



Sigfox Module

WSG303S

Compact-sized
With Ultra-low Power
Consumption

RF on pad



IPEX



Sigfox Support



Zone: RC 1/3/5/6/7



AT Commands



Extended Temperature
Range: -40°C to +85°C



Ultra-Low Power Consumption
(2.2uA @ sleep mode)

WSG303S(RC1/3/5/6/7) is a Sigfox modem module for the low power wide area network (LPWAN) market. It is designed with STM's system S2-LP+STM32 MCU for the European, Japan, South Korea and India market.

The module was designed for high performance, high quality, low cost, small form factor and most importantly, high RF power of up to 14dBm. The design is fully compliant to ETSI regulations. The Sigfox application is running on SMT32 MCU at high efficiency executed at high efficiency using its internal 32bit core Cortex-M0 processor.

Every module is preloaded with Sigfox application software, module specific ID/KEY/PAC as referring to Sigfox network system. The preloaded software also includes a bootloader which allows software update or future user application development.

◆ SIGFOX VERIFIED CERTIFICATE



Sigfox Verified™ Certificate

M_004E_728B_01

Congratulations LiteOn, the following product is now Sigfox Verified™ certified:



<i>PRODUCT COMMERCIAL NAME: ...</i>	WSG303S Sigfox module
<i>PRODUCT MODEL NAME:</i>	WSG303S
<i>RADIO CONFIGURATION:</i>	RC1; RC3; RC5; RC6; RC7
<i>TEST REPORT:</i>	CORP-13438; 60412161-001
<i>LAYOUT VERSION:</i>	V03
<i>SCHEMATIC VERSION:</i>	V03
<i>BOM VERSION:</i>	V03
<i>FIRMWARE VERSION:</i>	V2.0.1.5
<i>SIGFOX LIB:</i>	V2.8.1_FDL + addon V0.6.0
<i>MESSAGE ROLLOVER COUNTER: ..</i>	4096
<i>SIGFOX REFERENCE:</i>	BUIL-945
<i>CERTIFICATION DATE:</i>	03/09/2020
<i>SIGFOX FEATURES:</i>	
DOWNLINK	✓
PAYLOAD ENCRYPTED	✓
MONARCH	✗

This certificate is valid for this product only. Any change to the certified product must be reported to Sigfox as it may lead to a renewal of the RF & protocol Tests.
The Sigfox Verified™ logo must be used in respect of Sigfox branding guidelines.



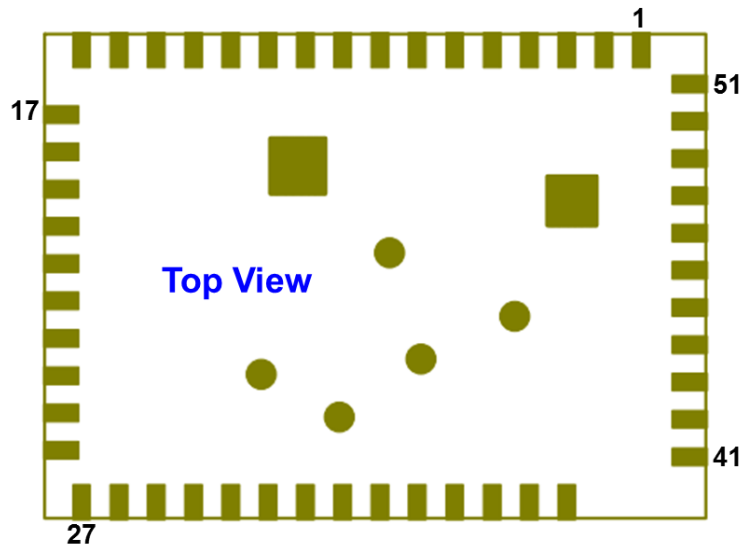
◆ General Feature

- General Sigfox module for Smart City, Smart Agriculture , Smart Industry, IOT Application
- Compact Form Factor: 22.5 x 16.5 x 3.0 mm
- 51 Pin LGA Pad for PCB SMT mounting
- Interface : I2C*1/UART*1/GPIO*3/ADC*2/SWD*1
- Temperature range: -40°C to +85°C
- Supply voltage: 2.0 ~ 3.6V
- Frequency range: ISM RC1/RC7(868MHz), RC3/RC5(923MHz), RC6(865MHz),
- Preloaded Sigfox application with ID/KEY/PAC and bootloader for firmware update

