正基科技股份有限公司

SPECIFICATION

PRODUCT NAME：W665S3

REVISION：V1.2

DATE： Apr. 24st, 2025

Customer APPROVED	
Company	
Representative Signature	

PREPARED	REVIEW				APPROVED	DCC ISSUE
	PM	QA	ET			
			PE			
			ME			
			APPROVED			

正基科技股份有限公司

AMPAK Technology Inc.

W665S3

Data Sheet

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Revision

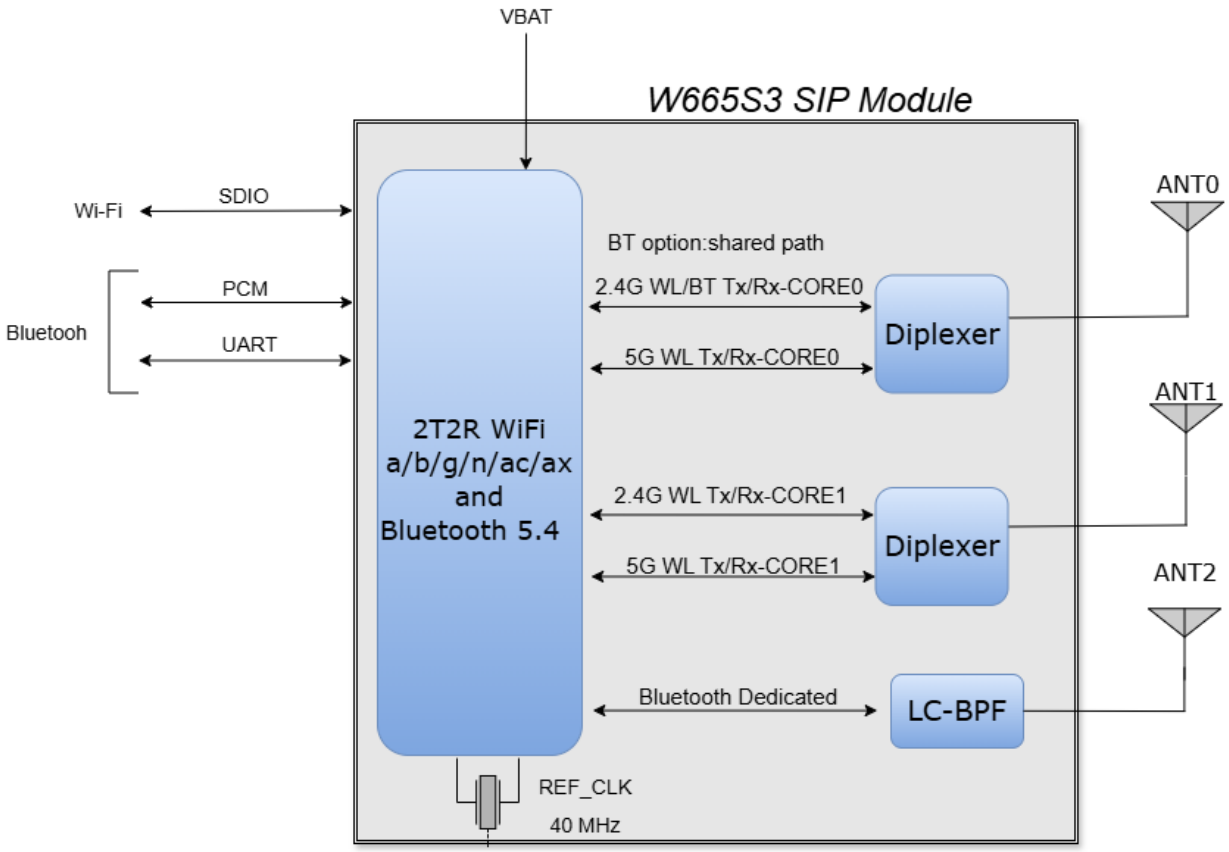
Revision	Date	Description	Revised By
V0.1	2023 / 05 / 31	-- Preliminary	Max
V0.2	2024 / 01 / 25	-- Modify RF Specification -- General Specification	Max
V0.3	2024 / 03 / 04	-- Modify Introduction	Max
V0.4	2024 / 03 / 04	-- Modify BT Sensitivity	Max
V0.5	2024 / 06 / 27	-- Modify Dimension	Max
V0.6	2024 / 07 / 15	-- Modify VBAT current consumption Peak	Max
V0.7	2024 / 08 / 01	-- Modify 802.11.n 2.4G 20M RF Specification	Max
V0.8	2024 / 09 / 20	-- Modify Rx Sensitivity	Max
V0.9	2025 / 01 / 23	-- Modify BT Spec	Max
V1.0	2025 / 02 / 12	-- Modify RF Wifi Rx Specification	Max
V1.1	2025 / 02 / 19	-- Modify RF Wifi &BT Tx Rx Specification	Max
V1.2	2025 / 04 / 24	--Added FCC Statement	Max

Contents

1. Introduction

1.1 Overview.

The Ampak Technology® W665S3 is a fully Wi-Fi and Bluetooth functionalities module with seamless roaming capabilities and advance security, also it could interact with different vendors' 802.11a/b/g/n/ac/ax 2x2 Access Points with MIMO standard and can accomplish up to speed of 1201Mbps with dual stream in 802.11ax to connect the wireless LAN. Furthermore W665S3 included SDIO Host interface for Wi-Fi, UART/ PCM interface for Bluetooth.
In addition, this compact module is a total solution for a combination of Wi-Fi + Bluetooth technologies.
The integrated Bluetooth controller is compliant with Bluetooth 5.4 supporting BDR/EDR2.1 and Bluetooth Low Energy dual mode featuring the most desired BLE audio. It supports a high-speed UART interface. The Bluetooth modem supports BDR, EDR2/EDR3 modulations, and LE1M, LE2M, LE2S and LE8S BLE rates. The module is specifically developed for tablet, OTT box and portable devices.



1.2 Product Features

1.2.1 Wi-Fi key Features

- IEEE 802.11 a/b/g/n/ac/ax compliant
- Supports 2.4GHz/5GHz band
- Supports two spatial streams 2T2R MIMO
- Supports standard SDIO v3.0, compatible with SDIO v2.0 HOST interfaces.
- Supports 20/40/80MHz bandwidth and modulation up to 1024-QAM
- Supports MU-MIMO RX
- Supports OFDMA RX and TB OFDMA TX
- Supports SU/MU RX Beamformee
- Supports STBC and LDPC
- Supports DFS and Radar detection
- Integrated PA/LNA/TR switch and single-ended RF port for both 2.4GHz and 5GHz
- Supports Wake-on-WLAN with programmable magic packet
- Security features:
  - Supports WEP-40/WEP-104, AES/TKIP/CCMP/GCMP
  - Supports WPA/WPA2/WPA3 personal, WPA2/WPA3 enterprise
  - Supports WPS2.0
  - Supports WAPI

