
Title :

Wi-Fi 6/6E and Bluetooth Combo Module
SX-SDMAX6E-2530S

Drawing Type :

製品仕様書 Product specifications

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本書は SX-SDMAX6E-2530S について説明するものです。

モデル名/ハードウェアバージョン識別番号(HVIN)は「SX-SDMAX6E」です。

This document describes about SX-SDMAX6E-2530S.

Model name/Hardware Version Identification Number (HVIN) of this module is "SX-SDMAX6E".

1. 製品概要 Product information

SX-SDMAX6E-2530S は、NXP 社 IW623 を採用した、2.4GHz/5GHz/6GHz Tri Band IEEE 802.11 a/b/g/n/ac/ax、Bluetooth 6.1 BR/EDR/LE 及び SDIO3.0 準拠の無線モジュールです。本モジュールは、MAC/BBP/RF/RF フロントエンド及び各種電源/クロックなどの外部回路を内蔵しています。

The SX-SDMAX6E-2530S is a wireless module that adopts NXP's IW623, supporting 2.4GHz/5GHz/6GHz TriBand IEEE 802.11 a/b/g/n/ac/ax, Bluetooth 6.1 BR/EDR/LE, and compliant with SDIO 3.0. This module integrates MAC/BBP/RF/RF front-end and various external circuits such as power supplies and clocks.

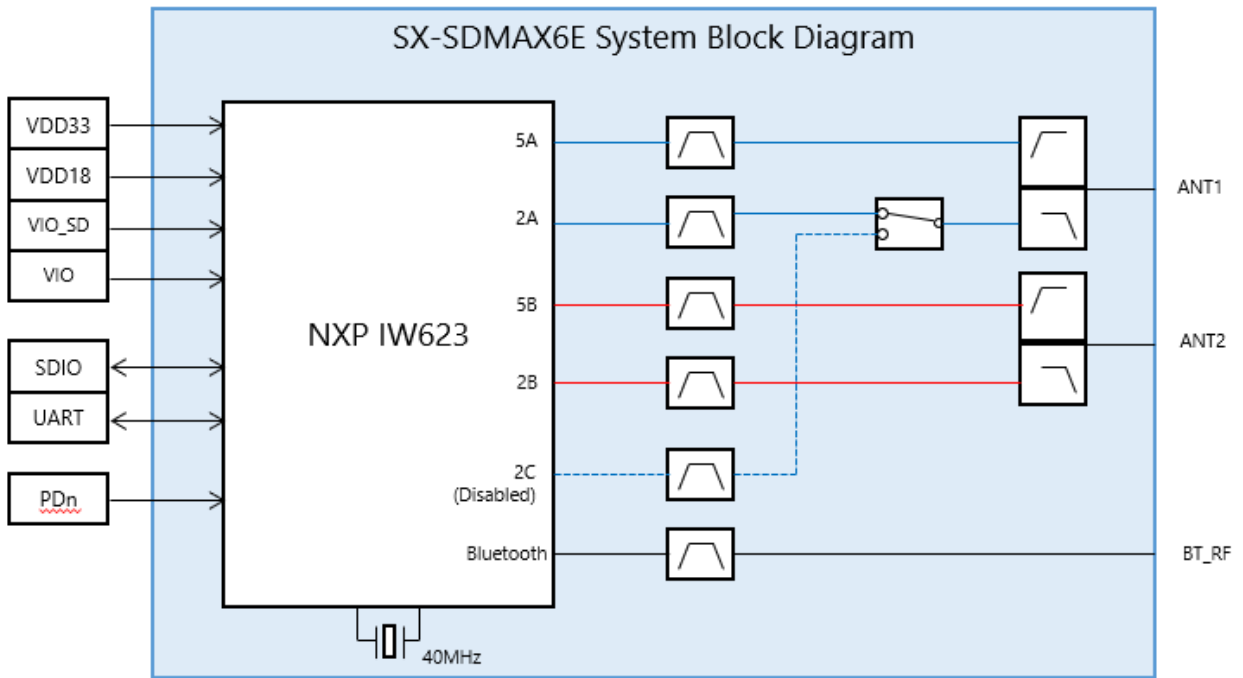
特徴 Features

- IEEE802.11a/b/g/n/ac/ax 準拠 (2.4 GHz, 5 GHz, 6GHz)
IEEE802.11a/b/g/n/ac/ax compliant (2.4 GHz, 5 GHz, 6GHz)
- Support Concurrent Dual Wi-Fi

	Concurrent Dual Wi-Fi	WLAN1	Bluetooth
Mode 1	No	2T2R 2.4GHz	Bluetooth, BLE
Mode 2	No	2T2R 5-7GHz	Bluetooth, BLE

- WLAN1
5 GHz/6GHz : 20/40/80 MHz 帯域幅モード対応
2.4 GHz : 20/40 MHz 帯域幅モード対応
5GHz/6GHz: Support 20/40/80 MHz bandwidth mode
2.4GHz: Support 20/40 MHz bandwidth mode
- Bluetooth 6.1 BR/EDR/LE
Bluetooth 1.x, 2.x, 3.0, 4.0, 4.1, 4.2, 5.0, 5.1, 5.2, 5.3, 5.4, 6.0 下位互換 Backward-compatible
- Wireless LAN ホスト IF として SDIO 3.0 対応
SDIO3.0 as the Wireless LAN host interface
- Bluetooth ホストインターフェイスとして UART 対応
UART as the Bluetooth host interface
- 欧州 RoHS 指令 2011/65/EU , (EU) 2015/863 準拠
Compliant with the EU's RoHS directive 2011/65/EU and (EU) 2015/863

2. ハードウェアブロック図 Hardware block diagram



3. 基板仕様 Board specifications

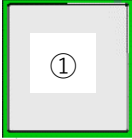
3.1. 一般仕様 General specifications

Items	Specifications	Units	Remarks
ホストボードへの接続方式 Connection with the host board	49-pin Land Grid Array (Direct solder)	–	
アンテナポート Antenna port	RF PAD x 3	pcs	
アンテナポート特性 Antenna port characteristics	50	Ω	Nominal value
ホストインターフェイス Host interface	SDIO v3.0	–	For Wireless LAN
	UART	–	For Bluetooth
無線接続方式 RF interface	IEEE802.11a/b/g/n/ac/ax	–	IEEE802.11-2020 IEEE802.11ax-2021
	Bluetooth 6.1 BR/EDR/LE	–	
重さ Weight	1.8	g	Typ.
寸法 Dimensions	17.0 x 18.0 x 2.65	mm	W x H x D § 7 参照 See § 7
MTTF	90,000	h	Min.
リフロー回数 The number of reflow	2	Time	Max. ^{NOTE1}
ESD 耐性 ESD resistance	ANT1,2,BT_RF 端子 ANT1,2,BT_RF pins	+/- 8000	V § 11 参照 See § 11 ^{NOTE2}

NOTE1	<p>解析のためにモジュールをホストボードから取り外す際は、JEDEC J-STD-33 Clause 6 BOARD REWORK に定める方法で取り外してください。</p> <p>実装、取り外しに限らず、リフロー回数としてカウントしますので、取り外したモジュールの再実装や 2 回リフロー後のモジュールの取り外しは 3 回目のリフローとなるため保証しません。</p> <p>In the case of removing the module from the board for the analysis, need to follow JEDEC J-STD-33 Clause 6 BOARD REWORK.</p> <p>Both re-assembling the removed module and removing the module after reflow 2 times won't be guaranteed since above actions may be counted as the number of reflow.</p>
NOTE2	<p>デジタル制御端子の ESD 耐性については IW623 のデータシートより +/-2000V (HBM according to AEC-Q100-002)。</p> <p>ESD resistance for digital logic port is +/- 2000V(HMB) referred to IW623 data sheet (according to AEC-Q100-002).</p>

3.2. 環境条件 Environmental specifications

Items	Specifications			Units	Remarks
	Min.	Typ.	Max.		
動作温度 Operating temperature	-40	—	+85	°C	周囲温度 *NOTE 1 Ambient temperature *NOTE 1 実装後電源電圧印加時 After assembled with powered
動作湿度 Operating humidity	15	—	95	%RH	結露無きこと No condensing 実装後電源電圧印加時 After assembled with powered
保存温度 Assembled storage temperature	-40	—	+90	°C	実装後電源電圧無印加時 After assembled with no-powered
保存湿度 Assembled storage humidity	10	—	95	%RH	結露無きこと No condensing 実装後電源電圧無印加時 After assembled with no-powered
保管温度 Storage temperature	+5	—	+35	°C	梱包時。開封後は MSL に従う。NOTE 2 Packaged. Apply MSL after unpackaged. NOTE 2
保管湿度 Storage humidity	20	—	60	%RH	結露無きこと No condensing 梱包時。開封後は MSL に従う。 Packaged. Apply MSL after unpackaged.
Moisture Sensitivity Level (MSL)	3			—	取り扱いについては下記を参照。 See below standard for handling IPC/JEDEC J-STD-033 *NOTE 3

NOTE1	<p>但し次に定義される部品のケース温度(表面接触温度)を超えないこと。 The case temperature (Tc), however, must not exceed below value.</p> <table border="1"> <thead> <tr> <th>Point</th> <th>Tc (Max.)</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>①</td> <td>+95</td> <td>°C</td> </tr> </tbody> </table>	Point	Tc (Max.)	Unit	①	+95	°C
	Point	Tc (Max.)	Unit				
①	+95	°C					
							
NOTE2	<p>部品倉庫などで長期間 (弊社出荷後 1 年間)保管する際の推奨条件です。ドライパック未開封状態の場合、この条件下でドライパック内の湿度が 10%RH 未満に保たれます。ドライパック内の湿度が 10%RH 以上となったかどうかの判断は、保管期間に関わらず、§10 に示す湿度表示シートでご確認ください。保管期間 1 年以上経過後や輸送時に保管条件を超えた可能性があった場合は、製造前に湿度表示シートの確認やハンダ濡れ性の確認を実施することを推奨いたします。</p> <p>This is condition to keep the product in the warehouse for long term (1 year after shipping from silex). In case of unpacked of the dry pack, humidity of inside shall be keep less than 10%RH. To know whether humidity in the dry pack is exceed 10%RH or not, please check out the humidity indication card (HIC). After 1 year from shipping or in case it might be exceeded this condition due to transportation, checking HIC or checking solderability before production is strongly recommended.</p>						
NOTE3	<p>推奨ベーキング条件 Recommended baking conditions 基板単独 Board only : 125°C+10/-0°C 24 hours リール状態 With reel : 40°C+5/-0°C ≤5%RH 13 days</p> <p>ドライパック開封後 JEDEC J-STD-033 の取扱い条件下で ≤30°C/60%RH でのフロアタイムが 168 時間を超えた場合ベーキングが必要です。ドライパック未開封時でも、§10 に示す湿度表示シートが 10%RH 以上の色に変色している場合ベーキングが必要です。</p> <p>In case ≤30°C/60%RH with handling rule of JEDEC J-STD-033 and floor time is exceeded 168hrs, baking must be necessary. Even before unpacking the dry pack, baking must be necessary if color of HIC is changed to color of 10%RH or more.</p>						

3.3. 電気的仕様 Electrical specifications
絶対最大定格 Absolute Maximum Ratings

Items	Specifications			Units	Remarks
	Min.	Typ.	Max.		
主電源電圧 VDD33 Main power supply	–	–	+3.96	V	
主電源電圧 VDD18 Main power supply	–	–	+2.16	V	
IO 電源電圧 VIO IO power supply voltage	–	–	+3.96	V	
SDIO 電源電圧 VIO_SD SDIO power supply voltage	–	–	+3.96	V	

推奨動作条件 Recommended Operating Conditions
主電源 Main power supply

Items	Specifications			Units	Remarks
	Min.	Typ.	Max.		
主電源電圧 VDD33 Main power supply	+3.14	+3.30	+3.46	V	
主電源電圧 VDD18 Main power supply	+1.71	+1.80	+1.89	V	

IO 電源 IO power supply

Items	Specifications			Units	Remarks
	Min.	Typ.	Max.		
IO 電源電圧 VIO, VIO_SD IO power supply voltage	+3.14	+3.30	+3.46	V	+3.3V operation
IO 電源電圧 VIO, VIO_SD IO power supply voltage	+1.71	+1.80	+1.89	V	+1.8V operation

デジタル論理信号レベル Digital logic signal level

+1.8V operation (VIO)

Items	Parameters	Specifications			Units	Remarks
		Min.	Typ.	Max.		
V _{IH}	入力 High レベル電圧 Input High voltage	0.7*VIO	–	VIO+0.4	V	
V _{IL}	入力 Low レベル電圧 Input Low voltage	-0.4	–	0.3*VIO	V	
V _{OH}	出力 High レベル電圧 Output High voltage	VIO-0.4	–	–	V	
V _{OL}	出力 Low レベル電圧 Output Low voltage	–	–	+0.4	V	
V _{HYS}	入力ヒステリシス Input hysteresis	100	–	–	mV	

+3.3V operation (VIO)

Items	Parameters	Specifications			Units	Remarks
		Min.	Typ.	Max.		
V _{IH}	入力 High レベル電圧 Input High voltage	0.7*VIO	–	VIO+0.4	V	
V _{IL}	入力 Low レベル電圧 Input Low voltage	-0.4	–	0.3*VIO	V	
V _{OH}	出力 High レベル電圧 Output High voltage	VIO-0.4	–	–	V	
V _{OL}	出力 Low レベル電圧 Output Low voltage	–	–	+0.4	V	
V _{HYS}	入力ヒステリシス Input hysteresis	100	–	–	mV	

3.4. 消費電流仕様 Current consumption specifications
動作温度 Operating temperature +25°C

Mode	VDD18		VDD33		Unit
	Typ.	Max.	Typ.	Max.	
WLAN TX 2.4GHz DSSS 1x1 15dBm	200	260	80	180	mA
WLAN TX 2.4GHz DSSS 2x2 15dBm	310	360	320	530	mA
WLAN TX 2.4GHz BW20 1x1 15dBm	240	280	80	170	mA
WLAN TX 2.4GHz BW20 2x2 15dBm	350	400	290	520	mA
WLAN TX 2.4GHz BW40 1x1 15dBm	250	300	80	170	mA
WLAN TX 2.4GHz BW40 2x2 15dBm	380	440	290	490	mA
WLAN TX 5GHz BW20 1x1 15dBm	350	400	170	310	mA
WLAN TX 5GHz BW20 2x2 15dBm	540	620	390	660	mA
WLAN TX 5GHz BW40 1x1 15dBm	370	430	170	310	mA
WLAN TX 5GHz BW40 2x2 15dBm	580	680	390	660	mA
WLAN TX 5GHz BW80 1x1 15dBm	400	460	170	310	mA
WLAN TX 5GHz BW80 2x2 15dBm	610	710	470	720	mA
WLAN TX 6GHz BW20 1x1 14dBm	390	450	250	450	mA
WLAN TX 6GHz BW20 2x2 14dBm	590	680	450	780	mA
WLAN TX 6GHz BW40 1x1 14dBm	410	460	250	440	mA
WLAN TX 6GHz BW40 2x2 14dBm	610	680	460	780	mA
WLAN TX 6GHz BW80 1x1 14dBm	430	490	260	460	mA
WLAN TX 6GHz BW80 2x2 14dBm	650	740	460	790	mA
WLAN RX 2.4GHz BW40 2x2	250	330	1.5	42	mA
WLAN RX 5GHz BW80 2x2	390	480	1.5	37	mA
WLAN RX 6GHz BW80 2x2	430	510	2.1	40	mA
Bluetooth TX Classic or BLE 4dBm	133	157	1.4	3.8	mA
Bluetooth RX Classic or BLE	122	137	1.2	2.5	mA

NOTE1	この電流値はテストモードで測定に基づくものです。 This current value is based on measurements in the test mode.
NOTE2	VDD18 は VDD18 と VIO_SD の消費電流を合わせたものです。 VDD18 current value is sum of VDD18 and VIO_SD. VDD33 は VDD33 と VIO の消費電流を合わせたものです。 VDD33 current value is sum of VDD33 and VIO.