◆ Product Specifications

	RF Function
Standard	Sigfox Network System
Interface	I2C/UART/GPIO/ADC/SWD
Transmit Output Power	14dBm
Data Rate	Uplink: 100bps Downlink: 600bps
Modulation Techniques	Uplink DBPSK Modulation Downlink GFSK Modulation
Sigfox Frequency bands	RC 1/3/5/6/7
Operating Voltage	2.0 ~ 3.6V
Operating Temperature	-40 ~ 85 degree C
Current consumption	Tx mode(TX period): 21mA Uplink(TX 1 frame): 24mA Downlink:14mA Normal mode: 5mA Sleep mode: 2.2 uA

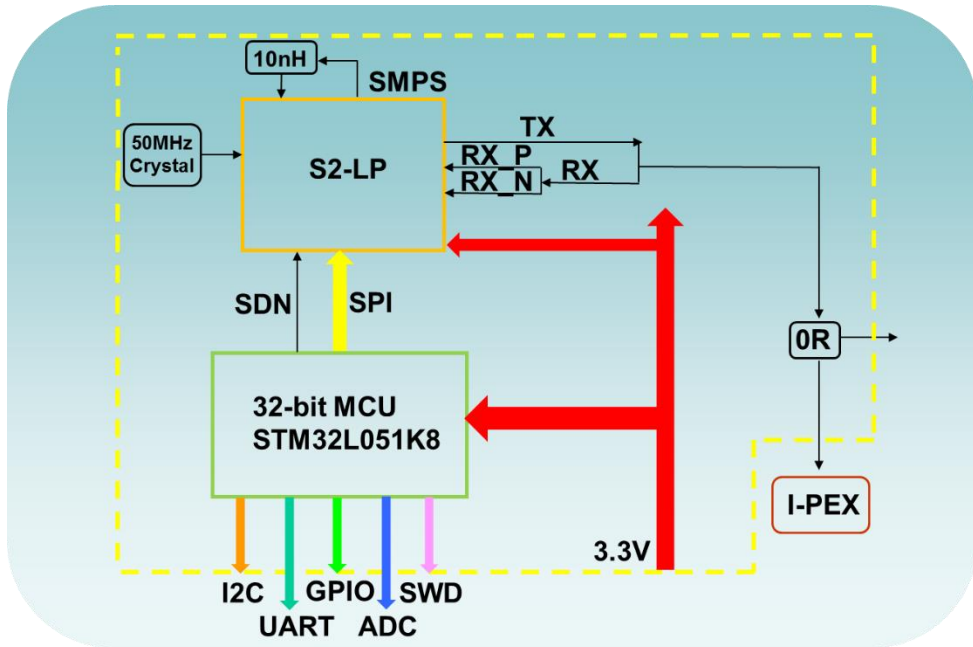
◆ **MODULE PINOUT**



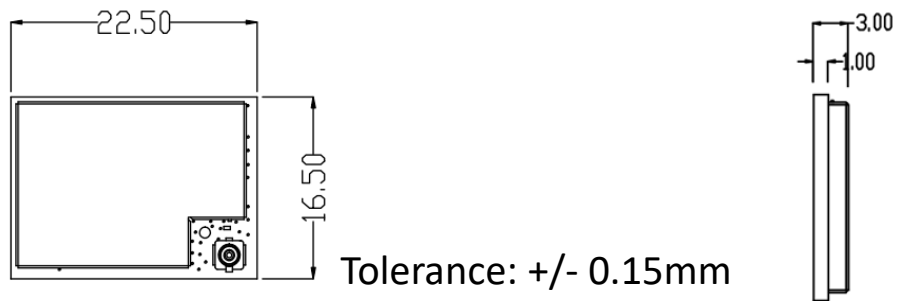
◆ **PIN DEFINITION**

Pin.	Description	Function	Pin	Description	Function
1,2,3,4,5,15,16,39,40,41,42,43,44,45,47,48,49,50,51	GND	GND	24	PA11	PA11
6	SDO	PA6(Suggest to floating)	25	PA12	PA12
7	SDI	PA7(Suggest to floating)	26	SWDIO	PA13 (MCU debugging and programming)
8	SCLK	PB3(Suggest to floating)	27	SWCLK	PA14 (MCU debugging and programming)
9	CSN	PA1(Suggest to floating)	28	NC	NC
10	GPIO	PA0	29	PB4	PB4
11	PA4	PA4	30	PB5	PB5
12	PB1	PB1	31	PB6	PB6
13	PA15	PA15	32	PB7	PB7
14	SDN	S2LP shut down pin, MCU control, please floating	33	NRST	NRST (MCU Reset)
17	USART2_TX	PA2 (115200bps) Default UART	34	BOOT0	BOOT0 (Floating or Low)
18	USART2_RX	PA3 (115200bps) Default UART	35	PB8	PB8
19	PA5	PA5	36	XI	PC14-OSC_IN (Ready for External Crystal)
20	PB0	PB0	37	XO	PC15-OSC32_OUT (Ready for External Crystal)
21	PB2	PB2	38	VDD	VDD_3V3
22	PA9	PA9	46	ANT1	SigFox Antenna
23	PA10	PA10			

