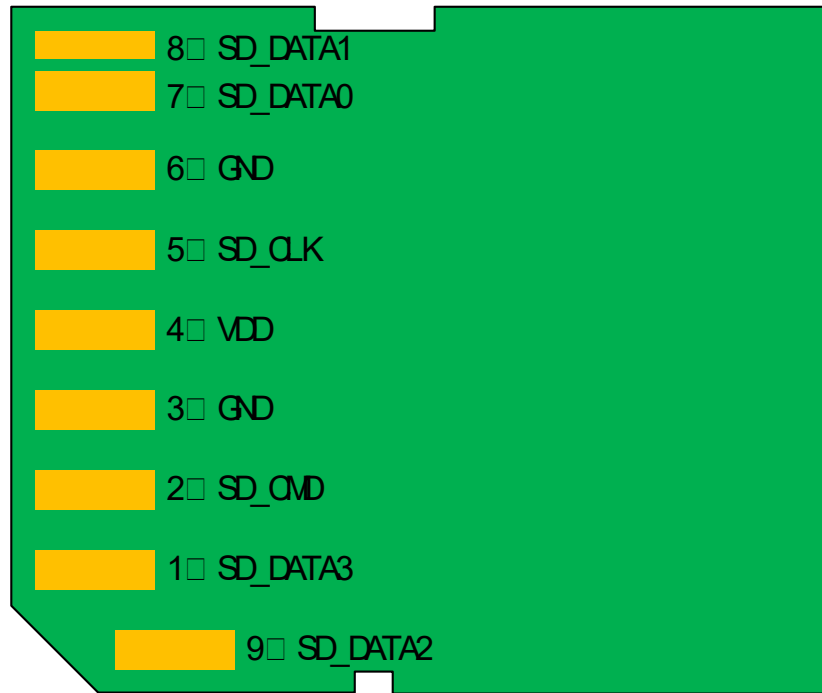


Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
31	PCM_SYNC	D_IO,PD	High	BT_VDD	BT PCM SYNC. Internal pull-down 100kohm. NC if not use BT Audio. High state during reset.
32	GND	GND	NA	NA	Ground
33	RESERVED	NA	NA	NA	Reserved pin. Keep NC.
34	RESERVED	NA	NA	NA	Reserved pin. Keep NC.
35	GND	GND	NA	NA	Ground
36	BT_PWD_L	DI	NA	BT_VDD	BT reset. (0=Reset, 1=BT awake) Pull-up in the out of module. <u>Must be de-asserted (High) before WLAN driver is loaded even if BT is not used.</u> <u>This signal can be Low after initial of WLAN driver is finished.</u>
37	RESERVED	NA	NA	NA	Reserved pin. Keep NC.
38	BT_WKUP_HOST	DO	High	BT_VDD	BT wake-up HOST. The Active mode is configurable by the driver. NC if not use.
39	WOW	IO, PD	Low	VDDIO	Wake on Wireless signal. Active High. (Keeps High until wake up indication from the host) Internal Pull-down (approx. 100kohm). NC if not used.
40	VDDIO	P	NA	NA	IO power supply +1.71 to +3.46V. Must be matched to BT_VDD.

NOTE1: In case using only Bluetooth and reducing current consumption, switch WLAN to deep sleep mode after initial of WLAN is finished.

NOTE2: Reset state conditions must be maintained during starting up because some of signal pins are used for boot strap option pins.(See the reference schematic.)

4.5. SD Card Type Edge Pin Locations



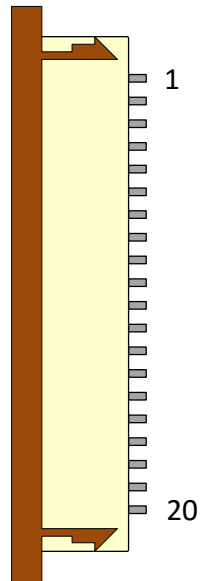
SD Card Edge (BOTTOM VIEW)

4.6. SDCARD Type Edge Signal Descriptions



Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
1	SD_D3	D_IO,PU	High	VDD_SDIO	SDIO Data[3] for WLAN. Internal pull-up 10kohm.
2	SD_CMD	D_IO,PU	High	VDD_SDIO	SDIO command for WLAN. Because this pin is used as Bootstrap option, must not be driven this pin till releasing the reset signal. Internal pull-up 10kohm.
3	GND	GND	NA	NA	Ground
4	VDD	P	NA	NA	Main Power Supply +3.14V to +3.46V
5	SD_CLK	DI	Hi-Z	VDD_SDIO	SDIO Clock for WLAN
6	GND	GND	NA	NA	Ground
7	SD_D0	D_IO,PU	High	VDD_SDIO	SDIO Data[0] for WLAN. Internal pull-up 10kohm.
8	SD_D1	D_IO,PU	High	VDD_SDIO	SDIO Data[1] for WLAN. Because this pin is used as Bootstrap option, must not be driven this pin till releasing the reset signal. Internal pull-up 10kohm.
9	SD_D2	D_IO,PU	High	VDD_SDIO	SDIO Data[2] for WLAN. Because this pin is used as Bootstrap option, must not be driven this pin till releasing the reset signal. Internal pull-up 10kohm.

4.7. SD Card Type FFC Pin Locations



FFC Connector (BOTTOM VIEW)

Connector Part Number
08 6210 020 340 800+ (Kyocera ELCO)

4.8. SDCARD Type FFC Signal Descriptions

Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
1	GND	GND	NA	NA	Ground
2	BT_UART_RTS	DO,PD	High	BT_VDD	UART RTS for BT. Internal pull-up 100kohm. NC if not use BT.
3	BT_UART_TXD	DO,PU	High	BT_VDD	UART TXD for BT. Internal pull-up 100kohm. NC if not use BT.
4	BT_UART_CTS	DI	High	BT_VDD	UART CTS for BT. NC if not use BT.
5	BT_UART_RXD	DI	High	BT_VDD	UART RXD for BT. Tri-state after reset. NC if not use BT.
6	VDD	P	NA	NA	Main Power Supply +3.14V to +3.46V
7	VDD	P	NA	NA	Main Power Supply +3.14V to +3.46V
8	WOW	IO, PD	Low	VDDIO	Wake on Wireless signal. Active High. (Keeps High until wake up indication from the host) Internal Pull-down (approx. 100kohm). NC if not used.
9	PCM_SYNC	D_IO,PD	High	BT_VDD	BT PCM SYNC. Internal pull-down 100kohm. NC if not use BT Audio. High state during reset.
10	PCM_BCK	D_IO,PD	High	BT_VDD	BT PCM BCK. Internal pull-down 100kohm. NC if not use BT Audio. High state during reset.



Pin Number	Pin Name	Type	Reset State	I/O Domain	Descriptions
11	PCM_IN	DI,PD	High	BT_VDD	BT PCM IN. Internal pull-down 100kohm. NC if not use BT Audio. High state during reset.
12	PCM_OUT	DO,PD	High	BT_VDD	BT PCM OUT. Internal pull-down 100kohm. NC if not use BT Audio.High state during reset.
13	GND	GND	NA	NA	Ground
14	BT_WKUP_HOST	DO	High	BT_VDD	BT wake-up HOST. The Active mode is configurable by the driver. NC if not use.
15	BT_PWD_L	DI	NA	BT_VDD	BT reset. (0=Reset, 1=BT awake) Pull-up in the out of module. <u>Must be de-asserted (High) before WLAN driver is loaded even if BT is not used.</u> <u>This signal can be Low after initial of WLAN driver is finished.</u>
16	NC	NA	NA	NA	NC pin.
17	NC	NA	NA	NA	NC pin.
18	NC	NA	NA	NA	NC pin.
19	BT_HOST_WKUP	DI	High	BT_VDD	HOST Wake-Up BT. Active mode is configurable by the driver. NC if not used. 100kohm pull-up.
20	NC	NA	NA	NA	NC pin.

NOTE1: In case using only Bluetooth and reducing current consumption, switch WLAN to deep sleep mode after initial of WLAN is finished.

NOTE2: Reset state conditions must be maintained during starting up because some of signal pins are used for boot strap option pins.(See the reference schematic.)

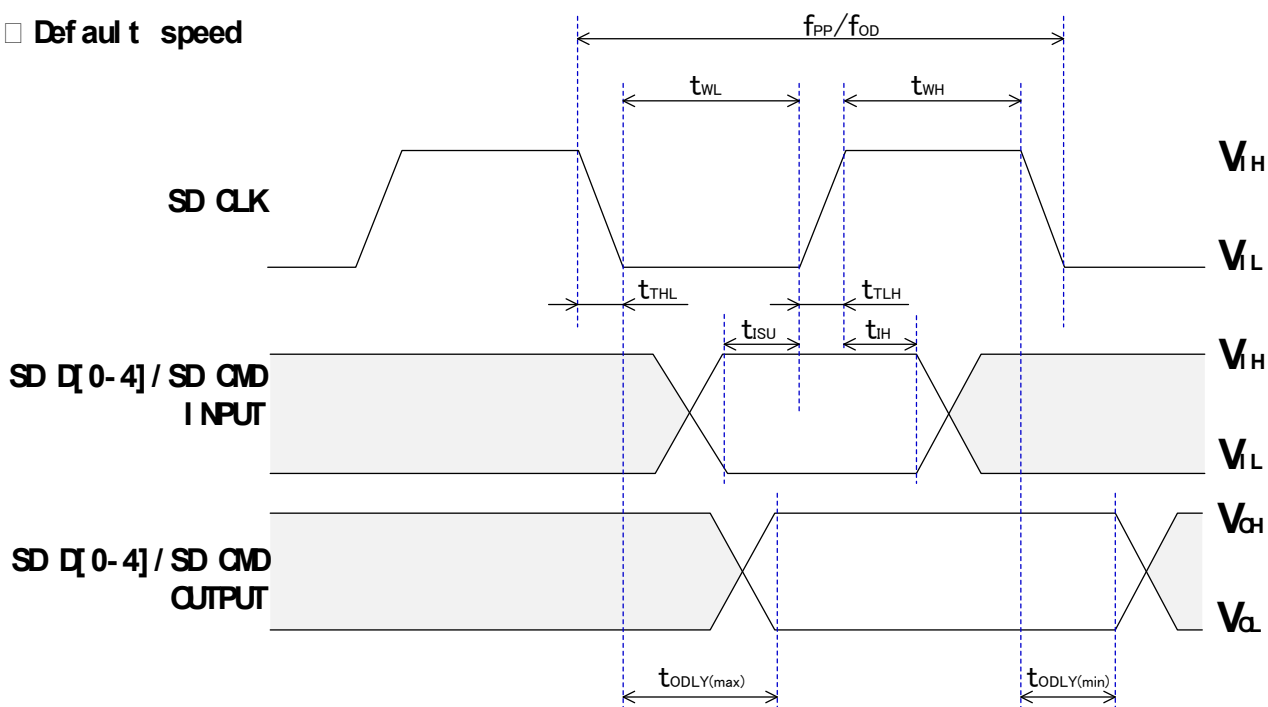
4.9. I/O Domain Definitions

Symbols	Descriptions
D_IO	CMOS bidirectional digital signal
DI	CMOS digital input
DO	CMOS digital output
PU	Input signal with weak pull-up.
PD	Input signal with weak pull-down.
P	Voltage supply
GND	Ground
NC	No connection
NA	Not applicable
_L	Active Low

5. Interface / Timing Specifications

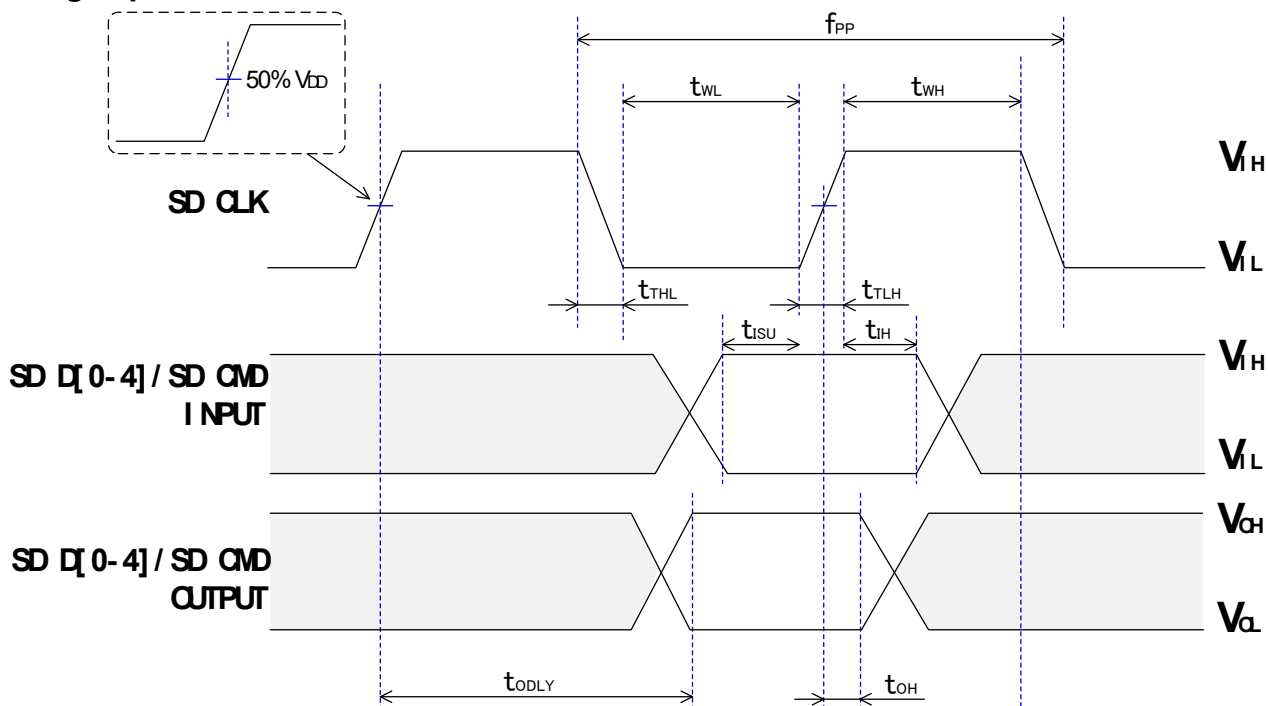
SDIO Interface specifications for WLAN

☐ Default speed



Symbols	Items	Specifications		Units	Remarks
		Min.	Max.		
f_{PP}	Clock frequency Data Transfer Mode	0	25	MHz	
f_{OD}	Clock frequency Identification Mode	100	400	kHz	Stop:0Hz
t_{WL}	Clock low time	10	—	nsec	
t_{WH}	Clock high time	10	—	nsec	
t_{TLH}	Clock rise time	—	10	nsec	
t_{THL}	Clock fall time	—	10	nsec	
t_{ISU}	Input setup time	5	—	nsec	
t_{IH}	Input hold time	5	—	nsec	
t_{ODLY}	Output Delay time during Data Transfer Mode	—	14	nsec	
t_{ODLY}	Output Delay time during Identification Mode	—	50	nsec	

□ High speed



Symbols	Items	Specifications		Units	Remarks
		Min.	Max.		
f_{PP}	Clock frequency Data Transfer Mode	0	50	MHz	
t_{WL}	Clock low time	7	—	nsec	
t_{WH}	Clock high time	7	—	nsec	
t_{TLH}	Clock rise time	—	3	nsec	
t_{THL}	Clock fall time	—	3	nsec	
t_{ISU}	Input setup time	6	—	nsec	
t_{IH}	Input hold time	2	—	nsec	
t_{OH}	Output Delay time during Data Transfer Mode	—	14	nsec	
t_{ODLY}	Output Delay time during Identification Mode	2.5	—	nsec	

5.1. UART Interface Specifications for Bluetooth

This module supports standard Bluetooth stack compatible HCI-UART interface.

Items	Specifications	Units	Remarks
Baud rates	115200, 375000, 460800, 750000 1500000, 3000000, 4000000	bps	
Number of data bits	8	bits	
Parity bit	None	—	
Stop bit	1	bit	
Flow control	RTS/CTS	—	

※ Flow control is necessary.

※ See Bluetooth core specifications from Bluetooth SIG for further information.

<https://www.bluetooth.com/specifications/>

The Link URL might be changed or be removed without notification.

