WISOL / SFM11R2D

P/N: WSSFM11R2DAT

DATA SHEET Rev.01

WISOL
531-7, Gajang-ro,Osan-si,Gyeonggi-do
Rep. of Korea

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1. Approval Revision Record

NO	REASON	RECORD OF REVISION	Date	Remark
1	REV00	WSSFM10R2DAT Approval Releases	2017-04-11	-
2	REV01	BOX Label design added	2017-07-09	

2. Scope

Description : Sigfox Module RC2&RC4

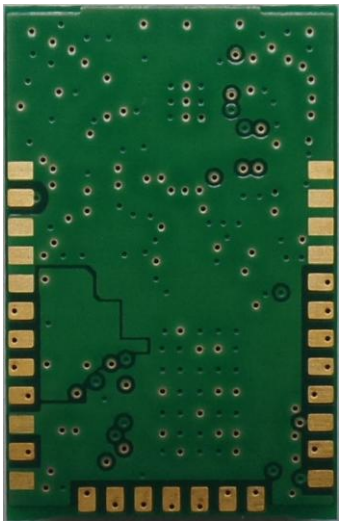
Type : SMD Type

PCBA Size : 13mm(W) x 20mm(L) x 2.21mm(H)

This module is SIGFOX verified and that the FCC are ongoing. FCC test result will be update.

3. Numbering of product

3-1. Product



3-2. Part No.

W	S	**S**	**F**	**M**	**1**	**1**	**R**	**2D**	A	T
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

No.	EXPLANATION
(1),(2)	WISOL
(3),(4)	Application (SF:Sigfox)
(5)	Type (M:Module)
(6),(7)	Group model numbering
(8), (9)	Region Code(R2D: US&AU)
(10),(11)	Application Type(Firm Ware Type) AT(AT command version) AP(API version)

3-3. Lot. No.

S	A	C	J	A	1	1	0	1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

①	Sigfox Module
②	Manufacture Area Packing Lot: A = Area Korea; B = China; C = Vietnam
③	Year 2010 = W; 2011 = X; 2012 = Y; 2013 = Z; 2014 = A; 2015 = B; 2016 = C; 2017 = D; 2018 = E; 2019 = F
④	Month 1 = A; 2 = B; 3 = C; 4 = D; 5 = E; 6 = F; 7 = G; 8 = H; 9 = I; 10 = J; 11 = K; 12 = L
⑤	Day 1 = 1; 2 = 2; 3 = 3; 4 = 4; 5 = 5; 6 = 6; 7 = 7; 8 = 8; 9 = 9; 10 = A; 11 = B; 12 = C; 13 = D; 14 = E; 15 = F; 16 = G; 17 = H; 18 = I; 19 = J; 20 = K; 21 = L; 22 = M; 23 = N; 24 = O; 25 = P; 26 = Q; 27 = R; 28 = S; 29 = T; 30 = U; 31 = V
⑥⑦	Model Serial Number (10,11,12,13…)
⑧⑨	A Serial Number (1serial: 900ea)

4. Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VCC	Module input voltage	0 to 4.2	V
OT	Operating Temperature	-30 to +85	℃
ST	Storage Temperature	-40 to +125	℃

5. DC Characteristics

Symbol	Parameter	Min	Typ.	Max	Unit
VCC	Module input voltage	2.7	3.3	3.6	V
Current	Tx Current(@ +22.5dBm, MOD)	-	170	-	mA
	Rx Current	-	32	-	mA
	Sleep Current		2.5		uA

6. I/O Specifications

Symbol	Parameter	Min	Typ.	Max	Unit
VIH	High level input voltage @VCC=3.3V	2.0			V
VIL	Low level input voltage @VCC=3.3V			0.8	V

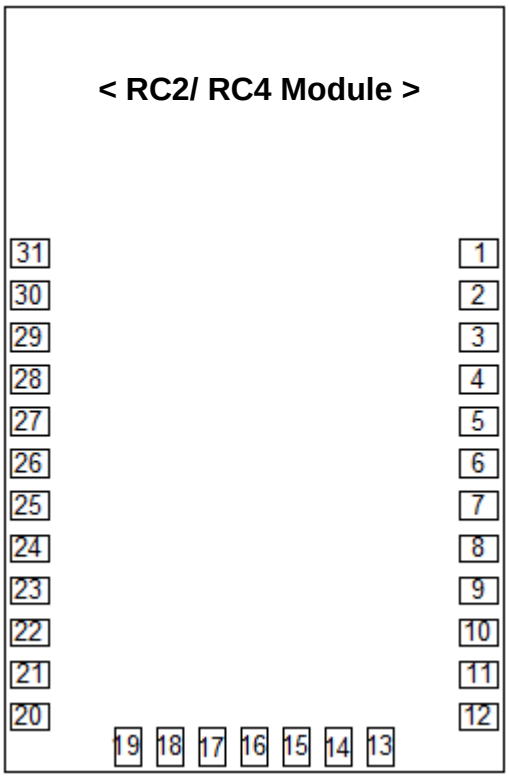
7. RF Specifications

Conditions: VCC=3.3V, Temp=25℃

Parameter			Min	Typ.	Max	Unit
RF Characteristics						
RF Frequency	RC2	Tx		902.2		MHz
		Rx		905.2		MHz
	RC4	Tx		920.8		MHz
		Rx		922.3		MHz
Tx output power(at “24” setting)			-	22.5	-	dBm
Frequency Error Tolerance(+25℃)			-2.5	-	+2.5	ppm
2nd Harmonics(conducted)			-	-44	-	dBm
3nd Harmonics(conducted)			-	-47	-	dBm
Rx Sensitivity(@600bps, GFSK)			-	-129	-	dBm
Rx Spurious Emission(30MHz~12.75GHz)					-54	dBm