3.5. 無線 LAN 一般仕様 Wireless LAN general specifications

Items	Specifications				Units	Remarks
Chipset	IW623LSHN/A1ZDI (NXP)				—	
Country/Domain Code	Select by software				—	
Operating Center Frequency	2.4GHz	Modes	Min	Max		
		11b	2412	2472	MHz	
		11g/n/ac/ax 20MHz	2412	2472	MHz	
	5GHz	11n/ac/ax 40MHz	2422	2462	MHz	
		11a/n/ac/ax 20MHz	5180	5825	MHz	
		11n/ac/ax 40MHz	5190	5795	MHz	
	6GHz	11ac/ax 80MHz	5210	5775	MHz	
		11ax 20MHz	5955	7115	MHz	
		11ax 40MHz	5965	7085	MHz	
	リンクデータレート Link Data Rate	11b	1,2,5.5L,5.5S,11L,11S			Mbps
6,9,12,18,24,36,48,54			Mbps			
11n		MCS 0,1,2,3,4,5,6,7			—	1T1R
		MCS 8,9,10,11,12,13,14,15			—	2T2R
11ac		MCS 0,1,2,3,4,5,6,7,8,9			—	
11ax		MCS 0,1,2,3,4,5,6,7,8,9,10,11				
変調型 Modulation type	11b	DSSS(DBPSK,DQPSK,CCK)			—	
	11a/g/n	OFDM(BPSK,QPSK,16QAM,64QAM)			—	
	11ac	OFDM (BPSK,QPSK,16QAM,64QAM,256QAM)			—	
	11ax	OFDM (BPSK,QPSK,16QAM,64QAM,256QAM,1024QAM)				
暗号化 Encryption	RC4	128			bits	
	AES	192			bits	

NOTE1	国/地域コードについて Country/Region code モジュールにはデフォルトで国/地域コードとして 0x0000 が書かれています。 モジュールのロード時にドライバにより任意のコードに書き換えてご使用ください。 0x0000 is programmed 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.
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利用可能チャンネルリスト Available channel list
2.4GHz

Channel	Fc (MHz)	20MHz	US/CA	EU/UK	JP
1	2412	20	Yes	Yes	Yes
2	2417	20	Yes	Yes	Yes
3	2422	20	Yes	Yes	Yes
4	2427	20	Yes	Yes	Yes
5	2432	20	Yes	Yes	Yes
6	2437	20	Yes	Yes	Yes
7	2442	20	Yes	Yes	Yes
8	2447	20	Yes	Yes	Yes
9	2452	20	Yes	Yes	Yes
10	2457	20	Yes	Yes	Yes
11	2462	20	Yes	Yes	Yes
12	2467	20	No	Yes	Yes
13	2472	20	No	Yes	Yes

Channel	Fc (MHz)	40MHz	US/CA	EU/UK	JP
3	2422	40	Yes	Yes	Yes
4	2427	40	Yes	Yes	Yes
5	2432	40	Yes	Yes	Yes
6	2437	40	Yes	Yes	Yes
7	2442	40	Yes	Yes	Yes
8	2447	40	Yes	Yes	Yes
9	2452	40	Yes	Yes	Yes
10	2457	40	No	Yes	Yes
11	2462	40	No	Yes	Yes

5GHz

Channel	Fc (MHz)	20MHz	40MHz	80MHz	US	CA	EU	UK	JP
36	5180	20	40	80	Yes	Yes	Yes	Yes	Yes
40	5200	20			Yes	Yes	Yes	Yes	Yes
44	5220	20	40		Yes	Yes	Yes	Yes	Yes
48	5240	20			Yes	Yes	Yes	Yes	Yes
52	5260	20	40	80	Yes	Yes	Yes	Yes	Yes
56	5280	20			Yes	Yes	Yes	Yes	Yes
60	5300	20	40		Yes	Yes	Yes	Yes	Yes
64	5320	20			Yes	Yes	Yes	Yes	Yes
100	5500	20	40	80	Yes	Yes	Yes	Yes	Yes
104	5520	20			Yes	Yes	Yes	Yes	Yes
108	5540	20	40		Yes	Yes	Yes	Yes	Yes
112	5560	20			Yes	Yes	Yes	Yes	Yes
116	5580	20	40	80	Yes	Yes	Yes	Yes	Yes
120	5600	20			Yes	Yes	Yes	Yes	Yes
124	5620	20	40		Yes	Yes	Yes	Yes	Yes
128	5640	20			Yes	Yes	Yes	Yes	Yes
132	5660	20	40	80	Yes	Yes	Yes	Yes	Yes
136	5680	20			Yes	Yes	Yes	Yes	Yes
140	5700	20	40		Yes	Yes	Yes	Yes	Yes
144	5720	20			Yes	Yes	No	Yes	Yes
149	5745	20	40	80	Yes	Yes	Yes	Yes	No
153	5765	20			Yes	Yes	Yes	Yes	No
157	5785	20	40		Yes	Yes	Yes	Yes	No
161	5805	20			Yes	Yes	Yes	Yes	No
165	5825	20			Yes	Yes	Yes	Yes	No

6GHz

Channel	Fc (MHz)	20MHz	40MHz	80MHz	US/CA (LPI. VLP)	EU/UK (LPI. VLP)	JP (LPI. VLP)
1	5955	20	40	80	Yes	Yes	Yes
5	5975	20			Yes	Yes	Yes
9	5995	20	40		Yes	Yes	Yes
13	6015	20			Yes	Yes	Yes
17	6035	20	40	80	Yes	Yes	Yes
21	6055	20			Yes	Yes	Yes
25	6075	20	40		Yes	Yes	Yes
29	6095	20			Yes	Yes	Yes
33	6115	20	40	80	Yes	Yes	Yes
37	6135	20			Yes	Yes	Yes
41	6155	20	40		Yes	Yes	Yes
45	6175	20			Yes	Yes	Yes
49	6195	20	40	80	Yes	Yes	Yes
53	6215	20			Yes	Yes	Yes
57	6235	20	40		Yes	Yes	Yes
61	6255	20			Yes	Yes	Yes
65	6275	20	40	80	Yes	Yes	Yes
69	6295	20			Yes	Yes	Yes
73	6315	20	40		Yes	Yes	Yes
77	6335	20			Yes	Yes	Yes
81	6355	20	40	80	Yes	Yes	Yes
85	6375	20			Yes	Yes	Yes
89	6395	20	40		Yes	Yes	Yes
93	6415	20			Yes	Yes	Yes

Channel	Fc (MHz)	20MHz	40MHz	80MHz	US/CA (LPI, VLP)	EU/UK (LPI, VLP)	JP (LPI, VLP)
97	6435	20	40	80	Yes	No	No
101	6455	20			Yes	No	No
105	6475	20	40		Yes	No	No
109	6495	20			Yes	No	No
113	6515	20	40	80	Yes	No	No
117	6535	20			Yes	No	No
121	6555	20	40		Yes	No	No
125	6575	20			Yes	No	No
129	6595	20	40	80	Yes	No	No
133	6615	20			Yes	No	No
137	6635	20	40		Yes	No	No
141	6655	20			Yes	No	No
145	6675	20	40	80	Yes	No	No
149	6695	20			Yes	No	No
153	6715	20	40		Yes	No	No
157	6735	20			Yes	No	No
161	6755	20	40	80	Yes	No	No
165	6775	20			Yes	No	No
169	6795	20	40		Yes	No	No
173	6815	20			Yes	No	No
177	6835	20	40	80	Yes	No	No
181	6855	20			Yes	No	No
185	6875	20	40		Yes	No	No
189	6895	20			Yes	No	No
193	6915	20	40	80	Yes	No	No
197	6935	20			Yes	No	No
201	6955	20	40		Yes	No	No
205	6975	20			Yes	No	No
209	6995	20	40	80	Yes	No	No
213	7015	20			Yes	No	No
217	7035	20	40		Yes	No	No
221	7055	20			Yes	No	No
225	7075	20	40	X	Yes	No	No
229	7095	20			Yes	No	No
233	7115	20	X		Yes	No	No

NOTE	<p>5150-5350MHz 帯域と 6GHz 帯域 LPI では日本、US、Canada、EU、UK の法令により屋内使用に制限されています。また、US、Canada の 5850-5895MHz 帯域も法令により屋内使用に制限されています。本製品を屋外で利用される場合は予め該当の電波を出さない様に設定してください。</p> <p>The 5150-5350MHz band and the 6GHz band LPI is restricted by Japan, US, Canada, EU, and UK, regulations to indoor use only. And the 5850-5895MHz band is restricted by US and Canada regulations to indoor use only too. If you intend to use this product outdoors, please ensure that it is configured not to emit signals in the corresponding frequency bands.</p>
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3.6. 無線 LAN 送信仕様 Wireless LAN transmitter specifications

IEEE 802.11 規格に準拠した最大送信電力値を示すものです。

There is maximum TX power which is compliant with IEEE 802.11 standard.

NOTE1	各チャンネルの最終的な送信電力値は、認証により制限を受けます。 仕向けにより制限された送信電力値は§15 に記載されています。 The final transmit power values for each channel are subject to limitations imposed by certification. The transmit power values restricted by destination are specified in §15.
NOTE2	ノーマルモード(非テストモード)で測定する際は Green Tx などの送信電力を動的に変える機能は無効として測定してください。 When measuring in normal mode (non-test mode), please disable features that dynamically change transmit power, such as Green Tx, and conduct the measurement.
NOTE3	送信電力は各アンテナ Chain 単独の値です。2 Data stream 時の総電力は+3.0dB されます。 The transmit power is the value for each antenna chain individually. The total power for 2 data streams is increased by +3.0dB.

2.4GHz

動作温度 Operating temperature +25°C

Standard	Modulation	Data Rates	2.4 GHz TX Power with IEEE 802.11 EVM and Spectral Mask at +25°C			Units
		Index	802.11b/g	802.11n/ax 20 MHz	802.11n/ax 40 MHz	
802.11b	BPSK	1Mbps	18.0			dBm
	QPSK	2 Mbps	18.0			dBm
	CCK	5.5 Mbps	18.0			dBm
	CCK	11 Mbps	18.0			dBm
802.11g	BPSK	6 Mbps	17.0			dBm
	BPSK	9 Mbps	17.0			dBm
	QPSK	12 Mbps	17.0			dBm
	QPSK	18 Mbps	17.0			dBm
	16 QAM	24 Mbps	17.0			dBm
	16 QAM	36 Mbps	17.0			dBm
	64 QAM	48 Mbps	17.0			dBm
	64 QAM	54 Mbps	17.0			dBm
802.11n	BPSK	MCS0		15.0	14.0	dBm
	QPSK	MCS1		15.0	14.0	dBm
	QPSK	MCS2		15.0	14.0	dBm
	16 QAM	MCS3		15.0	14.0	dBm
	16 QAM	MCS4		15.0	14.0	dBm
	64 QAM	MCS5		15.0	14.0	dBm
	64 QAM	MCS6		15.0	14.0	dBm
	64 QAM	MCS7		15.0	14.0	dBm
802.11ax	BPSK	MCS0		17.0	17.0	dBm
	QPSK	MCS1		16.0	17.0	dBm
	QPSK	MCS2		15.0	17.0	dBm
	16 QAM	MCS3		15.0	17.0	dBm
	16 QAM	MCS4		15.0	17.0	dBm
	64 QAM	MCS5		15.0	17.0	dBm

	64 QAM	MCS6		15.0	17.0	dBm
	64 QAM	MCS7		15.0	17.0	dBm
	256 QAM	MCS8		15.0	17.0	dBm
	256 QAM	MCS9		15.0	17.0	dBm
	1024 QAM	MCS10		15.0	17.0	dBm
	1024 QAM	MCS11		15.0	17.0	dBm

5GHz
動作温度 Operating temperature +25°C

Standard	Modulation	Data Rates	5 GHZ TX Power with IEEE 802.11 EVM and Spectral Mask at +25°C				Units
		Index	802.11a	802.11n/ac/ax 20 MHz	802.11n/ac/ax 40 MHz	802.11ac/ax 80 MHz	
802.11a	BPSK	6 Mbps	15.0				dBm
	BPSK	9 Mbps	15.0				dBm
	QPSK	12 Mbps	15.0				dBm
	QPSK	18 Mbps	15.0				dBm
	16 QAM	24 Mbps	15.0				dBm
	16 QAM	36 Mbps	15.0				dBm
	64 QAM	48 Mbps	15.0				dBm
	64 QAM	54 Mbps	15.0				dBm
802.11n/ac	BPSK	MCS0		14.0	14.0	14.0	dBm
	QPSK	MCS1		14.0	14.0	14.0	dBm
	QPSK	MCS2		14.0	14.0	14.0	dBm
	16 QAM	MCS3		14.0	14.0	14.0	dBm
	16 QAM	MCS4		14.0	14.0	14.0	dBm
	64 QAM	MCS5		14.0	14.0	14.0	dBm
	64 QAM	MCS6		14.0	14.0	14.0	dBm
	64 QAM	MCS7		14.0	14.0	14.0	dBm
802.11ac	256 QAM	MCS8		14.0	14.0	14.0	dBm
	256 QAM	MCS9			14.0	14.0	dBm
802.11ax	BPSK	MCS0		15.0	15.0	15.0	dBm
	QPSK	MCS1		15.0	15.0	15.0	dBm
	QPSK	MCS2		15.0	15.0	15.0	dBm
	16 QAM	MCS3		15.0	15.0	15.0	dBm
	16 QAM	MCS4		15.0	15.0	15.0	dBm
	64 QAM	MCS5		15.0	15.0	15.0	dBm
	64 QAM	MCS6		15.0	15.0	15.0	dBm
	64 QAM	MCS7		15.0	15.0	15.0	dBm
	256 QAM	MCS8		15.0	15.0	15.0	dBm
	256 QAM	MCS9		15.0	15.0	15.0	dBm
	1024 QAM	MCS10		15.0	15.0	15.0	dBm
1024 QAM	MCS11		15.0	15.0	15.0	dBm	

6GHz (+25°C)
動作温度 Operating temperature +25°C

Standard	Modulation	Data Rates	6 GHz TX Power with IEEE 802.11 EVM and Spectral Mask			Units
		Index	ax 20 MHz	ax 40 MHz	ax 80 MHz	
			Typical	Typical	Typical	
802.11ax	BPSK	MCS0	14.0	14.0	14.0	dBm
	QPSK	MCS1	14.0	14.0	14.0	dBm
	QPSK	MCS2	14.0	14.0	14.0	dBm
	16 QAM	MCS3	14.0	14.0	14.0	dBm
	16 QAM	MCS4	14.0	14.0	14.0	dBm
	64 QAM	MCS5	14.0	14.0	14.0	dBm
	64 QAM	MCS6	14.0	14.0	14.0	dBm
	64 QAM	MCS7	14.0	14.0	14.0	dBm
	256 QAM	MCS8	14.0	14.0	14.0	dBm
	256 QAM	MCS9	14.0	14.0	14.0	dBm
	1024 QAM	MCS10	14.0	14.0	14.0	dBm
1024 QAM	MCS11	14.0	14.0	14.0	dBm	

NOTE1	各チャンネルの最終的な送信電力値は、認証により制限を受けます。FCC/ISED/CE/UKCA および MIC により制限された送信電力値は§15 に記載されています。 Actual TX Power value of each channel is limited by the regulatory certification. Please refer to the product specifications §15 regarding limited TX Power by FCC, ISED, CE, UKCA and MIC.
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送信パワーの不確かさ Transmit power uncertainty
動作温度 Operating temperature (-40°C ~ +85°C)

Items	Specifications					Units	Remarks
	Modes		Min.	Typ.	Max.		
周囲環境条件による 送信パワーの不確かさ Power uncertainty due to environmental conditions ※温度、電源条件 Temperature, Power supply	802.11a	6-54Mbps	-2.0	-	+2.0	dB	
	802.11b	1-11Mbps	-2.0	-	+2.0	dB	
	802.11g	6-54Mbps	-2.0	-	+2.0	dB	
	802.11n/ac/ax	MSC0-11	-2.0	-	+2.0	dB	

周波数精度 Frequency accuracy
動作温度 Operating temperature (-40°C ~ +85°C)

Item	Specifications				Unit	Remark
	Standards	Min.	Typ.	Max.		
周波数精度 Frequency accuracy	11a/11b/11g/11n/11ac/11ax	-20	0	+20	ppm	

3.7. 無線 LAN 受信仕様 Wireless LAN receiver specifications
3.7.1. 2.4GHz 動作温度 Operating temperature -40°C ~ +85°C

Items	Specifications				Units	Remarks	
	Modes	Min.	Typ.	Max.			
最小受信感度 Receiver minimum sensitivity	11b	1Mbps	–	-86.0	-76.0	dBm	FER<8%
		2Mbps	–	-86.0	-76.0	dBm	
		5.5Mbps	–	-86.0	-76.0	dBm	
		11Mbps	–	-86.0	-76.0	dBm	
	11g	6Mbps	–	-86.0	-82.0	dBm	PER<10%
		9Mbps	–	-84.0	-81.0	dBm	
		12Mbps	–	-84.0	-79.0	dBm	
		18Mbps	–	-81.0	-77.0	dBm	
		24Mbps	–	-79.0	-74.0	dBm	
		36Mbps	–	-74.0	-70.0	dBm	
		48Mbps	–	-72.0	-66.0	dBm	
		54Mbps	–	-69.0	-65.0	dBm	
	11n/ax 20MHz	MCS0	–	-84.0	-82.0	dBm	
		MCS1	–	-81.0	-79.0	dBm	
		MCS2	–	-82.0	-77.0	dBm	
		MCS3	–	-81.0	-74.0	dBm	
		MCS4	–	-75.0	-70.0	dBm	
		MCS5	–	-72.0	-66.0	dBm	
		MCS6	–	-69.0	-65.0	dBm	
		MCS7	–	-67.0	-64.0	dBm	
11ax 20MHz	MCS8	–	-69.0	-59.0	dBm		
	MCS9	–	-66.0	-57.0	dBm		
	MCS10	–	-62.0	-54.0	dBm		
	MCS11	–	-60.0	-52.0	dBm		

Items	Specifications					Units	Remarks
	Modes		Min.	Typ.	Max.		
最小受信感度 Receiver minimum sensitivity	11n/ax 40MHz	MCS0	–	-82.0	-79.0	dBm	PER<10%
		MCS1	–	-78.0	-76.0	dBm	
		MCS2	–	-79.0	-74.0	dBm	
		MCS3	–	-81.0	-71.0	dBm	
		MCS4	–	-75.0	-67.0	dBm	
		MCS5	–	-72.0	-63.0	dBm	
		MCS6	–	-68.0	-62.0	dBm	
	MCS7	–	-66.0	-61.0	dBm		
	11ax 40MHz	MCS8	–	-68.0	-56.0	dBm	
		MCS9	–	-65.0	-54.0	dBm	
		MCS10	–	-62.0	-51.0	dBm	
MCS11		–	-59.0	-49.0	dBm		