5.2. PCM Interface Specifications for Bluetooth

This module supports the following CODECs, and supports both 8kHz / 16kHz sampling. See the datasheet of the CODEC for further information.

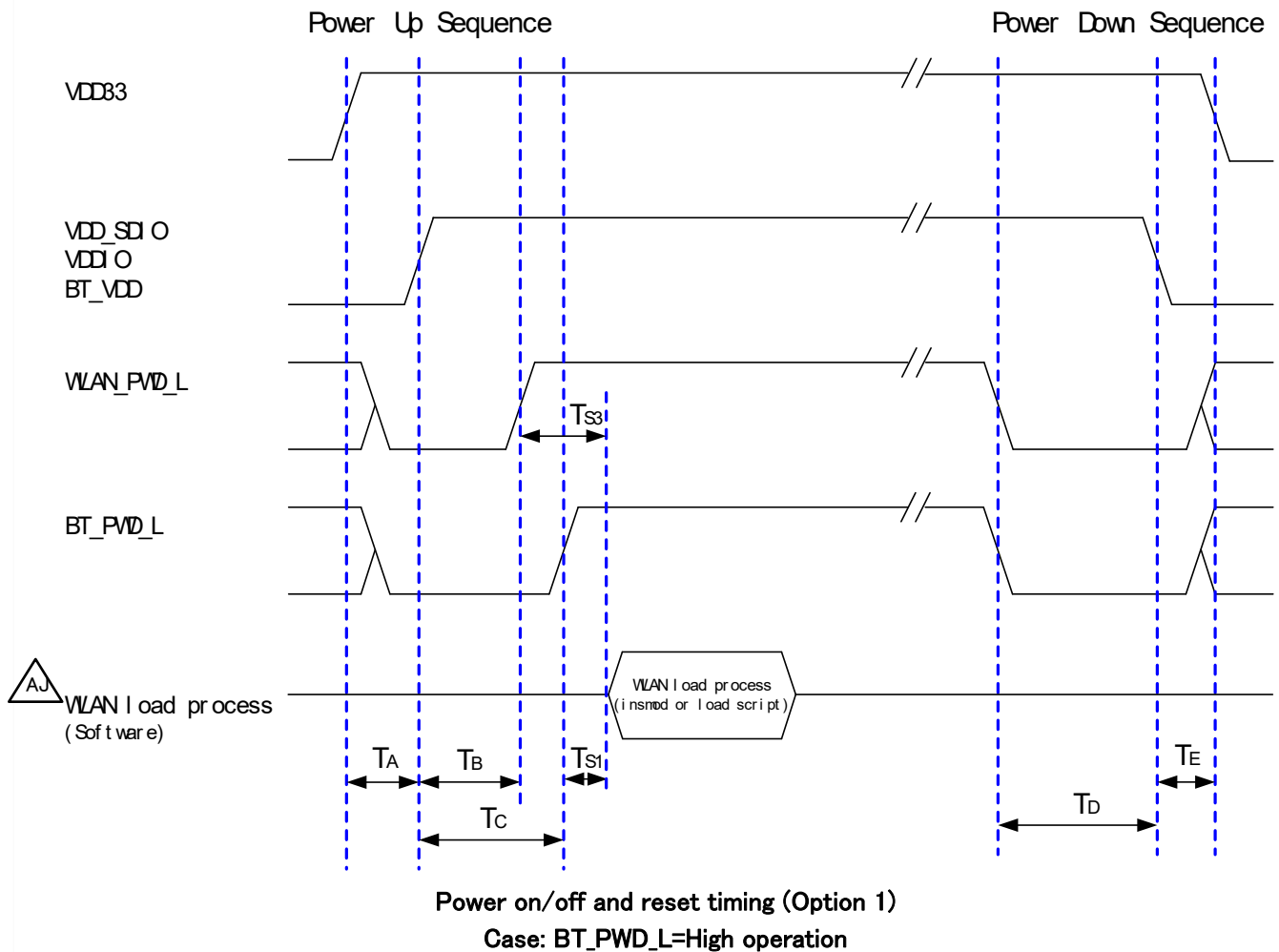
Bluetooth block can operate as the PCM interface master generating an output clock or configured as a PCM slave. It supports 13-bit, 16-bit, 8-bit, or 14-bit, μ -law, A-law, or linear mono sample formats 8k, 16k, 32k, 48k, 64k, 94k samples.

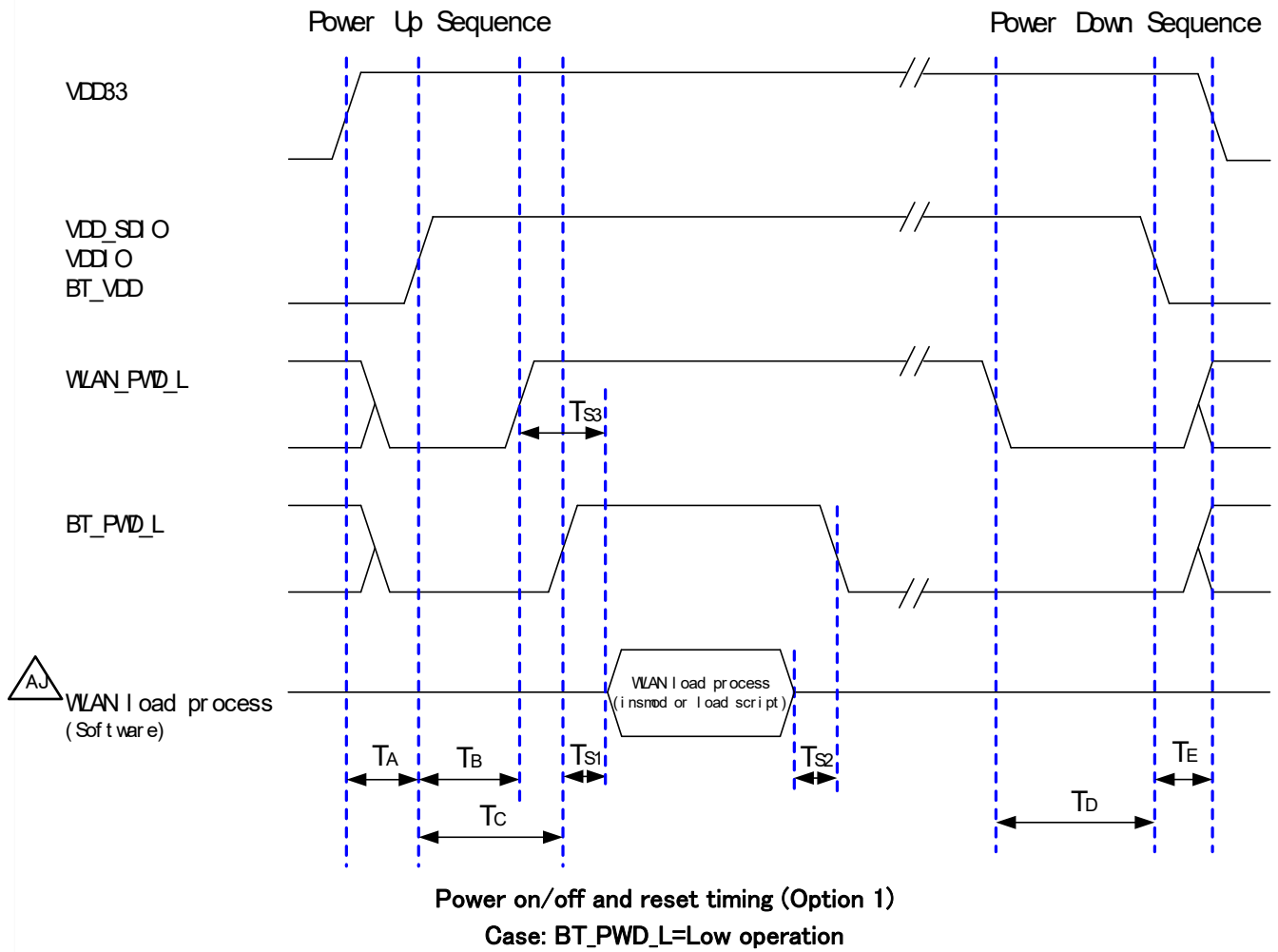
Supported CODECs

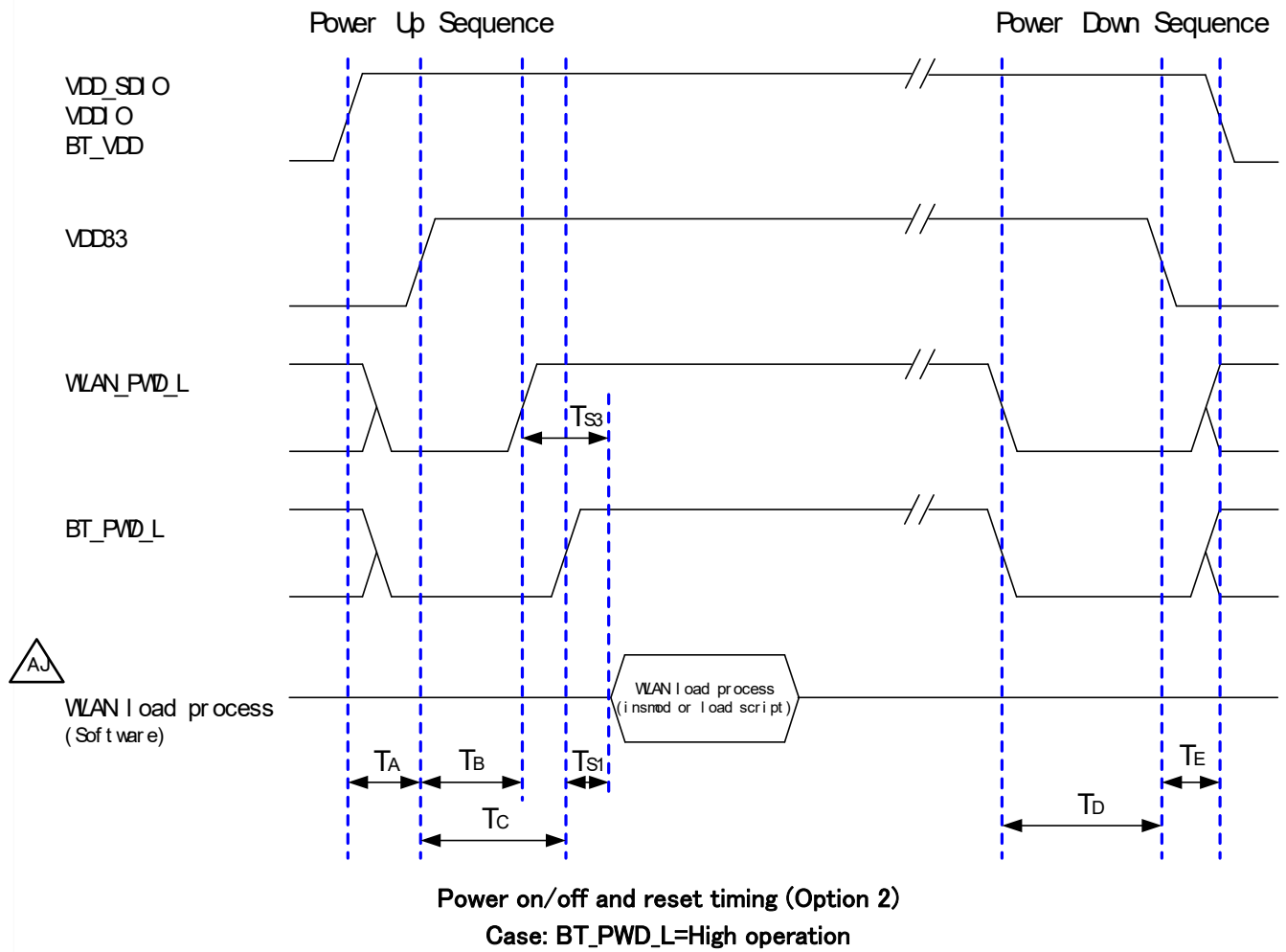
Nuboton	W681360
Wolfs	WM8974
Realtek	ALC5620

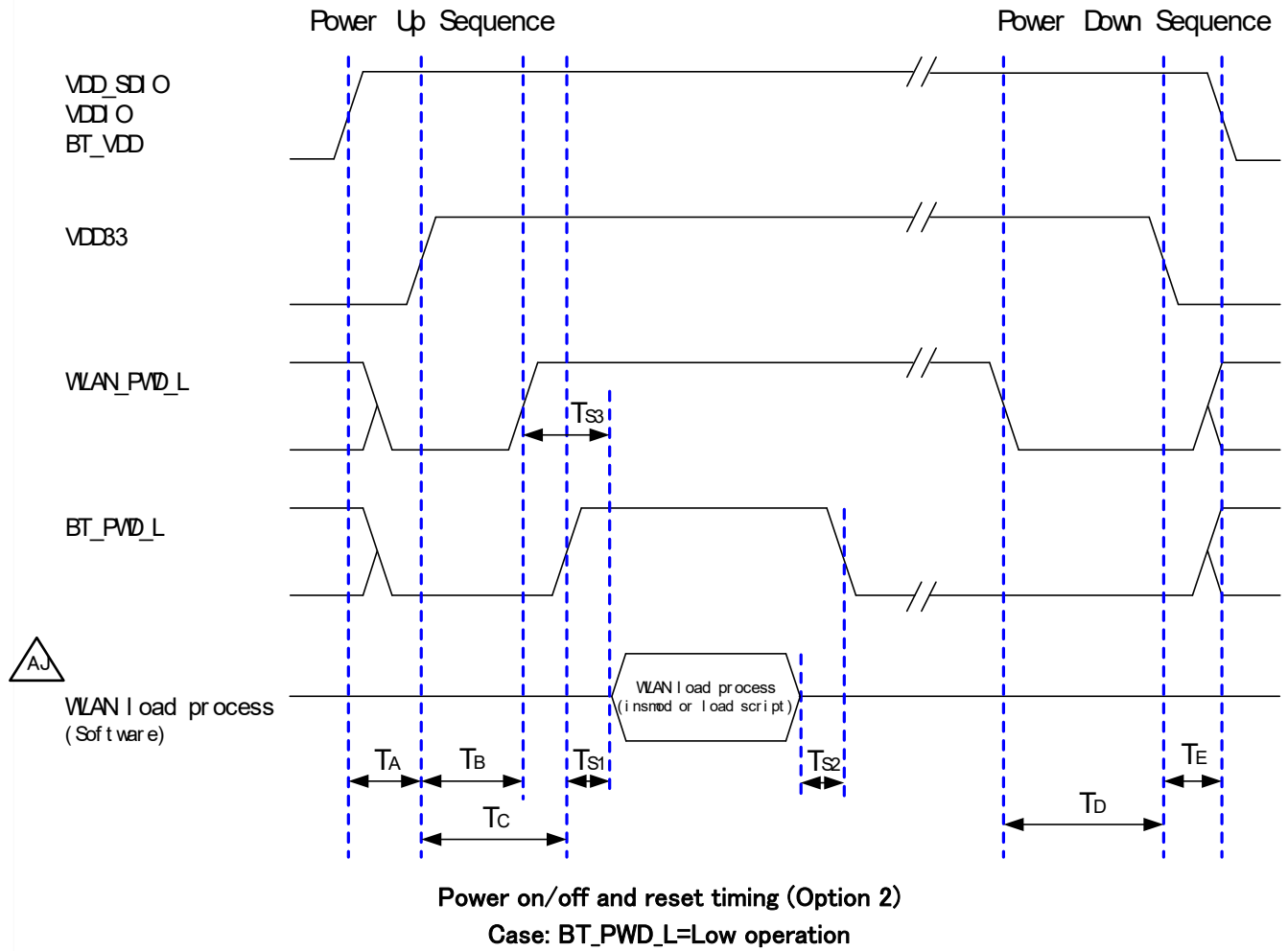
5.3. Power On/Off and Reset Timing

Boot strap pins shown in § 4 are fixed by negation of WLAN_PWD_L. See descriptions in § 4 to know internal pull directions.

