RF Module

- Digital Module -

SAMSUNG ELECTRO-MECHANICS

RF Module - Digital Module

■ INTRODUCTION

SAMSUNG Electro-mechanics has two kinds of Digital RF Modules ; 2.4GHz, DECT

2.4GHz RF Module is an unit product of RF part in SST phone.
This RF unit transmits and receives with TDD(Time Division Duplexer), MCA(Multi Channel Access), SS(Spread Spectrum) system which has channel space 864KHz in 92 channels.

DECT RF Module is a unit product of RF part in DECT phone. This RF Unit transmits and receives with TDD(Time Division Duplexer) and MCA(Multi Channel Access) system in DECT(Digital Enhanced Cordless Telecommunications) which has channel space 1.728MHz in 10 channels.

■ FEATURE AND APPLICATION

● Feature

▶ 2.4GHz RF Module

- Built-in Shielding
- Complete Transmit and Receive Radio Functions
- Low Power Consumption
- -94dBm Typical Receiver Sensitivity
- Supports 10.368MHz Reference frequency
- Operational Range 3.0 to 4.0 Volts
- Strong Performance of Blocking and Interference
- SMD Type
- Small and Slim size (35 x 29 x 3.6mm, 4cc)
- Compliant with FCC part15
- Data rate 100~576Kbps
- 2.4GHz ISM band (2401.056MHz ~ 2479.68MHz)
- High TX Power performance (typ. 24dBm)

▶ DECT RF Module

- Compliance with ETSI TBR6 DECT specification
- Economical solution for a radio in DECT cordless telephones
- Integrated low phase noise VCO with no production tuning required
- Fully integrated receiver with high sensitivity
- Low current consumption
- Supports 19.2, 19.68, 19.8MHz Reference frequency
- 3.0V minimum supply 3.0V, typical supply 3.2V
- Elimination of SAW channel filter
- SMD Type
- Small and Slim Package(36 ×26 ×3.6 mm , 4cc)
- Compatible with PHILIPS and WINBOND baseband
- Power down modes
- Extended DECT band coverage
- Reduction of control signal

● Application

▶ 2.4GHz RF Module

- DSSS Cordless Phone
- FHSS Cordless Phone
- WPBX
- Data Communication

▶ DECT RF Module

- This paper should apply to base set (RU1890B04HAA) and hand set (RU1890H04HAA) of DECT RF UNIT

■ SPECIFICATION

● 2.4GHz RF Module

No.	Items	Specification				Conditions
		Min.	Typ.	Max.	Unit	
TRANSMITTER PART						
1	TX Power	20	23.5	26	dBm	- Conduction status - Antenna removed
2	TX Frequency Accuracy	-70	0	70	kHz	- No.1 condition - TXDA RF Unit input signal : 90mVp-p, BT=0.5 Gaussian
3	Frequency Deviation	±120	±170	±220	kHz	- No.2 condition
RECEIVER PART						
4	BER	-	-91	-88	dBm	- No.1 Condition - BER 0.1%

● DECT RF Module

- General Specification

No.	Item	Specification
1	Frequency range	1881.792MHz to 1897.344MHz
2	Total number of channel	10 channels
3	Nominal antenna impedance	50ohms
4	Modulation system	GFSK
5	Operating voltage	Typical : +3.2V Extreme : +3.0V ~ +3.6V
6	Size	36 ×26 ×3.6 mm (4 cc)
7	PLL Reference(Clock)	External input Freq. : 13.824MHz Vpp : 3.2V(typ) ※Vpp : Peak to peak input signal level

