


**DATASHEET****Part No.****90-Degree Hybrid Coupler****CXH 03 T 1117 BG**

CUSTOMER : _____

DATA SHEET

Product Name : 90-Degree Hybrid Coupler**Part No : CXH 03 T 1117 BG****Customer Code :**

	MAKER	Location	TEL.	ADDRESS
	Office(Korea) Manufacture	Incheon	TEL) 82-32-821-0363 FAX) 82-32-811-0283	(21629) 5BL-1Lot, Namdongsearo 380, Namdong-Gu, Incheon, KOREA
	Homepage(URL)	http://www.amotech.co.kr		

1. Parts description

1.1. Overview

The CXH Series is a low cost, low profile sub-miniature high performance 3 dB coupler in an easy to use surface mount package. LTCC (Low Temperature Co-fired Ceramic), high conductivity metal conductor (Ag), and gold (Au) plating enable the CXH Series to minimize insertion loss and improve durability for thermal stabilization and electricity. The CXH Series is offered in a variety of frequency bands compatible with various types of high frequency wireless systems.

1.2. Features

- 1100 ~ 1700MHz
- Mean Coupling 3dB
- Low Insertion Loss
- Surface mount type
- LTCC base (Er=4.6)
- RoHS Compliance (Pb Free)

1.3. Applications

- Balanced Amplifiers and Signal Distribution in Wireless Communications
- LTE, WiMax and WiBro
- Base station and Repeater
- Antenna Module for GNSS



DATASHEET

Part No.

90-Degree Hybrid Coupler

CXH 03 T 1117 BG

2. Model and Lot Number description

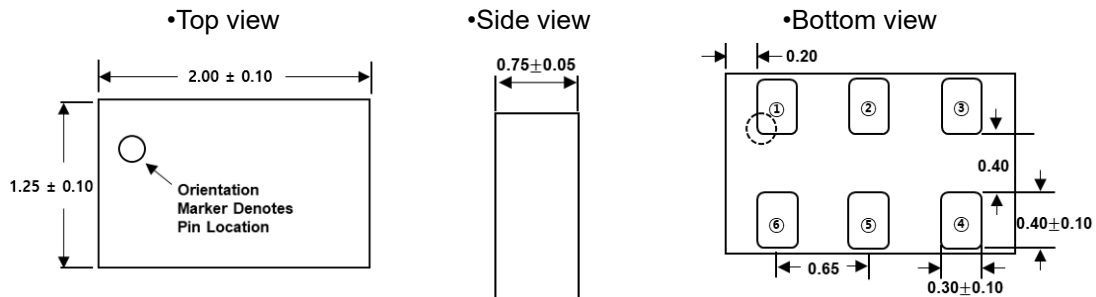
2.1. Model

<u>CXH</u>	<u>03</u>	<u>T</u>	<u>1117</u>	<u>BG</u>
(1)	(2)	(3)	(4)	(5)

- (1) Series name
- (2) Coupling (dB) : Mean Coupling 3dB
- (3) Chip Size : "T" – 0805inch (2.0 x 1.2 mm)
- (4) Frequency Bandwidth: 1100MHz ~ 1700MHz
- (5) Design Code

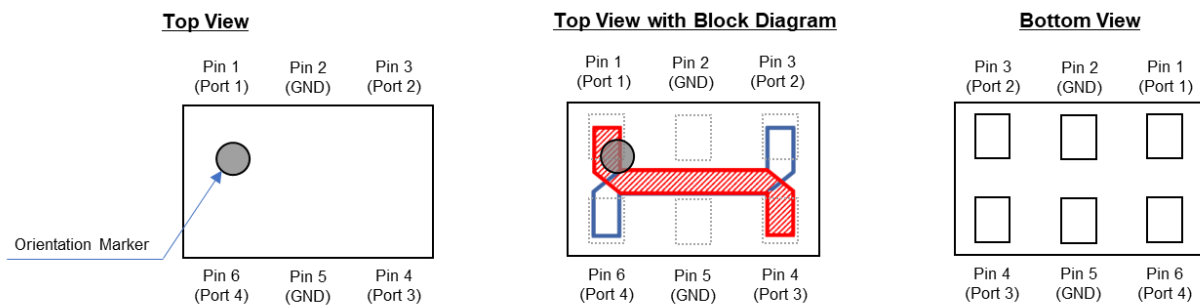
3. Style and Dimension

3.1. Appearance and dimension



- **Unit : mm**
- **Tolerances are Non-Cumulative**

3.2. Pin Description



- ※ It has an orientation marker to denote Pin1
- ※ It is designed with a symmetrical structure, so the input port can be configured the below table.