8. Pin Description

8-1. Interface PIN(SMD Type : 31 Pin)_Bottom view



1	GND	9	GPIO5	17	TXLED/ DBG_CLK	25	GPIO2
2	GND	10	GPIO4	18	NC4/DBG_EN	26	GPIO3
3	GND	11	CPU_LED	19	RST_N	27	GND
4	GND	12	RADIO_LED	20	GND	28	GND
5	NC3/ SYSCLK	13	GPIO9	21	VDD_IO	29	GND
6	GPIO8	14	UARTTX	22	GND	30	RF_IO
7	GPIO7	15	UARTRX	23	GPIO0	31	GND
8	GPIO6	16	RXLED/ DBG_DATA	24	GPIO1		

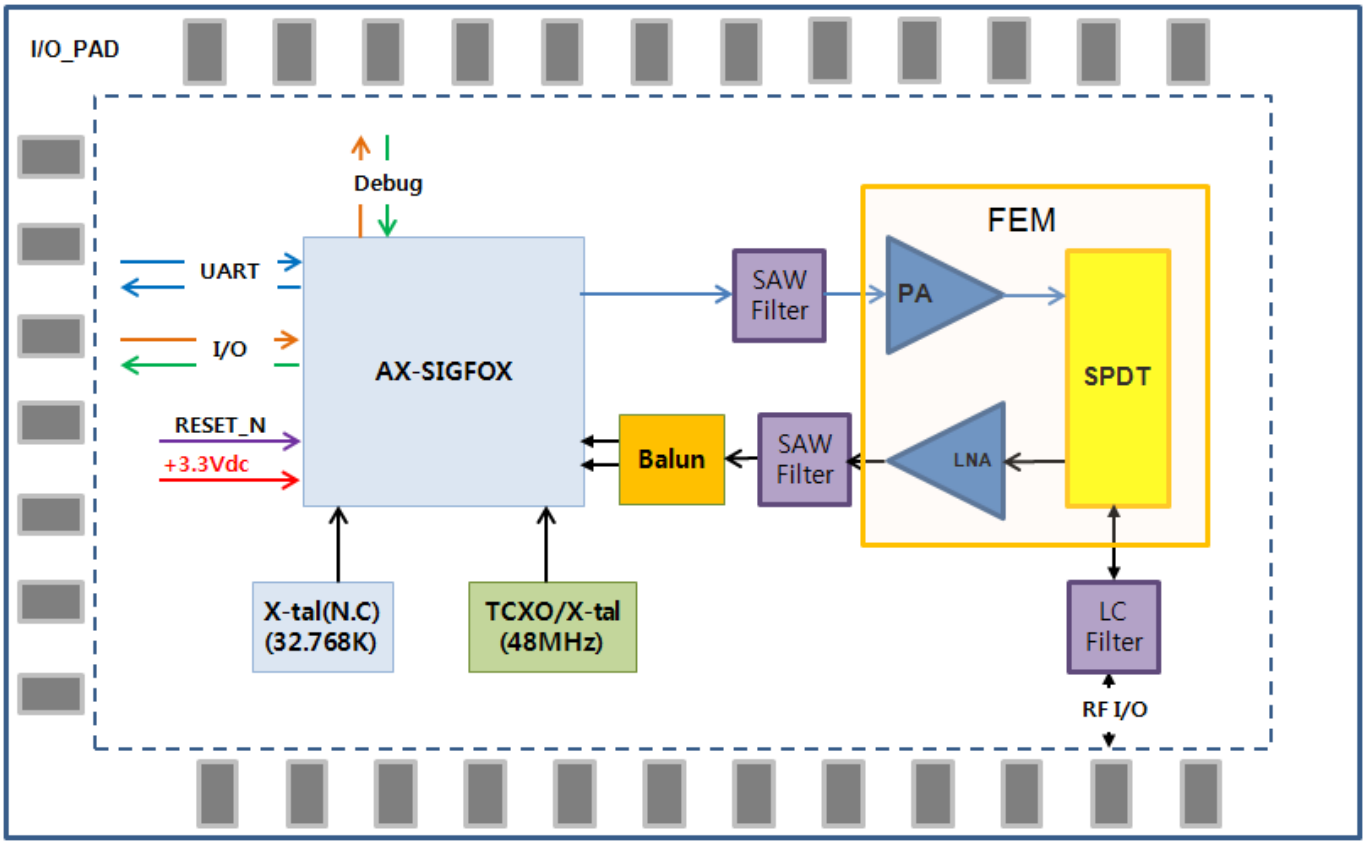
Pin-map of RCZ1, RCZ2, RCZ3 and RCZ4 module is compatible (Pin to Pin)

8-2. Interface PIN description

PIN(s)	NAME	TYPE	Description
1~4	GND	P	Ground
5	NC3/SYSCLK	N	Do not connect
6	GPIO8	I/O/PU	General purpose IO
7	GPIO7	I/O/PU	General purpose IO, selectable SPI functionality (MISO)
8	GPIO6	I/O/PU	General purpose IO, selectable SPI functionality (MOSI)
9	GPIO5	I/O/PU	General purpose IO, selectable SPI functionality (SCK)
10	GPIO4	I/O/PU	General purpose IO, selectable ∑Δ DAC functionality, selectable dock functionality
11	CPU_LED	O	CPU activity indicator
12	RADIO_LED	O	Radio activity indicator
13	GPIO9	I/O/PU	General purpose IO, wakeup from deep sleep
14	UARTTX	O	UART transmit
15	UARTRX	I/PU	UART receive
16	RXLED/DBG_DATA	O	Receive activity indicator
17	TXLED/DBG_CLK	O	Transmit activity indicator
18	NC4/DBG_EN	PD	Do not connect
19	RST_N	I/PU	Optional reset pin
20	GND	P	Ground
21	VDD_IO	P	Power supply
22	GND	P	Ground
23	GPIO0	I/O/A/PU	General purpose IO, selectable ADC functionality, selectable ∑Δ DAC functionality, selectable clock functionality
24	GPIO1	I/O/A/PU	General purpose IO, selectable ADC functionality
25	GPIO2*	I/O/A/PU	General purpose IO, selectable ADC functionality
26	GPIO3**	I/O/A/PU	General purpose IO, selectable ADC functionality
27	GND	P	Ground
28~29	GND	P	Ground
30	RF_IO	A	RF input/output
31	GND	P	Ground