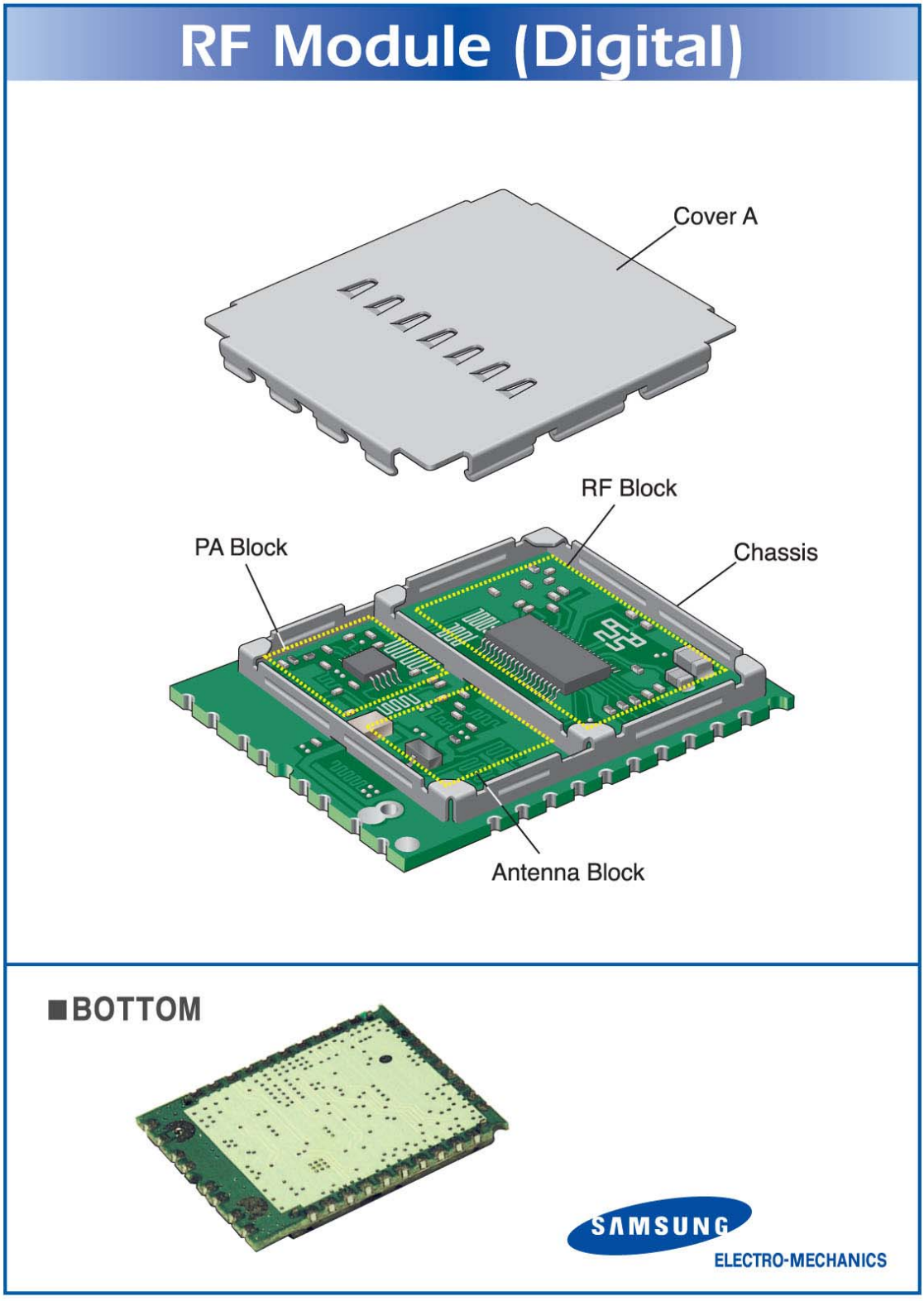
- Environment Specification

No.	Item	Specification
1	Operating temperature	0℃ to 40℃
2	Storage temperature	-10℃ to 70℃
3	Storage humidity	Less than 90%

● PIN DESCRIPTION

Pin No.	Pin Name	Input/Output	Descriptions
3	VCC_PA	I	Supply voltage for Power Amplifier circuits
6	SYEN	I	PLL Enable
7	SYDA	I	PLL Data
8	SYCL	I	PLL Clock
9	SYRI	I	System Reference Frequency Input
11	RXDSG	I	Receiver Sample & Hold (Data Slice) Gating and Driver Mode Select
17	VCC_OC	I	Supply voltage for other circuits
19	TXDA	I	TX Data Input Gaussian DATA (BT=0.5)
21	RXDA	O	Receiver Data Output (DIGITAL OUT)
22	RSSI	O	Radio Signal Strength Indicator(ANALOG OUT)
26	PAON	I	Power Amplifier On (DIGITAL) V_{IH} = Power Amplifier ON
27	PSEL*	I	Power selector V_{IH} = PSEL Low power mode ON
36	RF1	I/O	RF In/Out Port
Other pins	GND	-	Ground