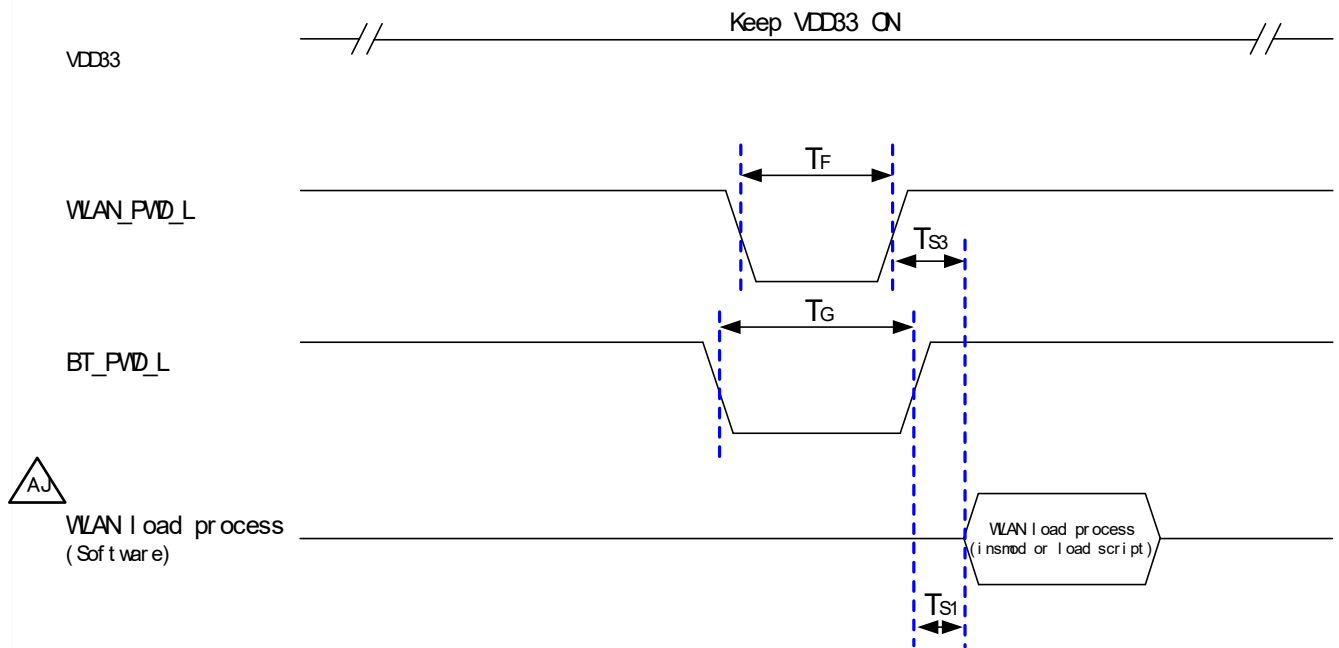








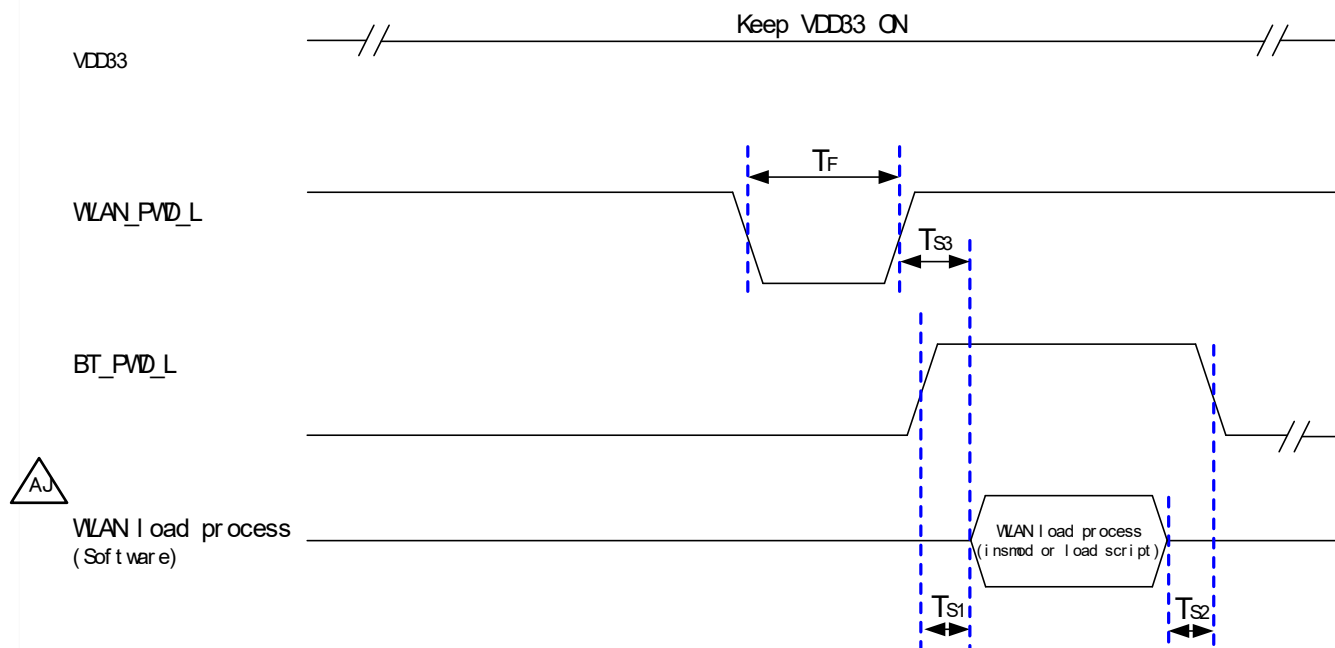
Reset and Power Down Timing



Hot reset timing

Case: BT_PWD_L=High operation

Reset and Power Down Timing



Hot reset timing

Case: BT_PWD_L=Low operation

Timing	Description	Specification		Units	Remarks
		Min.	Max.		
T _A	Time between VDD33 ON and VDD_SDIO,VDDIO,VDD_BT ON	0	—	μ sec	
T _B	Time between VIO supplies VDD_SDIO,VDDIO,VDD_BT ON and WLAN_PWD_L High	3	—	msec	
T _C	Time between VIO supplies VDD_SDIO,VDDIO,VDD_BT ON and BT_PWD_L High	9	—	msec	NOTE1,NOTE2
T _D	Time between WLAN_PWD_L=Low/BT_PWD_L=Low and VDD33 VDD_SDIO,VDDIO, VDD_BT OFF	0	—	μ sec	
T _E	Time between VDD_SDIO,VDDIO,VDD_BT OFF and VDD33 OFF	No requirements			
T _F	Time of WLAN_PWD_L assertion during reset or power down period. Both +3.3V and VIO should keep ON.	5	—	μ sec	
T _G	Time of BT_PWD_L assertion during reset or power down period. Both +3.3V and VIO should keep ON.	5	—	msec	NOTE1,NOTE2
 T _{S1}	Time from BT_PWD_L = High (De-assert) to the start of the WLAN load process.	0	—	msec	NOTE1,NOTE2
 T _{S2}	Time from the completion of processing of WLAN load process until you BT_PWD_L = Low (assert).	0	—	msec	NOTE1,NOTE2
 T _{S3}	Time from the completion of processing of WLAN load process until you WLAN_PWD_L = Low (assert).	0	—	msec	



NOTE1: BT_PWD_L must be de-asserted (High) before WLAN driver is loaded even if BT is not used.

NOTE2: **Board:PW101980BA**

BT_PWD_L cannot keep assert state (Low). This signal must be de-asserted after reset.

Board:PW101980CX

BT_PWD_L can keep assert state (Low) after WLAN initial is finished.

6. Standards Compliance

6.1. Standard List

Standards conformity :

- IEEE802.11-2012
- Bluetooth 4.0+LE Dual mode (Bluetooth QDID : 68764, DID : D026477)
- SDIO v2.0

Law regulation compliance :

- Japan Radio Law (MIC)
 - Article 2 Section 1 Number 19 (Master/Station mode)
 - Article 2 Section 1 Number 19-3 (W52 Master/Station mode、W53 Station mode)
 - Article 2 Section 1 Number 19-3-2 (Station mode)

Certification number : **007-AD0088**

- FCC Part15 (Subpart C, Subpart E (UNII-1/2/2Ext/3))
(2.4GHz,W52,W58 Master/Station mode、W53,W56 Station mode)
ID:N6C-SDMAN2
- IC RSS (UNII-1/2/2Ext/3)
(2.4GHz,W52,W58 Master/Station mode、W53,W56 Station mode)
ID:4908A-SDMAN2
- CE ETSI (EN 300 328, EN 301 893) (Master/Station mode)
(2.4GHz,W52 Master/Station mode、W53,W56 Station mode)
- CE RoHS Directive

Countries :

- Asia
 - Japan
- North America
 - United States
 - Canada
- EU

6.2. Recommended Antenna List

Antennas	Vendors	2.4GHz Gain	5GHz Gain	MIC No.19	MIC No.19-3	MIC No.19-3-2	FCC Subpart-C	FCC Subpart-E	ETSI EN30032 9	ETSI EN30189 3
H2B1PC1A1C (AA258) (Include cable loss)	Unictron	+1.8dBi	+3.9dBi	☒	☒	☒	☒	☒	☒	☒
H2U84W1H1S (AA077) (On-board antenna)	Unictron	+2.1dBi	+2.2dBi	☒	☒	☒	☒	☒	☒	☒
H2B1PD1A1C (AA222) (Include cable loss)	Unictron	+2.6dBi	+3.3dBi	☒	☒	☒	—	—	—	—
1000418 (Include cable loss)	Ethertronics	+2.5dBi	+3.5dBi	☒	☒	☒	—	—	—	—
ANTDC-081A0/B0 (Include cable loss)	Sansei-Denki	+2.0dBi	+2.0dBi	☒	☒	☒	☒	☒	☒	☒
ANTDP-027A0 (Exclude cable loss)	Sansei-Denki	+1.5dBi	+2.1dBi	☒	☒	☒	☒	☒	☒	☒

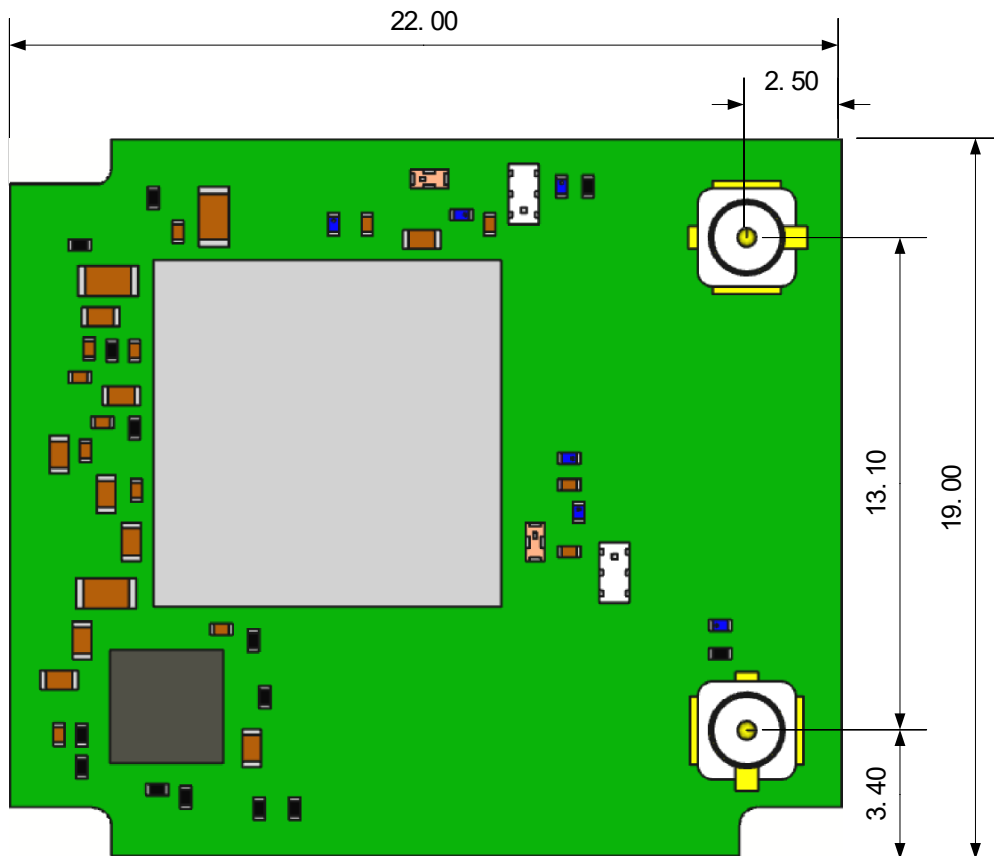
NOTE1: The above certification is effective only with the silex recommended antennas, silex recommended board data file and driver. However, the re-certification might be required in the case of the final product form even if the silex recommended antennas are used or no use of the silex driver.

NOTE2: In case using this module with Bluetooth, +5.0dBi@2400MHz-2500MHz antenna including cable loss must be used.

NOTE3: EMC certification of each country might be required as the final product.

7. Mechanical Specifications

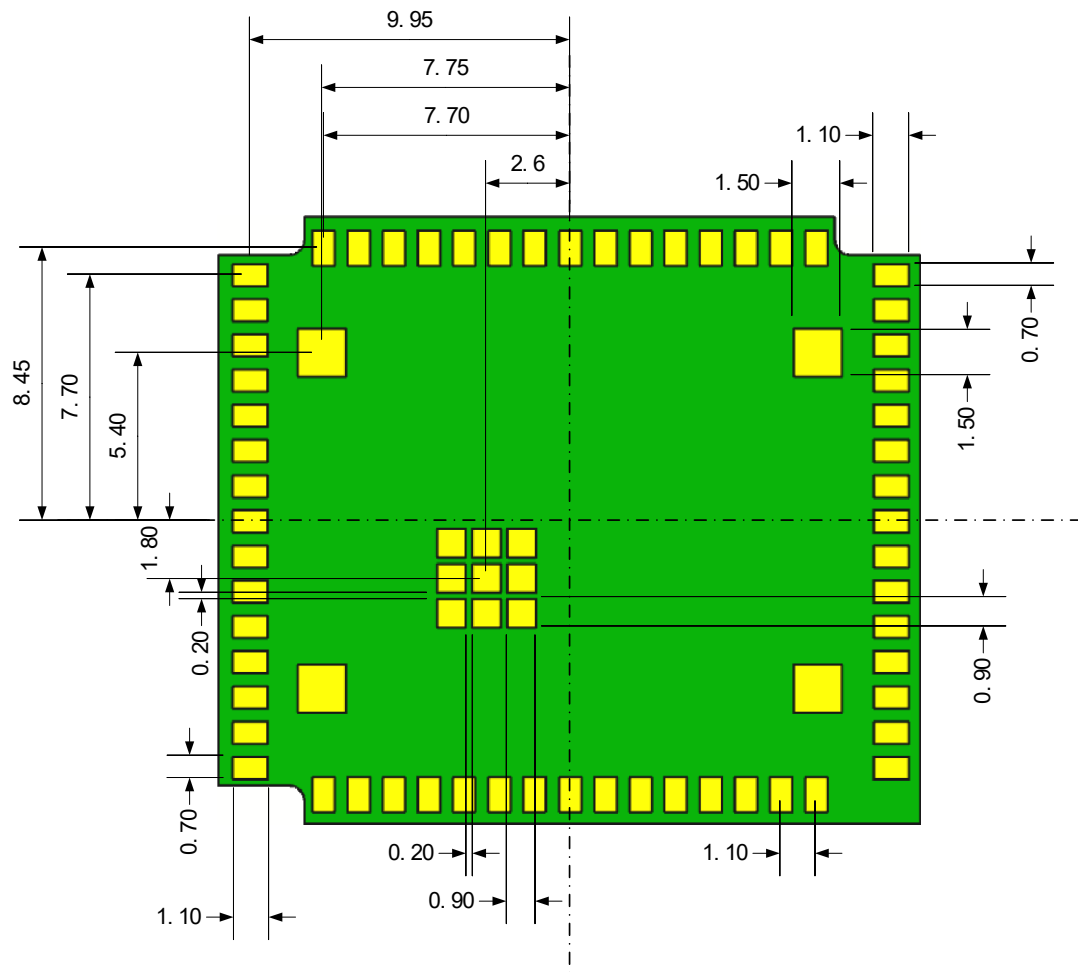
Surface Mount Type



(mm)

