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Product Name	Type	Rev.	Hutec	IR
RT410 SUB, WIFI	FPCB+Carrier Type		Franklin Technology	

# APPROVAL SHEET

Customer Name : Franklin Technology

Company Name : Hutec

Product Name : RT410 SUB, WIFI

Mfr. P/N :

Written by	Checked by	Approved by
박성미	/	AB.

**HUTEC Co.,ltd**

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## 1. Revision History of Product Specification

### 1.1 History List of Approval Sheet

History List of Approval Sheet							
NO.	Rev.		Rev. Date (Submission Date)	Revision Detail & Revised Contents	Amount	Request Dept.	Process Stage
	Franklin Technolog	Hutec					
1		IR	2020.10.21.	Approval publication	-	-	-

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## 2. Circuit Specification

### 2.1 Test Condition

#### 2.1.1 Test Environment (Condition/Method)

##### ① Voltage Standing Wave Ratio(VSWR)

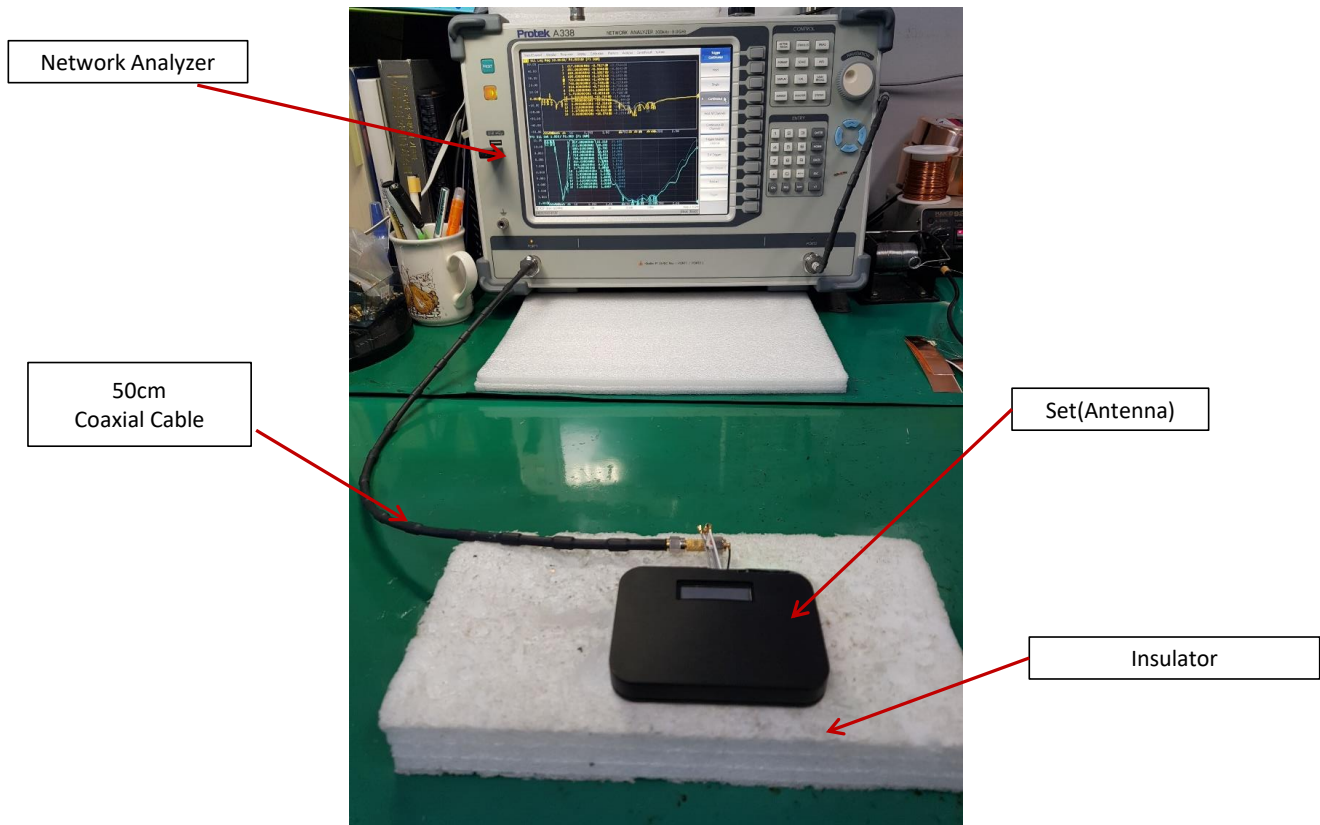
Step 1. Set the frequency range after connect 50cm cable to Network analyzer.