■ STRUCTURE


RF Module (Digital)
Cover A
RF Block
PA Block
Chassis
Antenna Block
■BOTTOM
SAMSUNG
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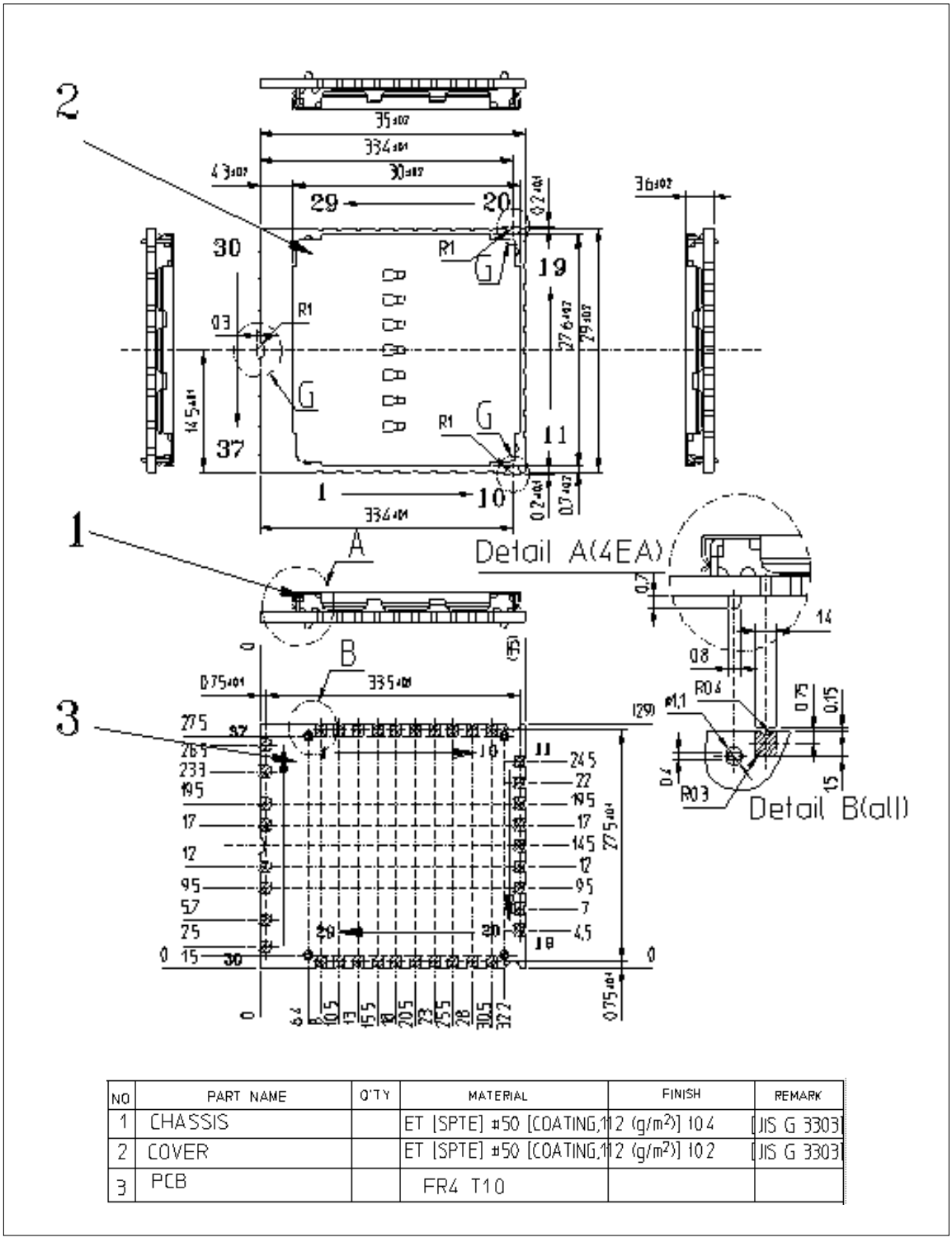
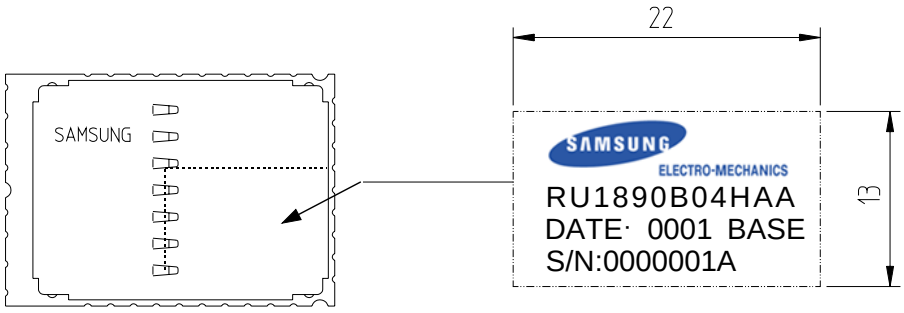
■ APPEARANCE AND DIMENSION



NO	PART NAME	Q'TY	MATERIAL	FINISH	REMARK
1	CHASSIS		ET [SPTE] t50 [COATING,1	2 (g/m²)] 10.4	[JIS G 3303]
2	COVER		ET [SPTE] t50 [COATING,1	2 (g/m²)] 10.2	[JIS G 3303]
3	PCB		FR4 T1.0		

● MARKING



SAMSUNG ELECTRO-MECHANICS

❶

R U 1 8 9 0 B 0 4 H A A

❷

DATE : 00 01 BASE

❸ ❹

S/N : 0000001 A

❺ ❻

❶ SAMSUNG LOGO
❷ Part Number
❸ Year & Week of Manufacture
❹ Base Set
❺ Serial Number
❻ Manufacturing Line

■ PART NUMBERING

RU	1890	B	04	H	A	A
❶	❷	❸	❹	❺	❻	❼

❶ Product Abbreviation
❷ Frequency Band
❸ Product Type
❹ Volume
❺ Code of User Country
❻ Code of Manufactured Country
❼ Serial Type

❶ Product Abbreviation

❷ Frequency Band

This frequency band 4 digit figures represent the value of using TX carrier frequency that is expressed in MHz.
For example, 1890 means that TX carrier frequency band is 1890MHz.

Symbol	Frequency Band
2441	2441MHz
1890	1890MHz

❸ Product Type

Symbol	Product Type
B	BASE SET
H	HAND SET

❹ Volume

This 2 digit figures represent the Volume of RF Module that is expressed in CC.
For example, 12 means that RF Module Volume is 12CC.