1.2.2 Bluetooth Key Features

- Supports 2 antenna configuration, shared with Wi-Fi 2.4GHz or dedicated Bluetooth antenna optional
- Supports low power mode
- Supports Bluetooth v5.4 with BLE audio
- Supports dual mode BDR/EDR and BLE
- Supports LE 1Mbps, LE 2Mbps, and LE coded for Long Range
- Supports Bluetooth Class 1 or Class 2 TX output power
- Supports dedicated Bluetooth antenna, or shared Bluetooth antenna with WLAN 2.4GHz
- Supports LE privacy, DPLE, and LE secure connection
- Supports SCO/eSCO and A2DP
- Supports LE isochronous channels
- Supports HS-UART and PCM interfaces
- Supports AFH for interference avoidance
- Supports Bluetooth/Wi-Fi coexistence

2. General Specification

2.1 General Specification

Model Name	W665S3
Product Description	2Tx/2Rx 802.11 ax/ac/a/b/g/n Wi-Fi + Bluetooth 5.4 Module
Dimension	L x W: 13 x 15(Typ.)mm、H : 2 .4(Max.) mm
WiFi Interface	Support SDIO V3.0/2.0
Bluetooth Interface	UART / PCM
Operating temperature	-20°C to 70°C
Storage temperature	-40°C to 125°C
Humidity	Operating Humidity : Less than 85% Non-Condensing Storage Humidity 5% to 95% Non-Condensing

2.2 DC Characteristics

2.2.1 Absolute Maximum Ratings

Symbol	Description	Min.	Max.	Unit
VBAT	Input supply Voltage	-0.5	3.63	V

2.2.2 Recommended Operating Rating

The module requires two power supplies: VBAT and VDDIO.

Voltage rails	Min.	Typ.	Max.	Unit
VBAT	3.2	3.3	3.63	V

VBAT current consumption 1.5A (Peak), when VBAT = 3.3V

3. Wi-Fi RF Specification

3.1 2.4GHz RF Specification

Conditions : VBAT=3.3V ; Temp:25°C

Feature	Description
WLAN Standard	IEEE 802.11 b/g/n/ax & Wi-Fi compliant
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4GHz ISM Band)
Number of Channels	2.4GHz：Ch1 ~ Ch13
Modulation	802.11b : DQPSK、DBPSK、CCK 802.11g/n : OFDM /64-QAM、16-QAM、QPSK、BPSK 802.11ax : OFDMA /256-QAM、64-QAM、16-QAM、QPSK、BPSK
Output Power , tolerance ± 1 dBm **The transmit EVM quality & spectrum mask are compliant with IEEE 802.11 standard**	

802.11b	**1Mbps**	**2Mbps**	**5.5Mbps**	**11Mbps**	
	16	16	16	16	
802.11g	**6、9Mbps**	**12、18Mbps**	**24Mbps**	**36Mbps**	**48Mbps**
	16	16	16	16	16
	54Mbps				
	16				
802.11n 20MHz	**MCS0~2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**
	14	14	14	14	14
	MCS7				
	14				
802.11n 40MHz	**MCS0~2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**
	15	15	15	15	15
	MCS7				
	15				
802.11ax 20MHz	**HE0~2**	**HE3**	**HE4**	**HE5**	**HE6**
	11	11	11	11	11
	HE7	**HE8**	**HE9**	**HE10**	**HE11**
	11	11	11	11	11
802.11ax 40MHz	**HE0~2**	**HE3**	**HE4**	**HE5**	**HE6**
	9	9	9	9	9
	HE7	**HE8**	**HE9**	**HE10**	**HE11**
	9	9	9	9	9

Note: The specifications of RF output power are subject to change to fulfill the safety regulation and requirements in end-user product.
Sensitivity, tolerance ± 2.5 dBm

CCK modulation PER ≦ 8%、OFDM modulation PER ≦ 10%				
802.11b	Data Rate	Spec.(dBm)		
	1Mbps	-93		
	2Mbps	-90		
	5.5Mbps	-87		
	11Mbps	-84		
802.11g SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	6Mbps	-88	24Mbps	-79
	9Mbps	-86	36Mbps	-75
	12Mbps	-84	48Mbps	-73
	18Mbps	-82	54Mbps	-72
802.11n_20MHz SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	MCS0	-88	MCS4	-75
	MCS1	-84	MCS5	-72
	MCS2	-82	MCS6	-71
	MCS3	-79	MCS7	-70
802.11n_20MHz MIMO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	MCS8	-88	MCS12	-75
	MCS9	-84	MCS13	-72
	MCS10	-82	MCS14	-71
	MCS11	-79	MCS15	-70
802.11n_40MHz SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	MCS0	-85	MCS4	-73
	MCS1	-82	MCS5	-69
	MCS2	-80	MCS6	-68
	MCS3	-77	MCS7	-67
802.11n_40MHz MIMO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	MCS8	-85	MCS12	-73
	MCS9	-82	MCS13	-69
	MCS10	-80	MCS14	-68
	MCS11	-77	MCS15	-67
802.11ax_20MHz SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	HE0	-88	HE6	-70
	HE1	-84	HE7	-69
	HE2	-82	HE8	-63
	HE3	-79	HE9	-61
	HE4	-75	HE10	-59

	HE5	-71	**HE11**	-57
802.11ax_20MHz MIMO	**Data Rate**	**Spec.(dBm)**	**Data Rate**	**Spec.(dBm)**
	HE0 NSS2	-88	**HE6 NSS2**	-70
	HE1 NSS2	-84	**HE7 NSS2**	-69
	HE2 NSS2	-82	**HE8 NSS2**	-63
	HE3 NSS2	-79	**HE9 NSS2**	-61
	HE4 NSS2	-75	**HE10 NSS2**	-59
	HE5 NSS2	-71	**HE11 NSS2**	-57
802.11ax_40MHz SISO	**Data Rate**	**Spec.(dBm)**	**Data Rate**	**Spec.(dBm)**
	HE0	-84	**HE6**	-68
	HE1	-82	**HE7**	-67
	HE2	-80	**HE8**	-65
	HE3	-77	**HE9**	-63
	HE4	-73	**HE10**	-61
	HE5	-69	**HE11**	-56
802.11ax_40MHz MIMO	**Data Rate**	**Spec.(dBm)**	**Data Rate**	**Spec.(dBm)**
	HE0 NSS2	-84	**HE6 NSS2**	-68
	HE1 NSS2	-82	**HE7 NSS2**	-67
	HE2 NSS2	-80	**HE8 NSS2**	-65
	HE3 NSS2	-77	**HE9 NSS2**	-63
	HE4 NSS2	-73	**HE10 NSS2**	-61
	HE5 NSS2	-69	**HE11 NSS2**	-56
Maximum Input Level	802.11b : -10 dBm			
	802.11g/n/ax : -20 dBm			

3.2 5GHz RF Specification

Conditions : VBAT=3.3V ; Temp:25°C

Feature	Description
WLAN Standard	IEEE 802.11a/n/ac/ax & Wi-Fi compliant
Frequency Range	5.15~5.35GHz、5.47~5.725GHz、5.725~5.85GHz (5GHz UNII Band)
Number of Channels	5.15~5.35GHz：Ch36 ~ Ch64 5.47~5.725GHz：Ch100 ~ Ch140 5.725~5.85GHz：Ch149 ~ Ch165
Modulation	802.11a : OFDM /64-QAM、16-QAM、QPSK、BPSK 802.11n : OFDM /64-QAM、16-QAM、QPSK、BPSK 802.11ac : OFDM /256-QAM、64-QAM、16-QAM、QPSK、BPSK 802.11ax : OFDMA /1024-QAM、256-QAM、64-QAM、16-QAM、QPSK、BPSK