3.7.2. 5GHz 動作温度 Operating temperature -40°C ~ +85°C

Items	Specifications				Units	Remarks	
	Modes	Min.	Typ.	Max.			
最小受信感度 Receiver minimum sensitivity	11a	6Mbps	-	-92.0	-82.0	dBm	PER<10%
		9Mbps	-	-91.0	-81.0	dBm	
		12Mbps	-	-89.0	-79.0	dBm	
		18Mbps	-	-87.0	-77.0	dBm	
		24Mbps	-	-84.0	-74.0	dBm	
		36Mbps	-	-81.0	-70.0	dBm	
		48Mbps	-	-77.0	-66.0	dBm	
		54Mbps	-	-76.0	-65.0	dBm	
	11n/ac/ax 20MHz	MCS0	-	-92.0	-82.0	dBm	
		MCS1	-	-90.0	-79.0	dBm	
		MCS2	-	-88.0	-77.0	dBm	
		MCS3	-	-85.0	-74.0	dBm	
		MCS4	-	-82.0	-70.0	dBm	
		MCS5	-	-76.0	-66.0	dBm	
		MCS6	-	-75.0	-65.0	dBm	
		MCS7	-	-74.0	-64.0	dBm	
	11ac/ax 20MHz	MCS8	-	-72.0	-59.0	dBm	
	11ax 20MHz	MCS9	-	-70.0	-57.0	dBm	
		MCS10	-	-66.0	-54.0	dBm	
		MCS11	-	-63.0	-52.0	dBm	
	11n/ac/ax 40MHz	MCS0	-	-87.0	-79.0	dBm	
		MCS1	-	-87.0	-76.0	dBm	
		MCS2	-	-83.0	-74.0	dBm	
		MCS3	-	-80.0	-71.0	dBm	
		MCS4	-	-76.0	-67.0	dBm	
		MCS5	-	-73.0	-63.0	dBm	
		MCS6	-	-72.0	-62.0	dBm	
		MCS7	-	-72.0	-61.0	dBm	
	11ac/ax 40MHz	MCS8	-	-69.0	-56.0	dBm	
		MCS9	-	-63.0	-54.0	dBm	
	11ax 40MHz	MCS10	-	-62.0	-51.0	dBm	
		MCS11	-	-62.0	-49.0	dBm	

Items	Specifications				Units	Remarks	
	Modes	Min.	Typ.	Max.			
最小受信感度 Receiver minimum sensitivity	11ac/ax 80MHz	MCS0	–	-87.0	-76.0	dBm	PER<10%
		MCS1	–	-85.0	-73.0	dBm	
		MCS2	–	-84.0	-71.0	dBm	
		MCS3	–	-81.0	-68.0	dBm	
		MCS4	–	-78.0	-64.0	dBm	
		MCS5	–	-74.0	-60.0	dBm	
		MCS6	–	-73.0	-59.0	dBm	
		MCS7	–	-71.0	-58.0	dBm	
		MCS8	–	-67.0	-53.0	dBm	
	MCS9	–	-65.0	-51.0	dBm		
	11ax 80MHz	MCS10	–	-61.0	-48.0	dBm	
MCS11		–	-59.0	-46.0	dBm		

3.7.3. 6GHz 動作温度 Operating temperature -40°C ~ +85°C

Items	Specifications				Units	Remarks	
	Modes	Min.	Typ.	Max.			
最小受信感度 Receiver minimum Sensitivity	11ax 20MHz	MCS0	–	-91.0	-82.0	dBm	PER<10%
		MCS1	–	-89.0	-79.0		
		MCS2	–	-88.0	-77.0		
		MCS3	–	-84.0	-74.0		
		MCS4	–	-82.0	-70.0		
		MCS5	–	-77.0	-66.0		
		MCS6	–	-76.0	-65.0		
		MCS7	–	-74.0	-64.0		
		MCS8	–	-70.0	-59.0		
		MCS9	–	-68.0	-57.0		
		MCS10	–	-63.0	-54.0		
	MCS11	–	-61.0	-52.0			
	11ax 40MHz	MCS0	–	-88.0	-79.0		
		MCS1	–	-86.0	-76.0		
		MCS2	–	-86.0	-74.0		
		MCS3	–	-82.0	-71.0		
		MCS4	–	-80.0	-67.0		
		MCS5	–	-76.0	-63.0		
		MCS6	–	-74.0	-62.0		
		MCS7	–	-73.0	-61.0		
		MCS8	–	-68.0	-56.0		
		MCS9	–	-66.0	-54.0		
		MCS10	–	-62.0	-51.0		
	MCS11	–	-55.0	-49.0			
	11ax 80MHz	MCS0	–	-85.0	-76.0		
		MCS1	–	-83.0	-73.0		
		MCS2	–	-82.0	-71.0		
		MCS3	–	-79.0	-68.0		
		MCS4	–	-77.0	-64.0		
		MCS5	–	-73.0	-60.0		
		MCS6	–	-70.0	-59.0		
		MCS7	–	-70.0	-58.0		
	MCS8	–	-66.0	-53.0			

		MCS9	-	-64.0	-51.0		
		MCS10	-	-60.0	-48.0		
		MCS11	-	-58.0	-46.0		

3.8. Bluetooth 一般仕様 Bluetooth general specifications

Items	Specifications			Units	Remarks
Chipset	IW623LSHN/A1ZMIZ (NXP)			–	
コア仕様 Core specification	Bluetooth 6.1			–	
動作周波数 Operating Frequency range	Mode	Min	Max		
	BR/EDR/LE/2LE	2402	2480	MHz	
周波数間隔 Frequency step	BR/EDR	1		MHz	Ch.0-Ch.78
	LE/2LE	2		MHz	Ch.0-Ch.39
変調方式 Modulation type	BR	GFSK		–	
	EDR	π/4-DQPSK, 8-DPSK			
	LE/2LE	GFSK			

3.9. Bluetooth 一般仕様 Bluetooth general specifications
JP/US/CA

Items	Specifications						Units	Remarks
	Standards			Min.	Typ.	Max.		
最大送信電力 Maximum TX power	BR	Class 2	Ch.0-Ch.78	-1.0	+2.0	+5.5	dBm	
	EDR	Class 2	Ch.0-Ch.78	-1.0	+2.0	+5.5		
	LE/2LE		Ch.0-Ch.39	-3.5	0.0	+2.5		

EU/UK

Items	Specifications						Units	Remarks
	Standards			Min.	Typ.	Max.		
最大送信電力 Maximum TX power	BR	Class 2	Ch.0-Ch.78	-1.0	+2.0	+5.5	dBm	
	EDR	Class 2	Ch.0-Ch.78	-1.0	+2.0	+5.5		
	LE/2LE		Ch.0-Ch.39	-3.5	0.0	+3.0		

Frequency accuracy
動作温度 Operating temperature -40°C ~ +85°C

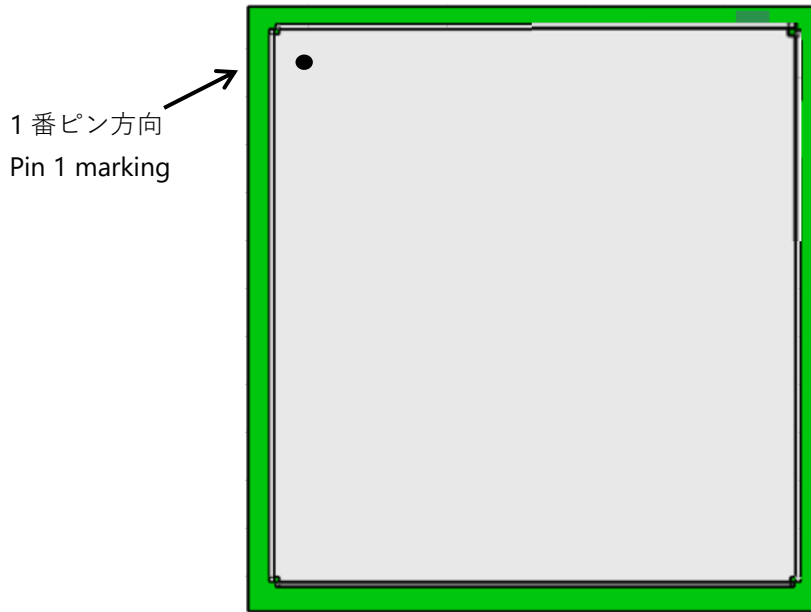
Items	Specifications				Units	Remarks
	Standards		Min.	Typ.		
中心周波数精度 Center frequency accuracy	BR/EDR/LE/2LE		-20	–	+20	ppm

3.10. Bluetooth 受信仕様 Bluetooth receiver specifications
Bluetooth BR/EDR/LE
動作温度 Operating temperature -40°C ~ +85°C

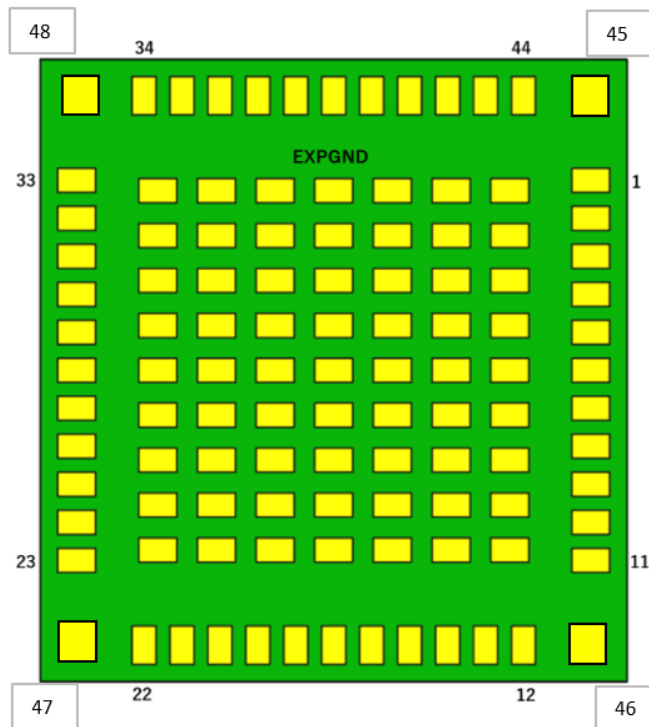
Items	Specifications					Units	Remarks
	Standards	Data rate	Min.	Typ.	Max.		
最小受信感度	BR	1Mbps	–	-92.0	-70.0	dBm	BER<0.1%
Receiver Minimum Sensitivity	EDR	2Mbps	–	-89.0	-70.0	dBm	BER<0.01%
		3Mbps	–	-84.0	-70.0	dBm	
	LE	1Mbps	–	-96.0	-70.0	dBm	PER<30%
	2LE	2Mbps	–	-94.0	-70.0	dBm	

4. 信号仕様 Signal pins specifications

4.1. SX-SDMAX6E-2530S ピン配置 SX-SDMAX6E-2530S pin locations



表面 Top view



背面 Bottom view

4.2. SX-SDMAX6E-2530S 信号仕様 SX-SDMAX6E-2530S signal specifications

Num	Signal name	Type	Power Supply	Descriptions
1	GND	GND	—	Ground
2	NC	NC	—	Not connected
3	PDn	I	VDD18	Full Power-down (input) (active low) 0 = full power-down mode 1 = normal mode • PDn can accept an high input of 1.4V(Min.) to 4.5V(Max.) • PDn may be driven by the host • PDn must be high for normal operation No internal pull-up on this pin. Connect to power down pin (GPIO) of host or tie to power rail. External host required to drive this pin high for normal operation mode.
4	VDD33	P	—	3.3V Voltage Input
5	VDD33	P	—	3.3V Voltage Input
6	VDD33	P	—	3.3V Voltage Input
7	VDD33	P	—	3.3V Voltage Input
8	VIO	P	—	1.8V/3.3V Digital I/O Power Supply
9	VDD18	P	—	1.8V Voltage Input
10	GND	GND	—	Ground
11	GND	GND	—	Ground

Num	Signal name	Type	Power Supply	Descriptions
12	SD_D3	I/O	VIO_SD	SDIO Data [3]. Internal pull-up.
13	SD_D2	I/O	VIO_SD	SDIO Data [2]. Internal pull-up.
14	SD_D1	I/O	VIO_SD	SDIO Data [1]. Internal pull-up.
15	SD_D0	I/O	VIO_SD	SDIO Data [0]. Internal pull-up.
16	SD_CMD	I/O	VIO_SD	SDIO command/response (input/output). Internal pull-up.
17	GND	GND	–	Ground
18	SD_CLK	I	VIO_SD	SDIO Clock input. Internal pull-up.
19	GND	GND	–	Ground
20	Reserved	I	VIO	Not connected
21	VIO_SD	P	–	1.8V/3.3V Digital I/O SDIO power supply For SDIO ultra-high speed mode (25 to 208 MHz), VIO_SD must be 1.8V. For SDIO default mode (up to 25 MHz) and high-speed mode (up to 50 MHz), VIO_SD must be 1.8V or 3.3V.
22	GND	GND	–	Ground

Num	Signal name	Type	Power Supply	Descriptions
23	GND	GND	–	Ground
24	BT_UART_RXD	I	VIO	UART RX. UART serial input signal. Internal pull-up.
25	BT_UART_CTS	I	VIO	UART CTS. UART clear-to-send input signal. Internal pull-up. ハードウェアフロー制御。Low 時に Data 送信、High 時に Data 送信停止。 Hardware flow control pin. If this pin is low, TX operates. If high, TX stops.
26	BT_UART_TXD	O	VIO	UART TX. UART serial output signal. Internal pull-up.
27	BT_UART_RTS	O	VIO	UART RTS. UART request-to-send output signal. Internal pull-up. ハードウェアフロー制御。Low 時に Data 受信、High 時に Data 受信停止。 Hardware flow control pin. If this pin is low, RX operates. If high, RX stops.
28	Reserved	I/O	VIO	Not connected
29	Reserved	I	VIO	Not connected
30	Reserved	I	VIO	Not connected
31	GND	GND	–	Ground
32	VDD33	P	–	3.3V Voltage Input
33	GND	GND	–	Ground

Num	Signal name	Type	Power Supply	Descriptions
34	GND	GND	—	Ground
35	BT_WAKE_HOST	DO	VIO	Oob(Out-of-band)スリープ制御信号 L 信号でホストに起動をかけます。 トータムポール出力。PDn 解除後(High)は入力設定かつ内部 Pull-up. Out-of-band sleep control signal. L to trigger a host. Totempole output. This pin is input and internal pull-up after PDn release (High).
36	WOW	DO	VIO	Wake on wireless 信号。 L 信号でホストに起動をかけます。 トータムポール出力。PDn 解除後(High)は入力設定かつ内部 Pull-up. Wake on wireless signal. L to trigger a host. Totempole output. This pin is input and internal pull-up after PDn release (High).
37	Reserved	I/O	VIO	
38	Reserved	I	VIO	Not connected
39	Reserved	I/O	VIO	Not connected
40	Reserved	I	VIO	Not connected
41	Reserved	O	VIO	Not connected
42	GND	GND	—	Ground
43	NC	NC	—	Not connected
44	GND	GND	—	Ground
45	ANT1	RF	—	WLAN1 RF PAD
46	GND	GND	—	Ground
47	BT_RF	RF	—	Bluetooth RF PAD
48	ANT2	RF	—	WLAN2 RF PAD

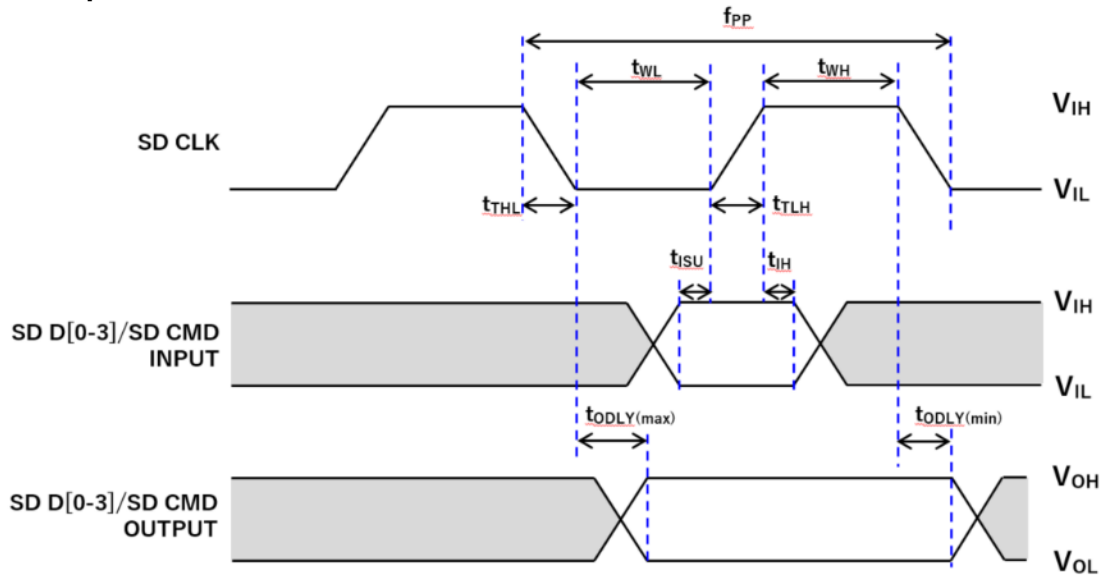
Num	Signal name	Type	Power Supply	Descriptions
EXP_GND	Exposed Ground	GND	—	Exposed Ground 63 pads

NOTE	内部 pull-up 値は 100k Ω です。SDIO 端子の公差は 70k Ω ~ 140k Ω です。 Internal pull-up is 100k Ω . SDIO line variance is 70k Ω to 140k Ω .
------	--

5. インターフェイス・タイミング仕様 Interface and timing specifications

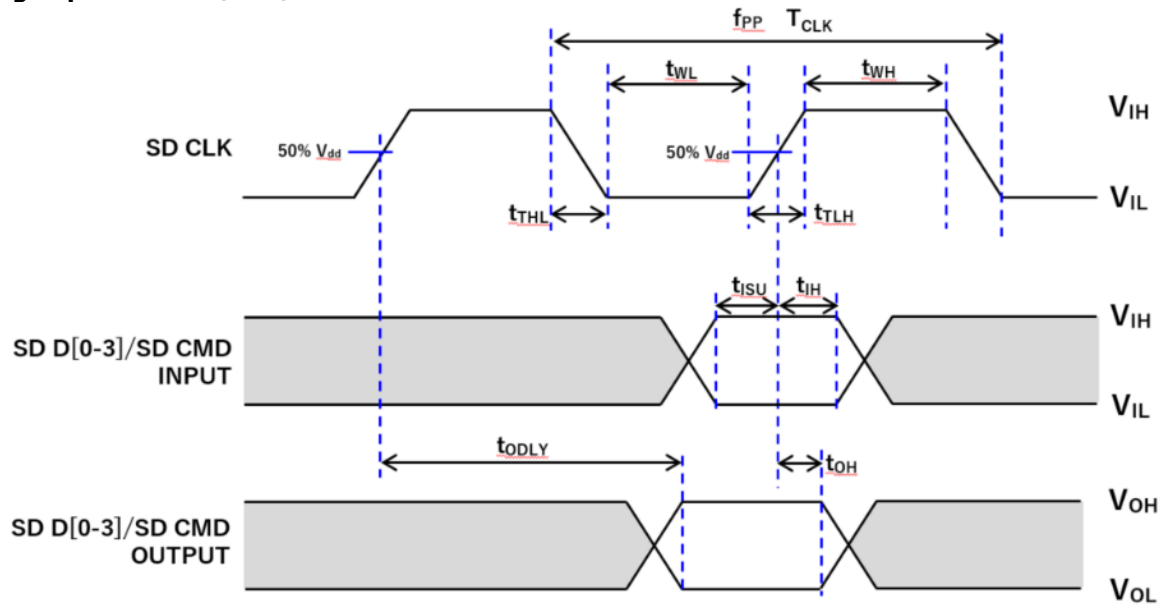
5.1. WLAN SDIO AC タイミング仕様 WLAN SDIO AC timing specifications