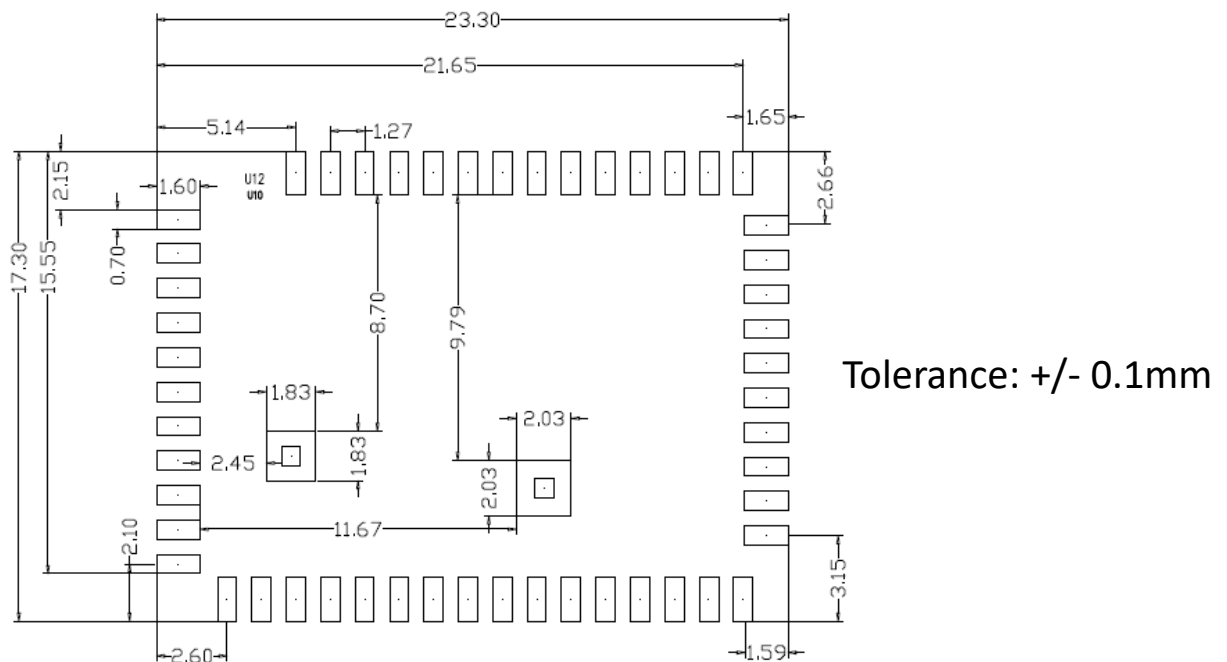
◆ **BLOCK DIAGRAM**



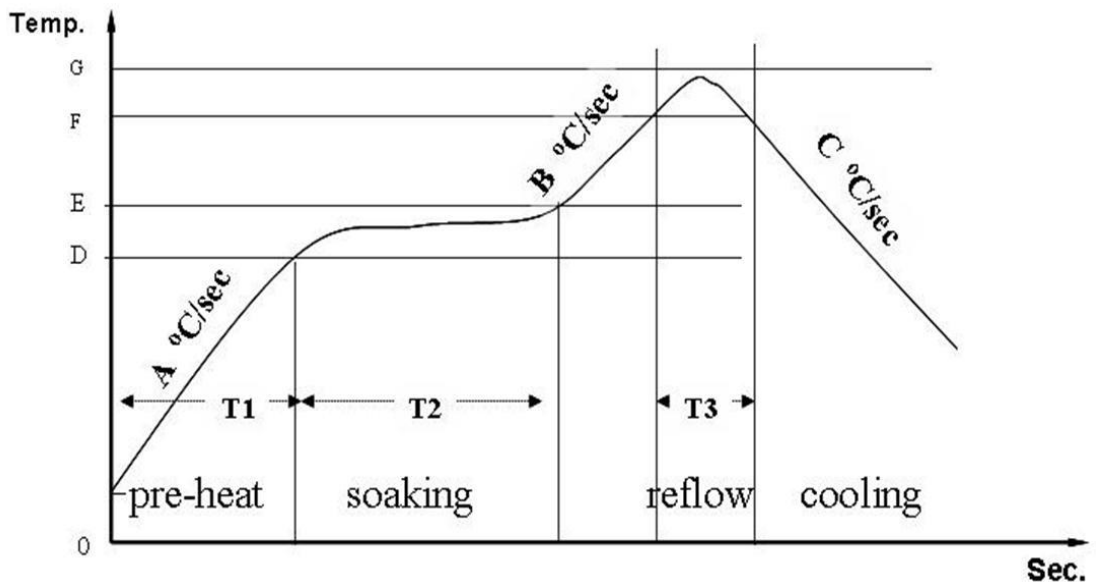
◆ **MODULE DIMENSION**



◆ **RECOMMENDED FOOTPRINT**



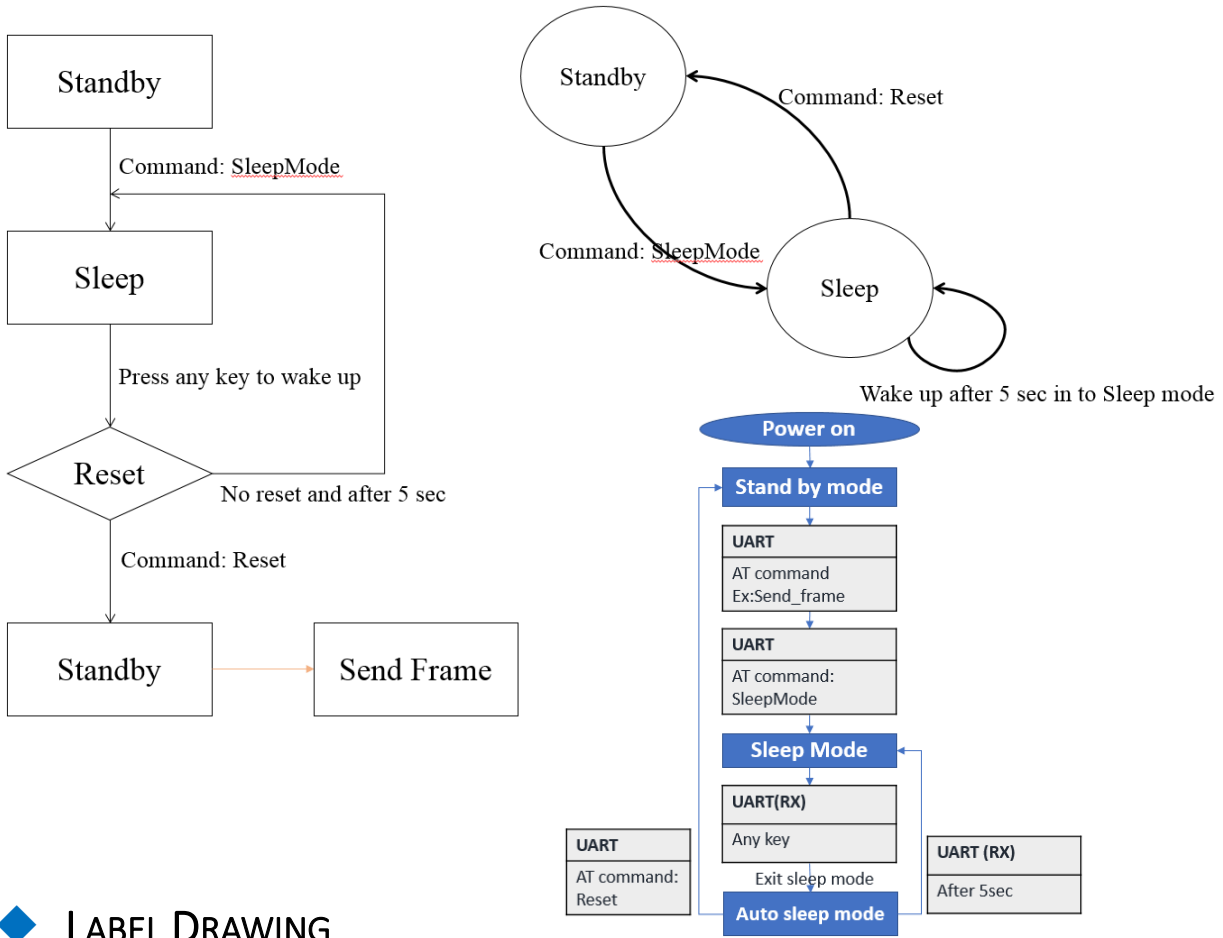
◆ **RECOMMENDED REFLOW PROFILE**



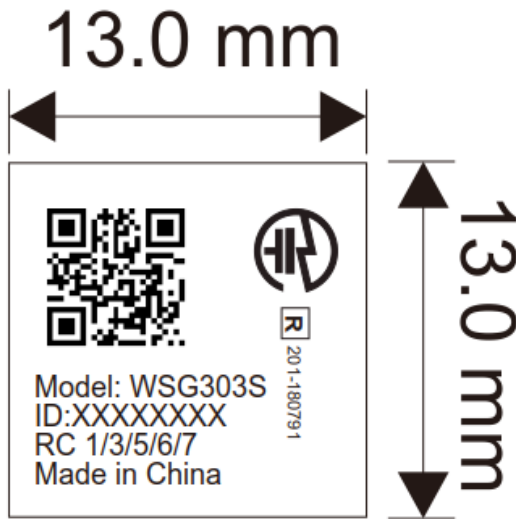
Standard conditions for reflow soldering:

- a. Pre-heating Ramp (A) (Initial temperature: 150°C): 1~2.5°C/sec;
- b. Soaking Time (T2) (150°C~180°C): 60sec~100sec;
- c. Peak Temperature (G): 230~250°C;
- d. Reflow Time (T3) (>220°C): 30~60 sec;
- e. Ramp-up Rate (B): 0~2.5°C/ sec;
- f. Ramp-down Rate (C): 1~3°C/ sec.