TOP VIEW

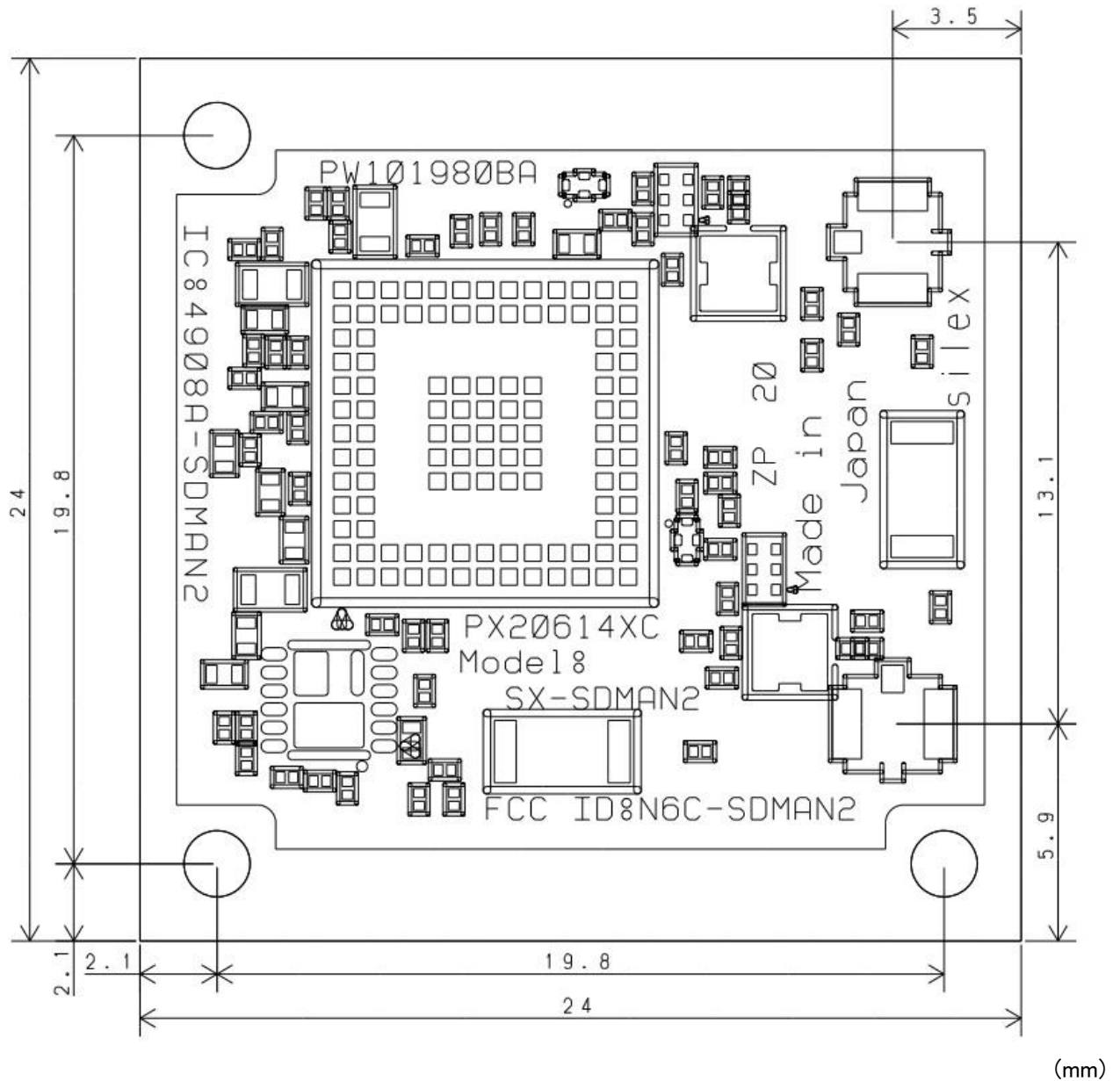
All dimension tolerances are ± 0.15 mm, unless otherwise specified.



(mm)
BOTTOM VIEW

All dimension tolerances are ± 0.15 mm, unless otherwise specified.

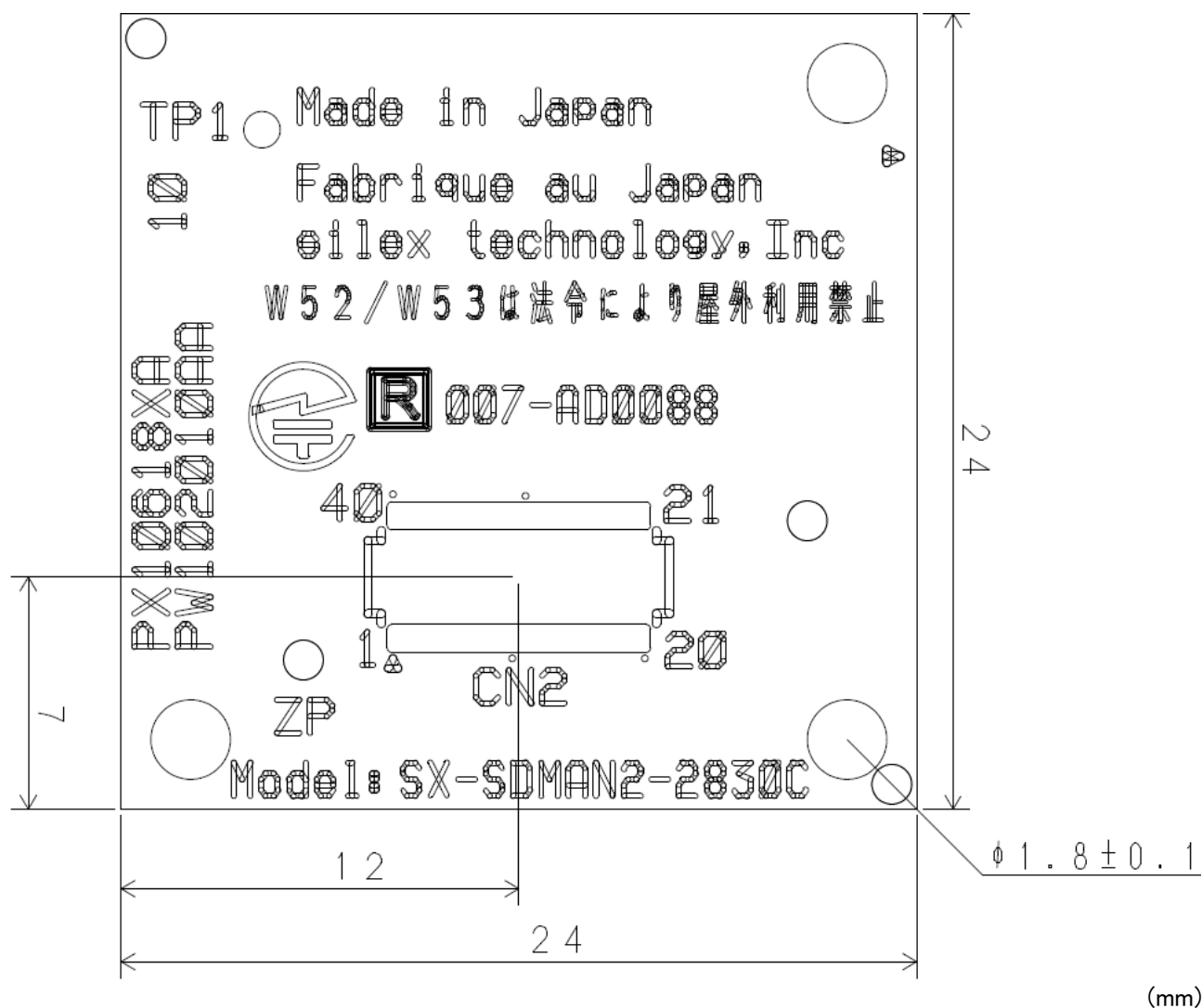
Board to Board Connector Type



TOP VIEW

All dimension tolerances are ± 0.15 mm, unless otherwise specified.

Recommended screw/washer is M1.7

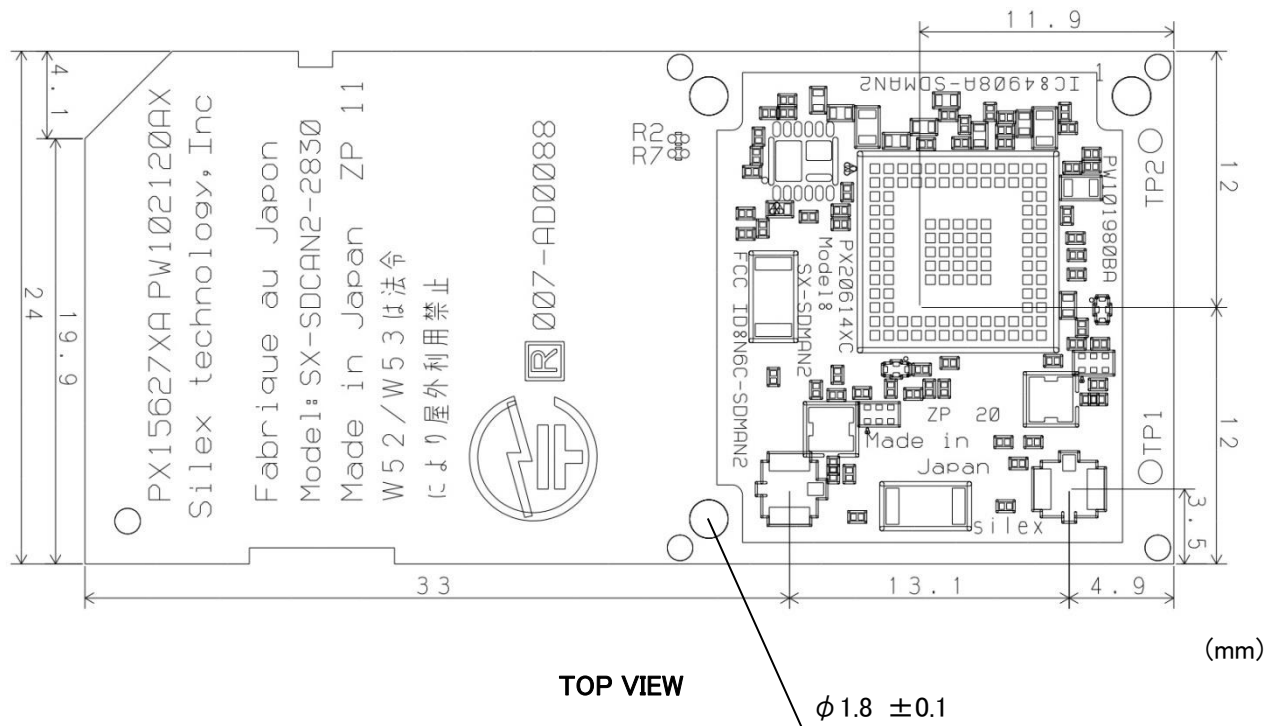


BOTTOM VIEW

All dimension tolerances are ± 0.15 mm, unless otherwise specified.

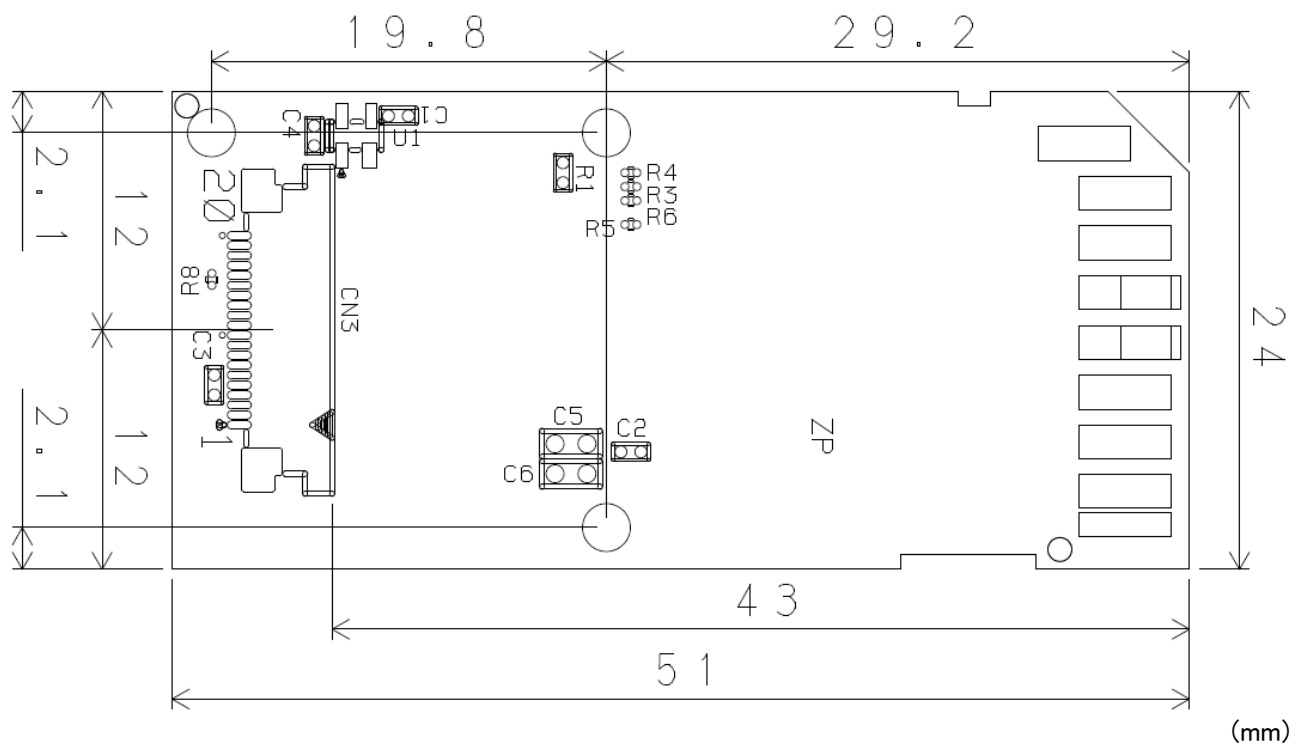
Recommended screw/washer is M1.7

SDCARD Type



All dimension tolerances are ± 0.15 mm, unless otherwise specified.

Recommended screw/washer is M1.7



TOP VIEW

All dimension tolerances are ± 0.15 mm, unless otherwise specified.

Recommended screw/washer is M1.7

Thickness

Items	Thickness	Descriptions
SMT (A simple substance)	2.25 mm +/- 0.15 mm	
SMT (Connector mating)	3.50 mm +/- 0.15mm	Mating Hight Antenna Connector = 2.50 mm
B2B (A simple substance)	4.45 mm +/- 0.30 mm	
B2B (Connector mating)	6.00 mm +/- 0.30 mm	Mating Hight B2B connector = 1.50 mm Antenna Connector = 2.50 mm
SDCARD (A simple substance)	5.80 mm +/- 0.30 mm	
SDCARD (Connector mating)	7.05 mm +/-0.3 mm	Mating Hight Antenna Connector = 2.50 mm

PCB Thickness

Items	Thickness	Descriptions
SMT PCB	1.00 mm +/- 0.15 mm	
B2B PCB	2.00 mm +/- 0.30 mm	
SD CARD PCB	1.50 mm +/- 0.15 mm	

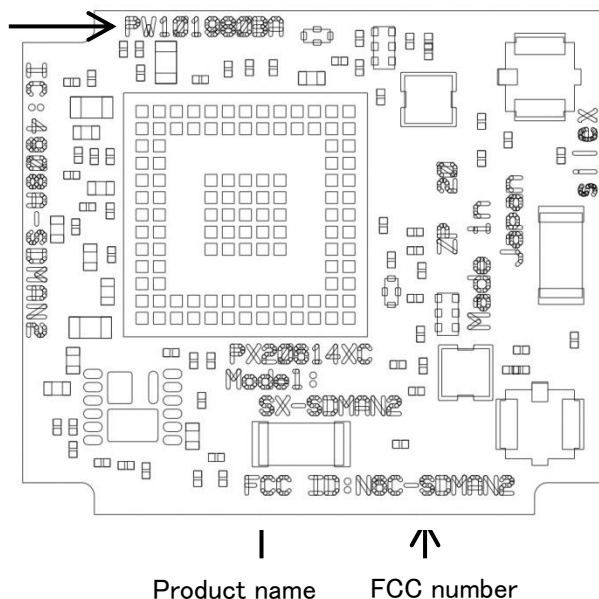
8. Marking Specifications

SMT Version

PW101980: PCB number

Final 2 digits: Board version

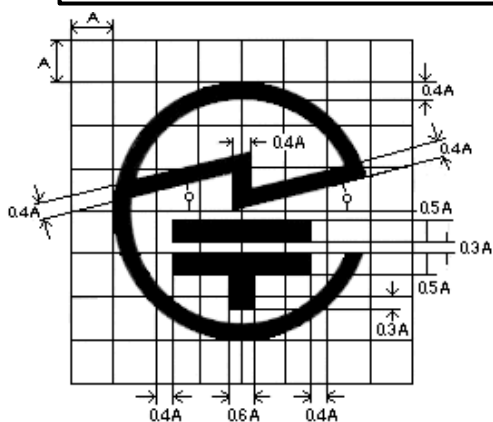
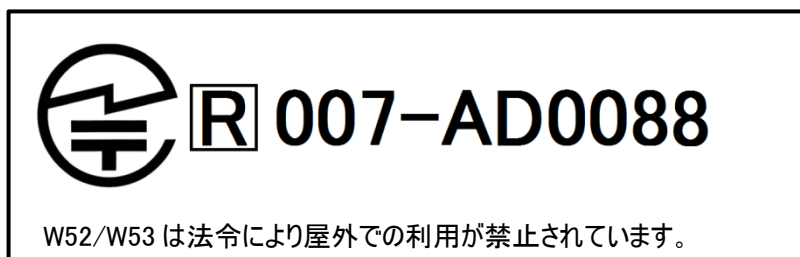
IC number



Country of origin

- ※ Since there is no indication required by Japan Radio Law on the board of the SX-SDMAN2-2830S, any users must display below indication on the main board that SX-SDMAN2 is soldered down. In addition to that, Warning message of W52/W53 prohibition in outdoor must be displayed on the enclosure of the final product. (Label is permitted.)