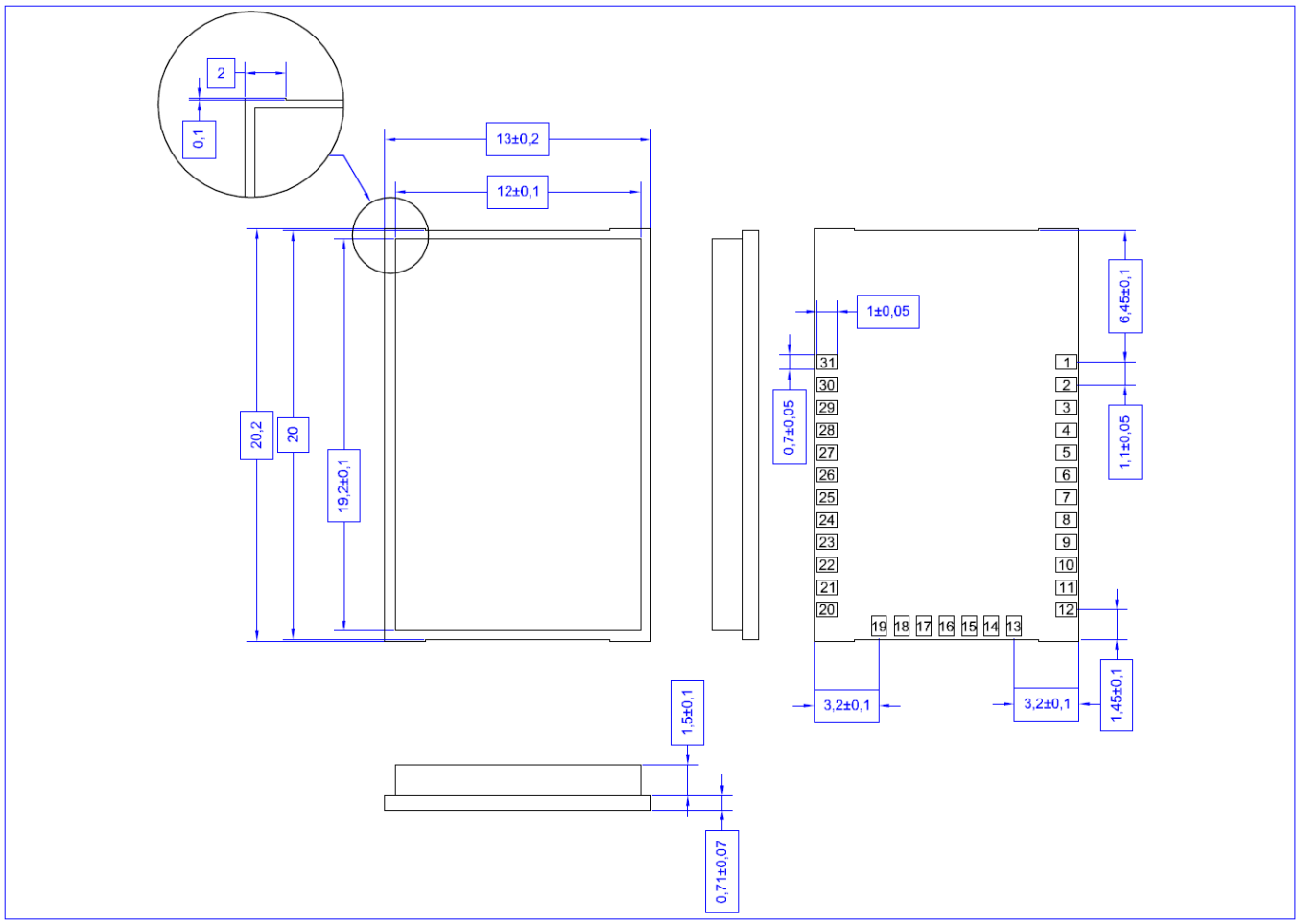
* GPIO2 is TX_EN pin of FEM. This pin can not be used by the user.
** GPIO3 is RX_EN pin of FEM. This pin can not be used by the user.