◆ FLOW OF STANDBY/SLEEP MODE



◆ LABEL DRAWING



條碼使用一維條碼QR CODE, 9*9MM
 顯示內容為兩行
 XXXXXXXX (8碼ID)
 XXXXXXXXXXXXXXXXXXXX (16碼PAC)

◆ **PACKAGING SPEC**

Do not put the module in the top 20 pcs and the last of 55 pcs by one reel

ITEM	P/N	DESCRIPTION	QTY
1	***	Product	1
2	5252000023KD	44MM Tape Reel	16.3m/800
3	5253000001KD	44MM Reel cover	500m/21600
4	5250000003KD	Reel Disc 15	2/800
5	5251000001KD	44 MM Reel Axis	1/800
6	MM125	Reel bag label	3/800
7	701A00000BYD	30 G Dryer	1/800
8	616300009437	10%-60% Humidity Indicator Card	1/800
9	5230000491ZD	44 Plastic strip	1/800
10	5011000102ZD	AL Bag Anti-Static	1/800
11	50810010073D	Caution label	1/800
12	5081000253D	ESD caveat	1/800
13	5030000821D	Pizza box	1/800
14	50300008341D	Carton	1/3200
15	MM108	Carton Label	1/3200
	5220000003ED	封箱膠帶	3.67/3200

DIM	A	B	C	D	ANGLE
0-5	±0.02	±0.05	±0.10		0°-30° = 0.1°
5-10	±0.05	±0.10	±0.15		31°-60° = 0.3°
10-50	±0.10	±0.15	±0.20		61°-90° = 0.5°
50-100	±0.15	±0.20	±0.25		
100+	±0.15	±0.20	±0.25		

A 3	UN I	SCALE	SHEET	MODEL No.	WSG300S
	MM	FREE	1 of 1	PART NAME	DUMMY PACKAGE
APPROVED	CHECKED	DESIGNED	PART No.		REV A1
Bing Li	Zhenxi Liu				

LITEON 光寶科技股份有限公司
LITE-ON TECHNOLOGY CORP.