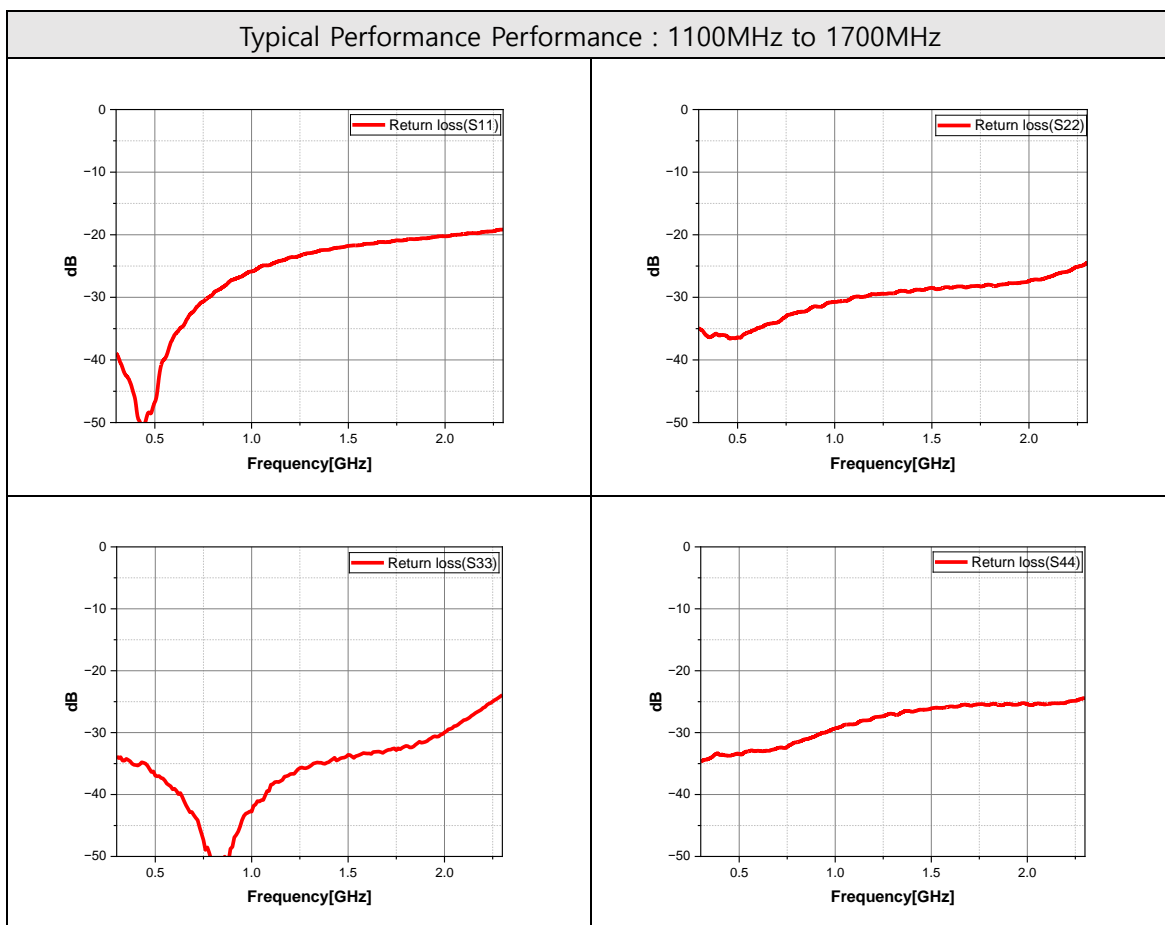
Port Configuration	Application							
	Splitter				Combiner			
	Case 1	Case 2	Case 3	Case 4	Case 1	Case 2	Case 3	Case 4
Pin 1(port 1)	Input	Isolated	-3dB, -90°	-3dB, 0°	Amplitude -90°	Amplitude 0°	Isolated	Output
Pin 2(GND)	GND	GND	GND	GND	GND	GND	GND	GND
Pin 3(port 2)	Isolated	Input	-3dB, 0°	-3dB, -90°	Amplitude 0°	Amplitude -90°	Output	Isolated
Pin 4(port 3)	-3dB, -90°	-3dB, 0°	Input	Isolated	Isolated	Output	Amplitude -90°	Amplitude 0°
Pin 5(GND)	GND	GND	GND	GND	GND	GND	GND	GND
Pin 6(port 4)	-3dB, 0°	-3dB, -90°	Isolated	Input	Output	Isolated	Amplitude 0°	Amplitude -90°