Step 2. Connect Calibration Kit to Network analyzer and calibrate.

Step 3. Fix the cable and keep separation distance over 30cm for reducing effect by Network analyzer.

Step 4. Fix insulator over 5cm on the bottom of measuring antenna.

Step 5. Measure VSWR with setting marker of desired frequency.



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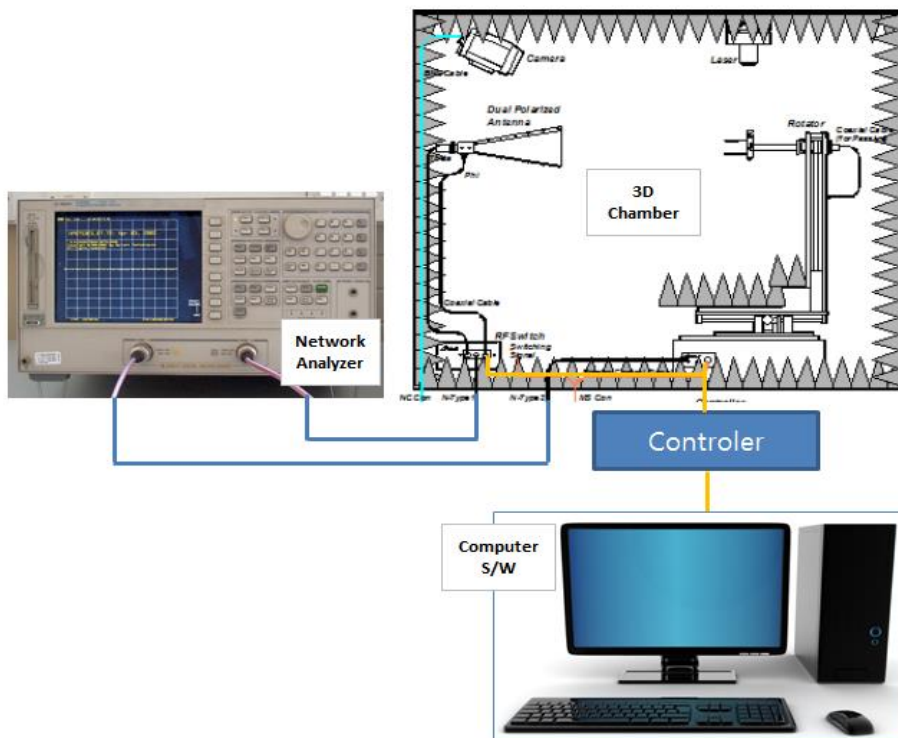
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② Radiation Pattern & Gain

Step 1. Calibrate the Chamber system using Horn antenna, and set up the software to control the Chamber system at the same time.

Step 2. Keep the measuring antenna to holder.

Step 3. Measure Gain & efficiency.



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## 2.2 Electrical Requirement

Frequency (Mhz)		SUB									
		617	652	729	746	859	894	1930	1995	2110	2200
VSWR	Test Data	7.0	10.1	3.5	3.9	2.6	1.9	3.1	4.5	2.3	1.8
	SPEC. (Less than)	8.0	11.1	4.5	4.9	3.6	2.9	4.1	5.5	3.3	2.8
3D Avg. Gain	Test Data (dBi)	-21.3	-23.3	-7.3	-8.9	-3.9	-7.3	-5.0	-5.4	-2.5	-2.1
	SPEC. (More than)	-22.3	-24.3	-8.3	-9.9	-4.9	-8.3	-6.0	-6.4	-3.5	-3.1
Directivity	Omni-directional										
Polarization	Linear										
Feed Impedance	50 Ohms										
Power Handing	2Watt										
Matching Value	<div style="display: flex; align-items: center; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; background-color: #cccccc;">SUB</div> </div>										