❺ Code of User Country

Symbol	Country
K	Korea
C	Canada
T	Taiwan
H	Hongkong
I	Italy
G	Germany
U	U.S.A
J	Japan

❻ Code of Manufactured Country

Symbol	Country
A	Korea
B	Thailand
C	China
D	Etc

❼ Serial Class

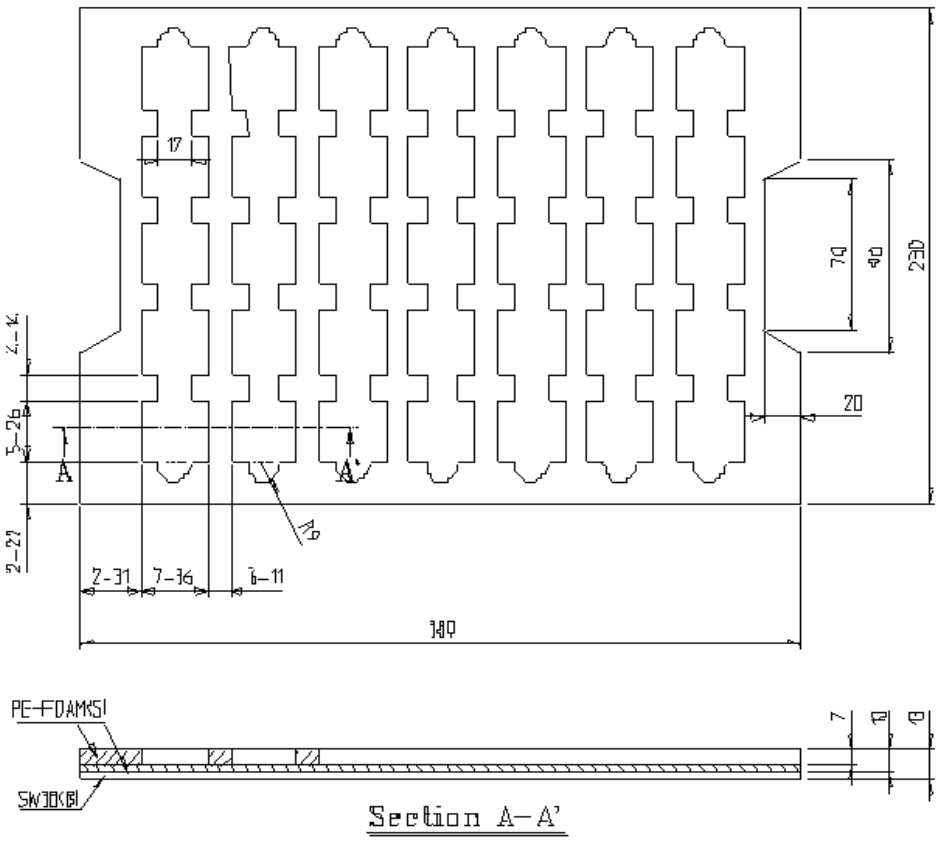
According to Engineering Change priority & Customer priority (A~Z, Except I , O)