Output Power , tolerance ± 1 dBm
The transmit EVM quality & spectrum mask are compliant with IEEE 802.11 standard

802.11a	**Frequency (MHz)**	**6~9Mbps**	**12~18Mbps**	**24Mbps**	**36Mbps**
	5180~5350	18	18	18	18
	5500~5720	18	18	18	18
	5745~5825	18	18	18	18
	Frequency (MHz)	**48Mbps**	**54Mbps**		
	5180~5350	18	18		
	5500~5720	18	18		
	5745~5825	18	18		
802.11n 20MHz	**Frequency (MHz)**	**MCS0~2**	**MCS3**	**MCS4**	**MCS5**
	5180~5350	16	16	16	16
	5500~5720	16	16	16	16
	5745~5825	16	16	16	16
	Frequency (MHz)	**MCS6**	**MCS7**		
	5180~5350	16	16		
	5500~5720	16	16		
	5745~5825	16	16		
802.11n 40MHz	**Frequency (MHz)**	**MCS0~2**	**MCS3**	**MCS4**	**MCS5**
	5180~5350	15	15	15	15
	5500~5720	15	15	15	15
	5745~5825	15	15	15	15
	Frequency (MHz)	**MCS6**	**MCS7**		

	5180~5350	15	15		
	5500~5720	15	15		
	5745~5825	15	15		
802.11ac 20MHz	Frequency (MHz)	MCS0~2	MCS3	MCS4	MCS5
	5180~5350	16	16	16	16
	5500~5720	16	16	16	16
	5745~5825	16	16	16	16
	Frequency (MHz)	MCS6	MCS7	MCS8	
	5180~5350	16	16	16	
	5500~5720	16	16	16	
	5745~5825	16	16	16	
802.11ac 40MHz	Frequency (MHz)	MCS0~2	MCS3	MCS4	MCS5
	5180~5350	15	15	15	15
	5500~5720	15	15	15	15
	5745~5825	15	15	15	15
	Frequency (MHz)	MCS6	MCS7	MCS8	MCS9
	5180~5350	15	15	15	15
	5500~5720	15	15	15	15
	5745~5825	15	15	15	15
802.11ac 80MHz	Frequency (MHz)	MCS0~2	MCS3	MCS4	MCS5
	5180~5350	15	15	15	15
	5500~5720	15	15	15	15
	5745~5825	15	15	15	15
	Frequency (MHz)	MCS6	MCS7	MCS8	MCS9
	5180~5350	15	15	15	15
	5500~5720	15	15	15	15
	5745~5825	15	15	15	15
802.11ax 20MHz	Frequency (MHz)	HE0~2	HE3	HE4	HE5
	5150~5350	17	17	17	17
	5470~5720	17	17	17	17
	5725~5825	17	17	17	17
	Frequency (MHz)	HE6	HE7	HE8	HE9
	5150~5350	17	17	17	17
	5470~5720	17	17	17	17
	5725~5825	17	17	17	17
	Frequency (MHz)	HE10	HE11		
	5150~5350	17	17		

	5470~5720	17	17		
	5725~5825	17	17		
802.11ax 40MHz	Frequency (MHz)	HE0~2	HE3	HE4	HE5
	5150~5350	14	14	14	13
	5470~5720	14	14	14	13
	5725~5845	14	14	14	13
	Frequency (MHz)	HE6	HE7	HE8	HE9
	5150~5350	15	15	15	15
	5470~5720	15	15	15	15
	5725~5825	15	15	15	15
	Frequency (MHz)	HE10	HE11		
	5150~5350	15	15		
	5470~5720	15	15		
	5725~5825	15	15		
802.11ax 80MHz	Frequency (MHz)	HE0~2	HE3	HE4	HE5
	5150~5350	16	16	16	16
	5470~5720	16	16	16	16
	5725~5845	16	16	16	16
	Frequency (MHz)	HE6	HE7	HE8	HE9
	5150~5350	16	16	16	16
	5470~5720	16	16	16	16
	5725~5845	16	16	16	16
	Frequency (MHz)	HE10	HE11		
	5150~5350	16	16		
	5470~5720	16	16		
	5725~5845	16	16		

Note：The specifications of RF output power are subject to change to fulfill the safety regulation and requirements in end-user product.

Sensitivity, tolerance ± 2.5 dBm
OFDM modulation PER ≦ 10%

802.11a SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	6Mbps	-84	24Mbps	-79
	9Mbps	-83	36Mbps	-75
	12Mbps	-82	48Mbps	-72
	18Mbps	-81	54Mbps	-68
802.11ac_20MHz SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	MCS0	-84	MCS5	-72
	MCS1	-83	MCS6	-70
	MCS2	-82	MCS7	-68

	MCS3	-79	MCS8	-62
	MCS4	-75		
802.11ac_20MHz MIMO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	MCS0 NSS2	-84	MCS5 NSS2	-72
	MCS1 NSS2	-83	MCS6 NSS2	-70
	MCS2 NSS2	-82	MCS7 NSS2	-68
	MCS3 NSS2	-79	MCS8 NSS2	-62
	MCS4 NSS2	-75		
802.11ac_40MHz SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	MCS0	-81	MCS5	-65
	MCS1	-78	MCS6	-66
	MCS2	-76	MCS7	-67
	MCS3	-73	MCS8	-63
	MCS4	-69	MCS9	-57
802.11ac_40MHz MIMO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	MCS0 NSS2	-81	MCS5 NSS2	-65
	MCS1 NSS2	-78	MCS6 NSS2	-66
	MCS2 NSS2	-76	MCS7 NSS2	-67
	MCS3 NSS2	-73	MCS8 NSS2	-63
	MCS4 NSS2	-69	MCS9 NSS2	-57
802.11ac_80MHz SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	MCS0	-78	MCS5	-63
	MCS1	-76	MCS6	-62
	MCS2	-74	MCS7	-60
	MCS3	-71	MCS8	-58
	MCS4	-67	MCS9	-54
802.11ac_80MHz MIMO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	MCS0 NSS2	-78	MCS5 NSS2	-63
	MCS1 NSS2	-76	MCS6 NSS2	-62
	MCS2 NSS2	-74	MCS7 NSS2	-60
	MCS3 NSS2	-71	MCS8 NSS2	-58
	MCS4 NSS2	-67	MCS9 NSS2	-54
802.11ax_20MHz SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	HE0	-84	HE6	-70
	HE1	-83	HE7	-69
	HE2	-82	HE8	-67
	HE3	-79	HE9	-58