9. Block Diagram

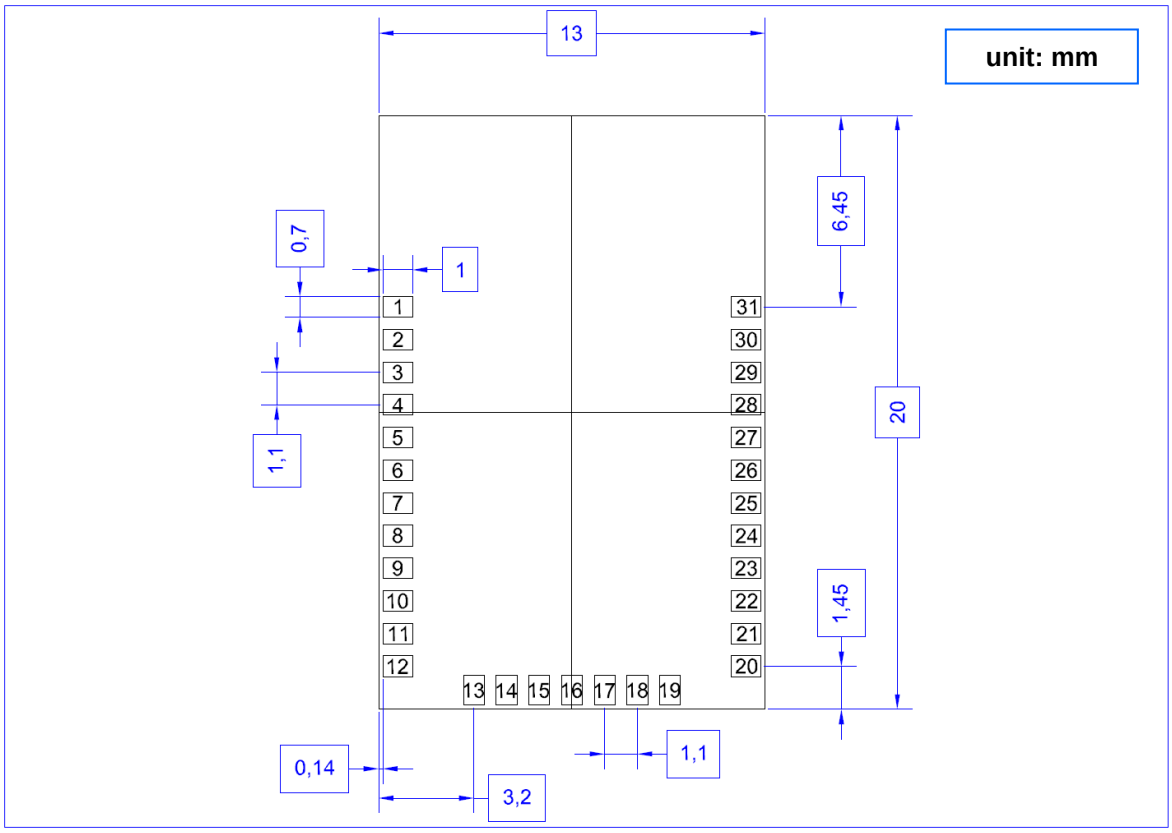


10. Dimensions & drawing

10-1. Design dimension



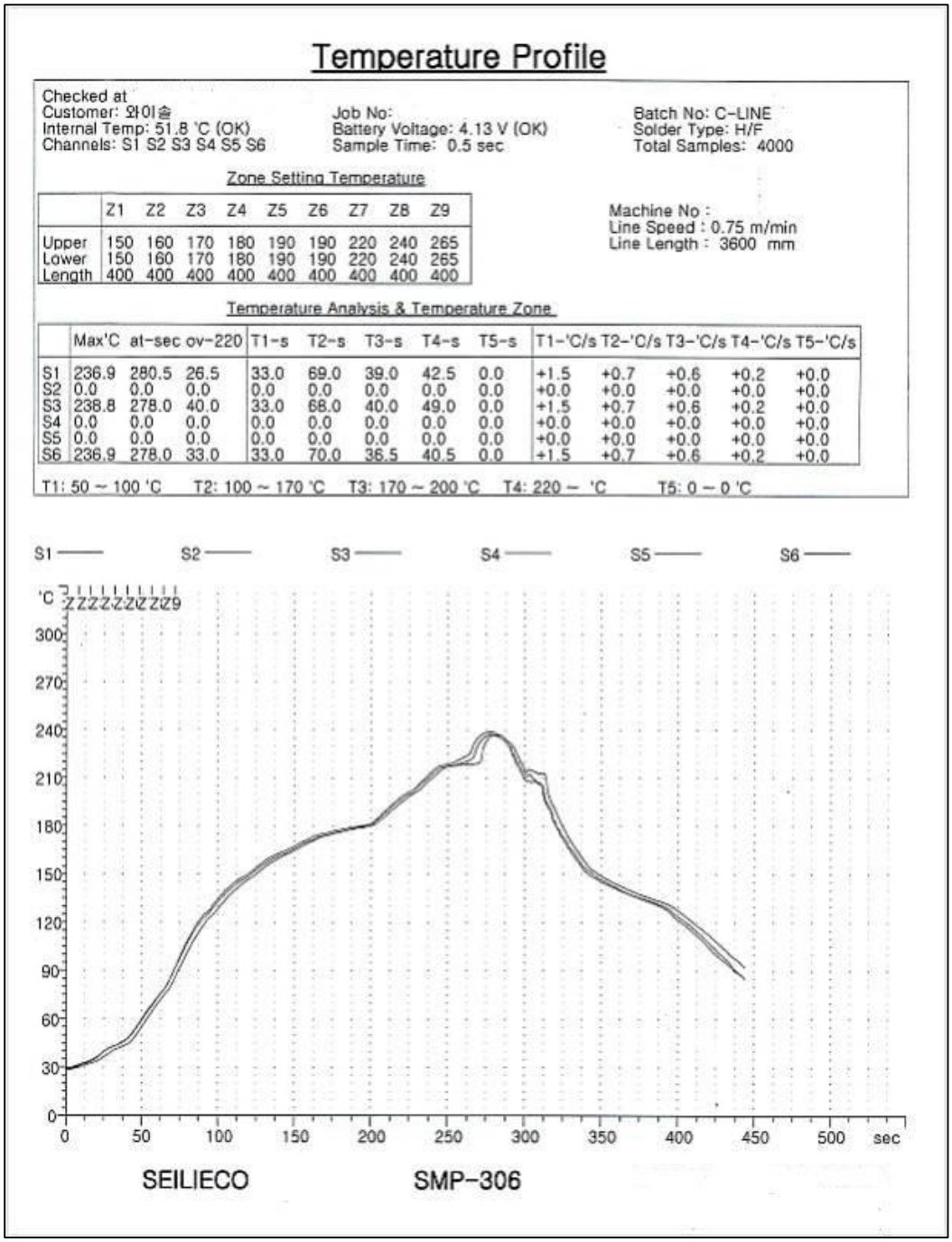
10-2. Soldering Footprint



[TOP View]