Frequency (Mhz)		WIFI			
		2400	2500	5100	5900
VSWR	Test Data	1.1	1.5	1.4	2.5
	SPEC. (Less than)	2.1	2.5	2.4	3.5
3D Avg. Gain	Test Data (dBi)	-0.6	-1.5	-2.7	-2.4
	SPEC. (More than)	-1.6	-2.5	-3.7	-3.4
Directivity	Omni-directional				
Polarization	Linear				
Feed Impedance	50 Ohms				
Power Handing	2Watt				
Matching Value	<div style="display: flex; align-items: center; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; background-color: #cccccc;">WIFI</div> </div>				

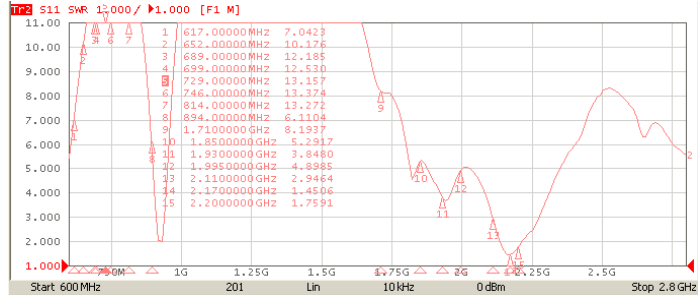
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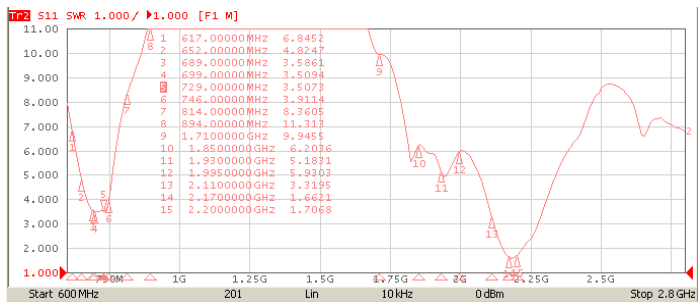
## 2.2.1 VSWR

SUB

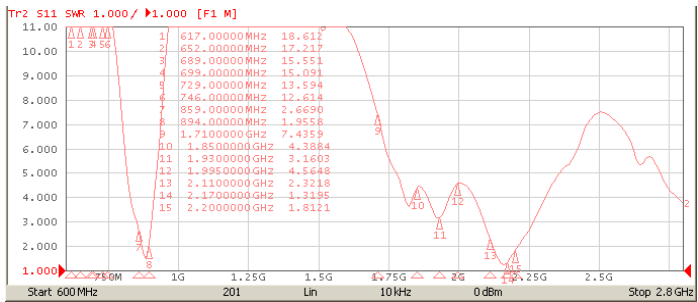
617~652Mhz



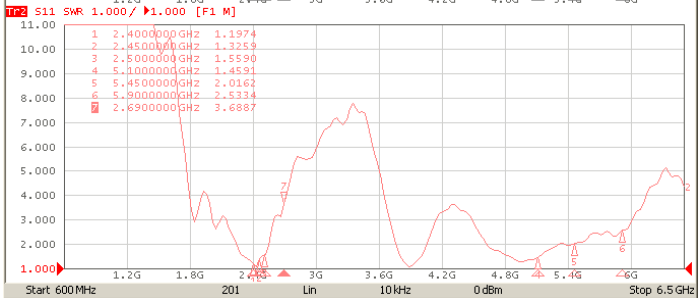
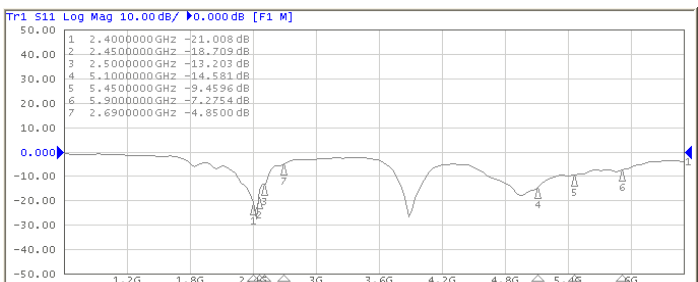
729~746Mhz