	HE4	-75	HE10	-55
	HE5	-71	HE11	-53
802.11ax_20MHz MIMO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	HE0 NSS2	-84	HE6 NSS2	-70
	HE1 NSS2	-83	HE7 NSS2	-69
	HE2 NSS2	-82	HE8 NSS2	-67
	HE3 NSS2	-79	HE9 NSS2	-58
	HE4 NSS2	-75	HE10 NSS2	-55
	HE5 NSS2	-71	HE11 NSS2	-53
802.11ax_40MHz SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	HE0	-81	HE6	-66
	HE1	-78	HE7	-67
	HE2	-76	HE8	-63
	HE3	-73	HE9	-61
	HE4	-69	HE10	-57
	HE5	-65	HE11	-54
802.11ax_40MHz MIMO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	HE0 NSS2	-81	HE6 NSS2	-66
	HE1 NSS2	-78	HE7 NSS2	-67
	HE2 NSS2	-76	HE8 NSS2	-63
	HE3 NSS2	-73	HE9 NSS2	-61
	HE4 NSS2	-69	HE10 NSS2	-57
	HE5 NSS2	-65	HE11 NSS2	-54
802.11ax_80MHz SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	HE0	-78	HE6	-62
	HE1	-76	HE7	-60
	HE2	-74	HE8	-59
	HE3	-71	HE9	-58
	HE4	-67	HE10	-54
	HE5	-63	HE11	-51
802.11ax_80MHz MIMO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)
	HE0 NSS2	-78	HE6 NSS2	-62
	HE1 NSS2	-76	HE7 NSS2	-60
	HE2 NSS2	-74	HE8 NSS2	-59
	HE3 NSS2	-71	HE9 NSS2	-58
	HE4 NSS2	-67	HE10 NSS2	-54
	HE5 NSS2	-63	HE11 NSS2	-51

Maximum Input Level	802.11a/n/ac/ax : -30 dBm

4. Bluetooth Specification

4.1 Bluetooth Specification

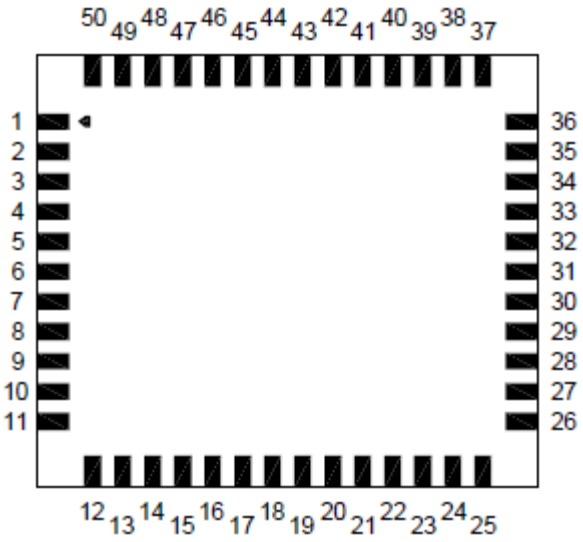
Conditions : VBAT=3.3V; Temp:25°C

Feature	Description		
General Specification			
Bluetooth Standard	BDR(1Mbps)、EDR(2、3Mbps)、LE(1Mbps、2Mbps)、LE2S、LE8S		
Host Interface	UART		
Frequency Band	2402 MHz ~ 2480 MHz		
Number of Channels	79 channels for classic、40 channels for BLE		
Modulation	GFSK, π/4-DQPSK, 8DPSK		
RF Specification			
	CL1 Output Power , tolerance ± 1 dBm		
BDR Output Power	9		
EDR Output Power	9		
LE Output Power	9		
	Min.	**Typical.**	**Max.**
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-86 dBm	
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)		-83 dBm	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-80dBm	
Sensitivity @ PER=30.8% for LE (1Mbps)		-90 dBm	
Sensitivity @ PER=30.8% for LE (2Mbps)		- 88dBm	
Maximum Input Level	GFSK (1Mbps):-10dBm		
	π/4-DQPSK (2Mbps) :-10dBm		
	8DPSK (3Mbps) :-10dBm		

5. Pin Definition

5.1 Pin Outline

<TOP VIEW>



5.2 Pin Assignment

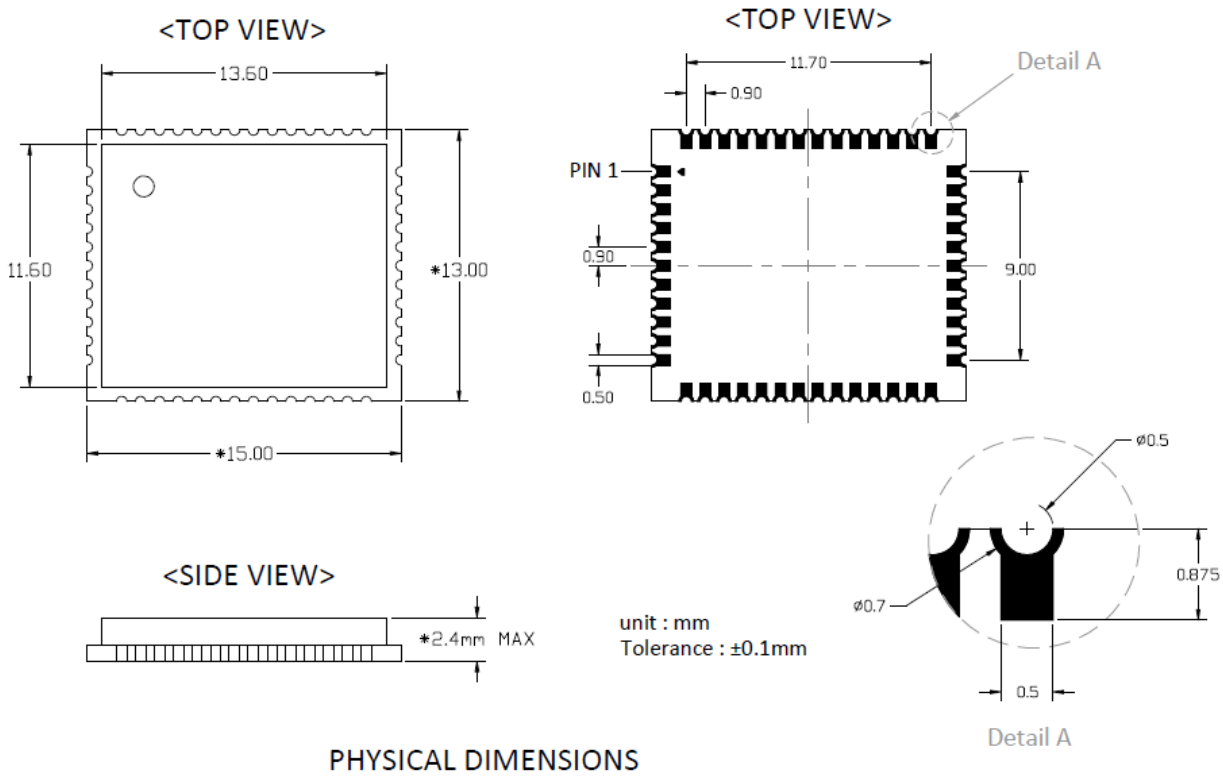
NO	Name	Type	Description
1	GND	—	Ground connections
2	WL_ANT0	I/O	WiFi RF I/O port ANT0
3	GND	—	Ground connections
4	GND	—	Ground connections
5	GND	—	Ground connections
6	GND	—	Ground connections
7	GND	—	Ground connections
8	GND	—	Ground connections
9	WL_ANT1	I/O	WiFi RF I/O port ANT1
10	GND	—	Ground connections
11	GND	—	Ground connections