■ PACKAGING

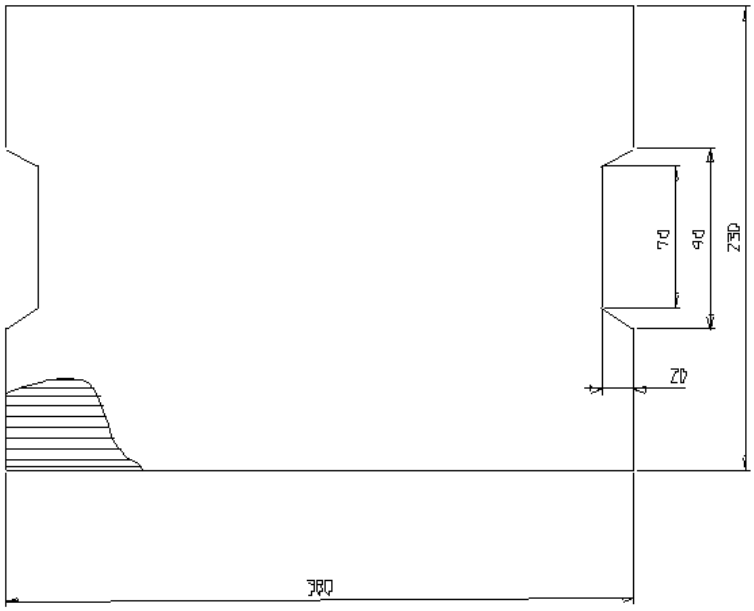
● TRAY and NIL-PAD PACKAGING

unit : mm

▶ **TRAY**

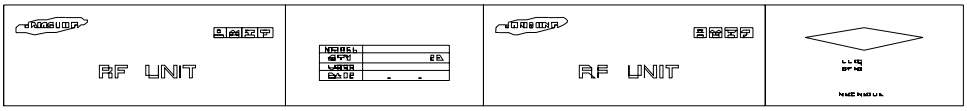


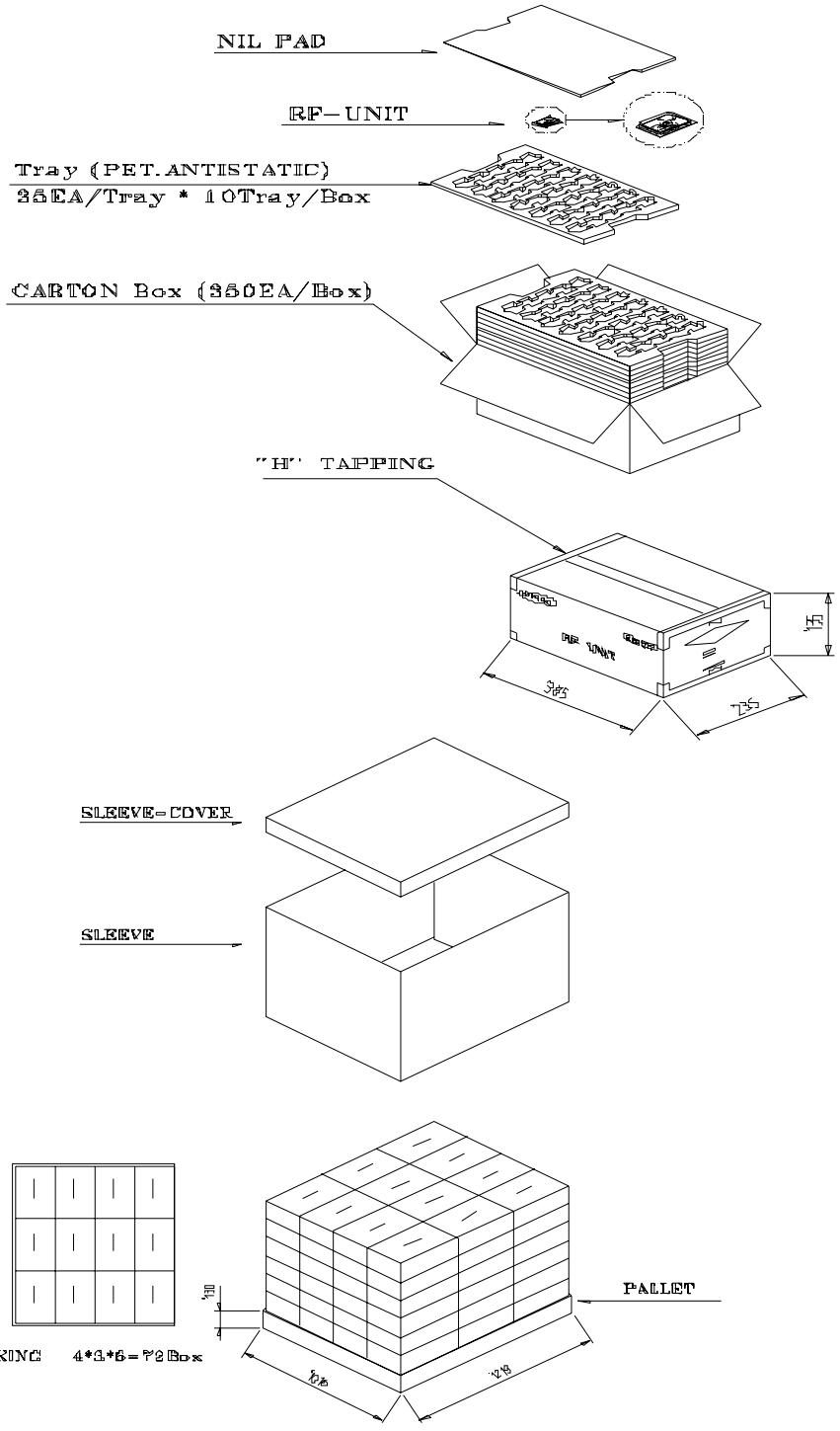
▶ **NIL PAD**



● BOX PACKAGING

unit : mm





■ RELIABILITY TEST DATA

● DECT RF Module

- Table1. Reliability Test Standards

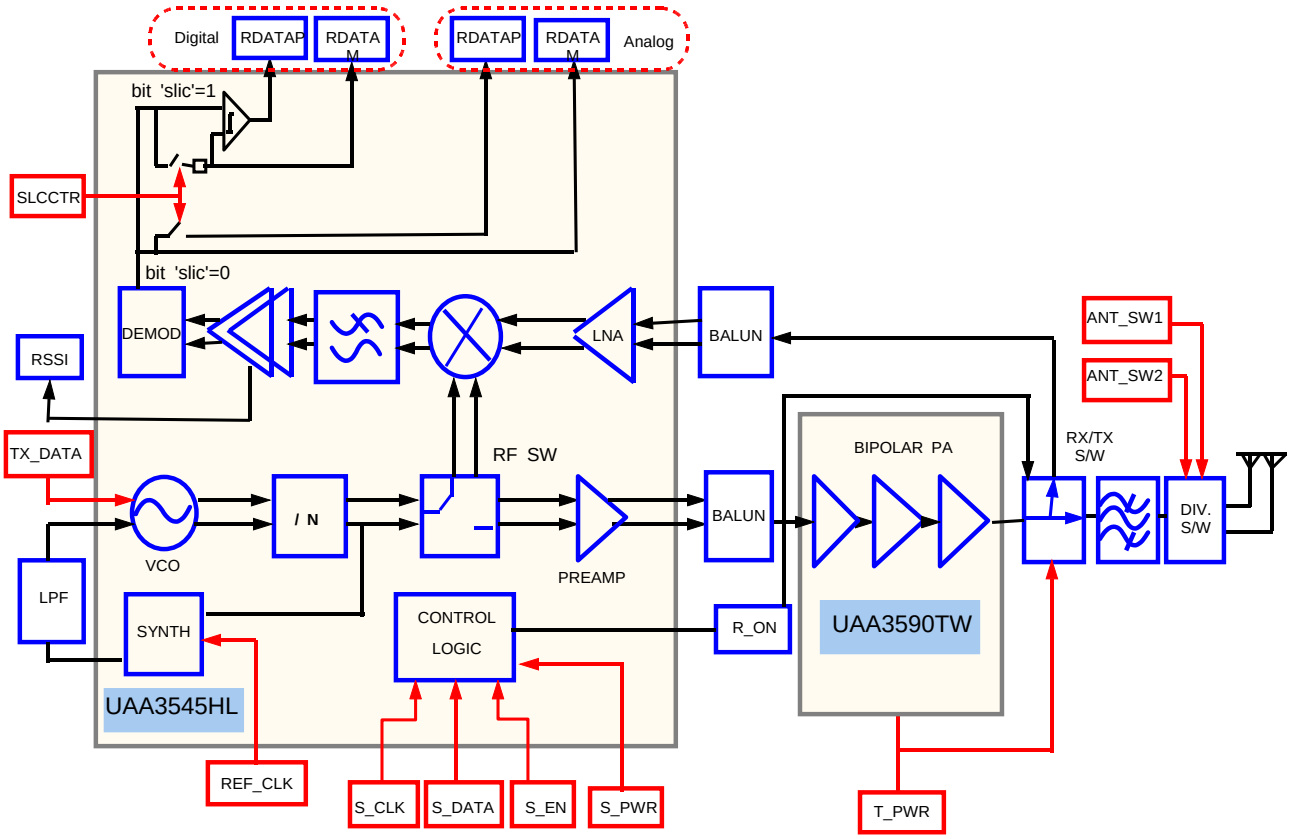
No.	Test Name	Test Conditions	Sample Q'ty
1	Temperature Stability	0℃ ← 25℃ → 40℃, 10℃ up each step	10ea
2	High Temperature Operating	40℃, 72hours	10ea
3	Low Temperature Operating	0℃, 72hours	10ea
4	Static Humidity	40℃, 90%, 72hours	10ea
5	High Temperature Storage	70℃, 72hours	5ea
6	Drop Test	Height : 100cm , 1 time at each 6sides without the part of connector	5ea
7	E.S.D Test	5 times at 5kV	5ea
8	Low Temperature Storage	-10℃, 72hours	5ea
9	Temperature Shock	-20℃(20min) ~ 80℃(20min) 10 cycle	5ea
10	Vibration	10~55~10Hz X, Y, Z each30min, Vibration amplitude:1.5mm	5ea