859~894Mhz  
1930~2200Mhz



WIFI

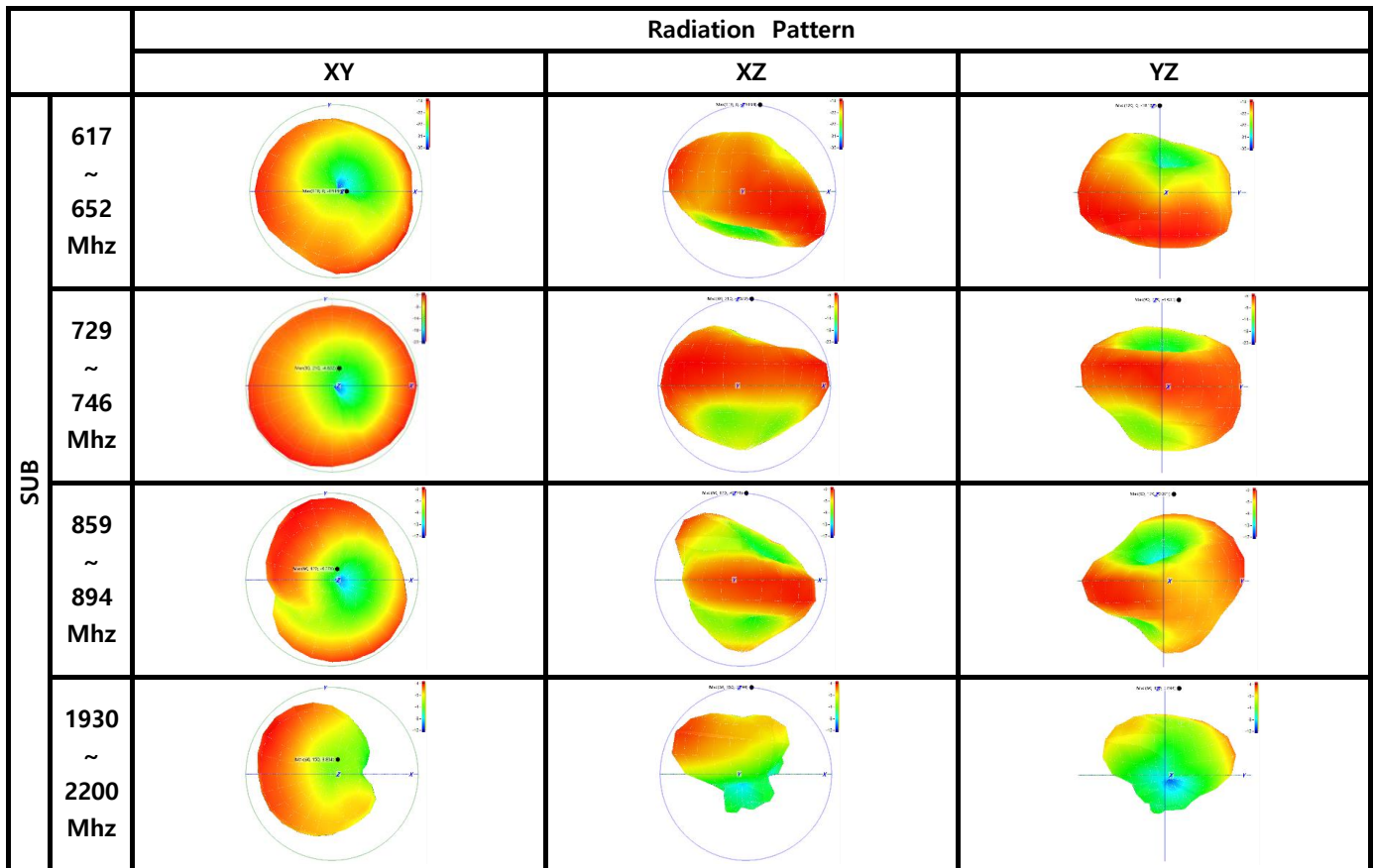


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## 2.2.2 3D Gain & Radiation Pattern