On the Host Board

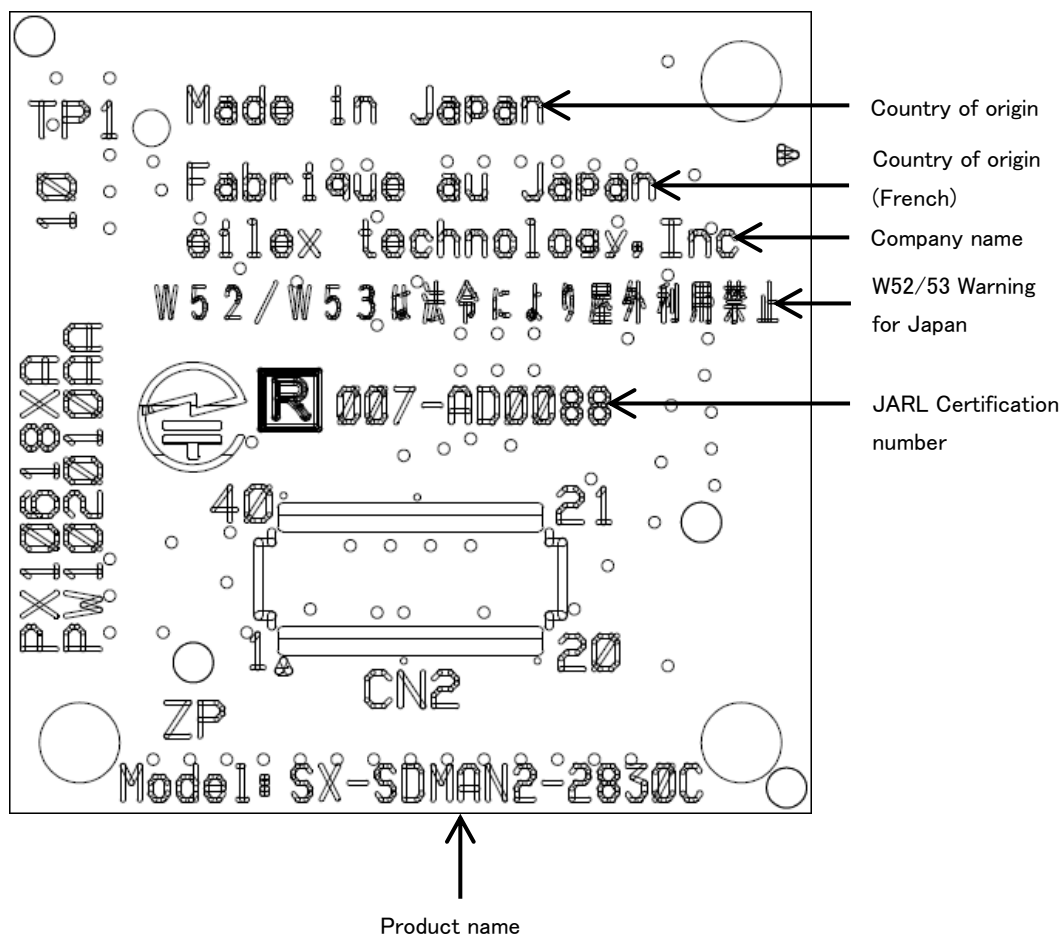


- W52/W53 の屋外利用禁止文（筐体上）
Warning message of W52/W53 prohibition in outdoor.
(On the enclosure)

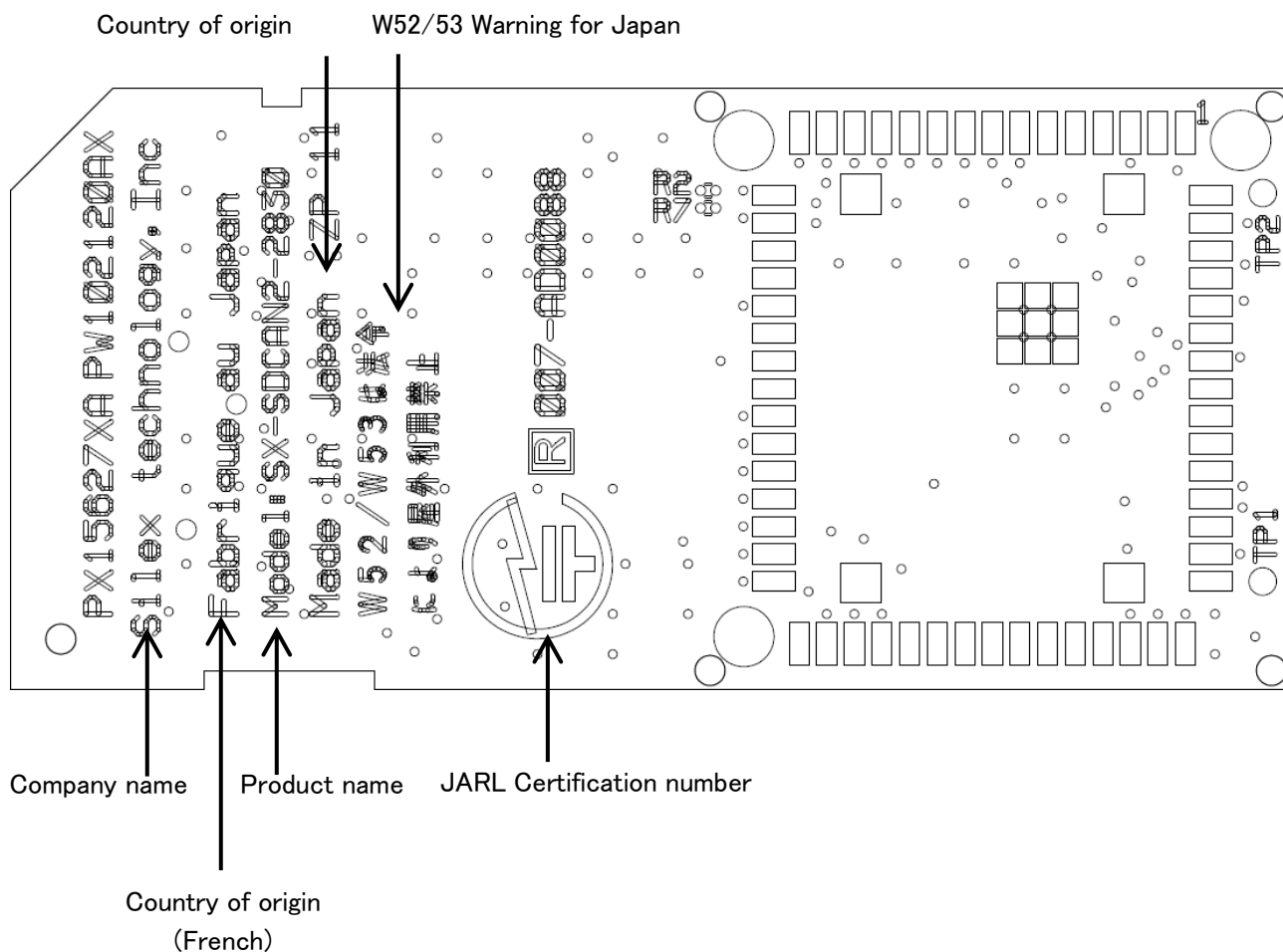
「W52/W53 は法令により屋外での利用が禁止されています。」

A = 0.5
(mm)

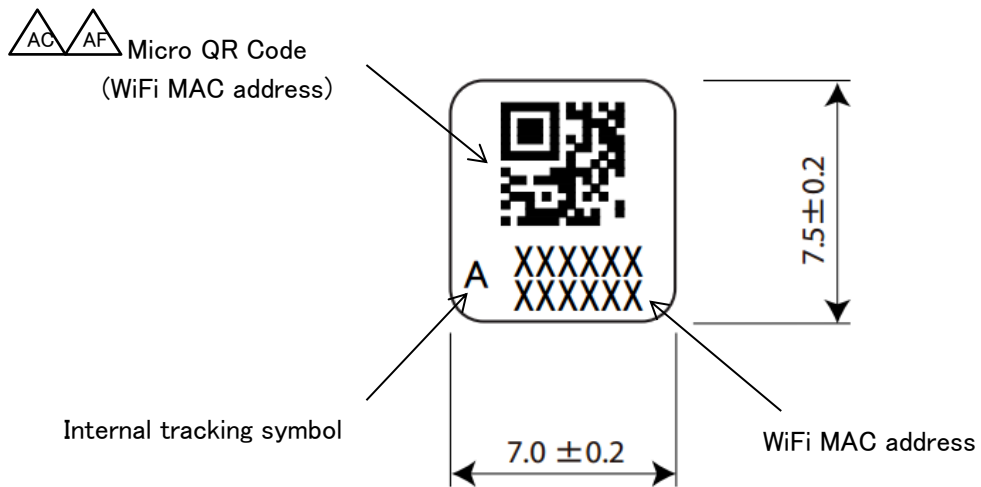
B2B Version



SDCARD Version



9. Label Specifications



10. Components Composition List

Categories	Items	Product No.						Remarks	
		ZXE03355	ZXE03356	ZXE03357	ZXE03358	ZXE03359	ZXE03360		
		SX-SDMAN2-2830C	SX-SDMAN2-2830S	SX-SDMAN2-2830C-SP	SX-SDMAN2-2830S-SP	SX-SDCAN2-2830	SX-SDCAN2-2830-SP		
Board	Main board	1	1	1	1	1	1		
Label	S/N Label	1	1	1	1	1	1		
	Packing Label	—	1/500	1	1/10	—	1/20		
	MSL Caution Label	—	1/500	—	1/10	—	—		
	Carton Label	1/100	1/2500	1/20	1/50	1/100	1/20		
Accessory	Humidity Indicator	—	1/500	—	1/10	—		For Reel	
	Antenna	—	—	—		—	2		
Packing	Packing Box	—	1/500	1	1/10	—	1		
	Carton Box	—	1/2500	1/20	1/50	—	1/20		
	Bulk Packing Box	1/100	—			1/100			
	Antistatic air-cap bag	1	—	1		1	2		
	Aluminum lamination bag	—	1/500	—	1/10	—	—	For Reel	
	Reel Set	—	1/500	—	1/10	—	—		
	Silicagel	—	1/500	—	1/10	—	—	For Reel	

(pcs)
Per 1 unit.

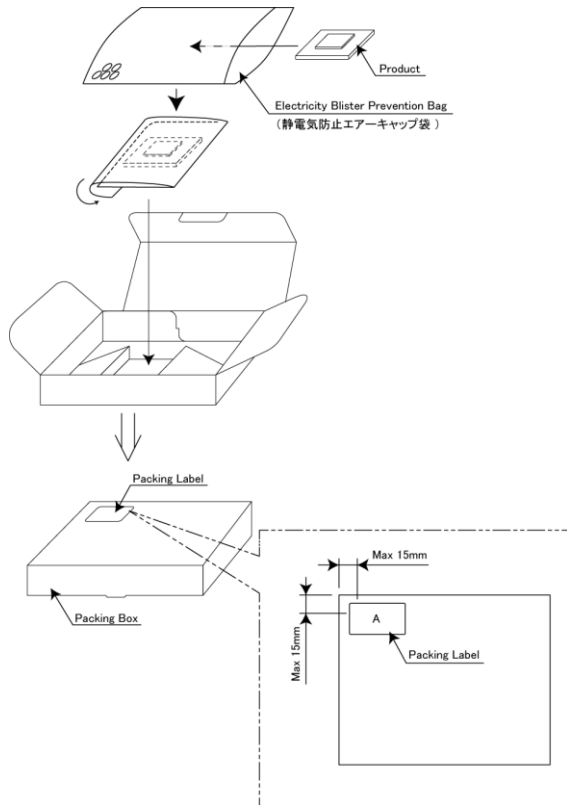
*Antenna and Antenna Cable are optional.

11. Packing Specifications

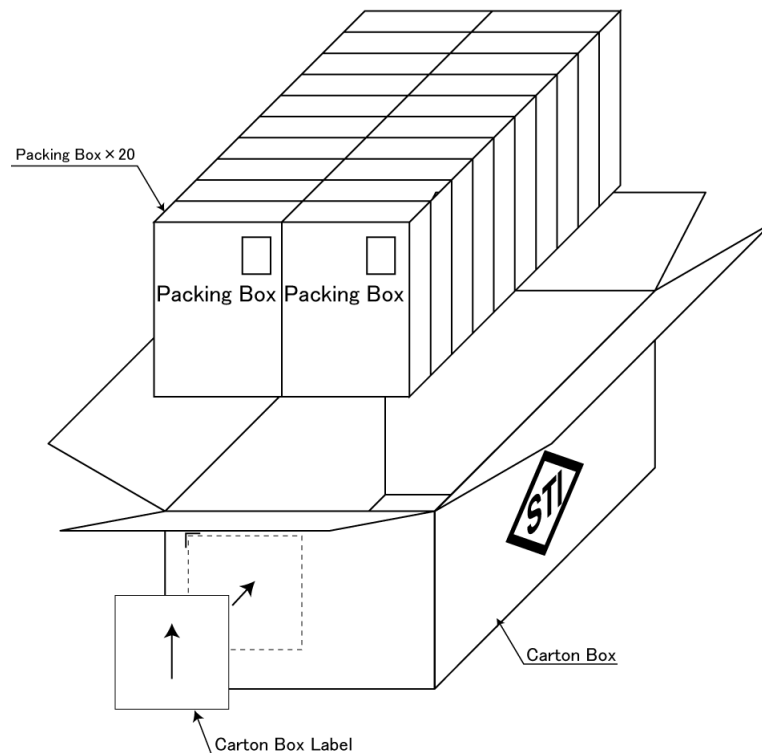
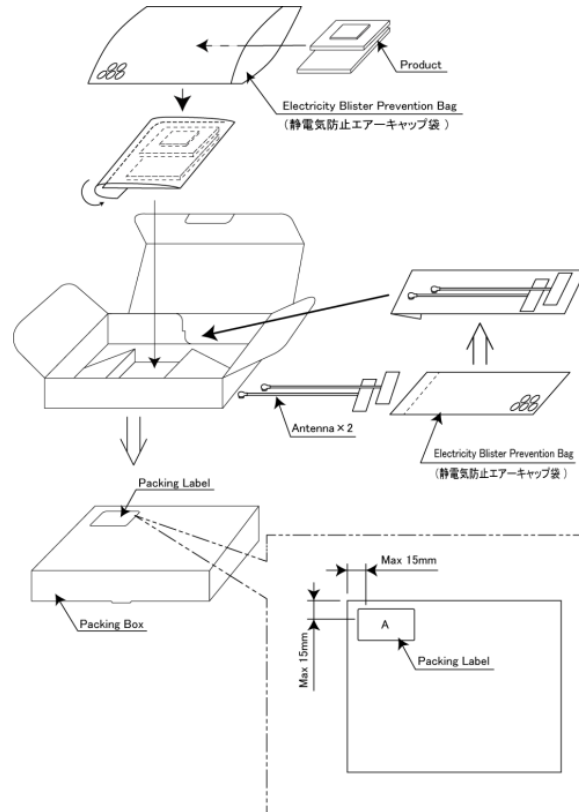
11.1. Packing