Default Speed (3.3V)



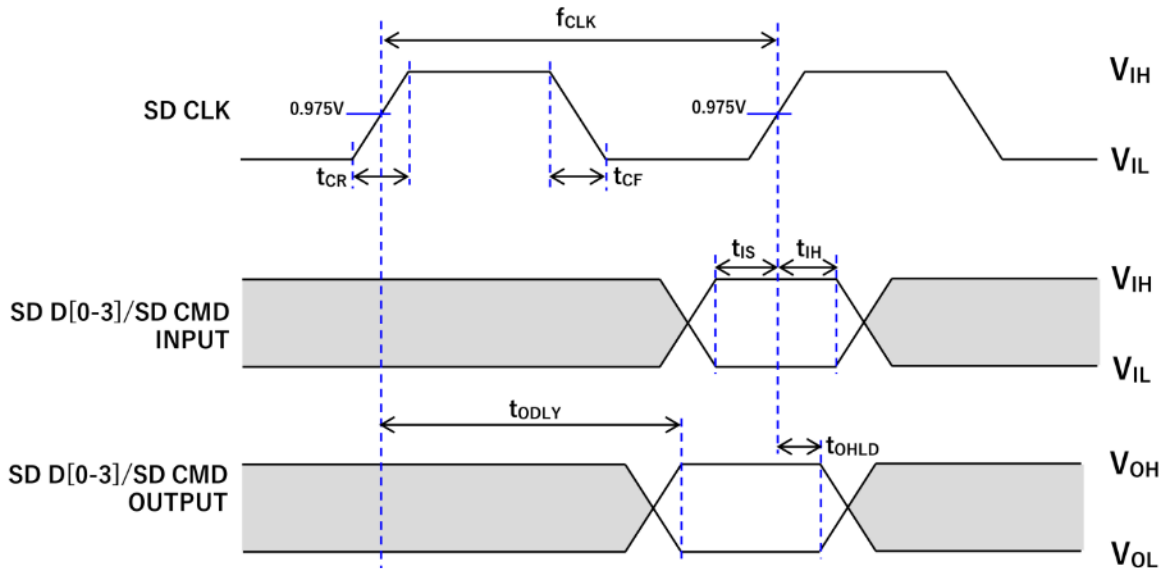
Symbols	Items	Specifications		Units	Remarks
		Min.	Max.		
f_{PP}	Clock frequency Data Transfer Mode	0	25	MHz	
t_{WL}	Clock low time	10	–	nsec	
t_{WH}	Clock high time	10	–	nsec	
t_{TLH}	Clock rise time	–	10	nsec	
t_{THL}	Clock fall time	–	10	nsec	
t_{ISU}	Input setup time	5	–	nsec	
t_{IH}	Input hold time	5	–	nsec	
t_{ODLY}	Output Delay time	–	14	nsec	

High Speed Mode (3.3V)



Symbols	Items	Specifications		Units	Remarks
		Min.	Max.		
f_{PP}	Clock frequency Data Transfer Mode	0	50	MHz	
T_{CLK}	Clock time	10	40	nsec	
t_{WL}	Clock low time	7	–	nsec	
t_{WH}	Clock high time	7	–	nsec	
t_{TLH}	Clock rise time	–	$0.2 * T_{CLK}$	nsec	
t_{THL}	Clock fall time	–	$0.2 * T_{CLK}$	nsec	
t_{ISU}	Input setup time	6	–	nsec	
t_{IH}	Input hold time	2	–	nsec	
t_{ODLY}	Output Delay time	–	14	nsec	
t_{OH}	Output Hold time	2.5	–	nsec	

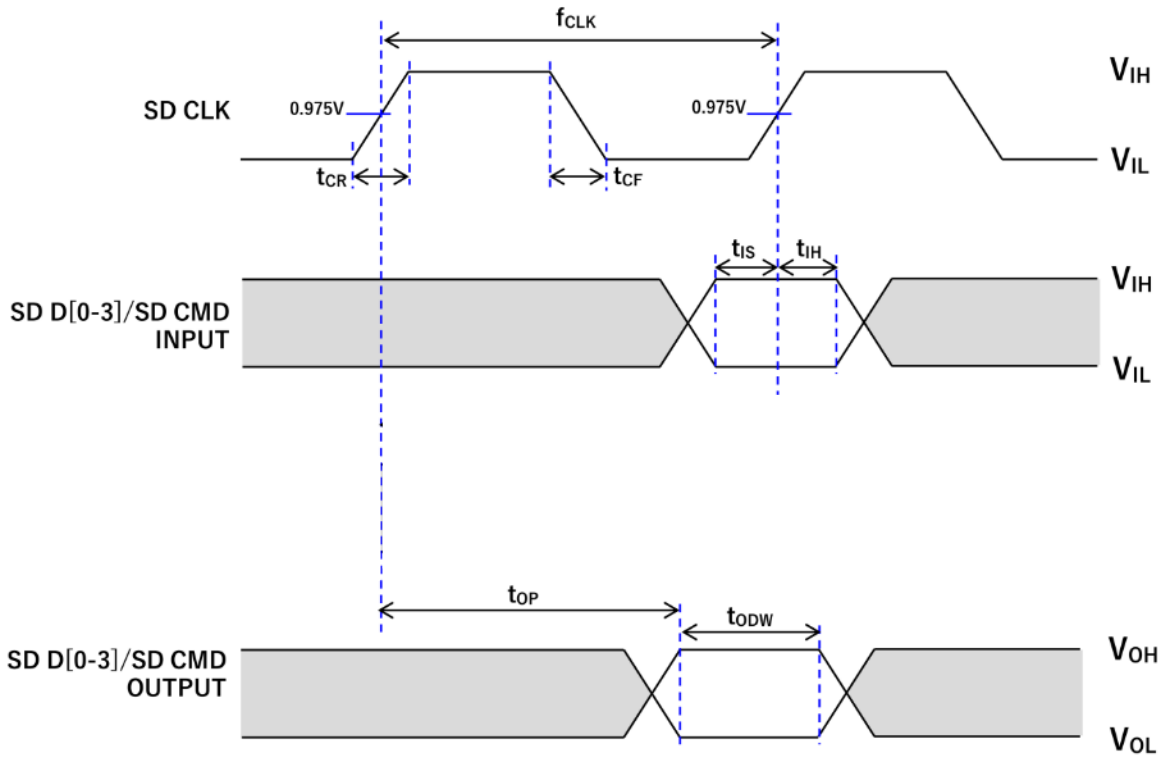
SDR12, SDR25, SDR50 modes (1.8V)



h	Items	Specifications		Units	Remarks
		Min.	Max.		
f_{CLK}	Clock frequency	25	100	MHz	
t_{CR}, t_{CF}	Clock rise time, Clock fall time	–	$0.2 * 1 / f_{CLK}$	nsec	NOTE1
t_{IS}	Input setup time	3.0	–	nsec	
t_{IH}	Input hold time	0.8	–	nsec	
t_{ODLY}	Output Delay time	–	7.5	nsec	
t_{OHLD}	Output Hold time	1.5	–	nsec	

NOTE1	2.00 nsec(Max.) at SDR50 (100MHz) 4.00 nsec(Max.) at SDR25 (50MHz) 8.00 nsec(Max.) at SDR12 (25MHz)
-------	---

SDR104 modes (1.8V)



h	Items	Specifications		Units	Remarks
		Min.	Max.		
f_{CLK}	Clock frequency	0	208	MHz	
t_{CR}, t_{CF}	Clock rise time, Clock fall time	–	$0.2 * 1 / f_{CLK}$	nsec	NOTE1
t_{IS}	Input setup time	1.4	–	nsec	
t_{IH}	Input hold time	0.8	–	nsec	
t_{OP}	Card Output phase	0	10	nsec	
t_{ODW}	Output valid data window	2.88	–	nsec	

NOTE1	0.96 nsec(Max.) at SDR104 (208MHz)
-------	------------------------------------

SDIO 信号の配線について SDIO signal length

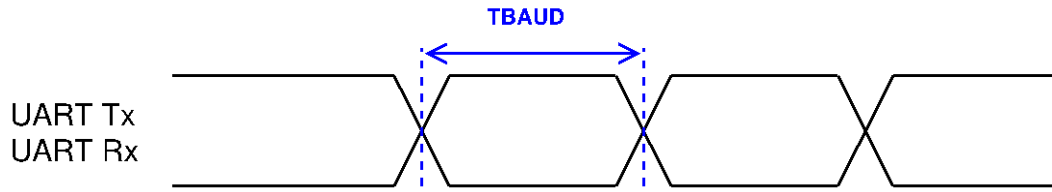
SDIO 仕様に準拠した遅延内で、レイアウト設計を行ってください。

Design the layout within a delay that conforms to the SDIO specification.

SX-SDMAX6E-2530S

Signals	SX-SDMAX6E-2530S SMT PCB	Units
SD_CLK	7.027	mm
SD_CMD	3.872	mm
SD_DATA3	6.755	mm
SD_DATA2	5.387	mm
SD_DATA1	6.904	mm
SD_DATA0	6.244	mm

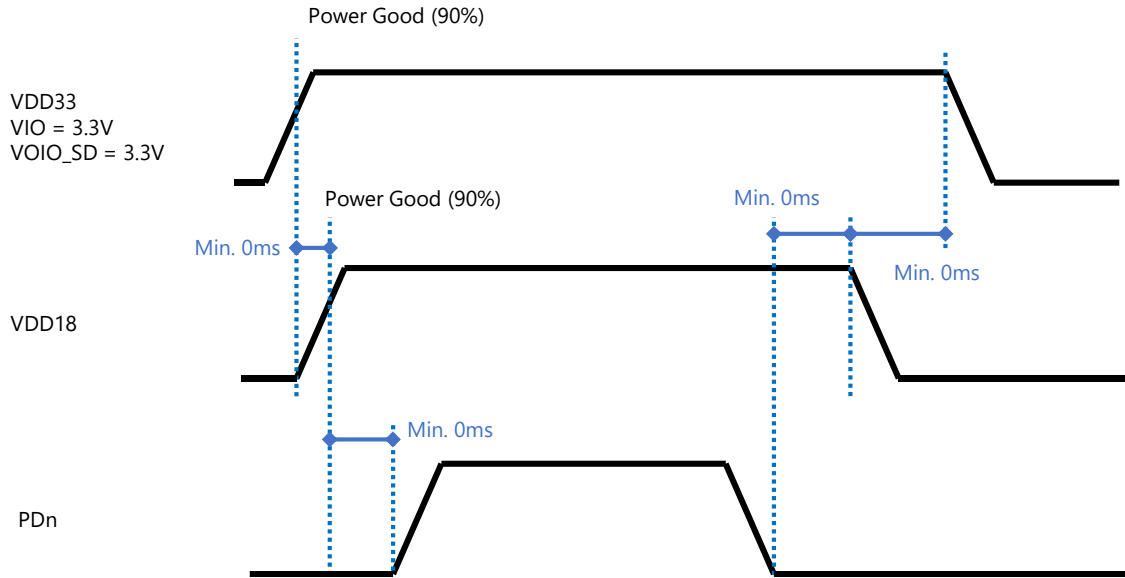
5.2. Bluetooth UART 仕様 Bluetooth UART interface specifications



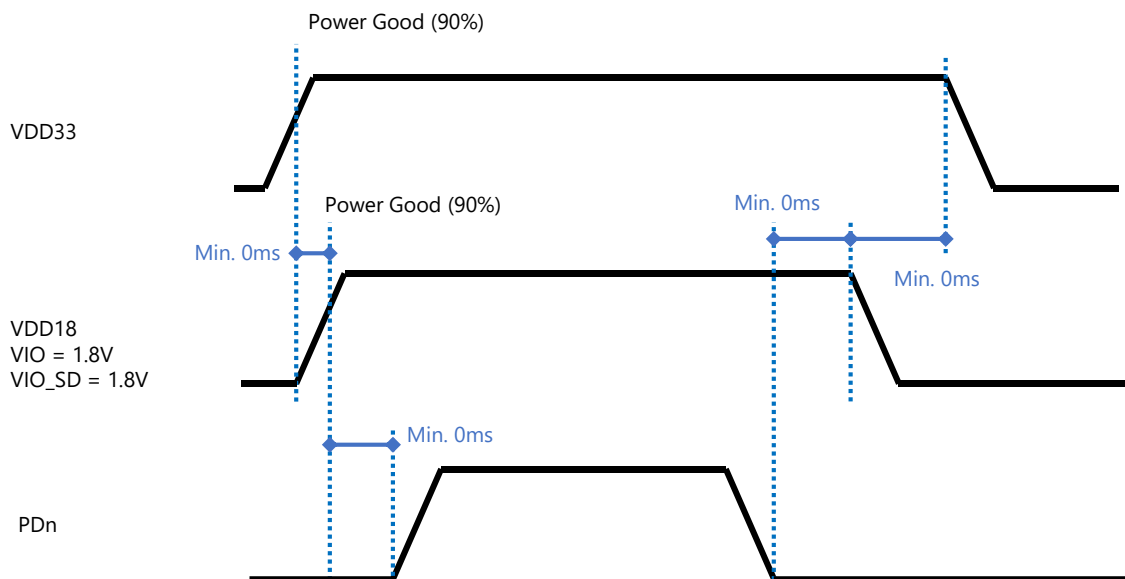
Symbol	Parameter	Min	Typ	Max	Unit
T _{BAUD}	Baud time	250	--	--	ns

5.3. パワーON & OFF, リセットタイミング Power ON & OFF, reset timing

VIO, VIO_SD : 3.3V



VIO, VIO_SD : 1.8V



6. 適合規格 Standards compliance

6.1. 規格一覧 Standards list

適合規格 Standards conformity

- IEEE802.11-2020 (a/b/g/n/ac)
- IEEE802.11ax
- Bluetooth 6.1 BR/EDR/LE (DN: Q382156)
- SDIO v3.0

適合法規制 Law regulation compliance

- ◇ 日本電波法 MIC
 - 証明規則第 2 条第 1 項 第 19 号 (WLAN, Bluetooth)
 - 証明規則第 2 条第 1 項 第 19 号の 3 (W52/W53/W56 DFS master 対応)^{NOTE3}
 - 証明規則第 2 条第 1 項第 79 号(VLP 子局)
 - 証明規則第 2 条第 1 項第 80 号(LPI 子局)
 - Article 2 paragraph 1 item (19) (WLAN, Bluetooth)
 - Article 2 paragraph 1 item (19)-3 (W52/W53/W56 with DFS master)^{NOTE3}
 - Article 2 paragraph 1 item (79) (VLP Client)
 - Article 2 paragraph 1 item (80) (LPI Client)
 - 認証番号 Certification number: **003-250323**
- ◇ FCC Part15
 - Subpart C (2.4GHz WLAN, Bluetooth)
 - Subpart E (U-NII-1/2A/2C/3/4 with DFS master, 6G Dual Client, VLP Client)
 - ID: **N6C-SDMAX6E**
- ◇ ISED
 - RSS-247 (2.4GHz WLAN, Bluetooth)
 - RSS-247 (U-NII-1/2A/2C/3 with DFS master)
 - RSS-248 (6G Client)^{NOTE1}
 - ID: **4908A-SDMAX6E**
- ◇ ETSI
 - EN 300 328 (2.4GHz WLAN, Bluetooth)
 - EN 301 893 (Sub band 1, 2, 3, 4 with DFS master)
 - EN 303 687 (6G Client)
- ◇ Ofcom
 - EN 300 328 (2.4GHz WLAN, Bluetooth)
 - EN 301 893 (Sub band 1, 2, 3, 4 with DFS master)
 - EN 303 687 (6G Client)
- ◇ CE RoHS Directive
- ◇ EN 62311
- ◇ EN 62368-1 : 2014 (EN 62368-1 : 2014 + A11 : 2017)