SUB

Frequency [MHz]	Avg. Gain [dBi]	Efficiency [%]	Peak Value			Null Value		
			$\theta$ [Deg]	$\Phi$ [Deg]	Value[dBi]	$\theta$ [Deg]	$\Phi$ [Deg]	Value[dBi]
617	-21.388	0.726	120	0	-18.158	30	60	-34.847
635	-22.926	0.51	90	180	-19.52	0	120	-31.599
652	-23.386	0.459	90	180	-19.322	60	30	-29.31
729	-7.322	18.526	90	210	-4.632	30	330	-23.022
738	-8.119	15.422	90	210	-5.352	30	330	-25.778
746	-8.912	12.848	90	0	-5.874	30	330	-26.011
859	-3.965	40.129	60	120	-0.371	30	0	-17.246
877	-4.431	36.05	90	90	-1.058	30	0	-13.935
894	-7.387	18.251	90	330	-3.581	0	90	-17.128
1930	-5.083	31.026	60	270	1.532	120	0	-21.388
1963	-4.157	38.399	60	300	1.404	120	0	-18.645
1995	-5.402	28.824	30	300	-0.364	120	0	-18.024
2110	-2.539	55.735	60	150	2.73	90	330	-14.939
2170	-1.764	66.617	60	150	3.894	120	30	-11.782
2200	-2.11	61.52	60	150	3.259	120	30	-13.975