Sample Pack

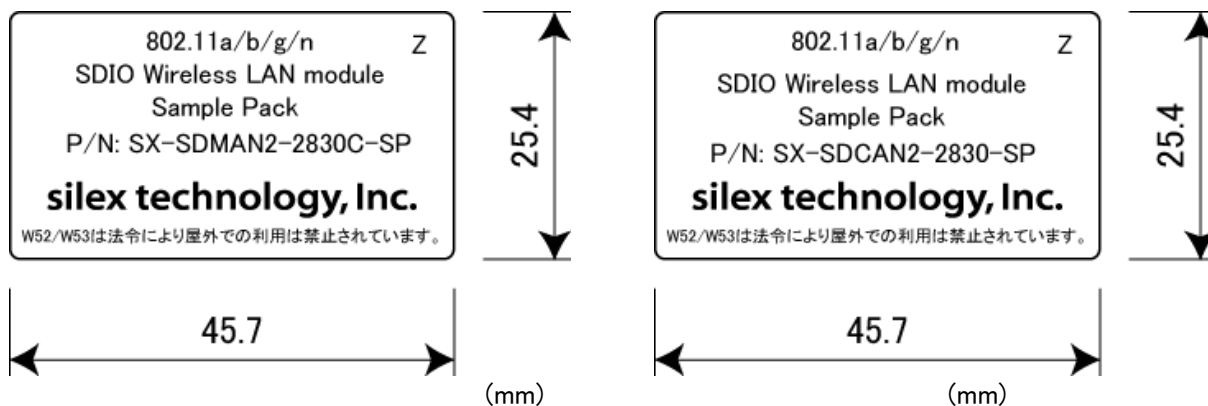
B2B Ver.



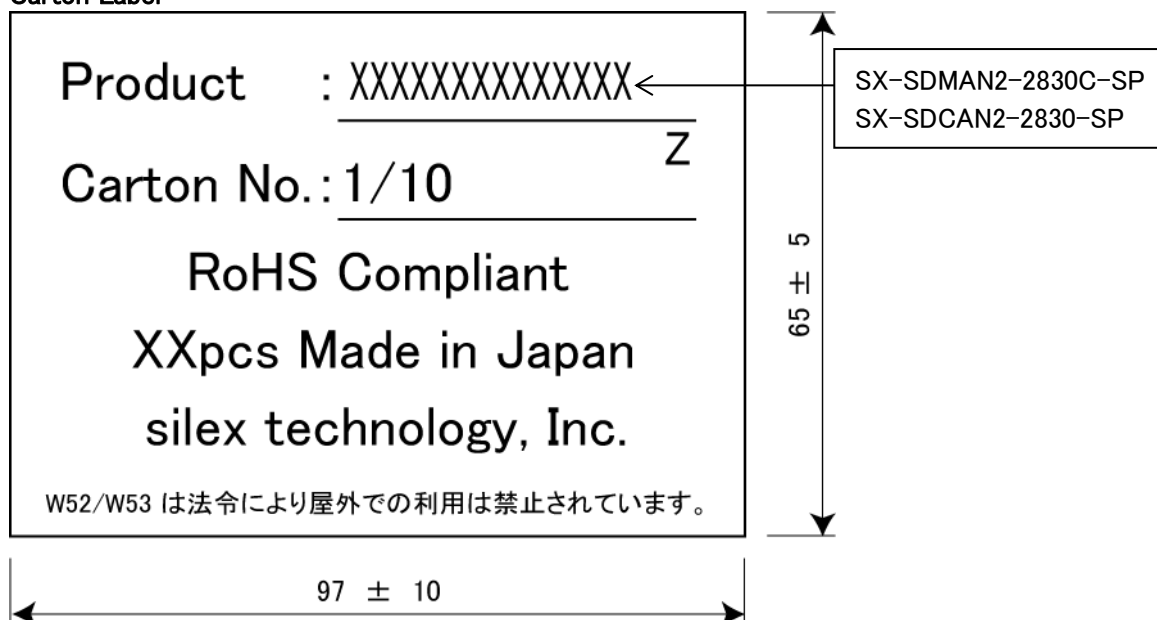
SD Card Ver.