11. Reflow profile

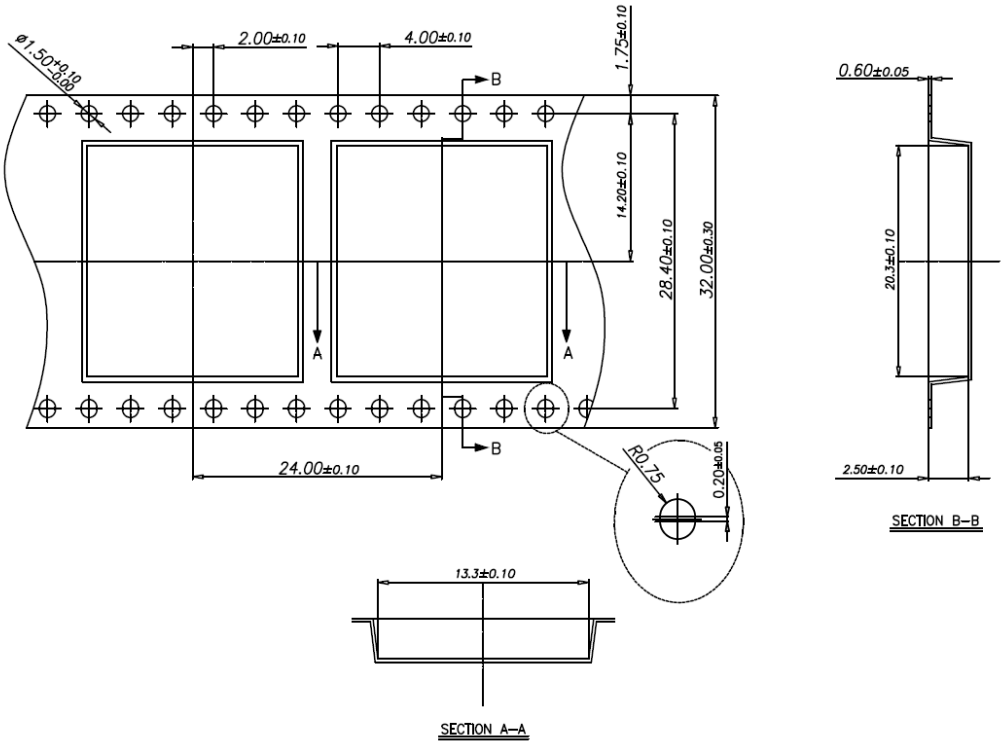
<Reflow profile of Module>



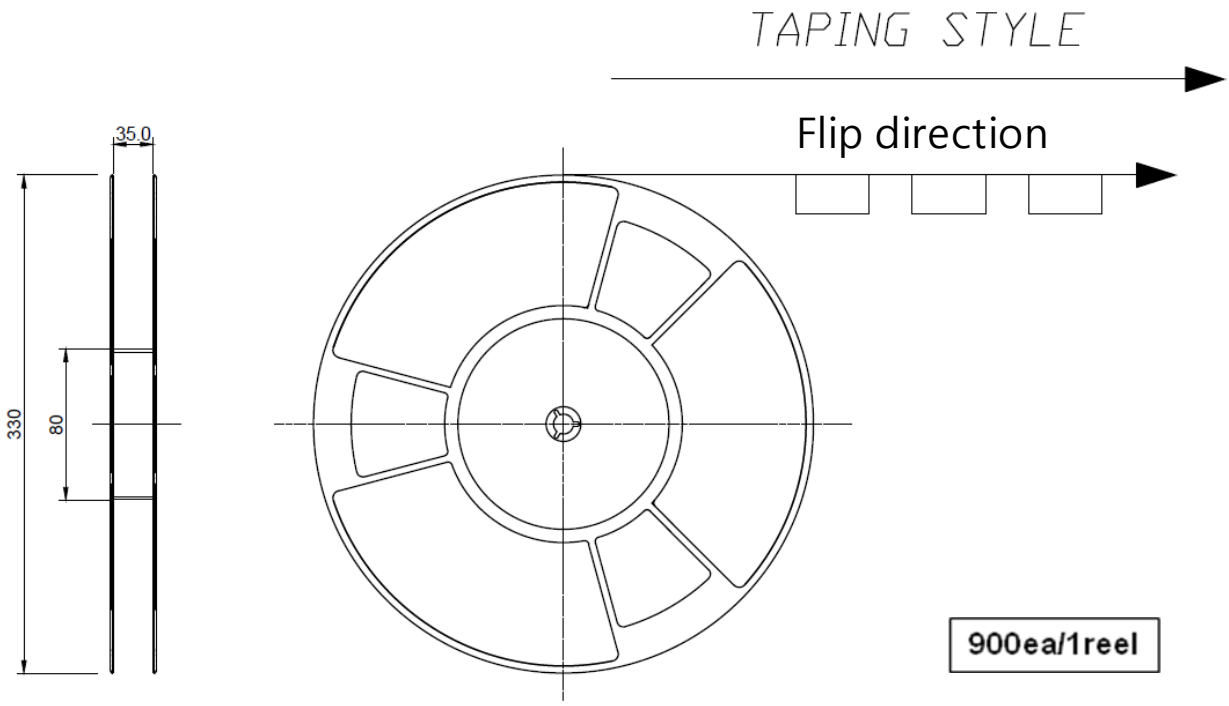
	Preheat	Soak	Ramp	PEAK
SPEC	50~100℃	100~170℃	220℃ ↑	240℃
	1~2℃/sec	60~100sec	30~50sec	±5℃
result of measurement	1.5	69	44	237.5
	OK	OK	OK	OK