- Table2. The Regulation in Each Test Item

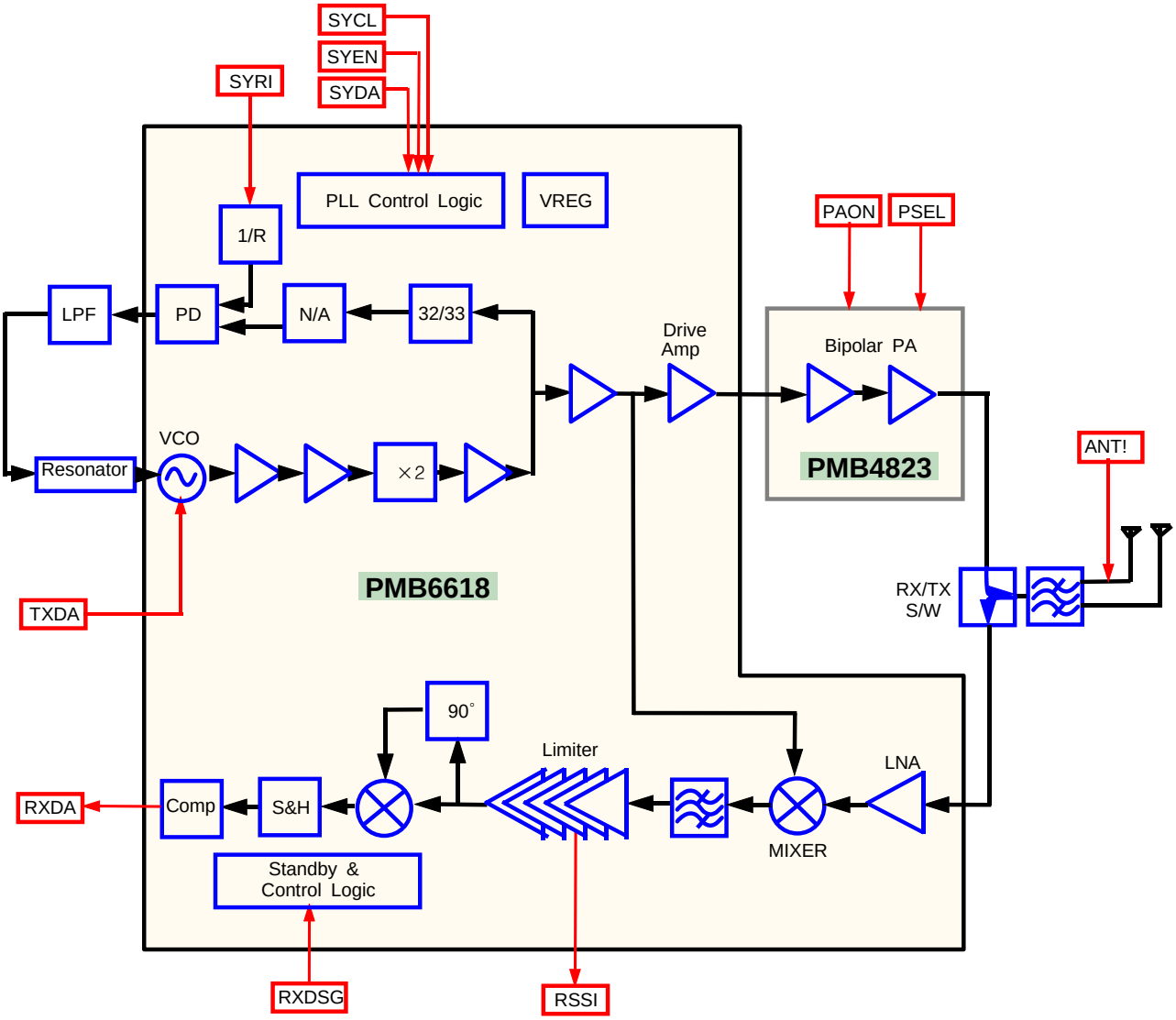
No.	Test Items		Limit Specification
1	Tx Carrier Power		Po±2dBm
2	Frequency Accuracy		Fc±50KHz
3	Frequency Drift		≤±15KHz
4	Frequency Deviation	FACC	±259~403KHz
		FDEV1_FS	±202~403KHz
		FDEV2_FS	±202~403KHz
5	Receiver Sensitivity		≤-86dBm

■ BLOCK DIAGRAM

● 2.4GHz RF Module



● DECT RF Module



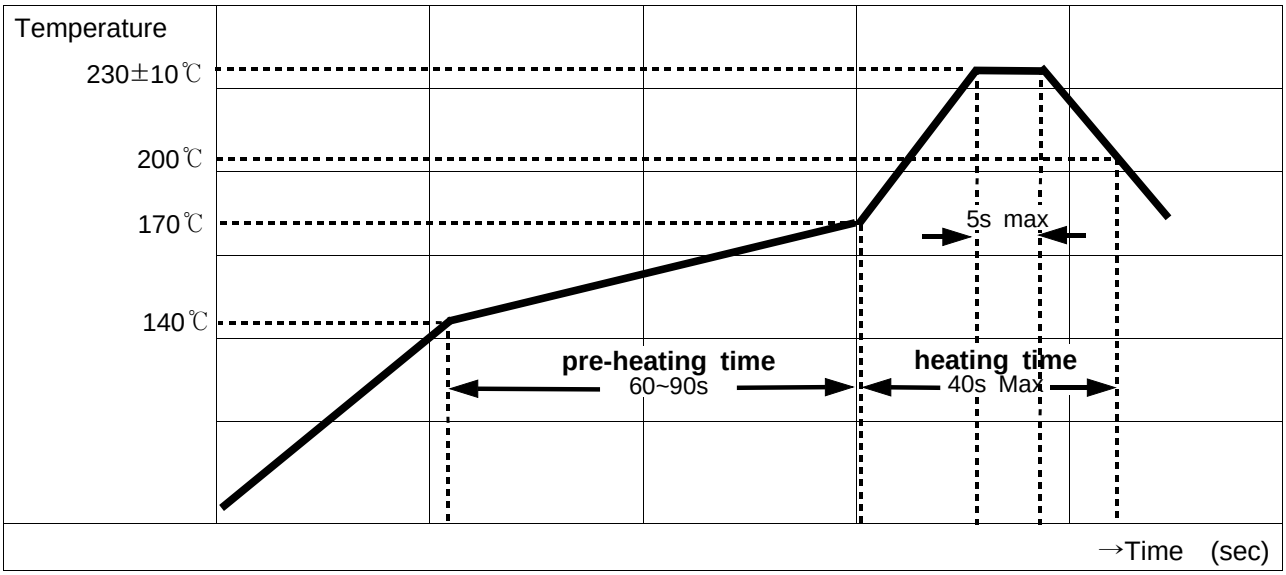
■ APPLICATION MANUAL

● 2.4GHz RF Module

- Soldering

▶ Soldering Profile

Reflow soldering of this module is available on the following temperature.