対応国 Countries

- ◆ Asia
Japan
- ◆ North America
US
Canada
- ◆ EU
- ◆ United Kingdom

NOTE1	<p>本製品の 6GHz 帯の認証取得クラス/カテゴリは US では 6CD (Dual Client)と VLP、Canada では Client Device です。他のクラス/カテゴリは未取得のため、6GHz 帯の Access Point としては使えません。</p> <p>The certification class/category for the 6GHz band of this product is 6CD (Dual Client) in the US and Client Device in Canada. As other classes/categories are not acquired, it cannot be used as an Access Point in the 6GHz band.</p>
NOTE2	<p>EU で 6GHz 帯を使用する場合、EU の NB 検証を取得する必要があります。</p> <p>United Kingdom で 6GHz 帯を使用する場合、United Kingdom の NB 検証を取得する必要があります。</p> <p>If you intend to use the 6GHz band in the EU, you need to obtain EU's NB verification.</p> <p>If you plan to use the 6GHz band in the United Kingdom, you need to obtain United Kingdom's NB verification.</p>
NOTE3	<p>DFS の制限：Host の追加申請が必要</p> <p>DFS restrictions: Additional application by the host is required.</p>
NOTE4	<p>日本電波法の認証番号は、必ず最終製品に表示してください。</p> <p>Please make sure to display the certification number of the Japanese Radio Law on the final product without fail.</p>
	<p>その他、各国の法令に従って使用してください。</p> <p>Additionally, please use the product in accordance with the regulations of each country.</p>
用語説明 Further Note of Glossary	
Access Point	<p>これは 6GHz 帯域での定義です。以下のいずれかに該当するものを指します。</p> <ul style="list-style-type: none"> - ピアツーピアのブリッジ接続をするもの - 優先と無線、それぞれのネットワークセグメント間を接続するもの - 無線ネットワークセグメント間のリレーをするもの <p>This is a definition for the 6GHz band, referring to any of the following:</p> <ul style="list-style-type: none"> ◇ Devices that establish point-to-point bridge connections. ◇ Devices that connect priority and wireless segments. ◇ Devices that relay between wireless network segments.
Client	<p>これは 6GHz 帯域での定義です。</p> <p>クライアントデバイスは、送信がアクセスポイントか室内で従属する機器の制御下におかれている機器です。クライアントデバイスはネットワークを開始できません。</p> <p>クライアントデバイスとは固定クライアントデバイス、ローパワークライアントデバイス、スタンダードクライアントデバイスを含みます。</p> <p>This is a definition for the 6GHz band.</p> <p>A client device is a device that is under the control of either an access point or an indoor unit for transmission.</p> <p>A client device cannot initiate a network.</p> <p>A client device includes fixed client devices, low-power client devices, and standard client devices.</p>

6.2. 推奨アンテナリスト Recommended antenna list
日本 (Japan) MIC

Antennas	Vendors	Type	2.4GHz (dBi)	5GHz (dBi)	6GHz (dBi)	No.19 2.4GHz	No.19-3 W52/53/56	No.79, 80 6GHz
AA258 (H2B1PC1A1C) (Include 50mm cable loss)	Unictron	Dipole	+2.67	+3.92	+3.59	✓	✓	✓
ANTDC-081A0/B0 (Exclude cable loss)	Sansei-Denki	Dipole	+2.0	+2.0	—	✓	✓	—
ANTDP-027A0 (Exclude cable loss)	Sansei-Denki	Dipole	+1.5	+2.1	—	✓	✓	—
AP02ML27***** (Include 300mm cable loss)	JAE	Dipole	+1.03	+2.74	+2.41	✓	✓	✓

アメリカ・カナダ (USA/Canada) FCC/ISED

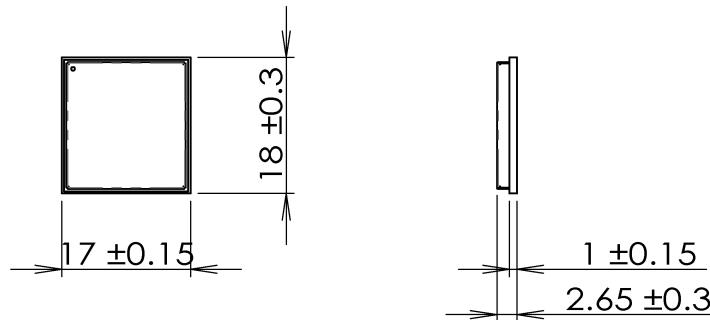
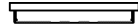
Antennas	Vendors	Type	2.4GHz (dBi)	5GHz (dBi)					6GHz (dBi)				Sub. C RSS-247 2.4GHz	Sub. E RSS-247 5GHz	Sub. E RSS-248 6GHz
				B1	B2A	B2C	B3	B4	B5	B6	B7	B8			
AA258 (H2B1PC1A1C) (Include 50mm cable loss)	Unictron	Dipole	+2.67	+3.22	+3.91	+2.77	+3.92	+4.4	+3.59	+3.63	+2.33	+1.37	✓	✓	✓
ANTDC-081A0/B0 (Exclude cable loss)	Sansei-Denki	Dipole	+2.0	+2.0	+2.0	+2.0	+2.0	—	—	—	—	—	✓	✓	—
ANTDP-027A0 (Exclude cable loss)	Sansei-Denki	Dipole	+1.5	+2.1	+2.1	+2.1	+2.1	—	—	—	—	—	✓	✓	—
AP02ML27***** (Include 300mm cable loss)	JAE	Dipole	+1.03	+1.36	+1.11	+2.15	+2.74	—	+2.41	+2.17	+2.28	+3.31	✓	✓	✓

ヨーロッパ・イギリス (Europe・UK) ETSI/Ofcom

Antennas	Vendors	Type	2.4GHz (dBi)	5GHz (dBi)				6GHz (dBi)	300328	301893	300440 2030/8/3	303687
				B1	B2A	B2C	B3	B5				
AA258 (H2B1PC1A1C) (Include 50mm cable loss)	Unictron	Dipole	+2.67	+3.22	+3.91	+2.77	+3.92	+3.59	✓	✓	✓	✓
ANTDC-081A0/B0 (Exclude cable loss)	Sansei-Denki	Dipole	+2.0	+2.0	+2.0	+2.0	+2.0	—	✓	✓	✓	—
ANTDP-027A0 (Exclude cable loss)	Sansei-Denki	Dipole	+1.5	+2.1	+2.1	+2.1	+2.1	—	✓	✓	✓	—
AP02ML27***** (Include 300mm cable loss)	JAE	Dipole	+1.03	+1.36	+1.11	+2.15	+2.74	+2.41	✓	✓	✓	✓

NOTE1	<p>本製品は上記の法規制に適合していますが、認可内容の詳細や制限事項については認可証/認可レポートを十分にご確認ください。</p> <p>This product is conformity with above regulations, please check the grant and certification report for details and restrictions.</p>
NOTE2	<p>これらの認証は silex 推奨アンテナ、silex 製ボードデータファイルと silex 製ドライバでのみ有効です。但し、silex の推奨アンテナを使用していたとしても最終製品の形態、または silex 製ドライバ以外を使う場合は再認証試験が必要になる可能性があります。</p> <p>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.</p>
NOTE3	<p>各国の EMC 認証は最終製品形態での試験が必要です。</p> <p>EMC certification of each country might be required as the final product.</p>
NOTE4	<p>5150-5350MHz 帯域と 6GHz 帯域 LPI では日本、US、Canada、EU、UK の法令により屋内使用に制限されています。また、US、Canada の 5850-5895MHz 帯域も法令により屋内使用に制限されています。本製品を屋外で利用される場合は予め該当の電波を出さない様に設定してください。</p> <p>The 5150-5350MHz band and the 6GHz band LPI is restricted by Japan, US, Canada, EU, and UK, regulations to indoor use only. And the 5850-5895MHz band is restricted by US and Canada regulations to indoor use only too. If you intend to use this product outdoors, please ensure that it is configured not to emit signals in the corresponding frequency bands.</p>

7. 機械的仕様 Mechanical specifications



ラベルの厚みは含まず。

表面 Top view

NOTE1	LGA パッド設計を CAD にインポートする必要がある場合は、PW104790XA_module_lga_pads.dxf をご利用ください。 In case LGA pad design need to be imported to CAD system, please use PW104790XA_module_lga_pads.dxf
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製品厚み Product thickness

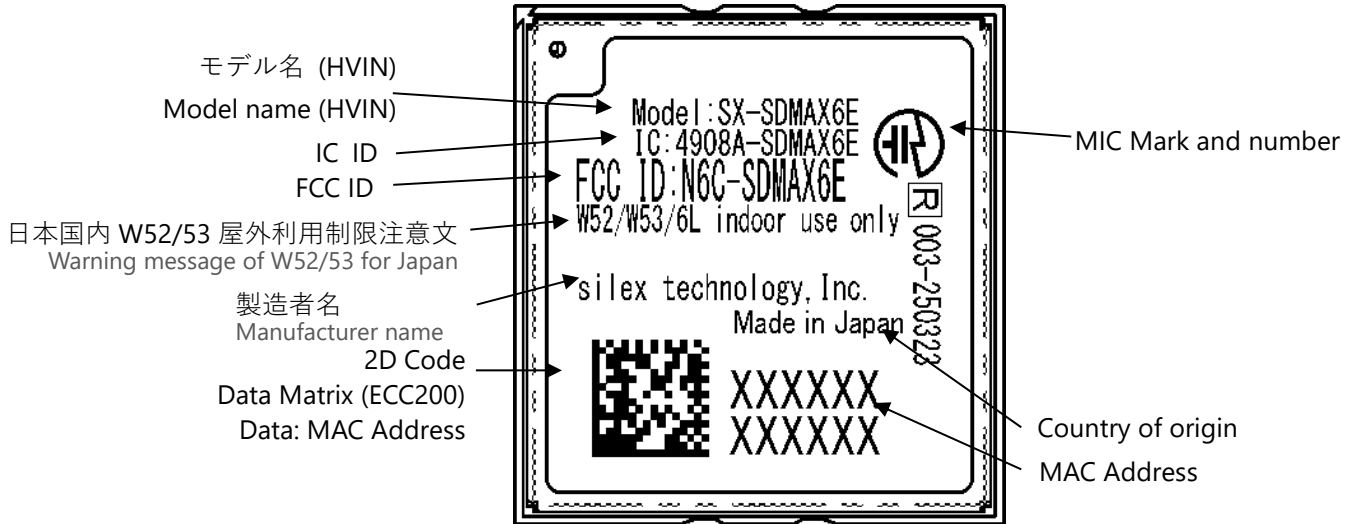
Items	Thickness	Remarks
SX-SDMAX6E-2530S (基板単体) SX-SDMAX6E-2530S (Board)	2.65mm +/- 0.3 mm	

PCB 厚 PCB thickness

Items	Thickness	Remark
SX-SDMAX6E-2530S PCB	1.0mm +/- 0.15 mm	

ラベルの厚み(0.05mm)は含まない。
The label thickness (0.05 mm) is not included.

8. 表示仕様 Indication specifications

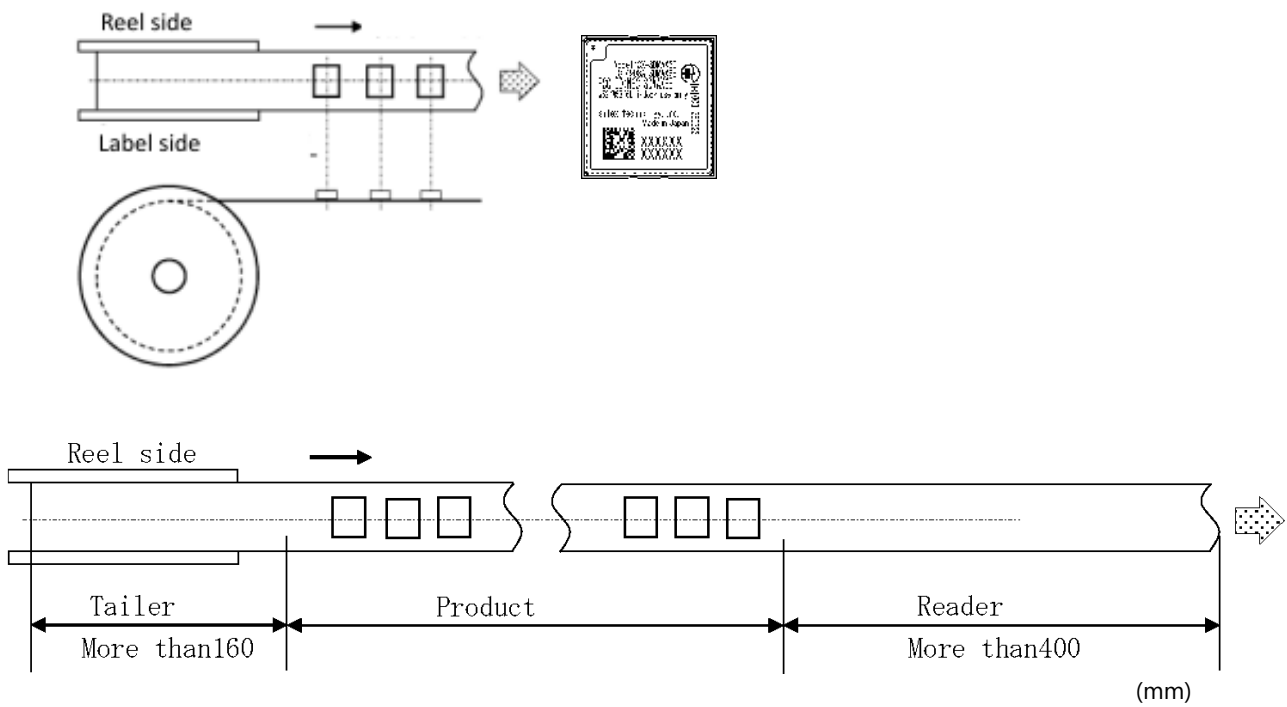
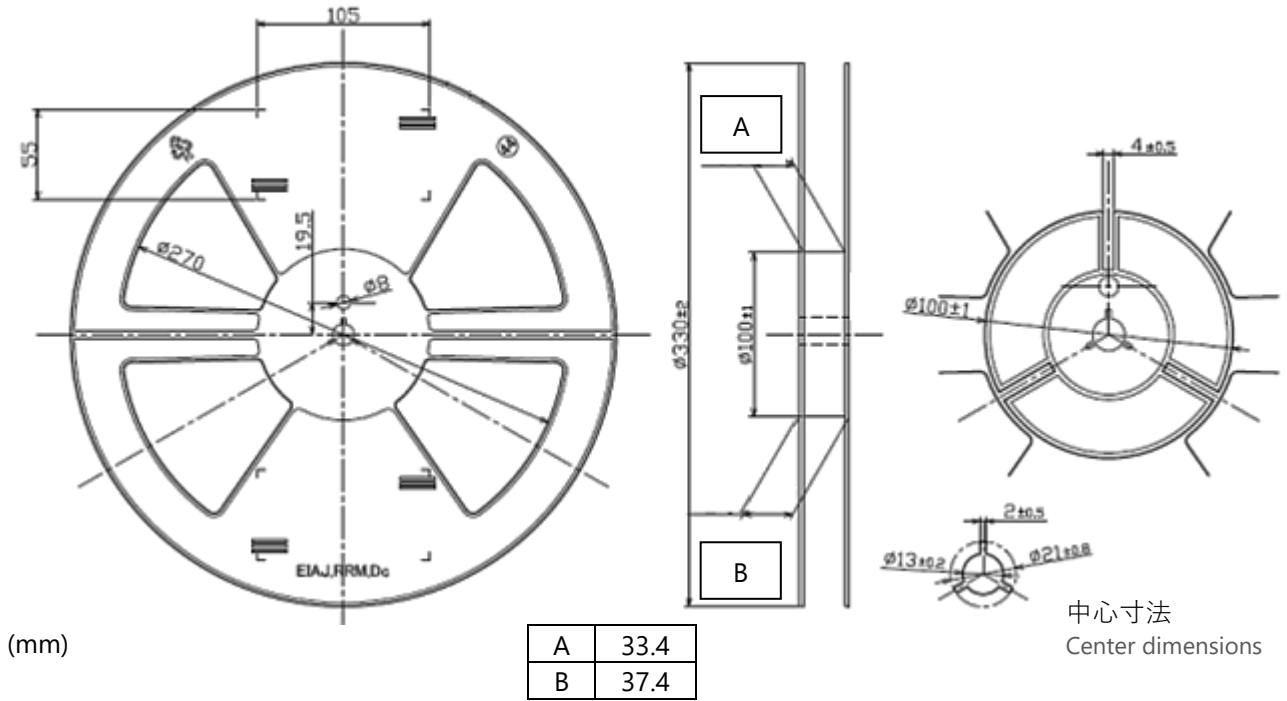


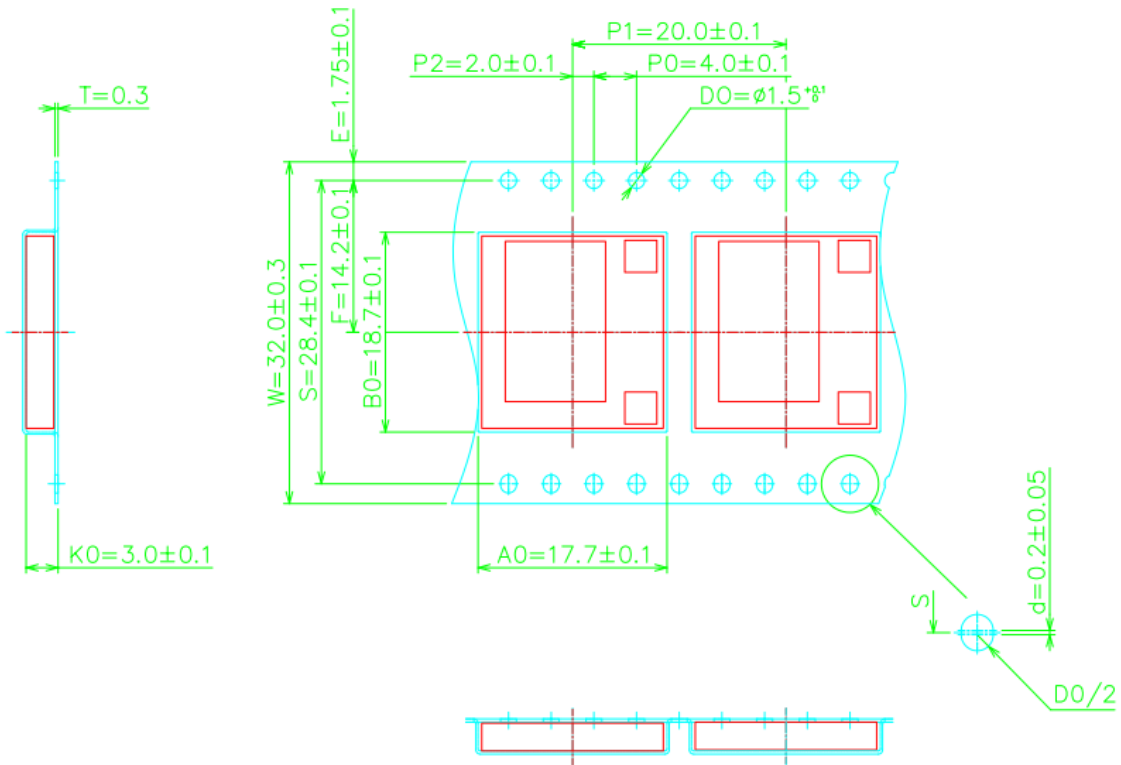
9. 構成リスト Components composition list

Categories	Items	ZXE04870	ZXE04871	Remarks
		SX-SDMAX6E -2530S	SX-SDMAX6E -2530S-SP	
基板 Board	主基板 Main board	1	1	
ラベル Label	S/N ラベル S/N label	1	1	
	MSL 警告ラベル MSL caution label	1/500	1/10	リールごと Per reel
	個装箱ラベル Individual box label	1/500	1/10	リールごと Per reel
	集合ラベル Carton label	1/2500	1/50	
付属品 Accessories	湿度表示カード Humidity indication card (HIC)	1/500	1/10	リールごと Per reel
梱包 Packing	静電防止袋 Aluminum lamination bag	1/500	1/10	リールごと Per reel
	リールセット Reel set	1/500	1/10	リールごと Per reel
	乾燥剤 Desiccant	2/500	2/10	リールごと Per reel
	個装箱 Individual box	1/500	1/10	リールごと Per reel
	集合箱 Carton box	1/2500	1/50	