12	NC	—	Floating (Don't connected to ground)
13	GND	—	Ground connections
14	NC	—	Floating (Don't connected to ground)
15	CHIP_EN	AIO/ DIO	CHIP_EN or PMU_TEST pin
16	WL_HOST_WAKE	O	WLAN to wake-up HOST
17	SDIO_CMD	I/O	WiFi SDIO command line
18	SDIO_CLK	I/O	WiFi SDIO clock line
19	SDIO_DATA_3	I/O	WiFi SDIO data line 3
20	SDIO_DATA_2	I/O	WiFi SDIO data line 2
21	SDIO_DATA_0	I/O	WiFi SDIO data line 0
22	SDIO_DATA_1	I/O	WiFi SDIO data line 1
23	GND	—	Ground connections
24	HIF mode	DI	SDIO interface -00:SDIO
25	RTC Mode	DI	CHIP interface select for external rtc/internal rtc, 0:external; 1: internal
26	BT WF print	DO	MUX Uart BT Print Out
27	BT_PCM_SYNC	DI/DO	Bluetooth PCM sync signal
28	BT_PCM_IN	DI	Bluetooth PCM data input
29	BT_PCM_OUT	DO	Bluetooth PCM Data output
30	BT_PCM_CLK	DI	Bluetooth PCM clock
31	RTC_CLK	I	External Low Power Clock input (32.768KHz)
32	GND	—	Ground connections
33	GPIO23	I/O	Digital GPIO23
34	NC	—	Floating (Don't connected to ground)
35	GPIO24	I/O	Digital GPIO24
36	VBAT	P	Main power voltage source input
37	GPIO25	I/O	Digital GPIO25
38	BT_REG_ON	I	Low asserting reset for Bluetooth core
39	GND	—	Ground connections
40	BT_UART_TXD	O	Bluetooth UART serial data output
41	BT_UART_RXD	I	Bluetooth UART serial data input
42	BT_UART_RTS_N	O	Bluetooth UART request to send
43	BT_UART_CTS_N	I	Bluetooth UART clear to send
44	WL_REG_ON	I	Low asserting reset for WiFi core
45	NC	—	Floating (Don't connected to ground)
46	GND	—	Ground connections

47	NC	—	Floating (Don’t connected to ground)
48	BT_ANT	I/O	Bluetooth RF I/O port ANT
49	BT_WAKE	I	HOST wake-up Bluetooth device
50	BT_HOST_WAKE	O	Bluetooth device to wake-up HOST

6. Dimensions

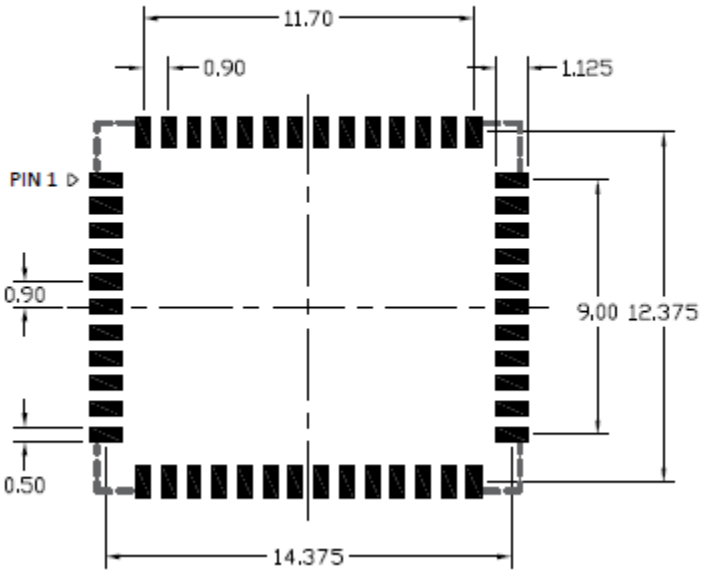
6.1 Module Dimensions



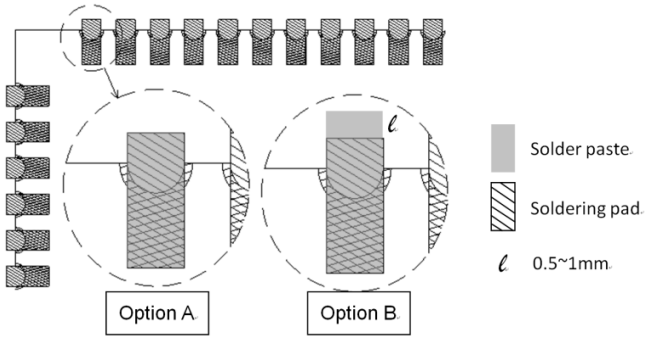
PHYSICAL DIMENSIONS

6.2 Recommended Footprint

<TOP VIEW>



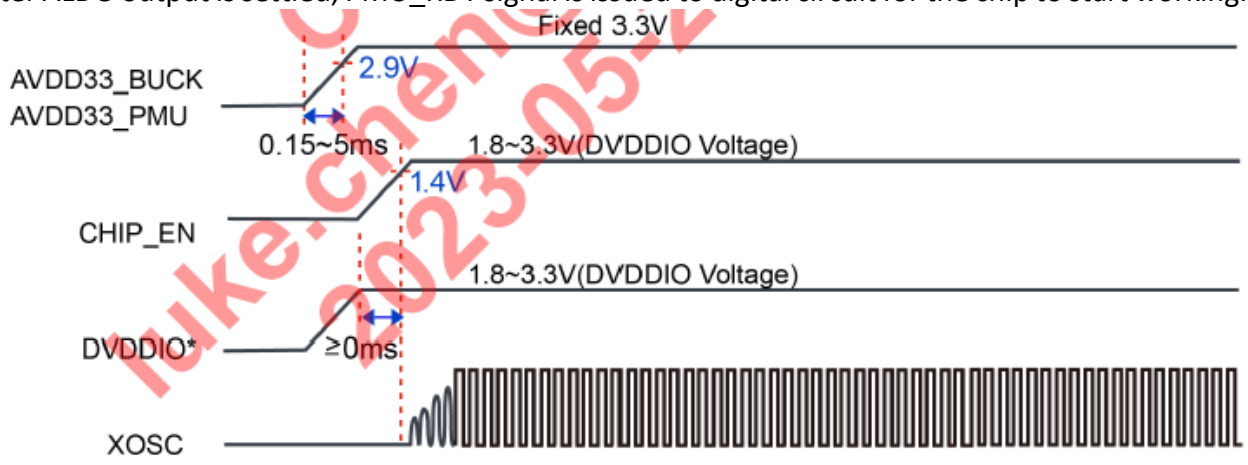
- Solder paste layer design is generally the same as recommended footprint.
  （锡膏层设计通常建议和焊垫尺寸相同）
- If soldering quality with good wetting on upright side is essential for PQC, how to optimize the aperture design in the stencil to adjust the amount of solder paste would be crucial. In addition, a kind of stencil design with stepped thickness in partial area would be considered if the thickness of stencil is about 0.1mm or thinner. Please optimize the stencil design by manufacture engineer or contact Ampak FAE for assistance.
  （如果模块吃锡质量考量侧面爬锡，如何优化钢网开孔设计以调整适当的锡膏量是非常重要的。 尤其钢网的厚度大约是 0.1mm 或更薄时，可考虑局部加厚钢网的设计。请咨询制程工程师以优化钢网的设计，或是联络椰壳科技技术支持团队）.