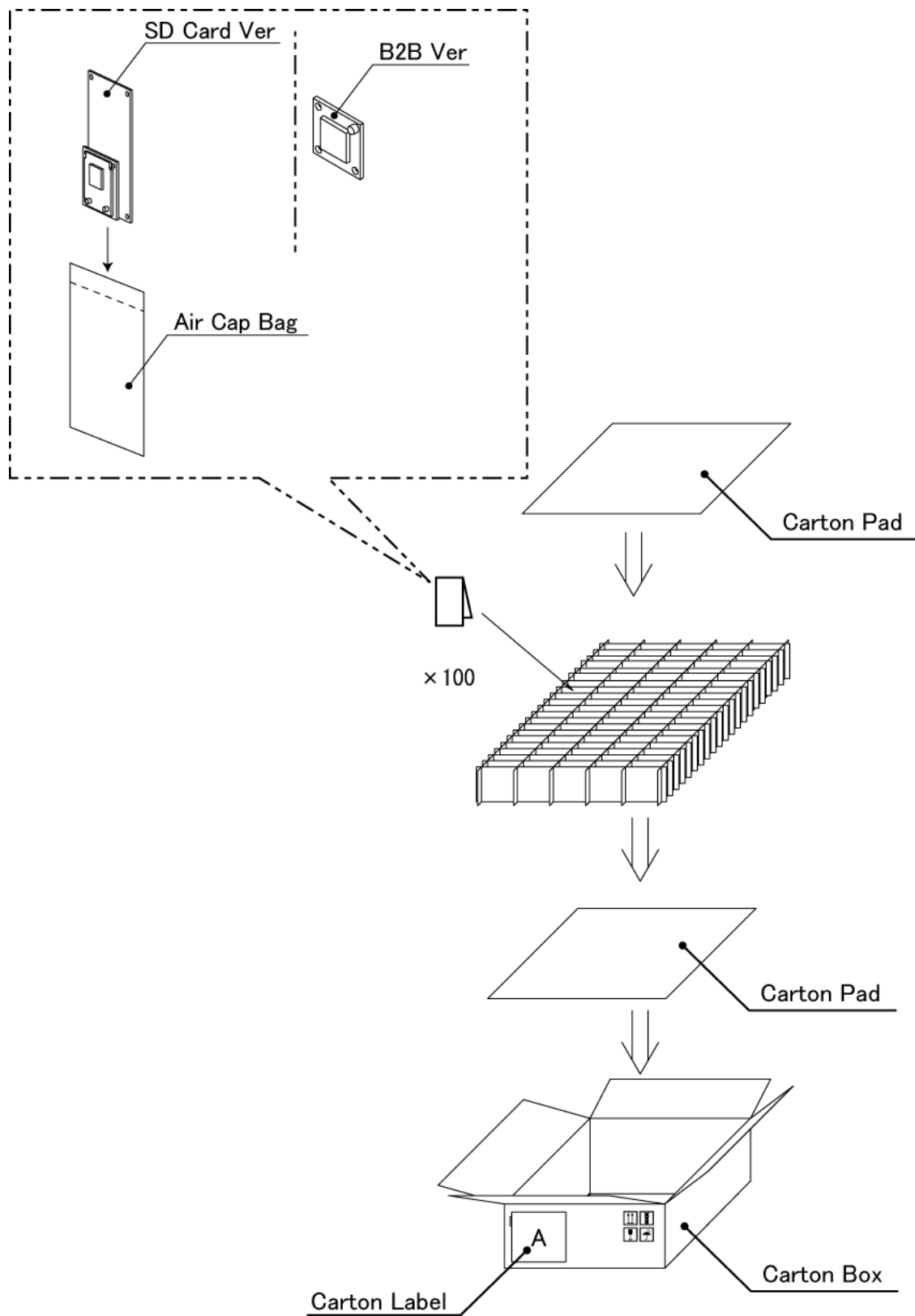
Packing Label



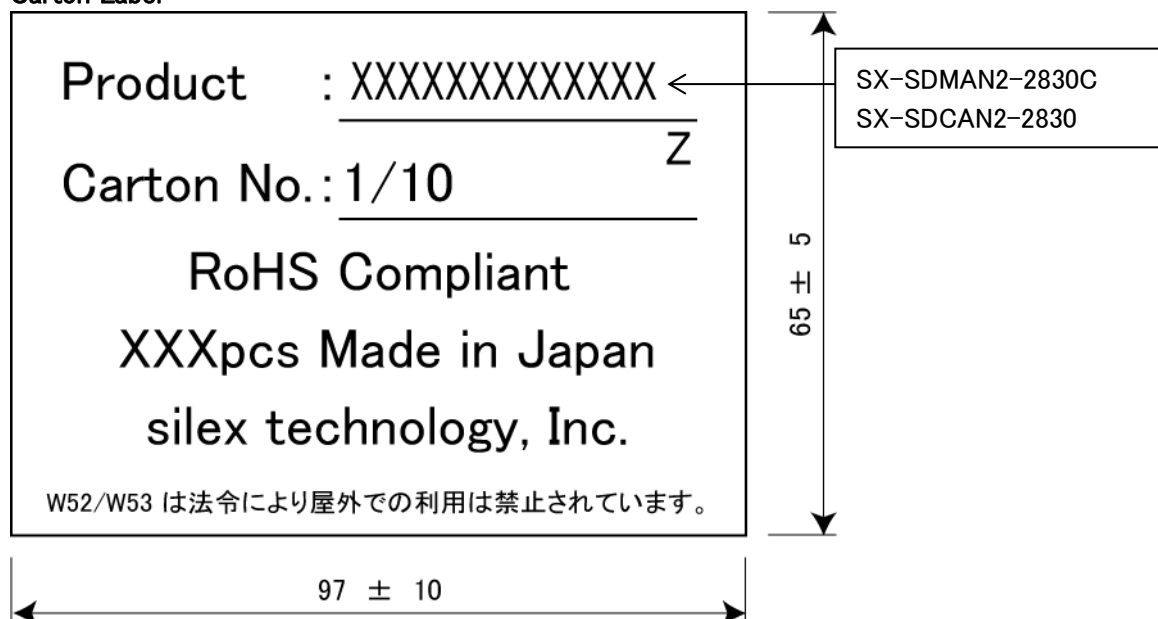
Carton Label



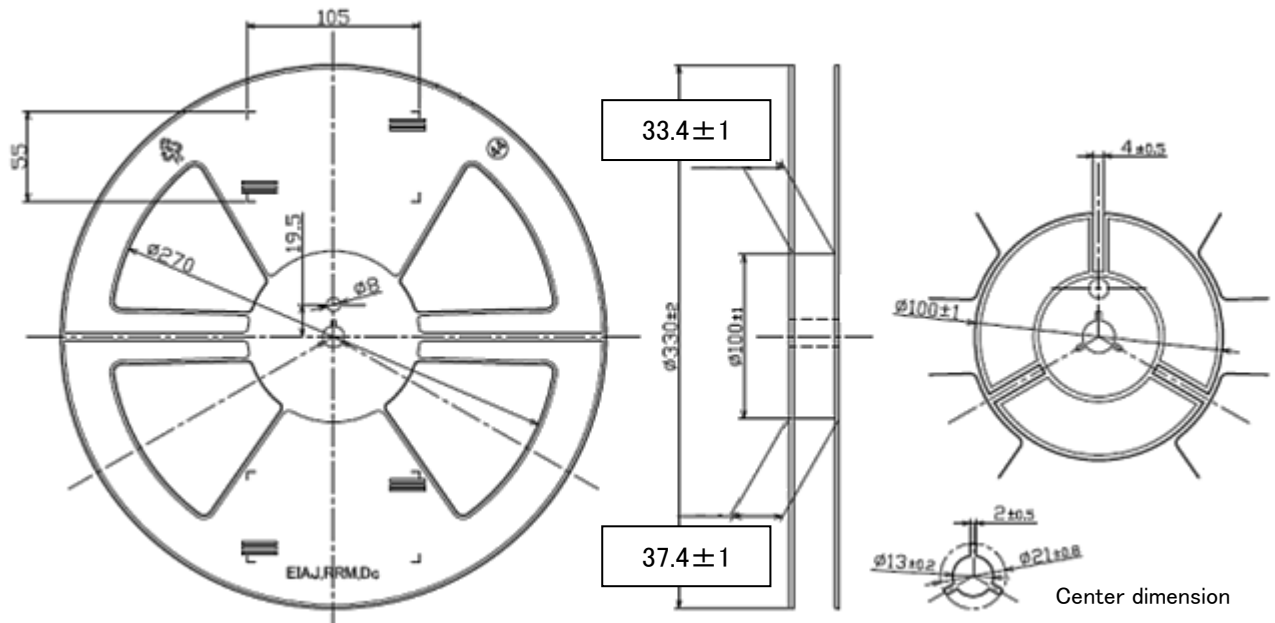
Bulk Packing



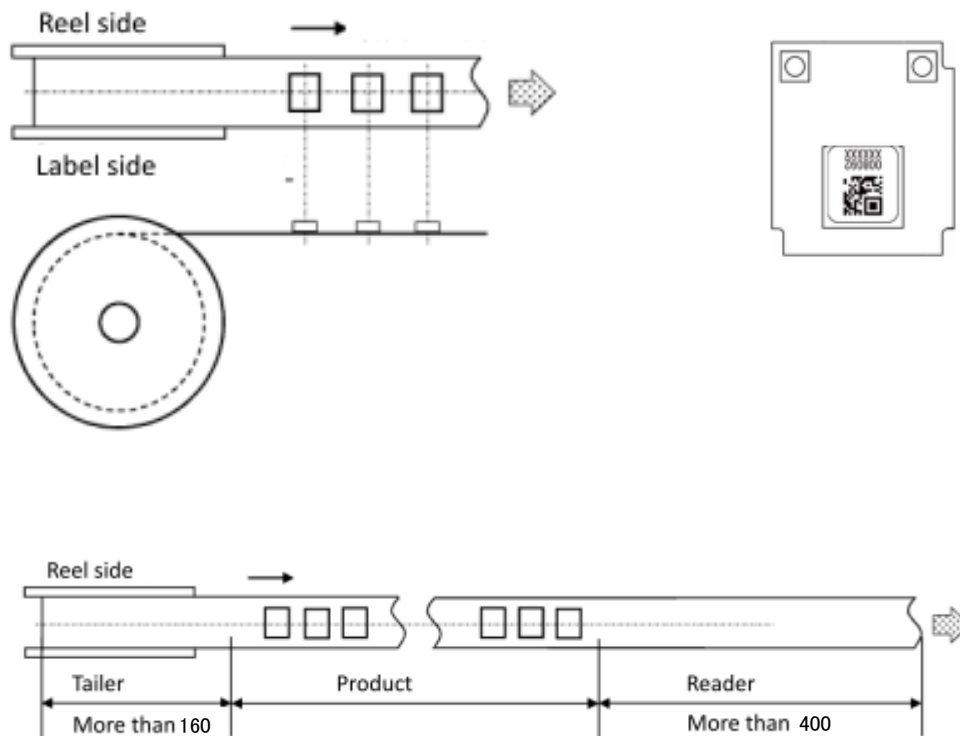
Carton Label



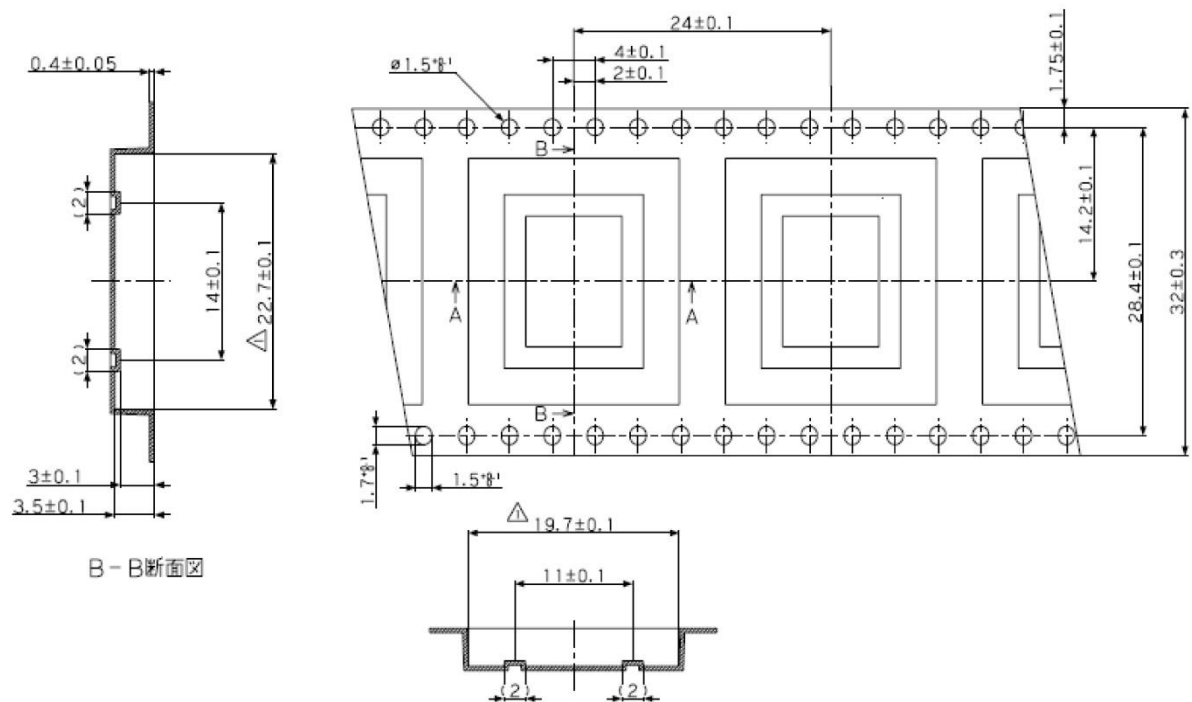
Reel



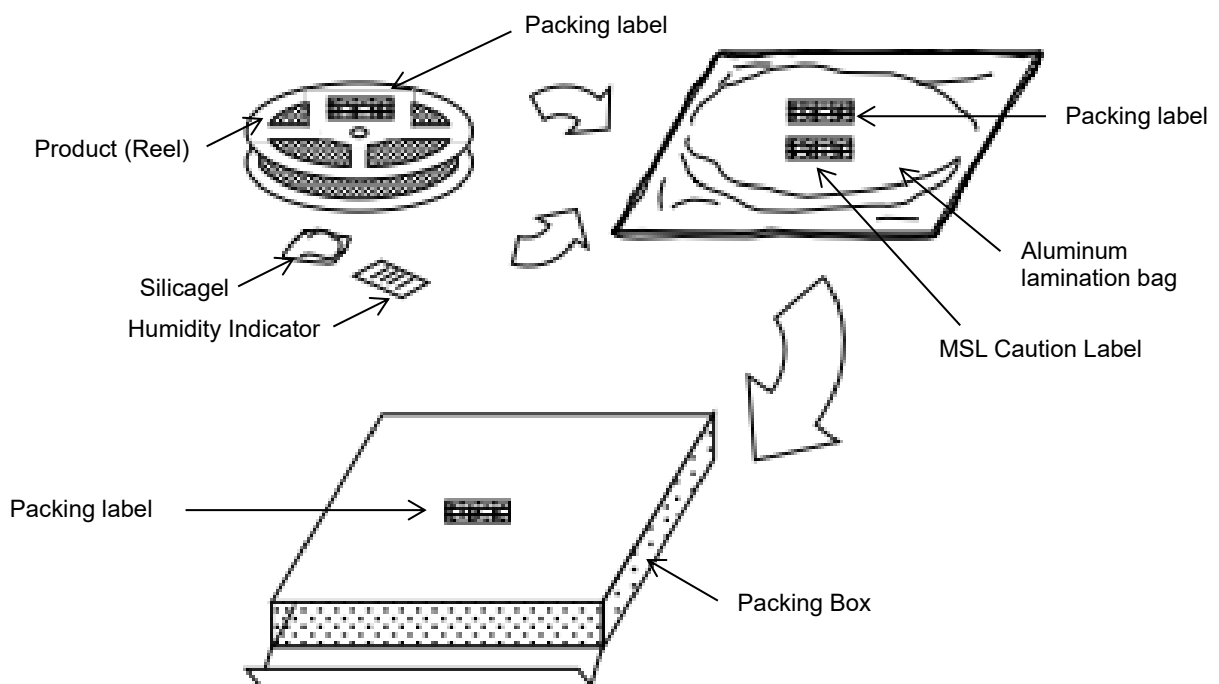
(mm)



(mm)



(mm)



Packing Label

品名	AN*****	Product Name	ラ	項目	表示内容
型名		Part No		リール	リ
数量	****			ラミネート袋	ラ
ロットNo.				内箱	内
完了日	YYYY/MM/DD	W52/W53 は法令により 屋外での利用は禁止されています			
巻き方					
担当者	****	*XXXXXX*	TRT:		

Product Name	Part No
SX-SDMAN2-2830S	ZXE03356 A
SX-SDMAN2-2830S-SP	ZXE03358 A

MSL Caution Label



Caution
This bag contains
MOISTURE-SENSITIVE DEVICES

LEVEL

3

1. Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)

2. Peak package body temperature: 250 °C

3. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must be

a) Mounted within: 168 hours of factory conditions
≤30°C/60% RH, or

b) Stored per J-STD-033

4. Devices require bake, before mounting, if:

a) Humidity Indicator Card reads > 10% for level 2a - 5a devices or >60% for level 2 devices when read at 23 ± 5°C

b) 3a or 3b are not met

5. If baking is required, refer to IPC/JEDEC J-STD-033 for bake procedure

Bag Seal Date: _____

Note: Level and body temperature defined by IPC/JEDEC J-STD-020
IPC-033c-3-4

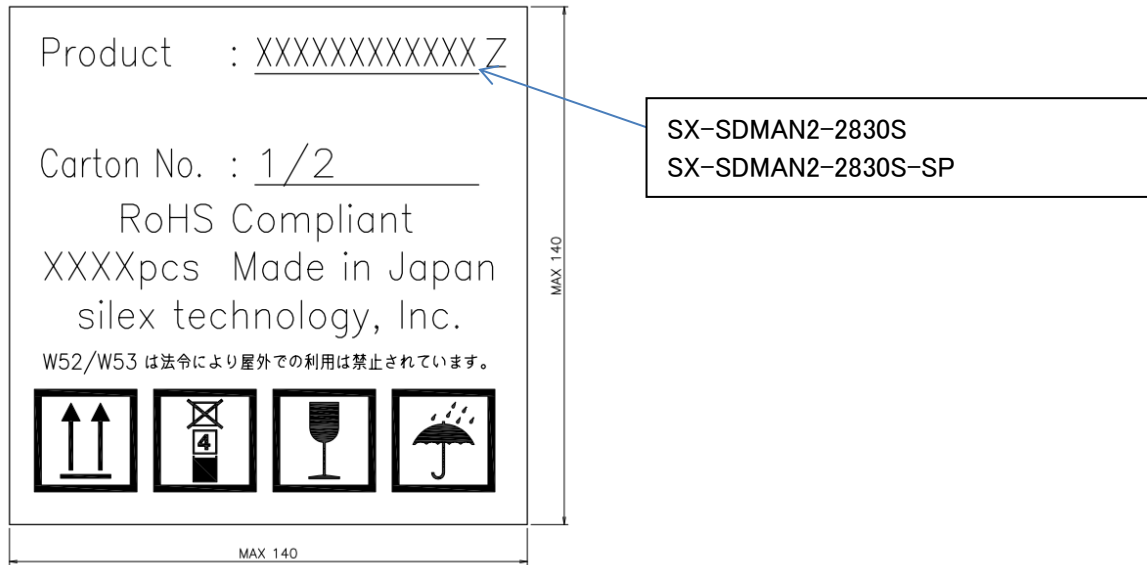
4-R1

110 ± 0.5

100 ± 0.5

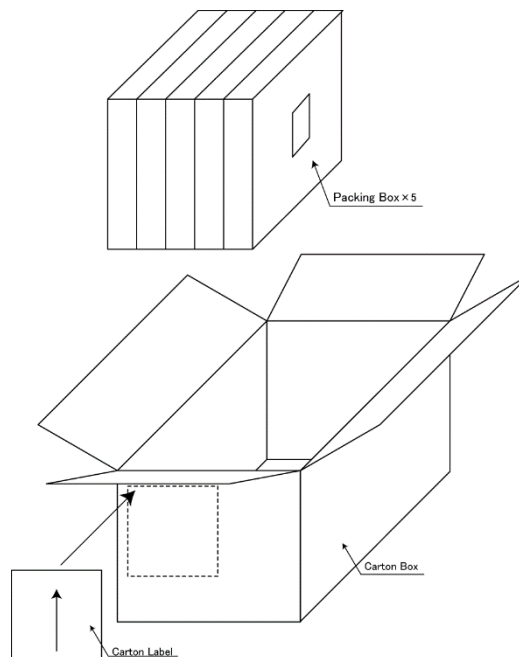
(mm)

Carton Label



(mm)

Humidity indicator (Example)



12. Reliability Test

Test items	Standards	Descriptions	Requirements																																																																																																																																																																																																							
			Electricity	Appearance																																																																																																																																																																																																						
DC Voltage	—	Expose to 3.0 V to 3.6 V and confirm DUT is working.	Workable	NA																																																																																																																																																																																																						
Temperature Rise	—	Change temperature 20°C/ H or more and confirm DUT is working.	Workable	NA																																																																																																																																																																																																						
Temp Humidity Cycle	—	Expose to the following conditions. Standard test[⇄: Ramp] (Hr:Min) <table><tr><td>Step</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td>°C</td><td>+25</td><td>⇨</td><td>-25</td><td>⇨</td><td>+90</td><td>⇨</td><td>-25</td><td>⇨</td><td>+85</td><td>+85</td></tr><tr><td>%RH</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>20</td><td>20</td><td>85</td></tr><tr><td>Time</td><td>0:05</td><td>1:00</td><td>2:00</td><td>1:00</td><td>2:00</td><td>1:00</td><td>4:00</td><td>1:00</td><td>2:00</td><td>6:00</td></tr><tr><td>Power</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td></tr></table> Step1112— — — — — — — — — — <table><tr><td>°C</td><td>⇨</td><td>+25</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>%RH</td><td>30</td><td>OFF</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>Time</td><td>1:00</td><td>0:10</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>Power</td><td>ON</td><td>ON</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr></table> Extended test[⇄: Ramp] (Hr:Min) <table><tr><td>Step</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td>°C</td><td>—</td><td>⇨</td><td>-25</td><td>⇨</td><td>0</td><td>⇨</td><td>+20</td><td>⇨</td><td>+40</td><td>+40</td></tr><tr><td>%RH</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>⇨</td><td>10</td><td>⇨</td><td>10</td><td>⇨</td></tr><tr><td>Time</td><td>0:00</td><td>1:15</td><td>2:00</td><td>1:00</td><td>2:00</td><td>1:00</td><td>3:00</td><td>1:00</td><td>4:00</td><td>0:45</td></tr><tr><td>Power</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td></tr></table> Step11121314151617— — — <table><tr><td>°C</td><td>+40</td><td>⇨</td><td>+85</td><td>⇨</td><td>+40</td><td>⇨</td><td>+25</td><td>—</td><td>—</td><td>—</td></tr><tr><td>%RH</td><td>95</td><td>⇨</td><td>95</td><td>⇨</td><td>95</td><td>⇨</td><td>50</td><td>—</td><td>—</td><td>—</td></tr><tr><td>Time</td><td>24:15</td><td>1:00</td><td>12:00</td><td>1:00</td><td>4:00</td><td>1:00</td><td>2:00</td><td>—</td><td>—</td><td>—</td></tr><tr><td>Power</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>—</td><td>—</td><td>—</td></tr></table>	Step	1	2	3	4	5	6	7	8	9	10	°C	+25	⇨	-25	⇨	+90	⇨	-25	⇨	+85	+85	%RH	OFF	OFF	OFF	OFF	OFF	OFF	OFF	20	20	85	Time	0:05	1:00	2:00	1:00	2:00	1:00	4:00	1:00	2:00	6:00	Power	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	°C	⇨	+25	—	—	—	—	—	—	—	—	%RH	30	OFF	—	—	—	—	—	—	—	—	Time	1:00	0:10	—	—	—	—	—	—	—	—	Power	ON	ON	—	—	—	—	—	—	—	—	Step	1	2	3	4	5	6	7	8	9	10	°C	—	⇨	-25	⇨	0	⇨	+20	⇨	+40	+40	%RH	OFF	OFF	OFF	OFF	OFF	⇨	10	⇨	10	⇨	Time	0:00	1:15	2:00	1:00	2:00	1:00	3:00	1:00	4:00	0:45	Power	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	°C	+40	⇨	+85	⇨	+40	⇨	+25	—	—	—	%RH	95	⇨	95	⇨	95	⇨	50	—	—	—	Time	24:15	1:00	12:00	1:00	4:00	1:00	2:00	—	—	—	Power	ON	ON	ON	ON	ON	ON	ON	—	—	—	Workable	NA
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Functional Cold Temp	—	Boot up and work at -25°C	Workable	NA																																																																																																																																																																																																						
Heat Resistance	—	Expose at +90°Cfor 8 hours. Leave at room temp for 2 hours after taking out from chamber.	Spec in	No damaged																																																																																																																																																																																																						
Cold Resistance	—	Expose at -40°Cfor 8 hours. Leave at room temp for 2 hours after r taking out from chamber.	Spec in	No damaged																																																																																																																																																																																																						
Device temp rise	—	Measure temperature on each device with exposing at +85°C.	Device spec in	NA																																																																																																																																																																																																						

Test items	Standards	Descriptions	Requirements																					
			Electricity	Appearance																				
Drop Shock (With box)	ISO 4180 JIS Z0200 Level II	Drop with the package from 60cm height to the wood board. (6 faces, 3 edges, 1 corner).	Spec in																					
Unit Shock	MIL-STD-202 Method 213B Condition A	Peak g's = 50g, Duration = 11ms, Waveform = Half-sine, Vi = 11.3ft/sec	Spec in	No damaged																				
Unit Vibration	MIL-STD-202 Method 204D Condition D	Peak g's = 20g, 10 <> 2000Hz at 20min/cycle for each X/Y/Z axis, Perform 12 times	Spec in	No damaged																				
Thermal Shock	MIL-STD-883J Method 1011.9	Repeat Step 1 (High temp) ⇒ Step 3 (Low temp) Check performance at 20 Cycles and 100 Cycles. Steps per Cycle [⇒: Ramp] <table border="1"> <thead> <tr> <th>Steps</th><th>1</th><th>2</th><th>3</th><th>4</th></tr> </thead> <tbody> <tr> <td>Temperature</td><td>+125 +10/-2°C</td><td>⇒</td><td>-55 +2/-10°C</td><td>⇒</td></tr> <tr> <td>Time</td><td>2 - 5min</td><td>< 10sec</td><td>2 - 5min</td><td>< 10sec</td></tr> <tr> <td>Power</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td></tr> </tbody> </table>	Steps	1	2	3	4	Temperature	+125 +10/-2°C	⇒	-55 +2/-10°C	⇒	Time	2 - 5min	< 10sec	2 - 5min	< 10sec	Power	OFF	OFF	OFF	OFF	Spec in	No damaged
Steps	1	2	3	4																				
Temperature	+125 +10/-2°C	⇒	-55 +2/-10°C	⇒																				
Time	2 - 5min	< 10sec	2 - 5min	< 10sec																				
Power	OFF	OFF	OFF	OFF																				

Criteria	Descriptions
No damaged	No damage on the appearance after test.
Spec in	Meet to specifications in § 3.
Workable	Can confirm working during test.
Device spec in	Meet to operation temperature range of each device.