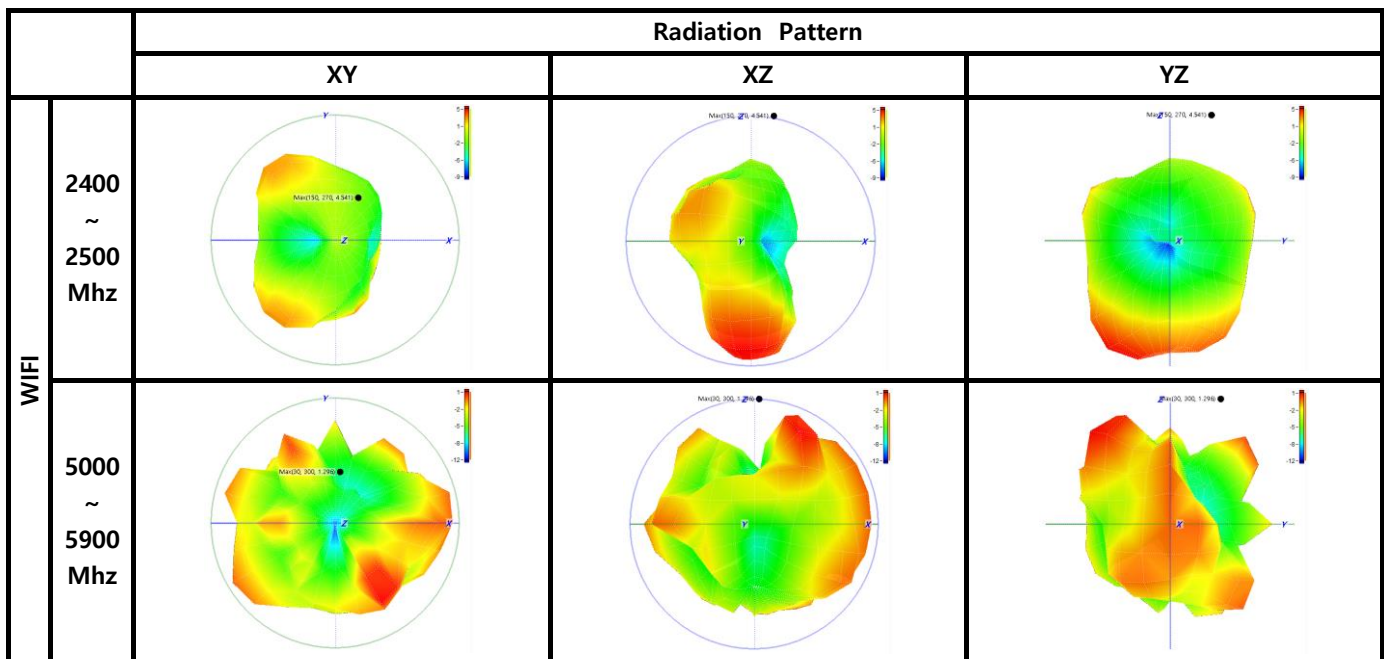


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WIFI

Frequency [MHz]	Avg. Gain [dBi]	Efficiency [%]	Peak Value			Null Value		
			$\theta$ [Deg]	$\Phi$ [Deg]	Value[dBi]	$\theta$ [Deg]	$\Phi$ [Deg]	Value[dBi]
2400	-0.615	86.789	150	270	4.541	120	0	-9.414
2450	-1.336	73.525	150	270	2.563	90	330	-9.57
2500	-1.527	70.363	60	120	3.517	120	150	-7.268
5000	-2.387	57.721	120	330	2.227	90	150	-12.222
5100	-2.708	53.609	120	330	2.582	60	60	-14.927
5300	-2.763	52.936	60	270	1.567	90	180	-16.845
5450	-2.292	58.99	150	210	1.057	30	150	-12.84
5600	-2.864	51.709	60	240	2.562	90	180	-11.969
5800	-2.187	60.439	30	300	1.296	0	30	-11.515
5900	-2.463	56.717	120	30	2.663	90	60	-18.076



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3. Mechanical Specification  
3.1 Material Certificate

**TBD**

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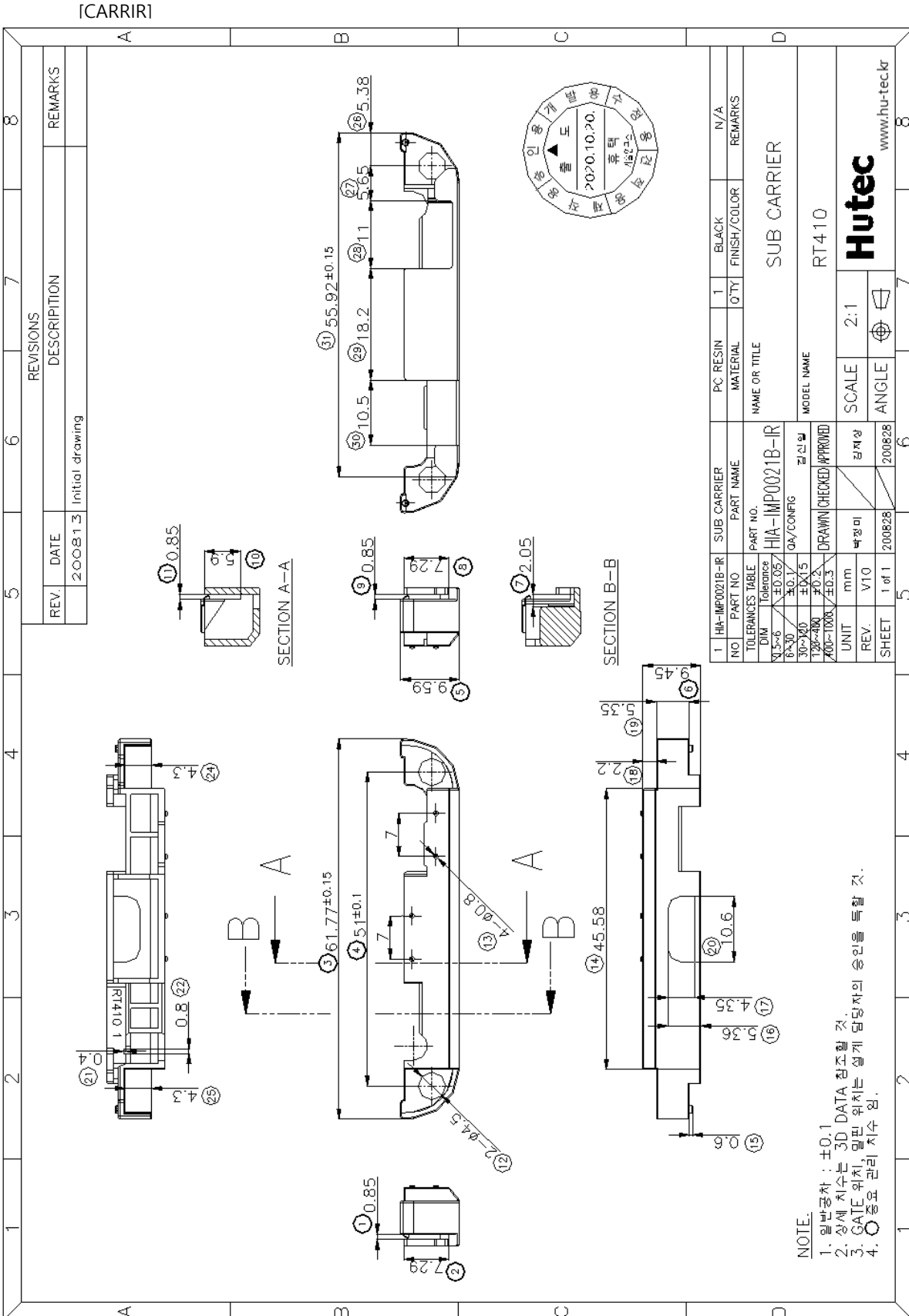
### 3.2 Mechanical Requirement