4. Specifications

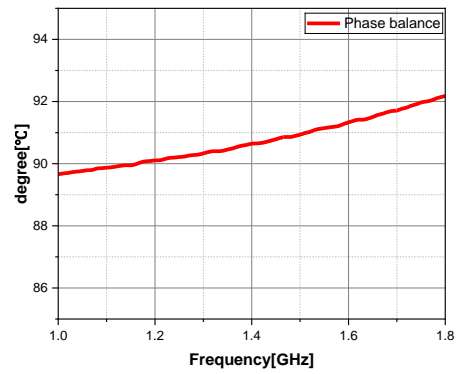
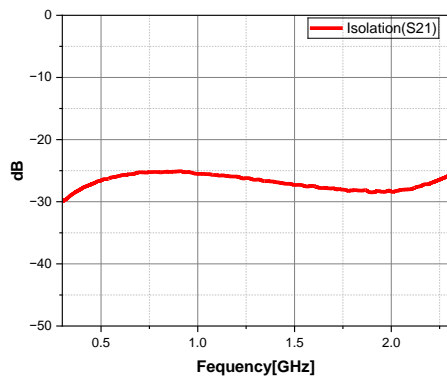
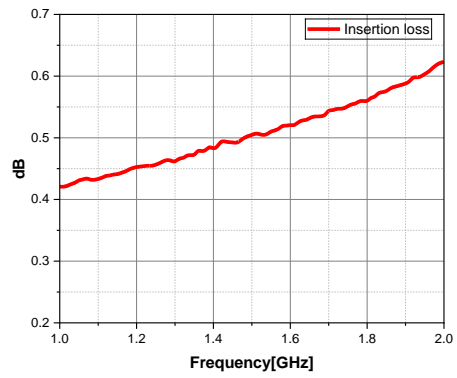
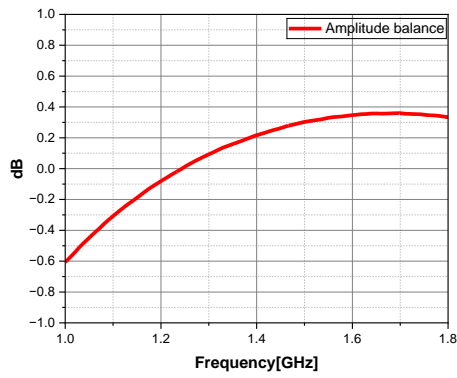
4.1. Frequency characteristics

Frequency (MHz)	Amplitude Balance Max.(dB)	Return Loss Min.(dB)	Insertion Loss Max.(dB)	Isolation Min.(dB)	Phase Balance (Degree)	Power Handling Avg.(W)	Operating Temperature(°C)
1100 ~ 1500 1500 ~ 1700	±0.60	18 20	0.55	20	90±5.0	5	-55 ~ 125