12. Package

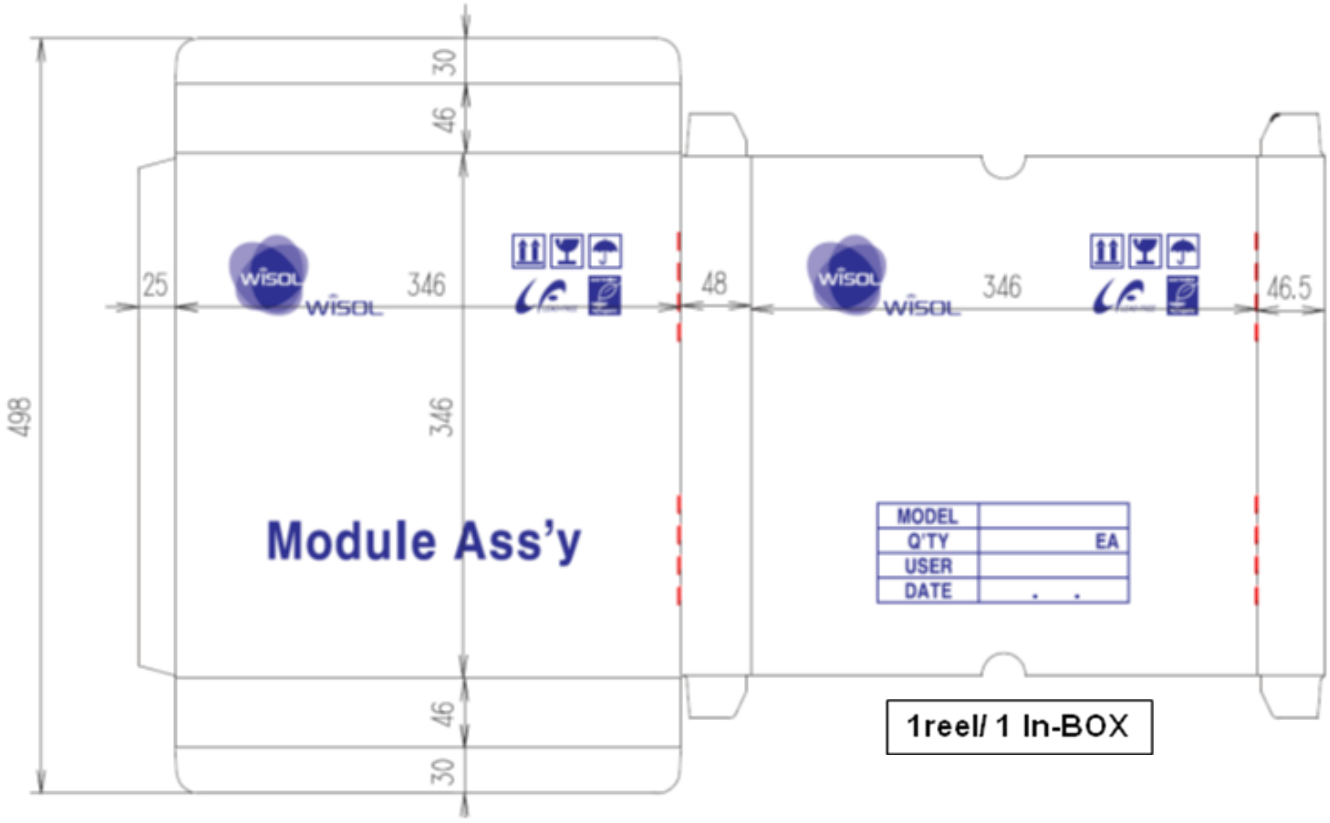
12-1. Dimension of Tape



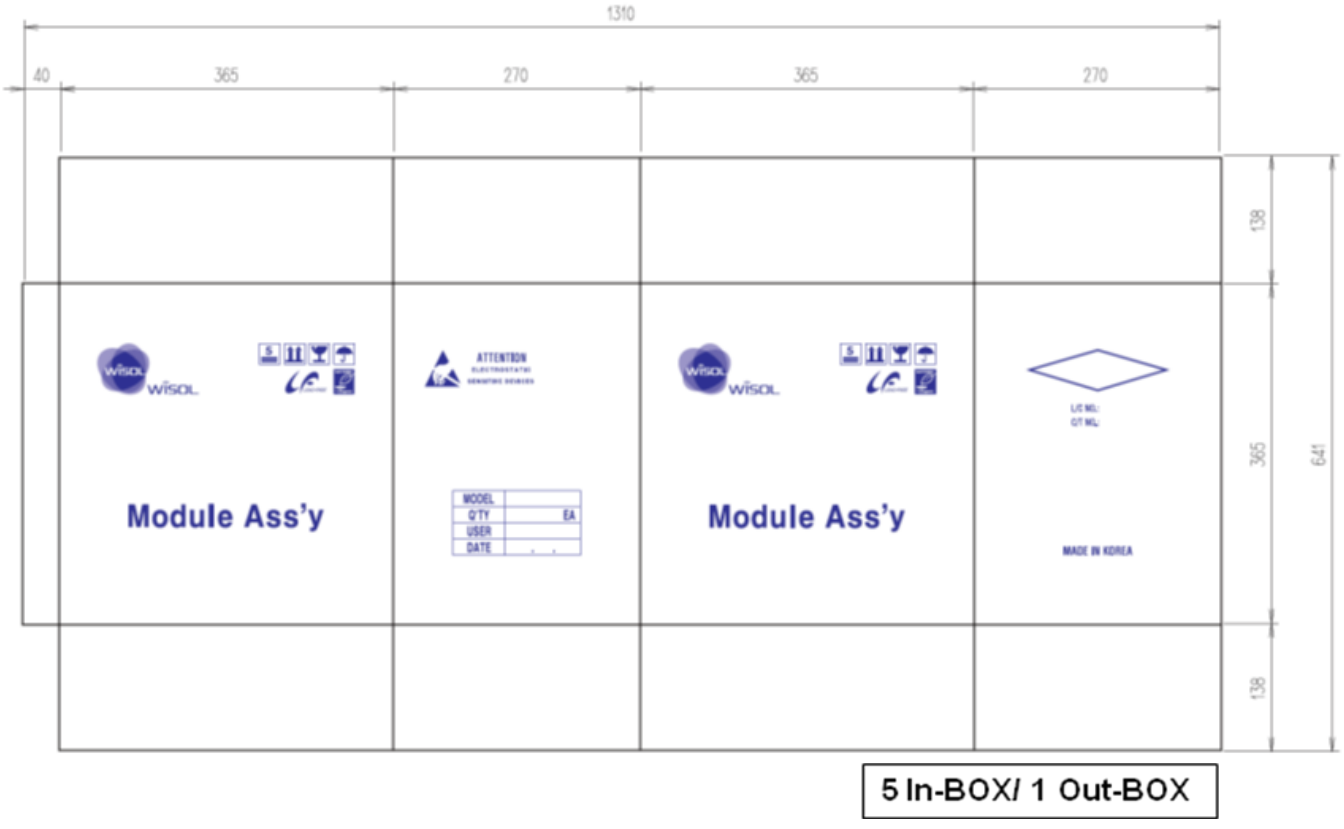
12-2. Dimension of Reel



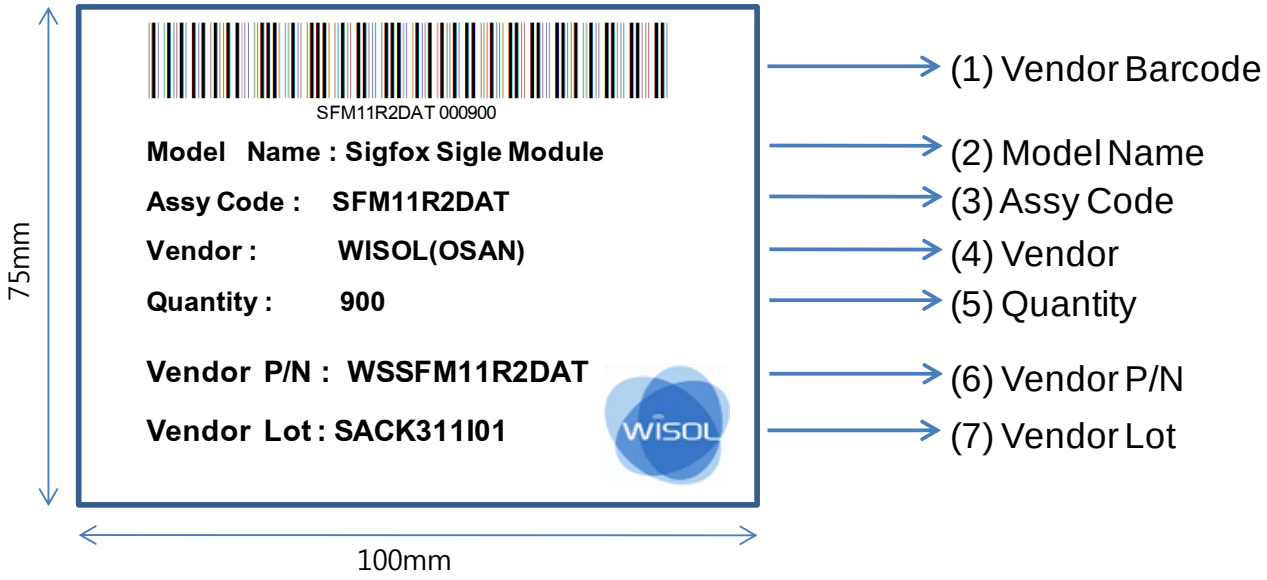
12-3. IN BOX



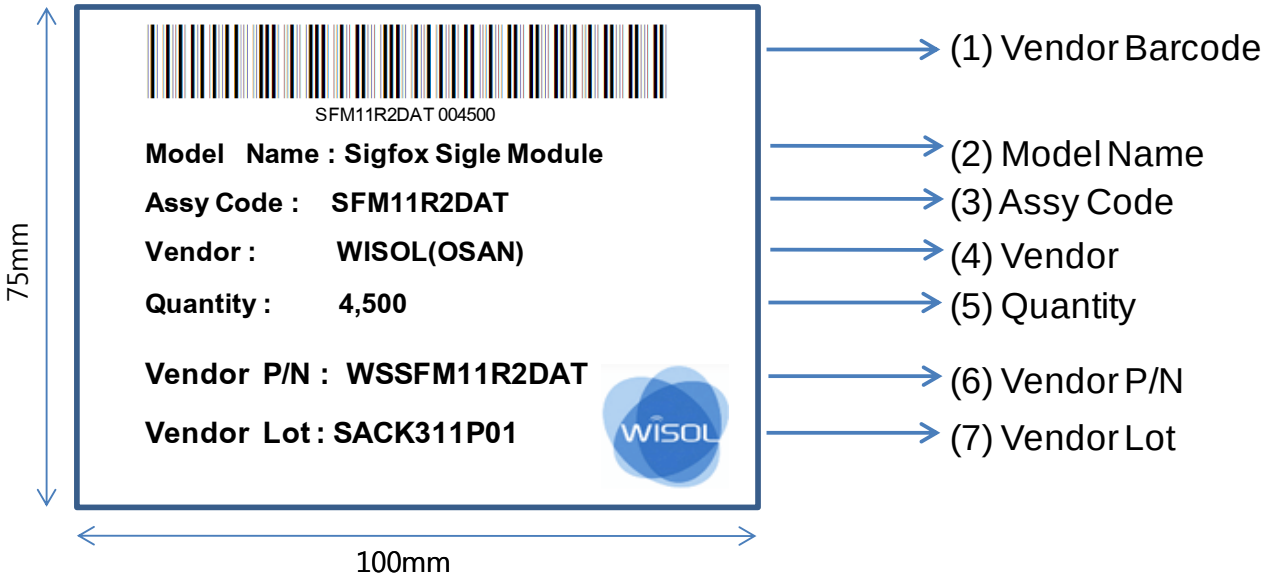
12-4. OUT BOX



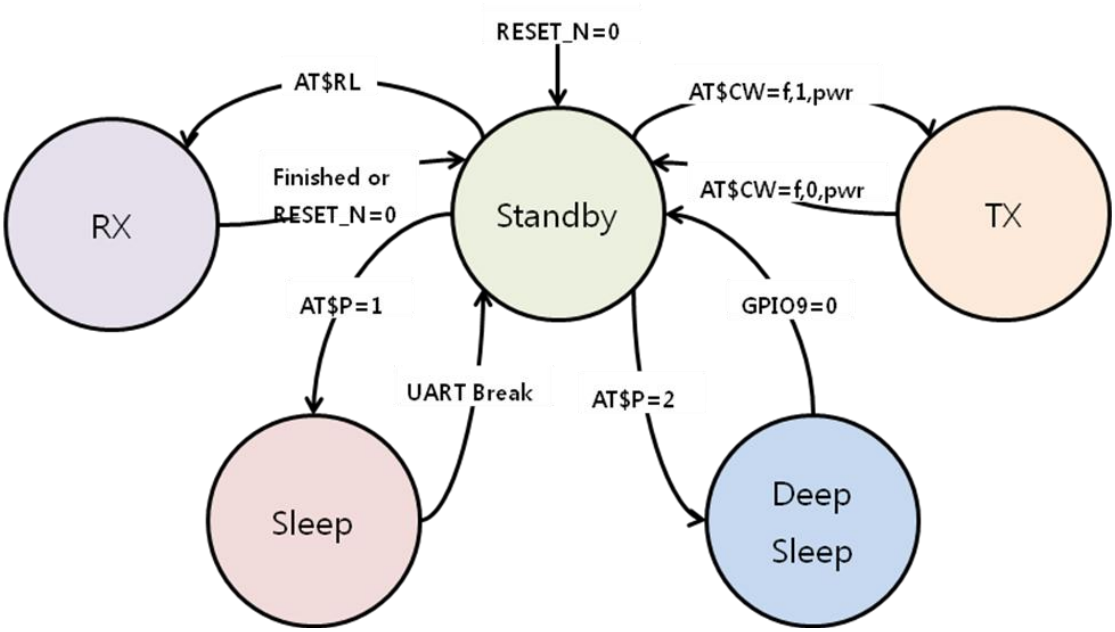
12-5. Reel Label & Inner BOX Label



12-6. Out BOX Label



13. Power Modes



13-1. RC2 Power Mode

TX current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. TX current test method
   1) Input AT command ‘AT’(UART condition checking)
   2) Click the Quick command (MOD US ON : default power table ‘24’) or
      Input AT command ‘AT$CW=902200000,1,24’ and then click ‘Send’ icon.
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check TX current

RX current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. RX current test method
   1) Input AT command ‘AT’(UART condition checking)
   2) Input AT command ‘AT$RL’ and then click ‘Send’ icon.
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check RX current.

Sleep current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. Sleep current test method