13. Notifications

- Specifications of this module compliant to law regulations of Standards Compliance §6, will not apply to the following cases.
 - 1) In the case this module is used with a different antenna from the antenna list. (Standards Compliance §6).
 - 2) In the case this module is used in a different country from the list. (Standards Compliance §6).
 - 3) In case the certification is renewed.
- This module is a wireless device using the 2.4GHz / 5GHz band. The 5.15–5.35GHz band (W52, W53) must be disabled for outdoor use in Japan because these bands are prohibited to be used by law.
- This module is designed to be embedded into general electronic devices. It is not designed for high reliability demands like aircraft instruments, atom control, artificial life support or any other devices requiring extremely high reliability and quality. **If embedding into a medical instrument, please contact Silex regardless of what medical class it belongs to.**
- As this module communicates by radio wave, it is strongly recommended to use some type of security to prevent unexpected information leakage to other wireless modules.
- This module is a radio module for embedded purposes. Please understand functions and features of this module, and evaluate the final product which has this module embedded. Also, if evaluation of EMC conformity of this module has not been performed, then the EMC conformity evaluation and application must be performed with the final product in which this module is embedded.
- The radio module can affect or be affected by other devices using the same frequency band. Please investigate the environment prior to using this module.
- Disassembling or modifying the radio module may lead to punishment based on radio law.
- The radio module is an embedded module that has exposed connectors and components. Please be cautious of electro static, condensing and dust.
- When being used with other wireless devices using the same frequency band around this product, please consider the recommendations below. (See IEEE802.11–2012)
 - 1) $\pm 25\text{MHz}$ ($\pm 25\text{MHz}$) or more frequency separation from the center frequency of this module is recommended in 2.4GHz.
 - 2) Appropriate environment to avoid interference from the adjacent channels or the non-adjacent channels is necessary.

- 2.4GHz: Center frequency $\pm 25\text{MHz}$ (5Ch), Non Adjacent channel : Further than Center frequency $\pm 25\text{MHz}$ (5Ch)
- 5GHz HT20: Center frequency $\pm 20\text{MHz}$ (4Ch), Non Adjacent channel : Further than Center frequency $\pm 20\text{MHz}$ (4Ch)
- 5GHz HT40 Adjacent channel: Center frequency $\pm 40\text{MHz}$ (8Ch), Non Adjacent channel : Further than Center frequency $\pm 40\text{MHz}$ (8Ch)

※Even if these conditions is satisfied, the module is possibly interfered when strong signal is input. The other wireless system should be enough far from this module

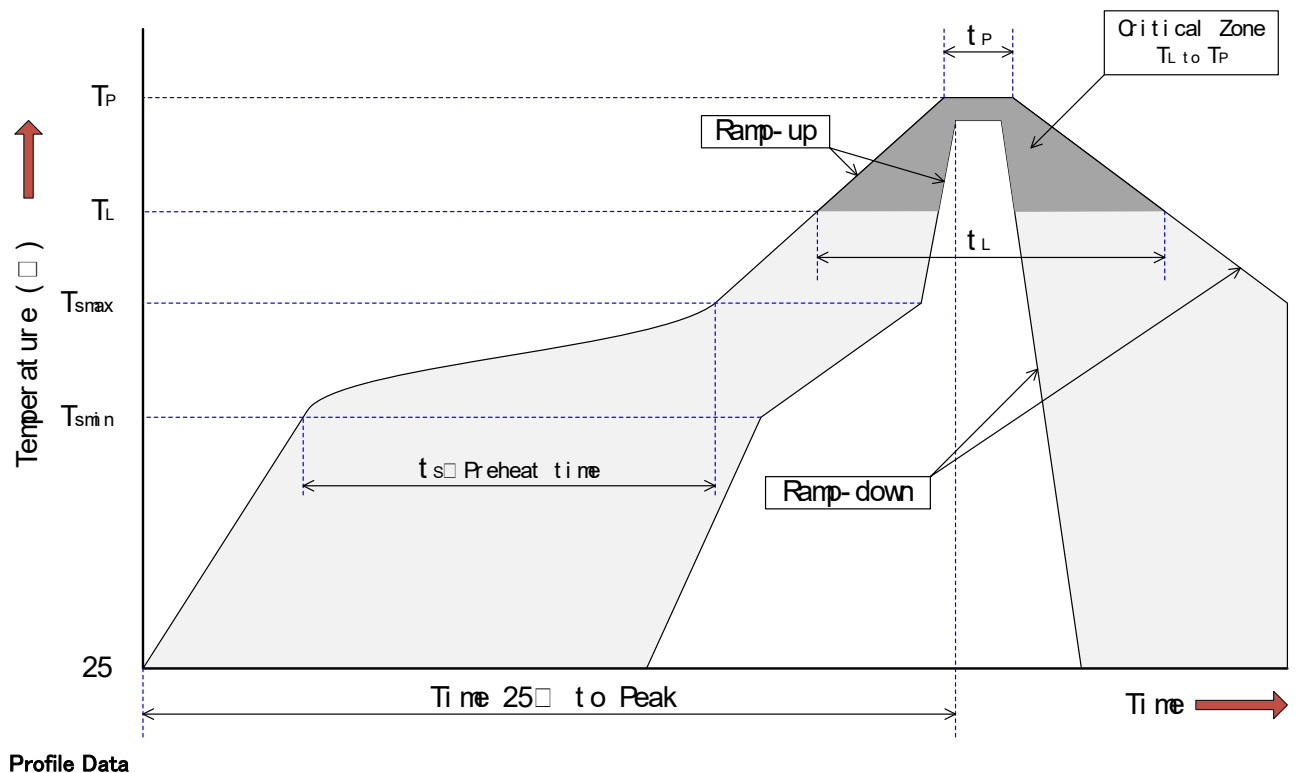
- The input level from the opponent device must be -20dBm or less at 2.4GHz, -30dBm or less at 5GHz with including antenna gain.

14. Appendix-A SMT Reflow Profiles

This recommended condition assumes Sn/Ag/Cu solder. This condition should be optimized per using solder type.

Sn/Ag/Cu Pb-Free Assembly

Profile Feature	Parametric	Conditions			
		Min.	Typ.	Max.	Units
Average ramp-up rate	T_L to T_p	1.5	—	2.5	°C/Sec
Preheat	Temperature T_{smin}	150	—	—	°C
	Temperature T_{smax}	—	—	170	°C
	Time t_s	60	—	120	Sec
Time maintained above	Temperature T_{L1}	217	—	—	°C
	Time t_{L1}	—	—	60	Sec
	Temperature T_{L2}	230	—	—	°C
	Time t_{L2}	—	—	40	Sec
Peak Temperature	T_p	240	—	250	°C
Time within 5°C of Actual Peak Temperature	t_p	—	—	10	Sec
Average ramp-down rate	—	1.5	—	6	°C/Sec
Time 25°C to Peak Temperature	—	—	—	8	Minutes



Profile Data

15. Appendix-B Operating Temperature Definition

This data of temperature rise and ambient temperature is the reference information.
Customers need to evaluate to temperature in your products.

Temperature Rise Data

1) 5GHz 1stream

Mode	Temp. rise [°C]	Throughput[Mbps]
TX	16.60	50.2
RX	5.48	50.4
Link	0.80	—

2) 5GHz 2stream

Mode	Temp. rise [°C]	Throughput[Mbps]
TX	22.80	77.5
RX	7.41	84.0
Link	0.90	—

3) 2.4GHz 1stream

Mode	Temp. rise [°C]	Throughput[Mbps]
TX	9.61	49.0
RX	4.61	48.9
Link	0.90	—

4) 2.4GHz 2stream

Mode	Temp. rise [°C]	Throughput[Mbps]
TX	13.32	75.8
RX	6.65	83.0
Link	0.90	—

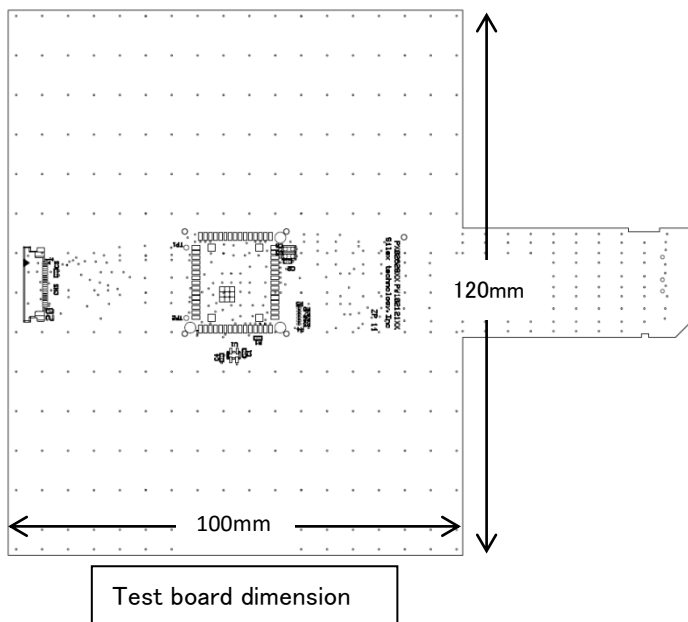
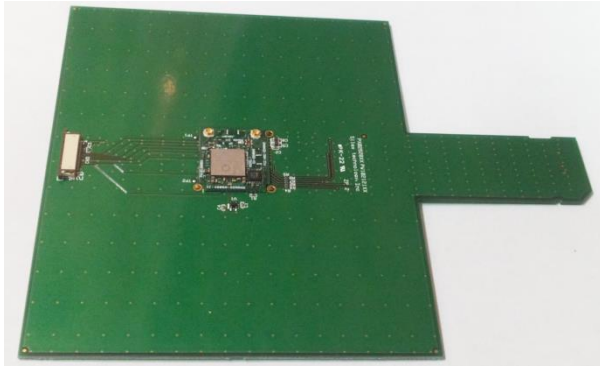
Operating Ambient Temperature (Ta)

Ta = Case temperature(Tc) - Temperature rise
= +85 - +22.8 = +62.2 [°C]

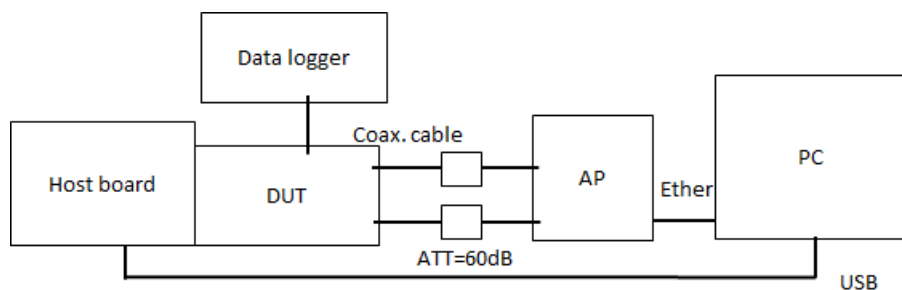
Conditions

The following is the condition when we measured.

DUT conditions



Block Diagram



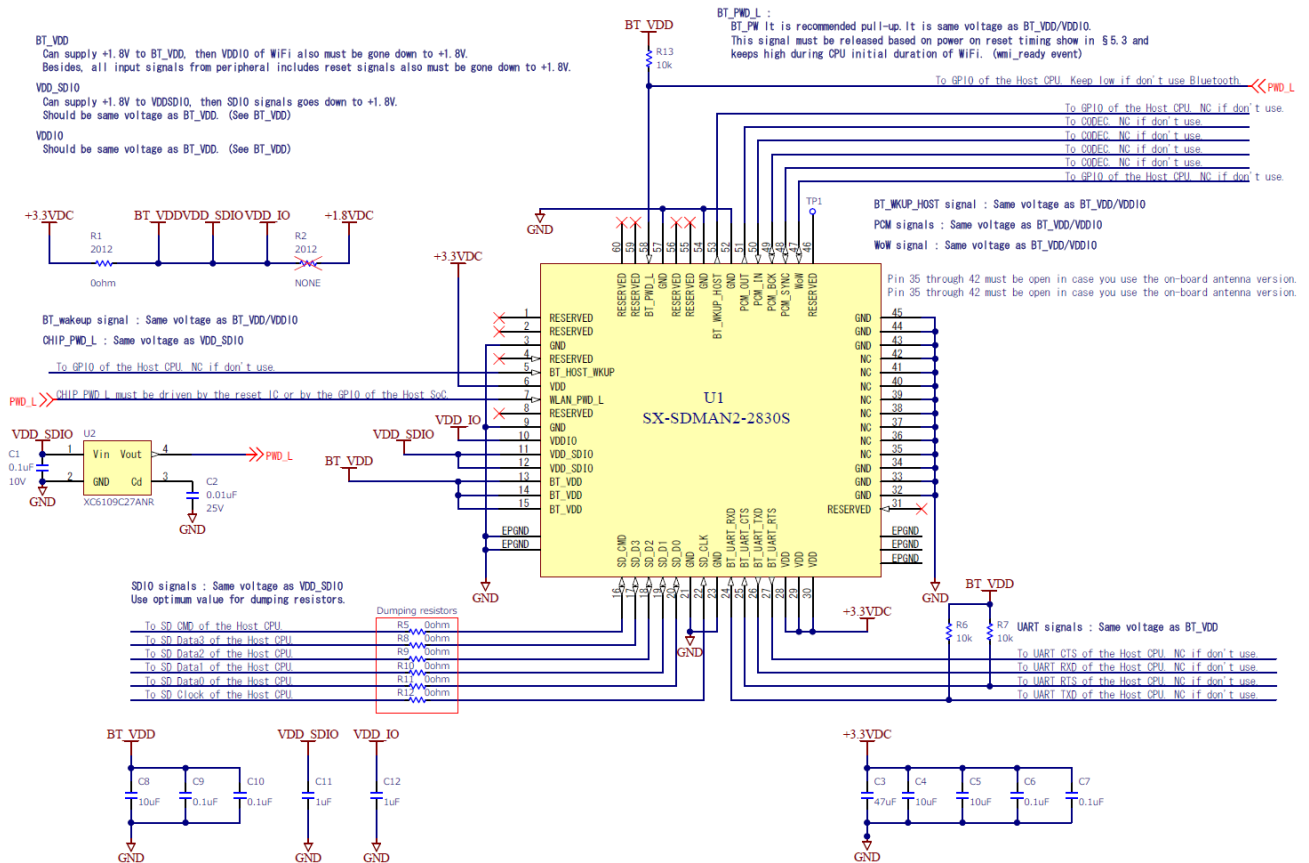
DUT	SX-SDMAN2-S	PW101980BX	—
	Test board	PW102121XX	—
Host board	MCIMX6Q-SDB		Freescale
AP	WZR-HP-AG300H		Buffalo
PC	Latitude D830		Dell
Data logger	LR8400+LR8500		Hioki
Software	Driver: Version 3.1.5		—
	iperf Version 1.7.0 for windows		—
	iperf 2.0.5 for linux		—

16. Appendix-C Reference Schematic



Reference schematic is shown below. It must be optimized based on conditions of the host board.

SX-SDMAN2-2830S



SX-SDMAN2-2830C

BT_VDD

Can supply +1.8V to BT_VDD, then VDDIO of WiFi also must be gone down to +1.8V.
Besides, all input signals from peripheral includes reset signals also must be gone down to +1.8V.

VDD_SDIO

Can supply +1.8V to VDDSDIO, then SDIO signals goes down to +1.8V.
Should be same voltage as BT_VDD. (See BT_VDD)

VDDIO

Should be same voltage as BT_VDD. (See BT_VDD)

BT_PWD_L

BT_PW It is recommended pull-up. It is same voltage as BT_VDD/VDDIO.
This signal must be released based on power on reset timing show in §5.3 and keeps high during CPU initial duration of WiFi. (wmi_ready event)

WoW signal : Same voltage as BT_VDD/VDDIO

BT_WKUP_HOST signal : Same voltage as BT_VDD/VDDIO

PCM signals : Same voltage as BT_VDD/VDDIO

BT_wakeup signal : Same voltage as BT_VDD/VDDIO

CHIP_PWD_L : Same voltage as VDD_SDIO