※: Inside Temperature of Module : 210℃ Max

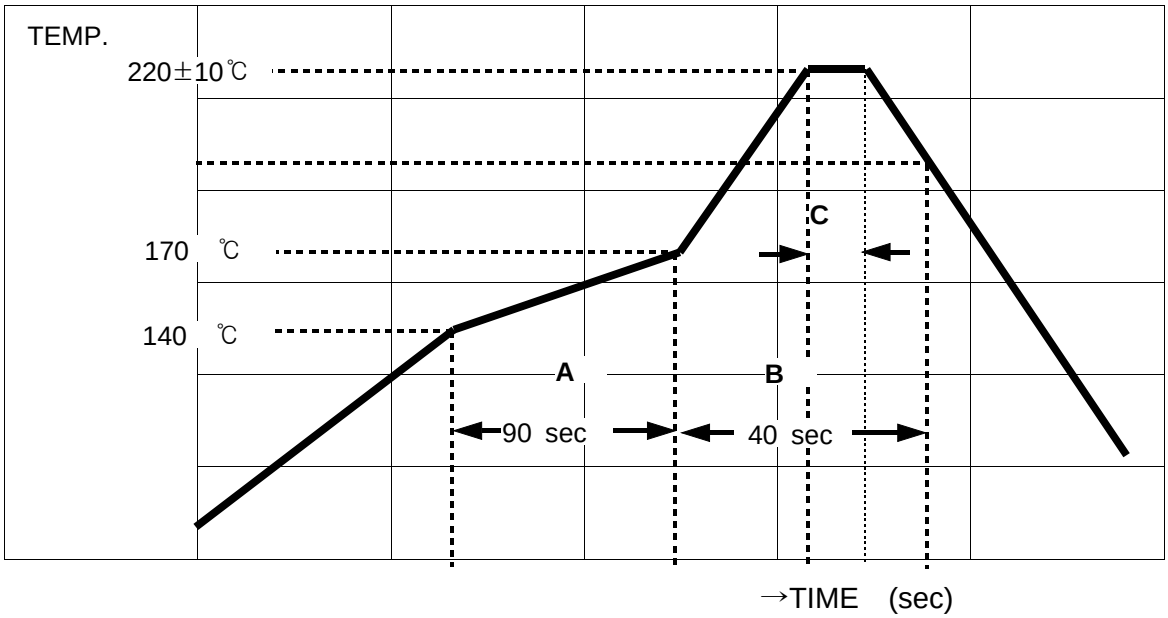
※ One Reflow Cycle is permissible

● DECT RF Module

- Soldering

▶ Soldering Profile

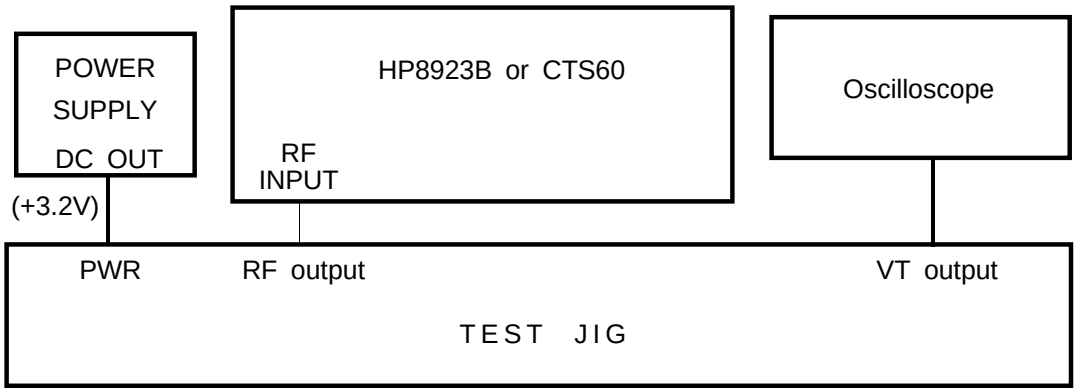
Reflow soldering of this module is available on the following temperature.



A : Preheat Temperature : 140 ~ 170 ℃
Heating Time : 60 ~ 90 seconds
B : Soldering Temperature : 170 ~ 230 ℃
Heating Time : 40 seconds Maximum
Maximum Temp.Heating Time : ≤ 5 seconds
C : Inside Temp.of Module : 210 ℃ Maximum
※ One Reflow Cycle is permissible !

● Measurement

▶ Measurement Settings



▶ Measurement Equipments

1) RF COMMUNICATIONS TEST SET (HP8923B or CTS60)
2) OSCILLOSCOPE
3) DIGITAL POWER SUPPLY (3.2V±0.05V)
4) TEST JIG

■ NOTICE

● DECT RF Module

- Use of a Line Filter

It is recommended that to use a line filter between RF module and a power supply, when applying DC voltage to drive it. If there is noise in DC voltage, it may change the intrinsic characteristics of BlueQ RF. Therefore exact measurement is impossible.
(ex. BER)

- Grounding

This module requires well-grounded condition for the proper measurement.
(ex. BER, Accuracy, Tx Power).

- No case disassembly

Do not disassemble the case. Correct characteristics are not guaranteed for reassembly.

- Measurement Condition

Measurement should be performed under the condition soldered and the applied power is rectified by a line filter. Otherwise, all characteristics including BER may be different from the data shown in the specification.