7. Recommended Power On Sequence

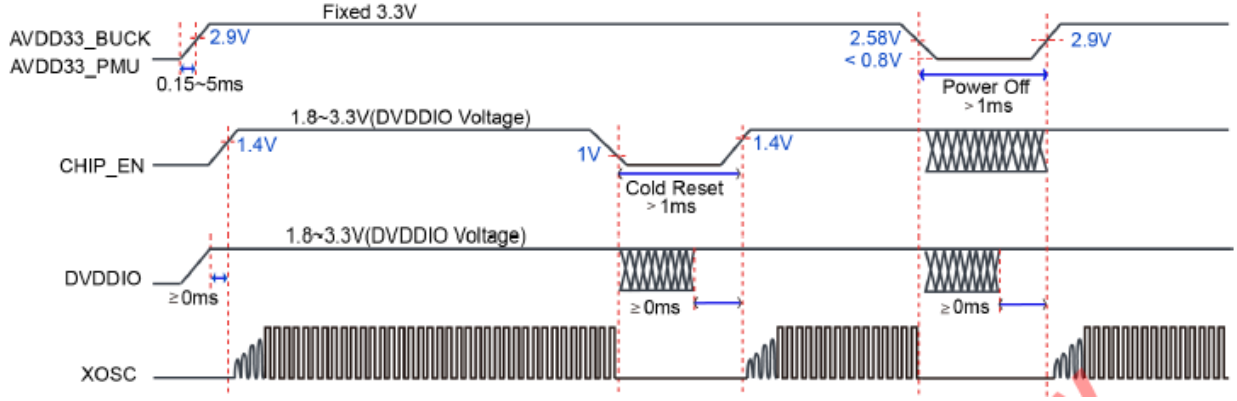
7.1 Power-up Sequence Timing Diagram

W265S1 is enabled by CHIP_EN pin. If CHIP_EN is raised to logic high level, and 3.3V supply is higher than 2.7V, PMU starts to power on AOLDO, buck, CLDO and ALDO sequentially.
After ALDO output is settled, PMU_RDY signal is issued to digital circuit for the chip to start working.

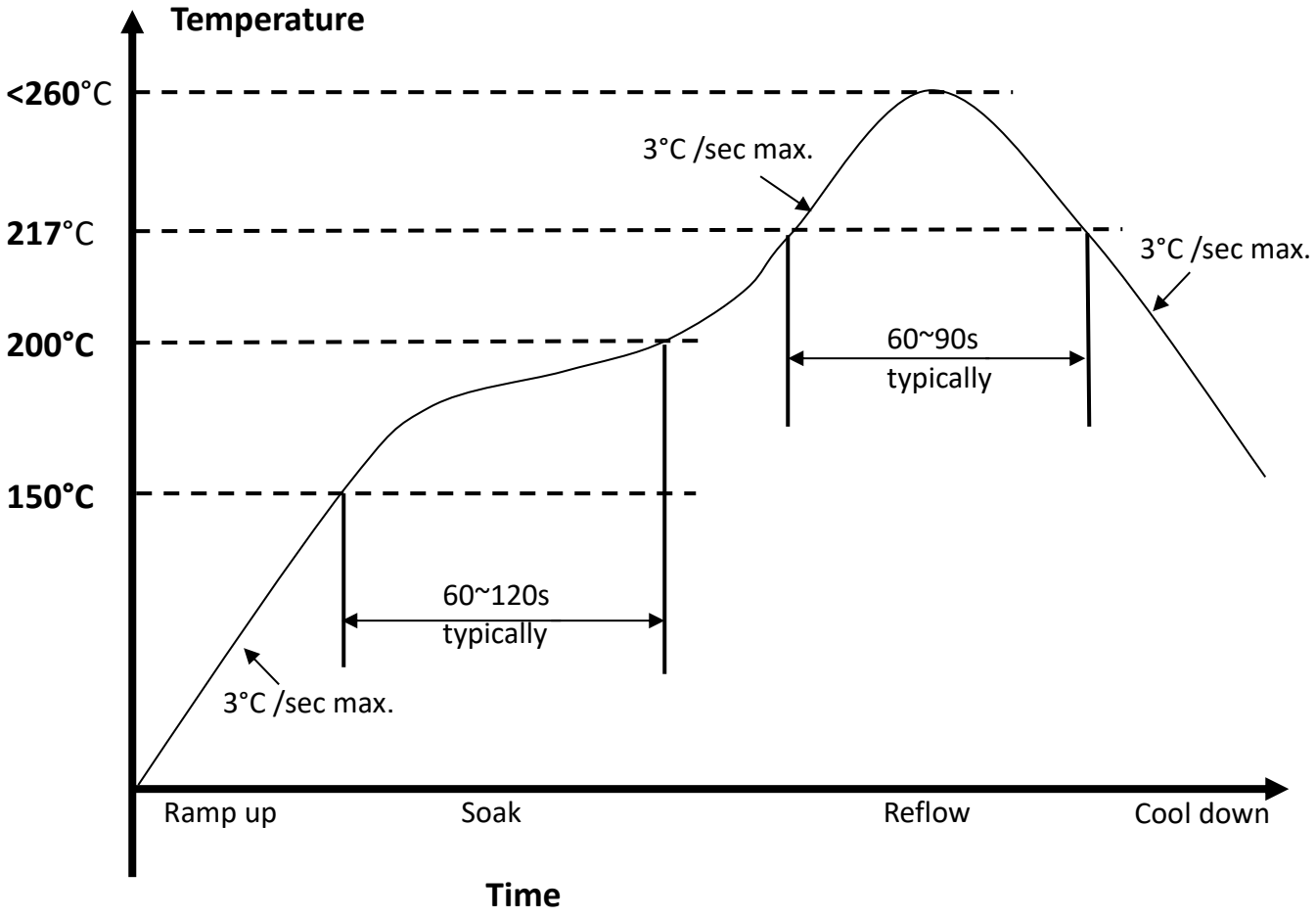


7.2 Reset

PMU reset ends at the moment when all default-on regulators are sequentially turned on.



8. Recommended Reflow Profile



1. Referred to IPC/JEDEC standard
2. Peak Temperature : <260°C
3. Cycle of Reflow : 2 times max.
4. Adding Nitrogen (N2) to implement 2000ppm or less of oxygen concentration during reflow process is recommended.
5. If the shelf time is exceeded, be sure baking step to remove the moisture from the component.

9. Product Safety Certification Statement

9.1 FCC 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.
Changes or modifications not expressly approved by the party responsible for compliance could void the user' s authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursua nt to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful inte rference in a residential installation. This equipment generates uses and can radiate radio frequency energy a nd, if not installed and used in accordance with the instructions, may cause harmful interference to radio com munications. 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 turn ing the equipment off and on, the user is encouraged to try to correct the interference by one or more 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 important announcement
Important Note:

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. Country Code selection feature to be disabled for products marketed to the US/Canada.
This device is intended only for OEM integrators under the following conditions:

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna,
3. For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band
   by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user
   regarding to Regulatory Domain change. (if modular only test Channel 1-11)

As long as the three conditions above are met, further transmitter testing 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 cannot 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 cannot 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.

End Product Labeling
The final end product must be labeled in a visible area with the following"
Contains FCC ID: **ZQ6-W665S3** "

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

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01r01

2.2 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures

Not applicable

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

2.7 Antennas

This radio transmitter **FCC ID: ZQ6-W665S3** has been approved by Federal Communications Commission 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.