**TBD**

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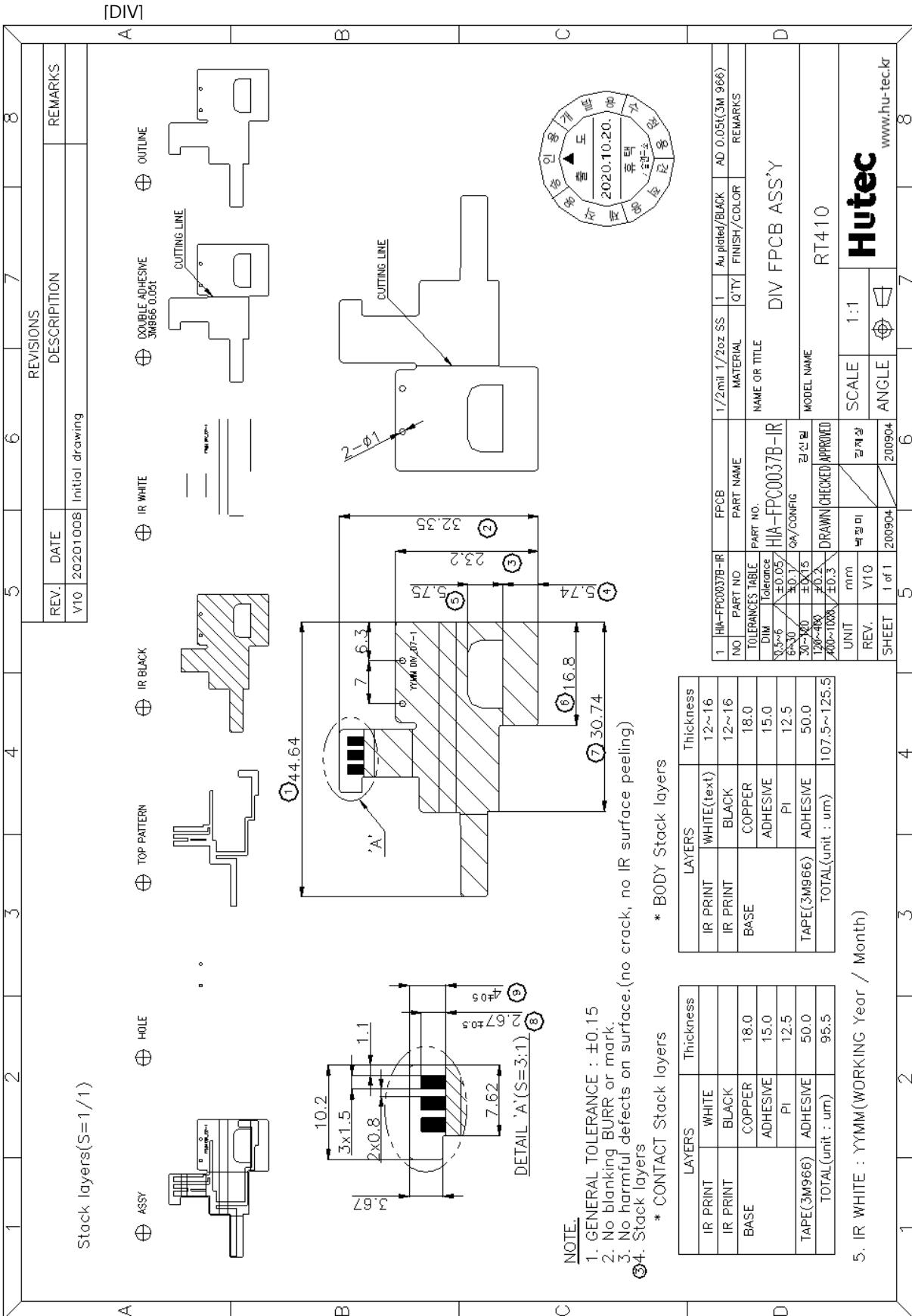
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### 3.2.2 Ass'y Drawing