   1) Input AT command ‘AT’(UART condition checking)
   2) Input AT command ‘AT$P=1’(sleep mode command)
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check Sleep current

Deep sleep current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. Deep sleep current test method
   1) Input AT command ‘AT’(UART condition checking)
   2) Input AT command ‘AT$P=2’(Deep sleep mode command)
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check Deep sleep current
   5) If the module wakes up, Push the tact switch(SW2: wakeup PIN)

13-2. RC4 Power Mode

TX current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. TX current test method
   1) Input AT command ‘AT’(UART condition checking)
   2) Click the Quick command (MOD RCZ4 ON : default power table ‘24’) or
      Input AT command ‘AT$IF=920800000’ click ‘Send’ icon and then input AT command ‘AT$CB=-1,1’ click ‘Send’ icon.
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check TX current

RX current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. RX current test method
   1) Input AT command ‘AT’(UART condition checking)
   2) Input AT command ‘AT$RL’ and then click ‘Send’ icon.
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check RX current.

Sleep current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. Sleep current test method
   1) Input AT command ‘AT’(UART condition checking)
   2) Input AT command ‘AT$P=1’(sleep mode command)
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check Sleep current

Deep sleep current test

1. Disconnect Debug Switch(SW5~SW9) on EVB
2. Connect UART Switch(SW10~SW11) on EVB
3. Power switch ON(SW4) on EVB
4. Push the RESET Switch(SW1) on EVB
5. Initial mode=Standby mode (@500uA/ Remove J2-CPULED jumper)
6. Deep sleep current test method
   1) Input AT command ‘AT’(UART condition checking)
   2) Input AT command ‘AT$P=2’(Deep sleep mode command)
   3) Disconnect UART Switch(SW10~SW11) on EVB
   4) And then, Check Deep sleep current
   5) If the module wakes up, Push the tact switch(SW2: wakeup PIN)

14. AT command for Region change

14-1. RC2 -> RC4

1. AT$DR=922300000
2. ATS400=<00000000><F0000000><0000001F>,63
3. AT$WR
4. AT$RC

14-2. RC4 -> RC2

1. AT$DR=905200000
2. ATS400=<000001FF><00000000><00000000>,1
3. AT$WR
4. AT$RC