Antenna No.	Model No. of antenna:	Type of antenna:	Gain of the antenna (Max.)		Frequency range:
			Antenna 1	Antenna 2	
Bluetooth	TZ2412W	Dipole Antenna	3.6	N/A	2402-2480MHz
2.4G Wi-Fi	TZ2412W	Dipole Antenna	3.6	3.6	2412-2462MHz
U-NII-1	TZ2412W	Dipole Antenna	4.97	4.97	5180-5240MHz
U-NII-2A	TZ2412W	Dipole Antenna	4.97	4.97	5260-5320MHz
U-NII-2C	TZ2412W	Dipole Antenna	4.97	4.97	5500-5720MHz
U-NII-3	TZ2412W	Dipole Antenna	4.97	4.97	5745-5825MHz

AMPAK Technology Inc.
6F-2., No. 23, Huanke 1st Rd., Zhubei City, Hsinchu 302047 Taiwan
http://www.ampak.com.tw

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains **FCC ID: ZQ6-W665S3**".

2.9 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.

2.11 Note EMI Considerations

Host manufacture is recommended to use D04 Module Integration Guide recommending as "best practice" RF

design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

2.12 How to make changes

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system. According to the KDB 996369 D02 Q&A Q12, that a host manufacture only needs to do an evaluation (i.e., no C2PC required when no emission exceeds the limit of any individual device (including unintentional radiators) as a composite. The host manufacturer must fix any failure.

9.2 NB statement

RED2014/53/EU

Declaration of Conformity

Hereby, AMPAK Technology Inc. declares that this W665S3 product is in compliance with essential requirements and other relevant provisions of Directive 2014/53/EU. A copy of the Declaration of conformity can be found at www.ampak.com.tw

The W665S3 used at 20cm from body.

When the device support wlan5G(5150-5250Mhz), Manufacture will list the following statement and country list (not EU country) on the user manual, and wlan5G only used to indoor

	AT	BE	BG	HR	CY	CZ	DK
	EE	FI	FR	DE	EL	HU	IE
	IT	LV	LT	LU	MT	NL	PL
	PT	RO	SK	SI	ES	SE	UK

10. Package Information

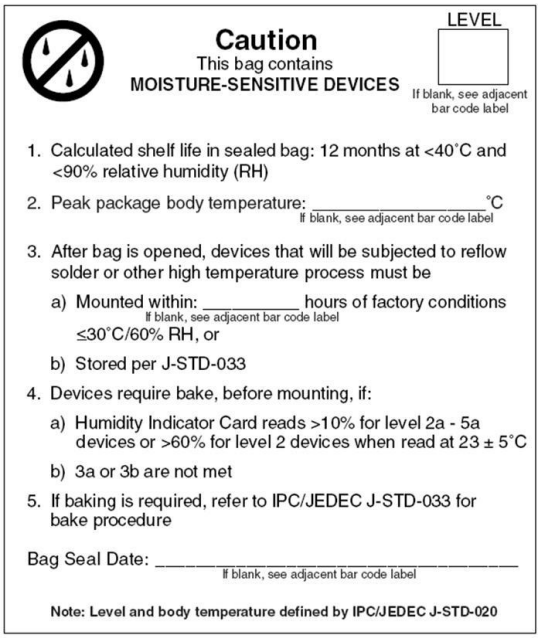
10.1 Label

Note:產品 **W665S3** 為 **Yeker** 委託正基代工製造

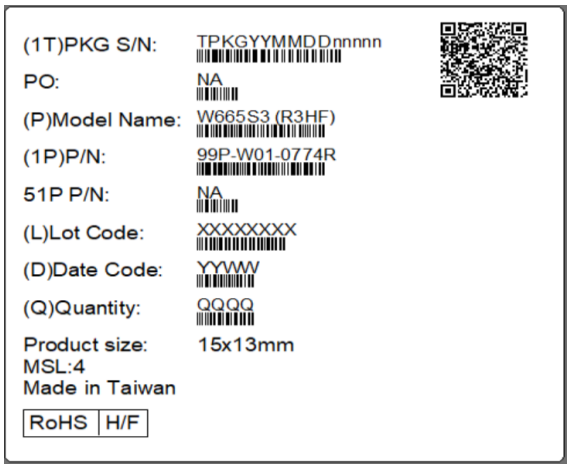
(This product is manufactured by AMPAK on behalf of Yeker**)**

Label A→ Anti-static and humidity notice

Label B→ MSL caution / Storage Condition

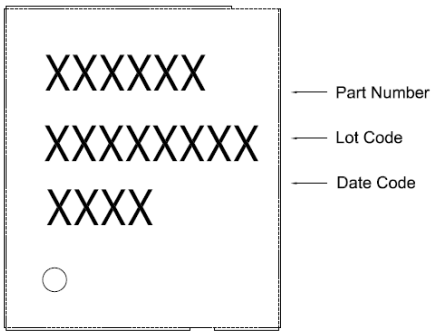


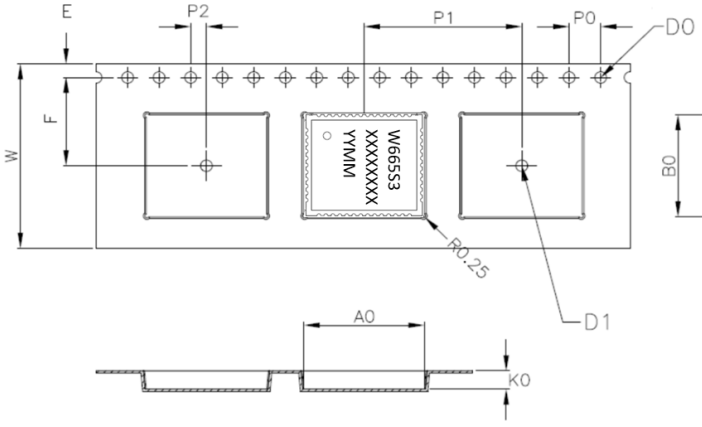
Label C→ Inner box label .



Label D→ Carton box label .