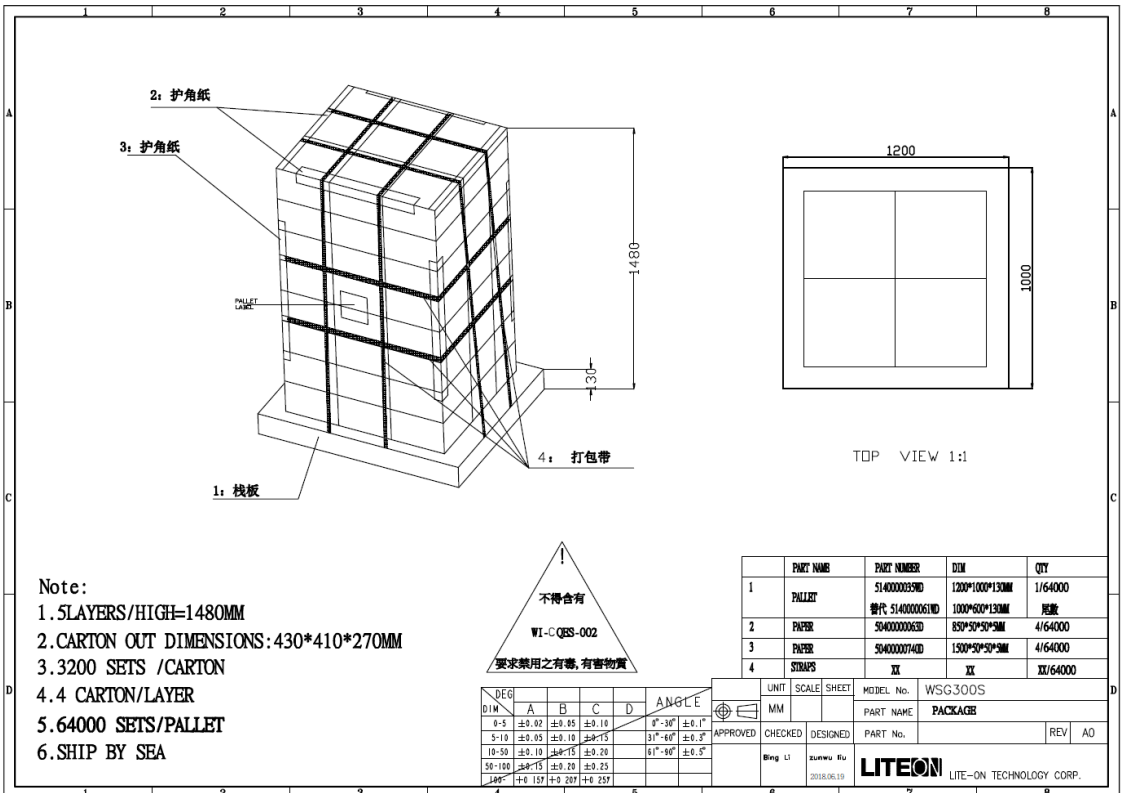
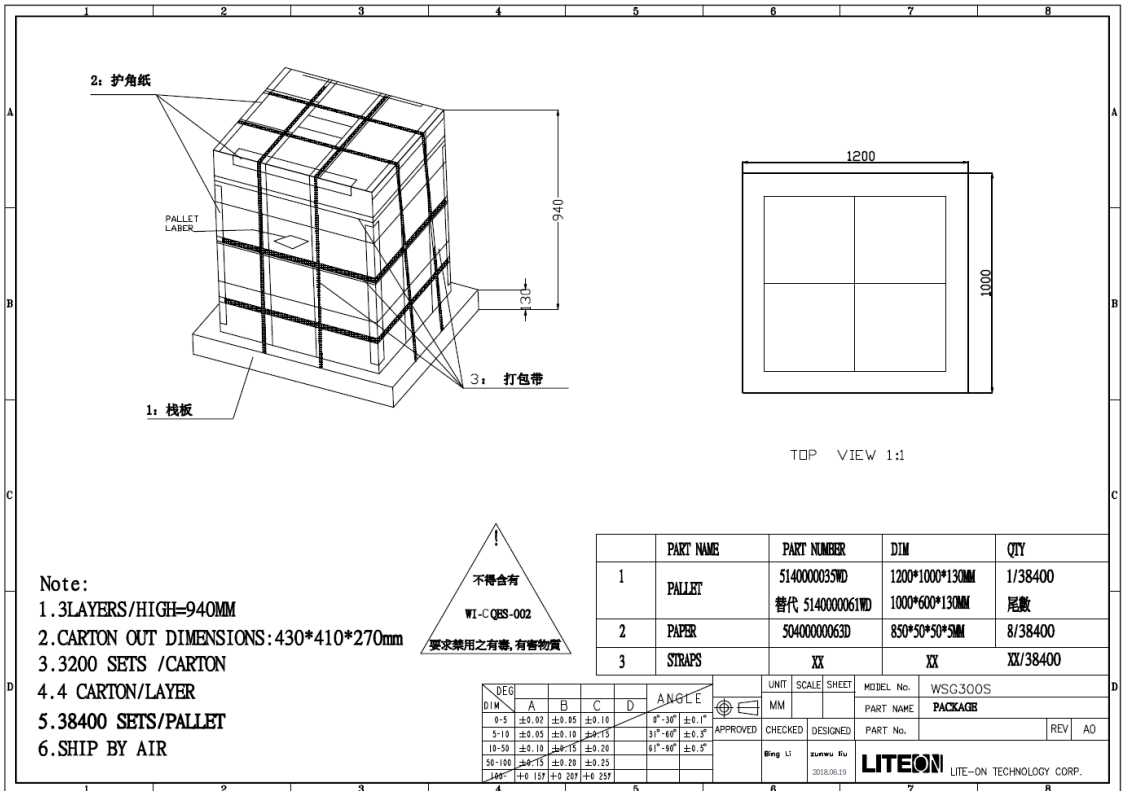
DIM TOLERANCES	REV.	ECN/R	DRAWN	DATE
X, ±0.30				
X.X ±0.20				
X.XX ±0.10				