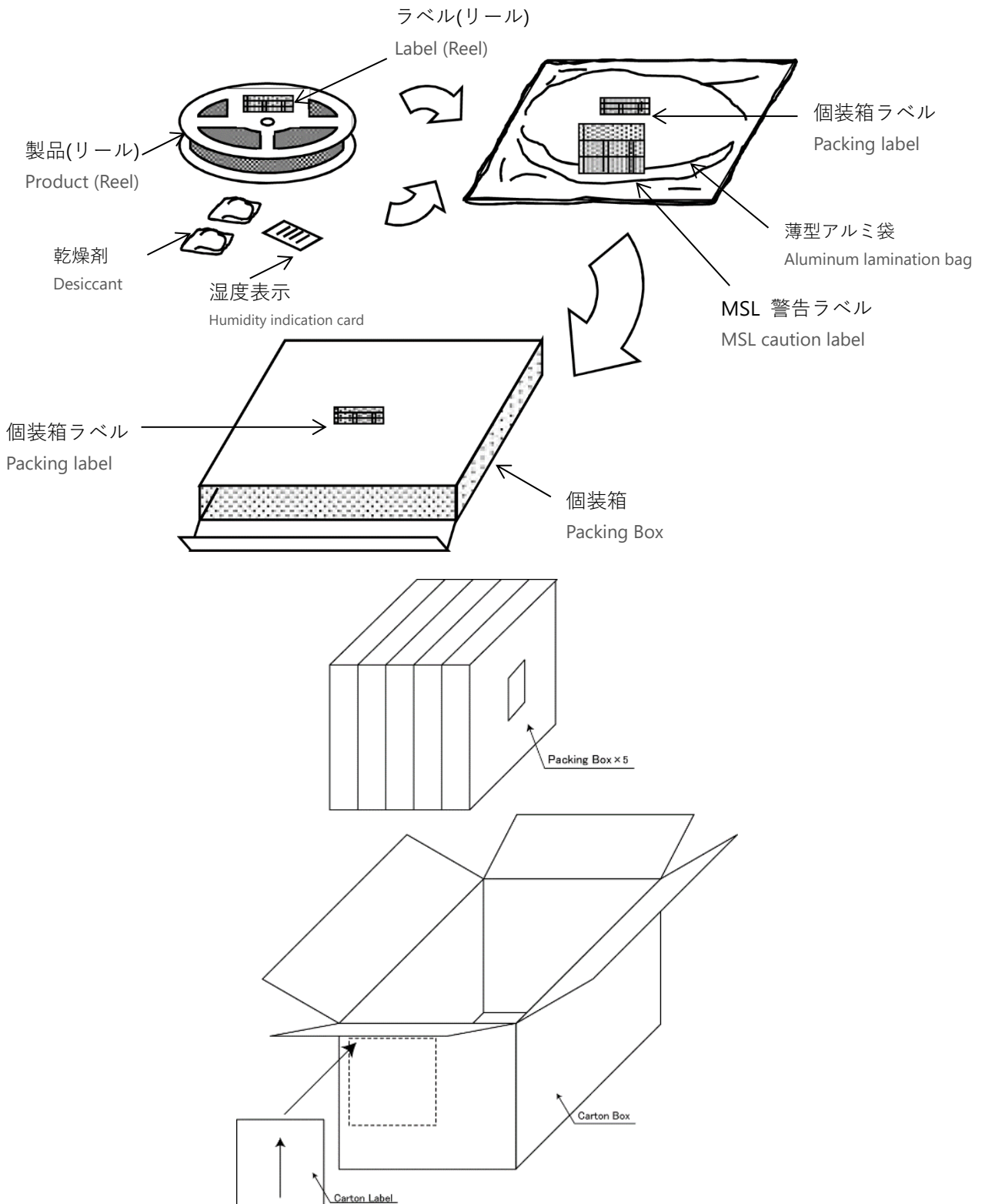
10. 梱包仕様 Packing specifications

リール Reel





(mm)


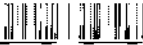


SX-SDMAX6E-2530S	SX-SDMAX6E-2530S-SP
8.0kg	3.5kg

Packing label

Part No

Product Name

品名		AN<*>*/SZ<*>*		ラ
型名		<*>*/<*>*		
数量		****		
ロットNo.		<*>*/<*>*		
完了日	YYYY/MM/DD			
巻き方向		ラーフ幅: 32 送りピッチ: 20 リール外径: 330		
担当者	****	*XXXXXXXX*	TRT:	

リール	リ
ラミネート袋	ラ
内箱	内

Product Name	Part No
SX-SDMAX6E-2530S	ZXE04870
SX-SDMAX6E-2530S-SP	ZXE04871


集合ラベル Carton label


Product : <*>*/<*>* ←


Type : _____


Carton No.: */*


Quantity : **** pcs












RoHS Compliant
 Made in Japan / Fabriqué au Japon
 silex technology, Inc.



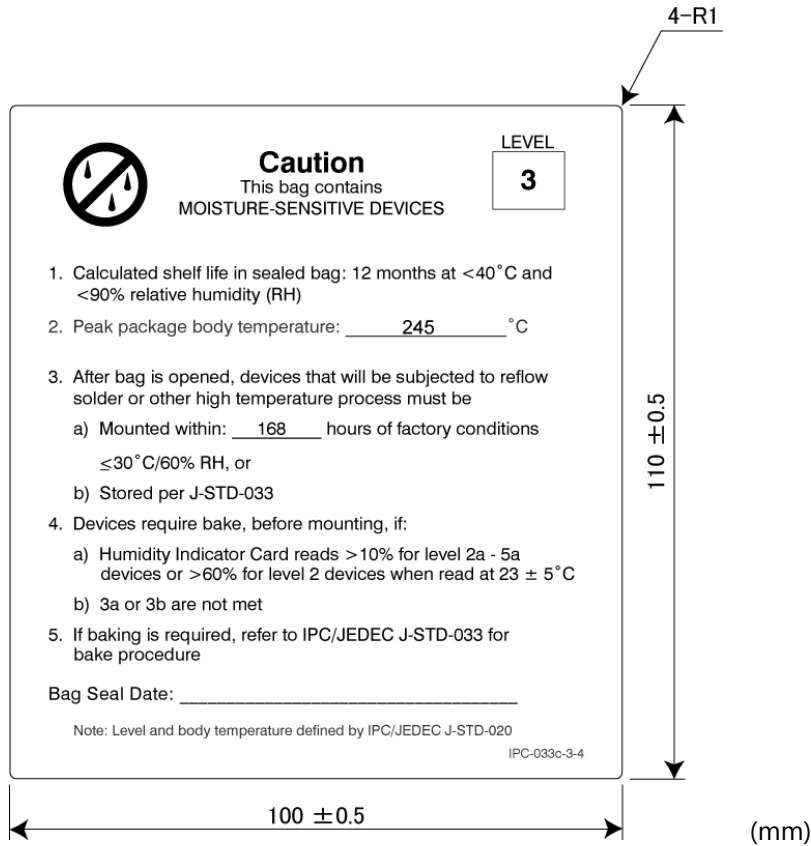
SX-SDMAX6E-2530S
 SX-SDMAX6E-2530S-SP

97 ± 10

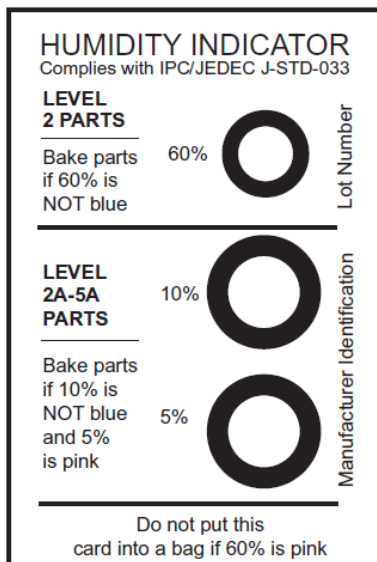
69 ± 5

(mm)

MSL 警告ラベル MSL caution label



湿度表示カード例 Example of humidity indication card



11. 信頼性試験 Reliability test

Test items	Standards	Description	Requirements																																																					
			Electricity	Appearance																																																				
DC 電圧試験 DC voltage test	—	電源電圧を仕様のmin,maxで動作確認を行う。 VDD33: +3.14 V ~ +3.46 V VDD18: +1.71 V ~ +1.89 V ・通信の停止や通信速度の異常が起こらないことを確認する。 Check to work with minimum and maximum voltage range. VDD33: +3.14 V ~ +3.46 V VDD18: +1.71 V ~ +1.89 V ・ Check no transaction stop or abnormal throughput.	動作可能 Workable	NA																																																				
温湿度電圧 サイクル試験 Temperature/ Humidity cycle test	—	下記条件で動作確認を行う。 ・通信の停止や通信速度の異常が起こらないことを確認する。 Check to work with below conditions. ・ Check no transaction stop or no throughput drop. Standard test[⇄: Ramp] (Hr:Min) <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Step</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> <th>9</th> <th>10</th> <th>11</th> <th>12</th> </tr> </thead> <tbody> <tr> <td>°C</td> <td>+25</td> <td>⇄</td> <td>-40</td> <td>⇄</td> <td>+90</td> <td>⇄</td> <td>-40</td> <td>⇄</td> <td>+90</td> <td>+90</td> <td>⇄</td> <td>+25</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>OFF</td> <td>OFF</td> <td>95</td> <td>⇄</td> <td>15</td> </tr> <tr> <td>Time</td> <td>0:05</td> <td>0:30</td> <td>4:00</td> <td>1:00</td> <td>2:00</td> <td>1:00</td> <td>2:00</td> <td>1:00</td> <td>2:00</td> <td>6:00</td> <td>1:00</td> <td>1:00</td> </tr> </tbody> </table>	Step	1	2	3	4	5	6	7	8	9	10	11	12	°C	+25	⇄	-40	⇄	+90	⇄	-40	⇄	+90	+90	⇄	+25	%RH	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	95	⇄	15	Time	0:05	0:30	4:00	1:00	2:00	1:00	2:00	1:00	2:00	6:00	1:00	1:00	動作可能 Workable	NA
Step	1	2	3	4	5	6	7	8	9	10	11	12																																												
°C	+25	⇄	-40	⇄	+90	⇄	-40	⇄	+90	+90	⇄	+25																																												
%RH	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	95	⇄	15																																												
Time	0:05	0:30	4:00	1:00	2:00	1:00	2:00	1:00	2:00	6:00	1:00	1:00																																												
電源 投入切断試験 Power ON OFF cycle test	—	下記条件で電源投入切断を2000回繰り返し、起動することを確認する。 Repeat power on/off 2000 times under the following conditions and confirm that it starts up. 電源遮断時間は、1,2,3,4,5,10,20,30,40,50秒とし、各200回実施する。 電源投入時間は、装置立ち上がりまでの時間とする。 Power OFF time are 1,2,3,4,5,10,20,30,40 and 50sec at each 200 times. The power-on time shall be the time until the device starts up.	動作可能 Workable	NA																																																				

Test items	Standards	Description	Requirements											
			Electricity	Appearance										
高温起動試験 High temperature boot-up test	—	高温状態での起動を確認する。 ・1回目は+90°Cで2時間放置後に電源をONにし、起動することを確認する。 ・2回目以降は30分放置し電源をONとし、起動することを確認する。 ・試行回数計5回。 Check to boot-up with high temperature. ・1st boot-up check is performed after 2 hours exposure at +90°C. ・2nd boot-up or later boot-up check is performed after 30 minutes exposure at +85°C. ・Total number of checking times are 5 times.	動作可能 Workable	NA										
低温起動試験 Low temperature boot-up test	—	低温状態での起動を確認する。 ・1回目は-40°Cで2時間放置後に電源をONにし、起動することを確認する。 ・2回目以降は30分放置し電源をONとし、起動することを確認する。 ・試行回数5回。 Check to boot-up with low temperature. ・1st boot-up check is performed after 2 hours exposure at -40°C. ・2nd boot-up or later boot-up check is performed after 30 minutes exposure at -40°C. ・Total number of checking times are 5 times.	動作可能 Workable	NA										
衝撃試験 Mechanical shock test	JIS C60068-2-27	衝撃を加えた後、動作確認を行う。 ・方向と回数：X1/2 (+/-), Y1/2 (+/-), Z1/2 (+/-) 各3回 (計18回) ・Half-sign wave, 11msec, 490m/s ² ・衝撃を加えた後も破損/故障/RF性能が劣化しないことを確認する。 Check to work after shocking. ・Axis and number of times： X1/2 (+/-), Y1/2 (+/-), Z1/2 (+/-) 3 times per direction (Total 18 times) ・Half-sign wave, 11msec, 490m/s ² ・Damage/Defect/RF degradation is not observed after shock.	検査仕様適合 Test spec in	損傷無し No damage										
振動試験 Mechanical vibration test	JEDEC JESD-22-B103B Service Condition 1	振動を加えた後、動作確認を行う。 ・方向と回数：X-Y-Z 各4分 各4回 (計12回) ・振動を加えた後も破損/故障/RF性能が劣化しないことを確認する。 Check to work after vibrating. ・Axis and number of times： X-Y-Z 4 times per direction (Total 12 times) ・Damage/Defect/RF degradation is not observed after vibration.	検査仕様適合 Test spec in	損傷無し No damage										
		<table border="1"> <thead> <tr> <th>Service condition</th> <th>Peak acceleration (G)</th> <th>Displacement pk-pk (in / mm)</th> <th>Cross-over frequency (Hz)</th> <th>Min. / Max. frequency (Hz)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20</td> <td>0.060 / 1.5</td> <td>80</td> <td>20 / 2000</td> </tr> </tbody> </table>	Service condition	Peak acceleration (G)	Displacement pk-pk (in / mm)	Cross-over frequency (Hz)	Min. / Max. frequency (Hz)	1	20	0.060 / 1.5	80	20 / 2000		
Service condition	Peak acceleration (G)	Displacement pk-pk (in / mm)	Cross-over frequency (Hz)	Min. / Max. frequency (Hz)										
1	20	0.060 / 1.5	80	20 / 2000										

Test items	Standards	Description	Requirements																					
			Electricity	Appearance																				
温度衝撃試験 Thermal shock test	JEDEC JESD22-A106B Test Condition A (Fluid Air)	本製品をL x W x T = 60 x 26 x 0.85 mmの基板に実装後に試験を実施する。 熱衝撃を加えた後、動作確認を行う。 ・ Step 1 (高温) / Step 3 (低温)を繰り返す。 ・ 500 Cycleで動作確認を実施する。 Perform after soldering this module on the L x W x T = 60 x 26 x 0.85 mm. Check to work after heat shocking ・ Repeat Step 1 (High temp.) / Step 3 (Low temp.) ・ Check to work after 500 Cycles Steps per 1 Cycle [∓: Ramp] <table border="1" style="margin-left: 20px;"> <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>+100 +10/-0°C</td> <td>∓</td> <td>-20 +0/-10°C</td> <td>∓</td> </tr> <tr> <td>Time</td> <td>5min</td> <td>< 10sec</td> <td>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	+100 +10/-0°C	∓	-20 +0/-10°C	∓	Time	5min	< 10sec	5min	< 10sec	Power	OFF	OFF	OFF	OFF	検査仕様適合 Test spec in	損傷無し No damage
Steps	1	2	3	4																				
Temperature	+100 +10/-0°C	∓	-20 +0/-10°C	∓																				
Time	5min	< 10sec	5min	< 10sec																				
Power	OFF	OFF	OFF	OFF																				
静電気試験 ESD test	JEDEC JESD22-A114F	アンテナ芯線とGNDへのESD印加試験を行う。 ・ 放電容量=100pF/放電抵抗=1.5kΩ ・ ANT1, 2, BT_RF端子: +/-8kV ・ 正極、負極各3回ずつの印加。 ・ 印加した後も故障/RF性能が劣化しないことを確認する。 Add ESD to the center pin and GND ring of antenna connector. ・ Discharging capacitance=100pF, Discharging resistance=1.5kΩ ・ ESD level into ANT1, ANT2 and BT_RF PAD: +/-8kV ・ 3 times per each plus pulse and minus pulse. ・ Check no damage and no RF performance degradation after testing.	動作可能 Workable	NA																				

Criteria	Description
損傷無し No damage	試験後外観に損傷が無いこと。 No damage on the appearance after test.
検査仕様適合 Test spec in	RF 検査仕様を満たすこと。 Meet to RF test specifications
動作可能 Workable	試験中動作が確認できること。 Can confirm to work during test.