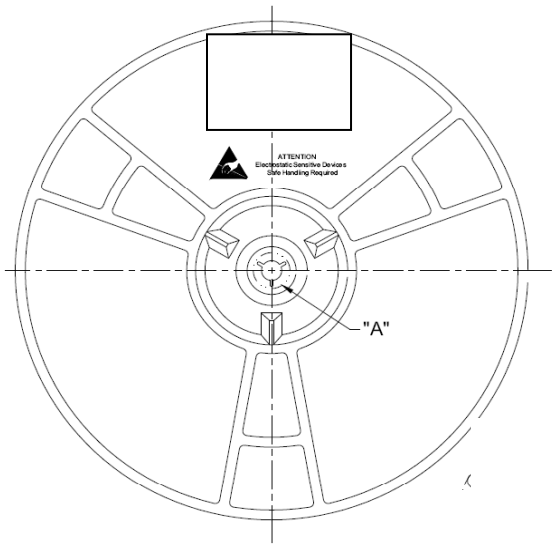
10.2 Dimension

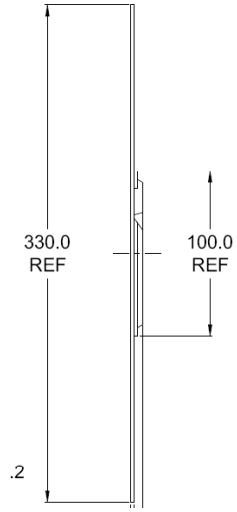


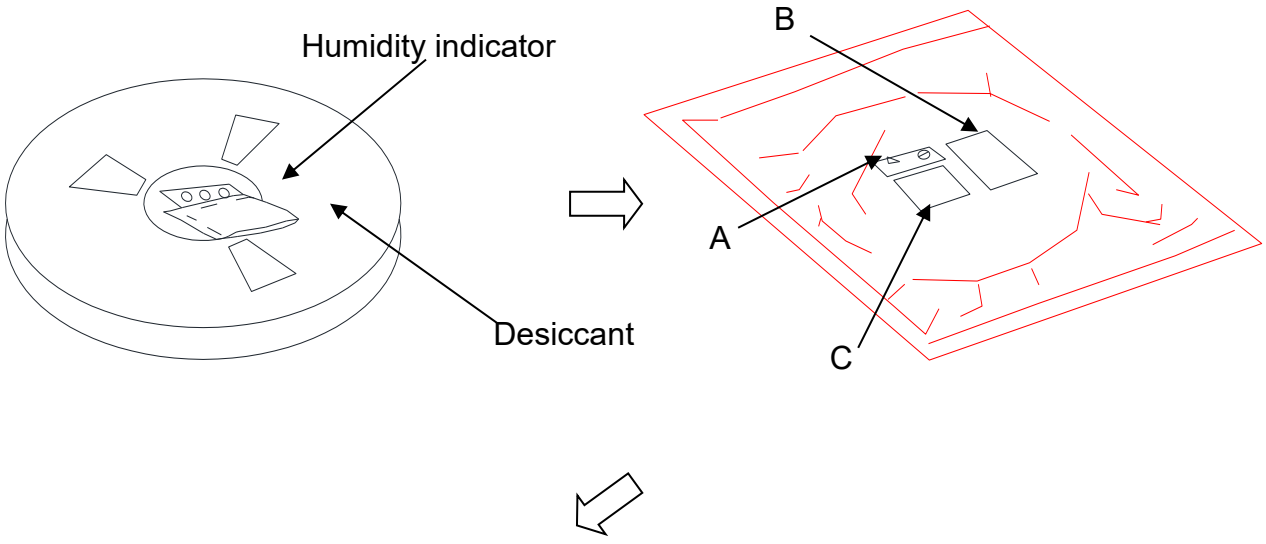


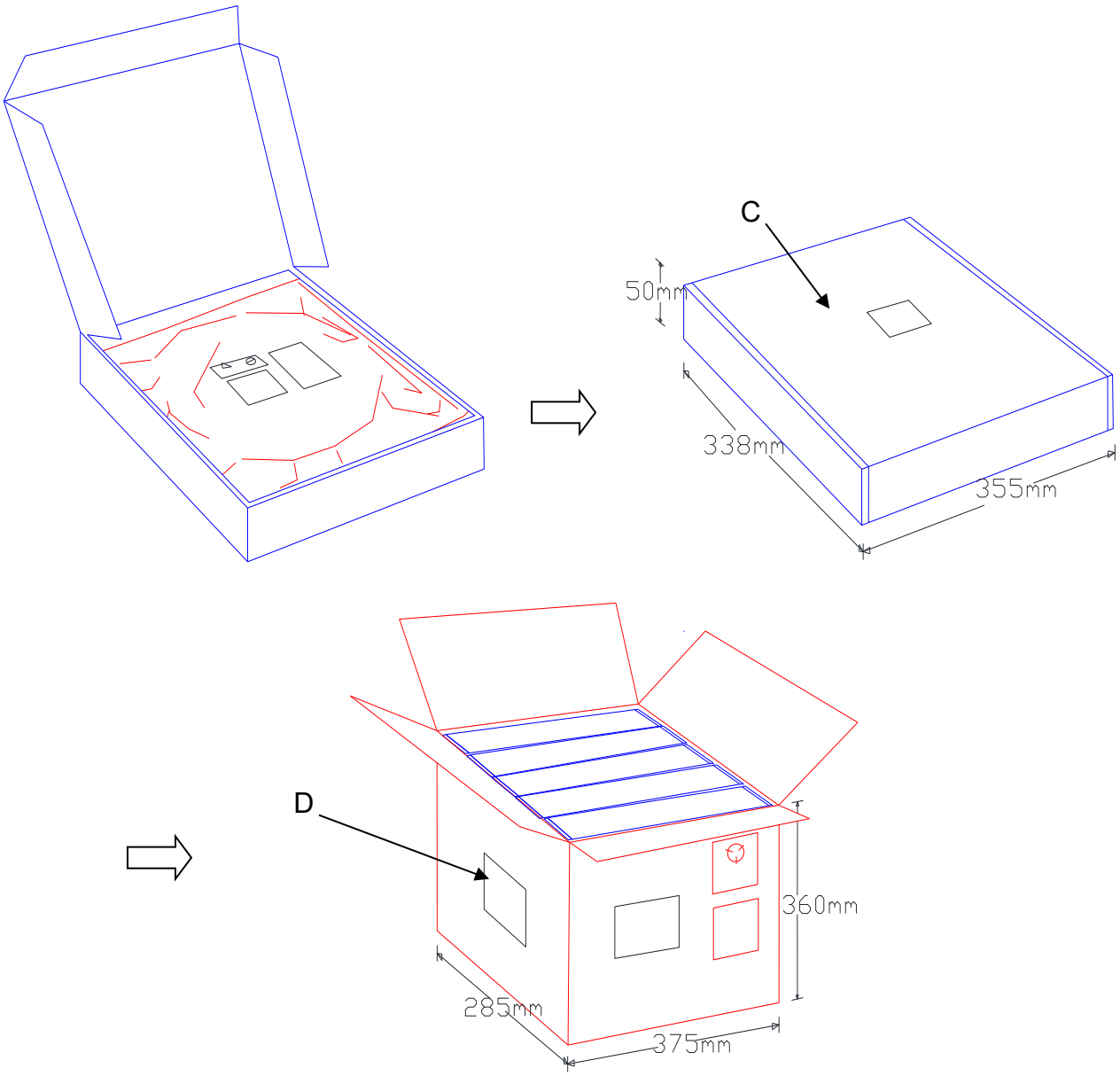
W	24.00±0.30
A0	15.30±0.10
B0	13.30±0.10
K0	2.40±0.10
E	1.75±0.10
F	11.50±0.10
P0	4.00±0.10
P1	20.00±0.10
P2	2.00±0.10
D0	1.50 +0.10 -0.00
D1	□1.50MIN

1. 10 sprocket hole pitch cumulative tolerance ±0.20.
2. Carrier camber is within 1 mm in 250 mm.
3. Material : Black Conductive Polystyrene Alloy.
4. All dimensions meet EIA-481-D requirements.
5. Thickness: 0.30±0.05mm.
6. Component load per 13”reel : 1000 pcs


ATTENTION
Electrostatic Sensitive Devices
Static Handling Required
"A"


330.0
REF
100.0
REF
.2


Humidity indicator
Desiccant
B
A
C


C
50mm
338mm
355mm
D
360mm
285mm
375mm

10.3 MSL Level / Storage Condition