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 : 0.40±0.05mm.
 6. Packing length per 22" reel : 36.6 Meters.(1:2)
 7. Component load per 15" reel : 800 pcs.(前後留空共75PCS)

W	44.00±0.30
A0	16.80±0.10
B0	22.80±0.10
K0	4.40±0.10
K1	3.50±0.10 (前開3D測量值)

U-PAK 瑋鋒科技股份有限公司 Ultra-Pak Industries Co., Ltd.	Customer No. : WSG300S	Approved : <i>Felly dong</i>	UPAK No. GBUK84423A
Article Number :	Description :	Checked :	UNIT SCALE DATE REV. mm 1.5:1 08/24/2006 R1
		Drawn : <i>Easy Han</i> 韓云蘭 03/10/2016	DWG NO.: DW-44X20

◆ **PACKAGING SPEC**



◆ CHANGE LIST

Rev	Date	Author	Change List
V1.0	2018.02.12	Kaysa Lee	Preliminary
V1.1	2018.06.11	Kelly Hsu	Update Voltage supply Update Current consumption Update AT Command List
V1.2	2018.06.19	Kaysa Lee	Add Packaging spec
V1.3	2018.07.02	Kelly Hsu	Add Reflow profile Add Label Drawing
V1.4	2018.09.03	Kaysa Lee	Add sigfox P1 Cert
V1.5	2018.09.25	Kaysa Lee	Update Power consumption data
V1.6	2018.10.04	Kaysa Lee	Add Standby/Sleep Flow chart
V1.7	2018.12.04	Kelly Hsu	Update Recommended footprint
V1.8	2018.12.27	Kaysa Lee	Update sigfox P1 cert. to support RC 1/3/5 Update AT Command for RC3/5
V1.9	2019.07.25	Kelly Hsu	Update sigfox P1 cert. to support RC 1/3/5/6 Modify AT Command List and Label Drawing
V2.0	2020.04.06	Kelly Hsu	Modify Pin Definition
V2.1	2020.09.14	Kelly Hsu	Update sigfox P1 cert. to support RC 1/3/5/6/7 Update AT Command for RC7 Modify Label Drawing
V2.2	2021.01.27	Kelly Hsu	Update Recommended footprint