본사의 동의없이 도면을 불법으로 복사/복제할수 없음. HUTECH FORM A3 (420mm X 297mm)

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[WIFI]

1	2	3	4	5	6	7	8
A							
B							
C							
D							

Stack layers(S=1/1)

REV.	DATE	DESCRIPTION	REMARKS
V10	20200928	Initial drawing	

⊕ ASSY

⊕ HOLE

⊕ TOP PATTERN

⊕ IR BLACK

⊕ IR WHITE

⊕ DOUBLE ADHESIVE 3M966 0.05L

⊕ OUTLINE

① 24.77

② 2.79

③ 9.25

④ 4.35

DETAIL 'A'(S=3:1)

**NOTE.**

- GENERAL TOLERANCE : ±0.15
- No blanking BURR or mark.
- No harmful defects on surface.(no crack, no IR surface peeling)
- Stack layers
  - \* CONTACT Stack layers
  - \* BODY Stack layers

LAYERS	Thickness
IR PRINT WHITE	12~16
IR PRINT BLACK	12~16
BASE COPPER	18.0
ADHESIVE	15.0
PI	12.5
TAPE(3M966)	ADHESIVE 50.0
TOTAL(unit : um)	107.5~125.5

LAYERS	Thickness
IR PRINT WHITE	12~16
IR PRINT BLACK	12~16
BASE COPPER	18.0
ADHESIVE	15.0
PI	12.5
TAPE(3M966)	ADHESIVE 50.0
TOTAL(unit : um)	95.5

5. IR WHITE : YMM(WORKING Year / Month)

NO	1	HIA-FPC0038B-IR	FPCB	PART NAME	1/2mil 1/2oz SS	1	Au plate/BLACK	AD 0.05(3M 966)
TOLERANCES TABLE	DIM Tolerance		QTY		FINISH/COLOR		REMARKS	
0.3~0.6	±0.05	HIA-FPC0038B-IR	NAME OR TITLE		WIFI FPCB ASS'Y			
0.6~3.0	±0.1	QTY/CONFIG	MODEL NAME		RT410			
3.0~30.0	±0.15	공보라	SCALE		1:1			
120~400	±0.2	DRAWN(CHECKED) APPROVED	ANGLE		30°			
400~1000	±0.3	김경미	REV.		V10		200904	
SHEET 1 of 1			REV.		V10		200904	

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