NOTE1	以下を除く全ての項目のサンプル数は3台 ・ 温度衝撃試験: 20台 Sample numbers for all test except below is 3 units. ・ Thermal shock test: 20 units
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12. 使用上の注意 Notifications

- ◇ 本製品の仕様は、§6. に掲げる法規制に適合していますが、以下の場合は仕様が変更になる可能性があります。
The specifications of this product comply with the regulations listed in §6. However, there is a possibility of specification changes in the following cases:
 - 1) §6.1 に掲げる国以外で使う場合。
When used in countries not listed in §6.1.
 - 2) §6.2 に掲げるアンテナ以外を使う場合。
When using antennas other than those listed in §6.2.
 - 3) 認可の更新が必要な場合。
When an update of the authorization is required.

- ◇ 本製品は 2.4GHz 帯と 5GHz 帯の電波を媒体とする無線通信機です。
法令により 5.15-5.35GHz 帯域 (W52, W53) 及び 6GHz 帯域 LPI を屋外で利用する事は禁止されております。
本製品を屋外で利用される場合は予め W52 / W53 帯域及び 6GHz 帯域 LPI の電波を出さない様に設定してください。
This product is a wireless communication device operating in the 2.4GHz and 5GHz bands. It is prohibited by regulations to use the 5.15-5.35GHz band (W52, W53) and 6GHz band LPI outdoors. If you intend to use this product outdoors, please ensure that it is configured not to emit signals in the W52/W53 and 6GHz band LPI frequency bands.

- ◇ 本製品は一般電子機器への組込みを目的に設計された物であり、航空機器、原子力制御、高信頼性医療器、高信頼性セキュリティ器等、極めて高い水準の信頼性・品質を要求される機器への組込みを意図した物ではありません。
医療機器に組込む際は医療機器クラスに関係なく弊社営業までお問い合わせください。
This product is designed for integration into general electronic devices and is not intended for integration into equipment that requires an extremely high level of reliability and quality, such as aircraft, nuclear control systems, highly reliable medical devices, high-reliability security devices, etc. **If you intend to integrate it into medical devices, please contact our sales department regardless of the medical device class.**

- ◇ 本製品は電波を媒体として通信を行いますので、第三者への情報漏洩を防ぐ為にセキュリティに関する設定を実施いただく事を強く推奨します。
Because this module communicates through radio waves, it is highly recommended to set security system in order to prevent the information leak to third parties.

- ◇ 本製品は組込みを意図した無線装置です。本製品の機能、特性をご理解の上、組込み最終製品での評価をお願いいたします。又、本無線装置単品での EMC 測定は実施しておりませんので、本無線装置を組み込んだ製品形態での EMC 試験の実施、及び認可申請を行う必要があります。
This product is an intended wireless device for integration. We request that you evaluate the functionality and characteristics of this product before incorporating it into the final product. Additionally, EMC measurements have not been conducted solely on this wireless device. Therefore, it is necessary to perform EMC testing and submit certification applications for the product form that includes this wireless device.

- ◇ 本製品が使用する無線帯域において、同一周波数帯を利用する装置への影響又は装置からの影響を受ける場合があります。設置においては事前に環境の調査を実施してください。
In the wireless frequency band used by this product, there may be potential interference from or to devices utilizing the same frequency band. Prior to installation, please conduct an environmental survey to assess the impact.

- ◇ 本製品について分解や改造を行うと電波法に基づいた処罰を受ける事があります。
Disassembling or modifying this product may result in penalties based on radio wave regulations.
 - ◇ 本製品は端子や部品が露出した組込み用モジュールです。製品組込み時には静電気（本製品には静電気に弱い高周波デバイスを使用しております）や水滴、その他粉塵等には十分注意願います。
This product is an embedded module with exposed terminals and components. During product integration, please exercise caution regarding electrostatic discharge (this product incorporates high-frequency devices sensitive to electrostatic electricity), water droplets, and other dust particles.
 - ◇ 周辺で同一周波数帯を使う他の無線機器を使う場合、以下に特に注意してください。
(IEEE802.11-2020 及び IEEE802.11ax-2021 参照)
When using other wireless devices in the vicinity that operate in the same frequency band, please pay special attention to the following:
(Refer to IEEE 802.11-2020 and IEEE 802.11ax-2021.)
 - 1) 2.4GHz 帯では、本モジュールの中心周波数から $\pm 25\text{MHz}$ (5Ch) 以上の間隔をあけて使用することが推奨されます。
 $\pm 25\text{MHz}$ (5Ch) or more frequency separation from the center frequency of this module is recommended in 2.4GHz.
 - 2) 隣接チャンネル及び非隣接チャンネルの信号入力には十分注意して、混信を避ける環境を設定してください。
Appropriate environment to avoid interference from the adjacent channels or the non-adjacent channels is necessary.
 - 2.4GHz 隣接チャンネル：中心周波数 $\pm 25\text{MHz}$ (5Ch), 非隣接チャンネル：中心周波数 $\pm 30\text{MHz}$ (6Ch)以上
2.4GHz: Center frequency $\pm 25\text{MHz}$ (5Ch), Non Adjacent channel: Further than Center frequency $\pm 30\text{MHz}$ (6Ch)
 - 5GHz HT20 隣接チャンネル：中心周波数 $\pm 20\text{MHz}$ (4Ch), 非隣接チャンネル：中心周波数 $\pm 40\text{MHz}$ (8Ch)以上
5GHz HT20: Center frequency $\pm 20\text{MHz}$ (4Ch), Non Adjacent channel: Further than Center frequency $\pm 40\text{MHz}$ (8Ch)
 - 5GHz HT40 隣接チャンネル：中心周波数 $\pm 40\text{MHz}$ (8Ch), 非隣接チャンネル：中心周波数 $\pm 80\text{MHz}$ (16Ch)以上
5GHz HT40 Adjacent channel: Center frequency $\pm 40\text{MHz}$ (8Ch), Non Adjacent channel: Further than Center frequency $\pm 80\text{MHz}$ (16Ch)
 - 5GHz HT80 隣接チャンネル：中心周波数 $\pm 80\text{MHz}$ (16Ch), 非隣接チャンネル：中心周波数 $\pm 160\text{MHz}$ (32Ch)以上
5GHz HT80 Adjacent channel: Center frequency $\pm 80\text{MHz}$ (16Ch), Non Adjacent channel: Further than Center frequency $\pm 160\text{MHz}$ (32Ch)
- ※上記の条件外であっても、強い電波入力がある場合は混信する可能性があるので、周辺の無線機器は十分距離を離してご使用ください。
Even outside the specified conditions, there is a potential for interference in the presence of strong radio signals. Therefore, please use surrounding wireless devices at a sufficient distance.
- ◇ 対向機からの入力は、アンテナゲインを含み 2.4GHz 帯で -20dBm 以下、5GHz 帯で -30dBm 以下としてください。
The input from the opposing device should be considered, including antenna gain, and be -20dBm or less for the 2.4GHz band and -30dBm or less for the 5GHz band.

Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Operations in the 5.15-5.25GHz band and 5.85-5.895GHz band are restricted to indoor usage only. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

Radiation Exposure Statement:

The product comply with the FCC portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

This module is intended for OEM integrators only. Per FCC KDB 996369 D03 OEM Manual v01 guidance, the following conditions must be strictly followed when using this certified module:

KDB 996369 D03 OEM Manual v01 rule sections:

2.2 List of applicable FCC rules

This module has been tested for compliance to FCC Part 15

2.3 Summarize the specific operational use conditions

The module is tested for standalone mobile RF exposure use condition. Any other usage conditions such as co-location with other transmitter(s) or being used in a portable condition will need a separate reassessment through a class II permissive change application or new certification.

2.4 Limited module procedures

Not applicable.

2.5 Trace antenna designs
Not applicable.

2.6 RF exposure considerations

This equipment complies with FCC mobile radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. If the module is installed in a portable host, a separate SAR evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

2.7 Antennas

The following antennas have been certified for use with this module; antennas of the same type with gains within the peak and minimum gain range may also be used with this module. The antenna must be installed such that 20 cm can be maintained between the antenna and users.

Antenna Type	Antenna Gain									
	2.4-2.5GHz	5.15-5.25GHz	5.25-5.35GHz	5.47-5.725GHz	5.725-5.85GHz	5.85-5.895GHz	5.925-6.425GHz	6.425-6.525GHz	6.525-6.875GHz	6.875-7.125GHz
Dipole(146153)	+3.175	+3.175	+2.975	+4.275	+3.775	+4.875	+5.025	+5.225	+5.425	+5.825
Dipole(AA258)	+2.67	+3.22	+3.91	+2.77	+3.92	+4.4	+3.59	+3.63	+2.33	+1.37

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following: "Contains FCC ID: **N6C-SDMAX6E**". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

2.9 Information on test modes and additional testing requirements

This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) or portable use will require a separate class II permissive change re-evaluation or new certification.

2.10 Additional testing, Part 15 Subpart B disclaimer

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B (unintentional radiator) rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule requirements if applicable.

As long as all conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

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

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

OEM/Host manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment

Prohibited for control of or communications with unmanned aircraft systems, including drones.

Industry Canada statement:

This device complies with ISED's licence-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Radiation Exposure Statement:

The product comply with the Canada portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

Déclaration d'exposition aux radiations:

Le produit est conforme aux limites d'exposition pour les appareils portables RF pour les Etats-Unis et le Canada établies pour un environnement non contrôlé.

Le produit est sûr pour un fonctionnement tel que décrit dans ce manuel. La réduction aux expositions RF peut être augmentée si l'appareil peut être conservé aussi loin que possible du corps de l'utilisateur ou que le dispositif est réglé sur la puissance de sortie la plus faible si une telle fonction est disponible.

This device is intended only for OEM integrators under the following conditions: (For module device use)

1) The transmitter module may not be co-located with any other transmitter or antenna.

As long as **1** conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)

1) Le module émetteur peut ne pas être coimplanté avec un autre émetteur ou antenne.

Tant que les **1** conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not

be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed and operated with greater than 20cm between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC: 4908A-SDMAX6E".

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un appareil où l'antenne peut être installée et utilisée à plus de 20 cm entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 4908A- SDMAX6E ".

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

Caution :

- (i) the device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
- (ii) for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;
- (iii) for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits as appropriate;
- (iv) where applicable, antenna type(s), antenna models(s), and worst-case tilt angle(s) necessary to remain compliant with the e.i.r.p. elevation mask requirement set forth in section 6.2.2.3 shall be clearly indicated.
- (v) Operation in 5850-5895MHz is for indoor use only.

Avertissement:

Le guide d'utilisation des dispositifs pour réseaux locaux doit inclure des instructions précises sur les restrictions susmentionnées, notamment :

- (i) les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

- (ii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis pour les dispositifs utilisant les bandes de 5 250 à 5 350 MHz et de 5 470 à 5 725 MHz doit être conforme à la limite de la p.i.r.e;
- (iii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis (pour les dispositifs utilisant la bande de 5 725 à 5 850 MHz) doit être conforme à la limite de la p.i.r.e. spécifiée, selon le cas;
- (iv) lorsqu'il y a lieu, les types d'antennes (s'il y en a plusieurs), les numéros de modèle de l'antenne et les pires angles d'inclinaison nécessaires pour rester conforme à l'exigence de la p.i.r.e. applicable au masque d'élévation, énoncée à la section 6.2.2.3, doivent être clairement indiqués
- (v) Le fonctionnement en 5850 à 5895 MHz est réservé à une utilisation à l'intérieur uniquement.

For 6G statement

- a. Operation shall be limited to indoor use only; and
 - b. Operation on oil platforms, cars, trains, boats and aircraft shall be prohibited except for on large aircraft flying above 10,000 ft.
-
- a. Utilisation limitée à l'intérieur seulement;
 - b. Utilisation interdite à bord de plateformes de forage pétrolier, de voitures, de trains, de bateaux et d'aéronefs, sauf à bord d'un gros aéronef volant à plus de 10 000 pieds d'altitude.

CBP statement:

The module includes CBP functionality to comply with 6 GHz band regulations. Integrators must ensure that the antenna's minimum gain complies with the specifications outlined in the module's certification to ensure proper operation of the CBP functionality.

Déclaration relative au CBP :

Ce module intègre la fonctionnalité CBP afin de se conformer à la réglementation de la bande 6 GHz. Afin d'assurer le bon fonctionnement de la fonctionnalité CBP, les intégrateurs doivent s'assurer que le gain minimal de l'antenne est conforme aux spécifications décrites dans la certification du module.

DETACHABLE ANTENNA USAGE

This radio transmitter [IC: **4908A-SDMAX6E**] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Le présent émetteur radio [IC: **4908A-SDMAX6E**] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

Antenna Type	Antenna Gain										Impedance
	2.4-2.5GHz	5.15-5.25GHz	5.25-5.35GHz	5.47-5.725GHz	5.725-5.85GHz	5.85-5.895GHz	5.925-6.425GHz	6.425-6.525GHz	6.525-6.875GHz	6.875-7.125GHz	
Dipole(146153)	+3.175	+3.175	+2.975	+4.275	+3.775	+4.875	+5.025	+5.225	+5.425	+5.825	50ohms
Dipole(AA258)	+2.67	+3.22	+3.91	+2.77	+3.92	+4.4	+3.59	+3.63	+2.33	+1.37	50ohms

The antenna-to-user separation distance must be greater than 15 mm.
 La distance de séparation antenne-utilisateur doit être supérieure à 15 mm.

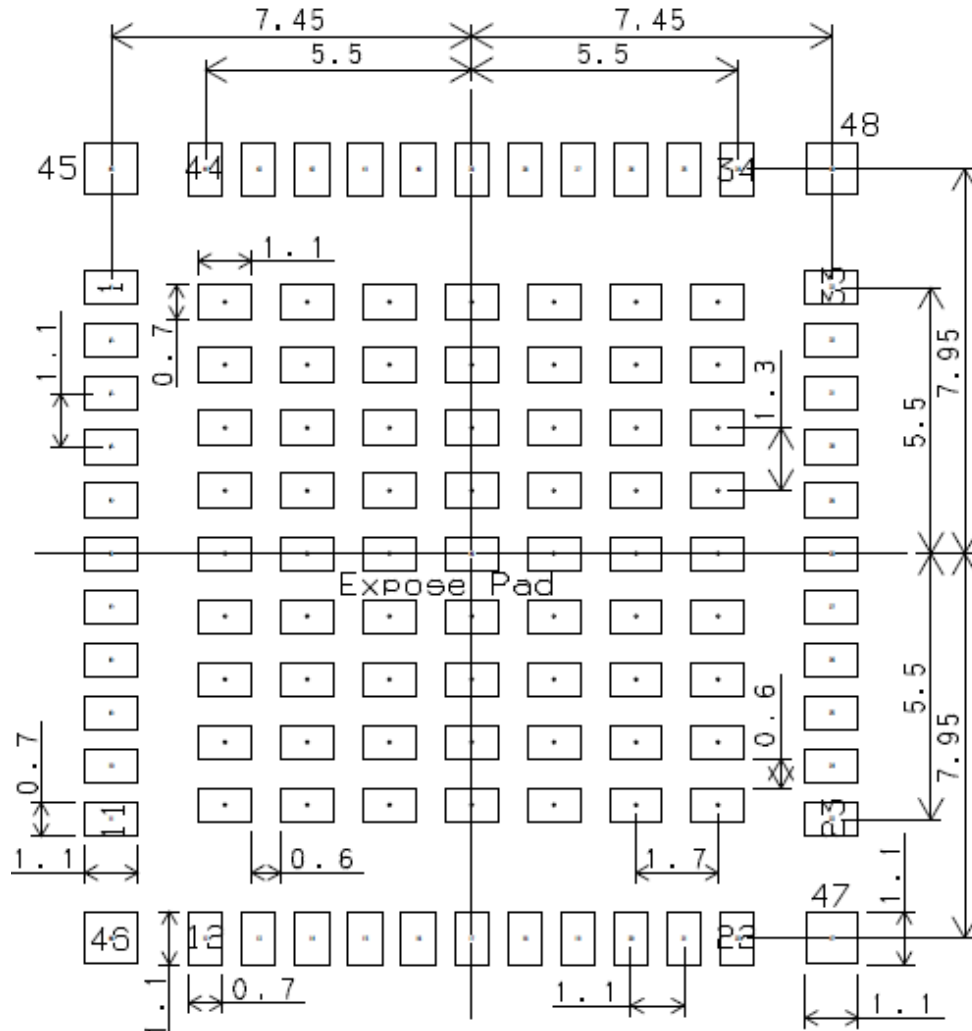
To ensure compliance with the Radio Frequency (RF) exposure guidelines, this device must be used at least 15 mm away from your body or nearby persons. Failure to observe this warning could result in the RF exposure levels exceeding the applicable limits.

Pour garantir la conformité aux directives d'exposition aux radiofréquences (RF), cet appareil doit être utilisé à au moins 15 mm de votre corps ou des personnes à proximité. Le non-respect de cet avertissement peut entraîner des niveaux d'exposition RF dépassant les limites applicables.

The distance between each antenna should more than 50 mm when integrated in the host to ensure the simultaneous transmission compliance.

La distance entre chaque antenne doit être supérieure à 50 mm lorsqu'elle est intégrée à l'hôte pour assurer la conformité de la transmission simultanée.

13. 付録 A 参考ランド設計 Appendix A Reference land design



Recommended stencil design: same size as lands.
Recommended stencil thickness:100-120um.

SX-SDMAX6E-2530S

表面 Top View

NOTE1	<p>ランド設計を CAD にインポートする必要がある場合は、SX-SDMAX6E_footprint.dxf をご利用ください。</p> <p>In case LGA pad design need to be imported to CAD system, please use SX-SDMAX6E_footprint.dxf.</p>
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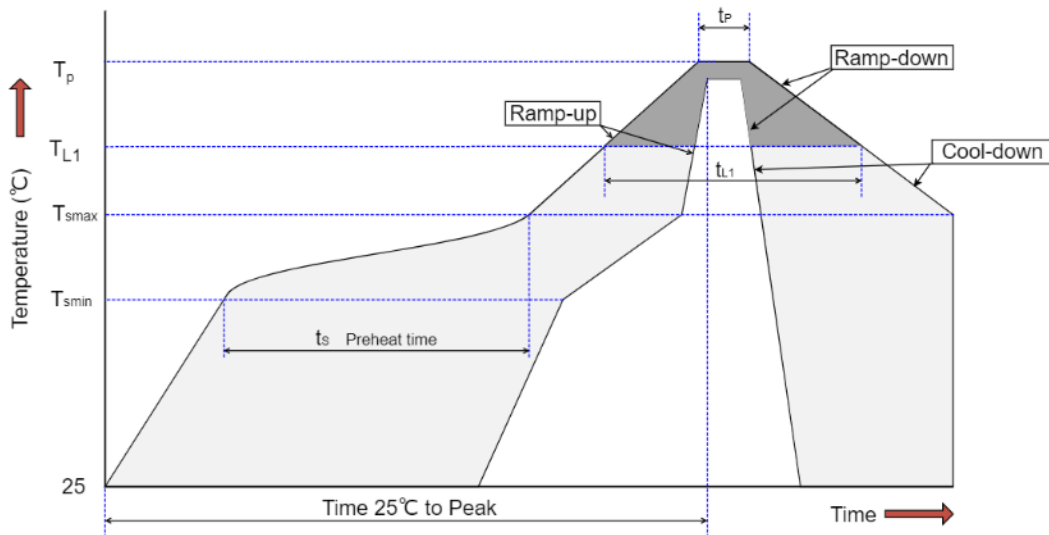
14. 付録 B SMT リフロー条件 Appendix-B SMT reflow profiles

本推奨条件は、Sn/Ag/Cu Pb-フリーハンダを使用した場合のものです。使用するハンダの種類によって最適化することを推奨します。

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

Sn/Ag/Cu Pb-フリー実装 Sn/Ag/Cu Pb-Free Assembly

Profile Feature	Parameters	Conditions			
		Min.	Typ.	Max.	Units
Average ramp-up rate	T_{L1} to T_p	1.5	—	3.0	°C/Sec
Preheat	Temperature T_{Smin}	150	—	—	°C
	Temperature T_{Smax}	—	—	200	°C
	Time t_s	60	—	120	Sec
Peak Temperature	T_p	—	—	245	°C
Time maintained above	Temperature T_{L1}	217	—	—	°C
	Time t_{L1}	60	—	150	Sec
	Time @ peak temperature t_p	—	—	30	Sec
Average ramp-down rate	T_{L1}	—	—	6	°C/Sec
Average cool-down rate	T_{L1} to T_{Smax}	—	—	6	°C/Sec
Time 25°C to Peak Temperature	—	—	—	8	Min



リフロープロフィールデータ Reflow profile data

15. 付録 C 仕向け毎の送信電力 Appendix-C TX power at each destination

NOTE1	送信電力表は Typ.値(dBm)を示します。Max. = Typ. +2.5dB, Min. = Typ. -2.5dB になります。 The transmit power table shows the Typ. values (dBm). Max. = Typ. +2.5dB, Min. = Typ. -2.5dB.
NOTE2	送信電力は各アンテナ Chain 単独の値です。2 Data stream 時の総電力は+3.0dB されます。 The transmit power is the value for each antenna chain individually. The total power for 2 data streams is increased by +3.0dB.

15.1. 2.4GHz 動作温度 Operating temperature +25°C
JP

Channel	Fc MHz	11b	11g	11n 20 11ax 20	11n 40 11ax 40	11ax 20	11ax 20	11ax 40	11ax 40
		1M-11M	6M-54M	M0-M7	M0-M7	M8-M9	M10-M11	M8-M9	M10-M11
1	2412	11.0	14.0	14.0	X	14.0	14.0	X	X
2	2417	11.0	14.0	14.0	X	14.0	14.0	X	X
3	2422	11.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
4	2427	11.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
5	2432	11.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
6	2437	11.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
7	2442	11.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
8	2447	11.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
9	2452	11.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
10	2457	11.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
11	2462	11.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
12	2467	11.0	14.0	14.0	X	14.0	14.0	X	X
13	2472	11.0	14.0	14.0	X	14.0	14.0	X	X

US/CA

Channel	Fc MHz	11b	11g	11n 20 11ax 20	11n 40 11ax 40	11ax 20	11ax 20	11ax 40	11ax 40
		1M-11M	6M-54M	M0-M7	M0-M7	M8-M9	M10-M11	M8-M9	M10-M11
1	2412	12.0	15.0	10.0	X	10.0	10.0	X	X
2	2417	12.0	15.0	14.0	X	14.0	14.0	X	X
3	2422	12.0	15.0	15.0	8.0	15.0	15.0	8.0	8.0
4	2427	12.0	15.0	15.0	10.0	15.0	15.0	10.0	10.0
5	2432	12.0	15.0	15.0	10.0	15.0	15.0	10.0	10.0
6	2437	12.0	15.0	15.0	9.0	15.0	15.0	9.0	9.0
7	2442	12.0	15.0	15.0	9.0	15.0	15.0	9.0	9.0
8	2447	12.0	15.0	15.0	8.0	15.0	15.0	8.0	8.0
9	2452	12.0	15.0	13.0	7.0	13.0	13.0	7.0	7.0
10	2457	12.0	13.0	13.0	X	13.0	13.0	X	X
11	2462	12.0	13.0	10.0	X	10.0	10.0	X	X

EU/UK

Channel	Fc MHz	11b	11g	11n 20 11ax 20	11n 40 11ax 40
		1M-11M	6M-54M	M0-M11	M0-M11
1	2412	9.0	11.0	11.0	X
2	2417	9.0	11.0	11.0	X
3	2422	9.0	11.0	11.0	11.0
4	2427	9.0	11.0	11.0	11.0
5	2432	9.0	11.0	11.0	11.0
6	2437	9.0	11.0	11.0	11.0
7	2442	9.0	11.0	11.0	11.0
8	2447	9.0	11.0	11.0	11.0
9	2452	9.0	11.0	11.0	11.0
10	2457	9.0	11.0	11.0	11.0
11	2462	9.0	11.0	11.0	11.0
12	2467	9.0	11.0	11.0	X
13	2472	9.0	11.0	11.0	X

15.2. 5GHz 動作温度 Operating temperature +25°C
JP

Channel	Fc MHz	11a	11n 11ac 11ax	11n 11ac 11ax	11ac 11ax
		20	20	40	80
		6M- 54M	M0- M11	M0- M11	M0- M11
36	5180	12.0	12.0	12.0	12.0
40	5200	12.0	12.0		
44	5220	12.0	12.0		
48	5240	12.0	12.0	12.0	12.0
52	5260	12.0	12.0	12.0	
56	5280	12.0	12.0	12.0	
60	5300	12.0	12.0	12.0	12.0
64	5320	12.0	12.0		
100	5500	12.0	12.0		
104	5520	12.0	12.0	12.0	12.0
108	5540	12.0	12.0	12.0	
112	5560	12.0	12.0	12.0	
116	5580	12.0	12.0	12.0	12.0
120	5600	12.0	12.0		
124	5620	12.0	12.0		
128	5640	12.0	12.0	12.0	12.0
132	5660	12.0	12.0	12.0	
136	5680	12.0	12.0	12.0	
140	5700	12.0	12.0	12.0	12.0
144	5720	12.0	12.0		

US/CA

Channel	Fc MHz	11a	11n 11ac 11ax	11n 11ac 11ax	11n 11ac 11ax	11ac 11ax	11ac 11ax
		20	20	40	40	80	80
		6M- 54M	M0- M11	M0- M9	M10- M11	M0- M9	M10- M11
36	5180	9.0	9.0	10.0	10.0	10.0	10.0
40	5200	9.0	9.0				
44	5220	9.0	9.0				
48	5240	9.0	9.0	12.0	12.0		
52	5260	12.0	12.0	12.0	12.0	10.0	10.0
56	5280	12.0	12.0				
60	5300	12.0	13.0	11.0	11.0		
64	5320	12.0	13.0				
100	5500	13.0	13.0	12.0	12.0	9.0	9.0
104	5520	13.0	13.0				
108	5540	13.0	13.0	13.0	12.0		
112	5560	13.0	13.0				
116	5580	13.0	13.0	13.0	12.0	13.0	12.0
120	5600	13.0	13.0				
124	5620	13.0	13.0	13.0	12.0		
128	5640	13.0	13.0				
132	5660	13.0	13.0	13.0	12.0	11.0	11.0
136	5680	13.0	13.0				
140	5700	13.0	13.0	13.0	12.0		
144	5720	13.0	13.0				
149	5745	13.0	13.0	13.0	12.0	13.0	12.0
153	5765	13.0	13.0				
157	5785	13.0	12.0	13.0	12.0		
161	5805	13.0	13.0				
165	5825	13.0	13.0	13.0	12.0	13.0	12.0
169	5845	13.0	13.0				
173	5865	13.0	13.0	13.0	12.0		
177	5885	13.0	13.0				

NOTE *	EU は ch.144 は使用できません。 It is unable to use channel 144 in EU.
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EU/UK

Channel	Fc MHz	11a	11n 11ac 11ax	11ac 11ax	11n 11ac 11ax	11ax	11ac 11ax	11ax
		20	20	20	40	40	80	80
		6M- 54M	M0- M7	M8- M11	M0- M9	M10- M11	M0- M9	M10- M11
36	5180	12.0	12.0	12.0	13.0	12.0	13.0	12.0
40	5200	12.0	12.0	12.0				
44	5220	12.0	12.0	12.0				
48	5240	12.0	12.0	12.0	13.0	12.0	13.0	12.0
52	5260	12.0	12.0	12.0				
56	5280	12.0	12.0	12.0				
60	5300	12.0	12.0	12.0	13.0	12.0	13.0	12.0
64	5320	12.0	12.0	12.0				
100	5500	10.0	10.0	10.0				
104	5520	10.0	10.0	10.0	13.0	12.0	13.0	12.0
108	5540	10.0	10.0	10.0				
112	5560	10.0	10.0	10.0				
116	5580	10.0	10.0	10.0	13.0	12.0	13.0	12.0
120	5600	10.0	10.0	10.0				
124	5620	10.0	10.0	10.0				
128	5640	10.0	10.0	10.0	13.0	12.0	13.0	12.0
132	5660	10.0	10.0	10.0				
136	5680	10.0	10.0	10.0				
140	5700	10.0	10.0	10.0	13.0	12.0	13.0	12.0
144*	5720	10.0	10.0	10.0				

EU

Channel	Fc MHz	11a	11n 11ac 11ax	11ac 11ax	11n 11ac 11ax	11n 11ac 11ax	11ax	11ac 11ax	11ax
		20	20	20	40	40	40	80	80
		6M- 54M	M0- M7	M8- M11	M0- M2	M3-M9	M10- M11	M0-M9	M10- M11
149	5745	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
153	5765	3.0	3.0	3.0					
157	5785	3.0	3.0	3.0					
161	5805	3.0	3.0	3.0					
165	5825	3.0	3.0	3.0	X	X	X	X	X

UK

Channel	Fc MHz	11a	11n 11ac 11ax	11ac 11ax	11n 11ac 11ax	11n 11ac 11ax	11ax	11ac 11ax	11ax
		20	20	20	40	40	40	80	80
		6M- 54M	M0- M7	M8- M11	M0- M2	M3-M9	M10- M11	M0-M9	M10- M11
149	5745	11.0	11.0	11.0	12.0	12.0	12.0	12.0	12.0
153	5765	11.0	11.0	11.0					
157	5785	11.0	11.0	11.0					
161	5805	11.0	11.0	11.0					
165	5825	11.0	11.0	11.0	X	X	X	X	X

15.3. 6GHz 動作温度 Operating temperature +25°C
JP

Channel	Fc MHz	11ax LPI	11ax LPI	11ax LPI	11ax VLP	11ax VLP	11ax VLP
		20	40	80	20	40	80
		M0- M11	M0- M11	M0- M11	M0- M11	M0- M11	M0- M11
1	5955	10.0	10.0	10.0	1.0	1.0	1.0
5	5975	10.0			1.0		
9	5995	10.0			1.0		
13	6015	10.0			1.0		
17	6035	10.0	10.0	10.0	1.0	1.0	1.0
21	6055	10.0			1.0		
25	6075	10.0			1.0		
29	6095	10.0			1.0		
33	6115	10.0	10.0	10.0	1.0	1.0	1.0
37	6135	10.0			1.0		
41	6155	10.0			1.0		
45	6175	10.0			1.0		
49	6195	10.0	10.0	10.0	1.0	1.0	1.0
53	6215	10.0			1.0		
57	6235	10.0			1.0		
61	6255	10.0			1.0		
65	6275	10.0	10.0	10.0	1.0	1.0	1.0
69	6295	10.0			1.0		
73	6315	10.0			1.0		
77	6335	10.0			1.0		
81	6355	10.0	10.0	10.0	1.0	1.0	1.0
85	6375	10.0			1.0		
89	6395	10.0			1.0		
93	6415	10.0			1.0		

US/CA

Channel	Fc MHz	11ax CD	11ax CD	11ax CD	11ax VLP	11ax VLP	11ax VLP
		20	40	80	20	40	80
		M0- M11	M0- M11	M0- M11	M0- M11	M0- M11	M0- M11
1	5955	1.0	3.0	6.0	-10.0	-7.0	-4.0
5	5975	1.0			-9.0		
9	5995	1.0			-9.0		
13	6015	1.0	3.0	6.0	-9.0	-7.0	-4.0
17	6035	1.0	3.0	6.0	-9.0	-7.0	-4.0
21	6055	1.0			-9.0		
25	6075	1.0			-9.0		
29	6095	1.0	3.0	6.0	-9.0	-7.0	-4.0
33	6115	1.0	3.0	6.0	-9.0	-7.0	-4.0
37	6135	1.0			-9.0		
41	6155	1.0			-9.0		
45	6175	1.0	3.0	6.0	-9.0	-7.0	-4.0
49	6195	1.0	3.0	6.0	-9.0	-7.0	-4.0
53	6215	1.0			-9.0		
57	6235	1.0			-9.0		
61	6255	1.0	3.0	6.0	-9.0	-7.0	-4.0
65	6275	1.0	3.0	6.0	-9.0	-7.0	-4.0
69	6295	1.0			-9.0		
73	6315	1.0			-9.0		
77	6335	1.0	3.0	6.0	-9.0	-7.0	-4.0
81	6355	1.0	3.0	6.0	-9.0	-7.0	-4.0
85	6375	1.0			-9.0		
89	6395	1.0			-9.0		
93	6415	1.0	3.0	6.0	-9.0	-7.0	-4.0

Channel	Fc MHz	11ax CD	11ax CD	11ax CD	11ax VLP	11ax VLP	11ax VLP
		20	40	80	20	40	80
		M0- M11	M0- M11	M0- M11	M0- M11	M0- M11	M0- M11
97	6435	1.0	3.0	6.0	-9.0	-7.0	-4.0
101	6455	1.0			-9.0		
105	6475	1.0	3.0		-9.0	-7.0	
109	6495	1.0			-9.0		
113	6515	1.0	3.0	6.0	-9.0	-7.0	-4.0
117	6535	1.0			-9.0		
121	6555	1.0	3.0		-9.0	-7.0	
125	6575	1.0			-9.0		
129	6595	1.0	3.0	6.0	-9.0	-7.0	-4.0
133	6615	1.0			-9.0		
137	6635	1.0	3.0		-9.0	-7.0	
141	6655	1.0			-9.0		
145	6675	1.0	3.0	6.0	-9.0	-7.0	-4.0
149	6695	1.0			-9.0		
153	6715	1.0	3.0		-9.0	-7.0	
157	6735	1.0			-9.0		
161	6755	1.0	3.0	6.0	-9.0	-7.0	-4.0
165	6775	1.0			-9.0		
169	6795	1.0	3.0		-9.0	-7.0	
173	6815	1.0			-9.0		
177	6835	1.0	3.0	6.0	-9.0	-7.0	-4.0
181	6855	1.0			-9.0		
185	6875	1.0	3.0		-9.0	-7.0	
189	6895	1.0			-10.0		
193	6915	1.0	3.0	6.0	-10.0	-7.0	-5.0
197	6935	1.0			-10.0		
201	6955	1.0	3.0		-10.0	-7.0	
205	6975	1.0			-10.0		
209	6995	1.0	3.0	6.0	-10.0	-7.0	-5.0
213	7015	1.0			-10.0		
217	7035	1.0	3.0		-10.0	-7.0	
221	7055	1.0			-10.0		
225	7075	1.0	3.0	X	-10.0	-7.0	X
229	7095	1.0			-10.0		
233	7115	1.0	X		-10.0	X	

EU/UK

Channel	Fc MHz	11ax LPI	11ax LPI	11ax LPI	11ax LPI	11ax LPI	11ax VLP	11ax VLP	11ax VLP
		20	40	40	80	80	20	40	80
		M0-M11	M0-M11	M0-M9	M10-M11	M0-M9	M10-M11	M0-M11	M0-M11
1	5955	10.0	12.0	11.0	12.0	11.0	1.0	3.0	3.0
5	5975	10.0					1.0		
9	5995	10.0	1.0						
13	6015	10.0		3.0					
17	6035	10.0	12.0	11.0	12.0	11.0	1.0	3.0	3.0
21	6055	10.0					1.0		
25	6075	10.0	1.0						
29	6095	10.0		3.0					
33	6115	10.0	12.0	11.0	12.0	11.0	1.0	3.0	3.0
37	6135	10.0					1.0		
41	6155	10.0	1.0						
45	6175	10.0		3.0					
49	6195	10.0	12.0	11.0	12.0	11.0	1.0	3.0	3.0
53	6215	10.0					1.0		
57	6235	10.0	1.0						
61	6255	10.0		3.0					
65	6275	10.0	12.0	11.0	12.0	11.0	1.0	3.0	3.0
69	6295	10.0					1.0		
73	6315	10.0	1.0						
77	6335	10.0		3.0					
81	6355	10.0	12.0	11.0	12.0	11.0	1.0	3.0	3.0
85	6375	10.0					1.0		
89	6395	10.0	1.0						
93	6415	10.0		3.0					