4.2. Frequency characteristics



Typical Performance Performance : 1100MHz to 1700MHz



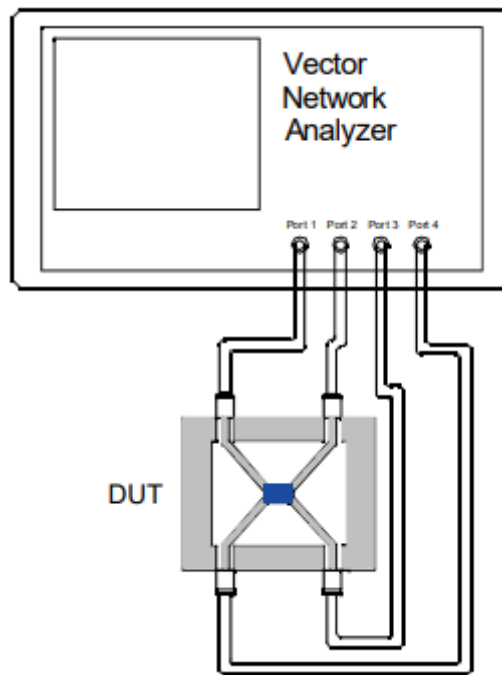
4.3. Definition of Measured Specifications

Parameter	Definition	Mathematical Representation
Coupling	At a given frequency coupling is the input power divided by the power at the coupled port. Coupling is the average values in the band.	$10\log (P_{cou} / P_{in})$
Return Loss	The impedance match of the coupler to a 50Ω System. Return Loss is an alternate mean to express VSWR.	$10\log (P_{in} / P_{back})$
Isolation	The input power divided by the power at the isolated port.	$10\log (P_{iso} / P_{in})$
Insertion Loss	The input power divided by the sum of the power at the two output port.	$10\log (P_{in} / (P_{cou} + P_{out}))$
Amplitude Balance	The power at each output divided by the average power of the two outputs.	$10\log \frac{P_{cou}}{\left(\frac{P_{cou}+P_{out}}{2}\right)}$
Phase Balance	The difference in phase angle between the two output ports.	Phase at coupled port – Phase at transmission port

* P_{in} : power of input port , P_{direct} : power of direct port , P_{cou} : power of coupled port ,
 P_{iso} : power of isolated port , P_{back} : Return power of input port

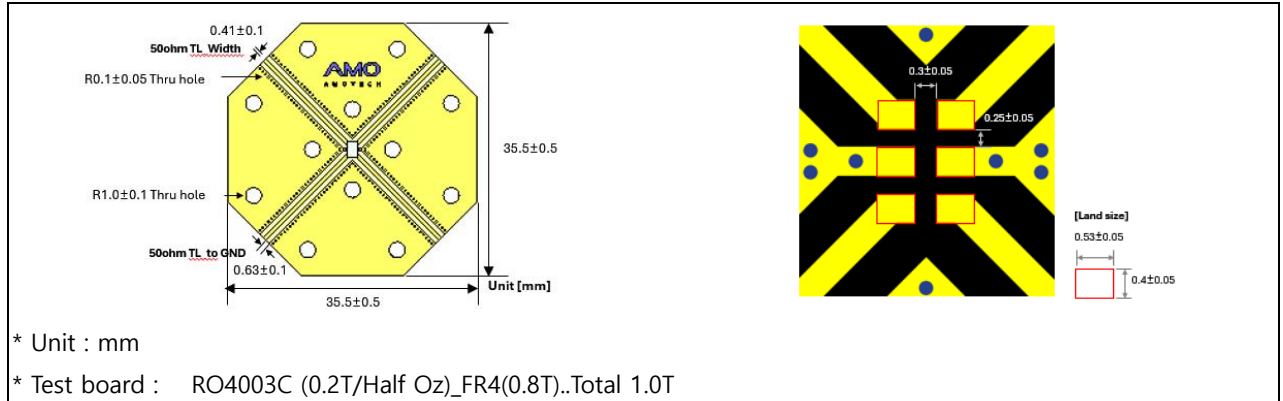
5. Test Method

1. Calibrating your vector network analyzer.
2. Connect the VNA 4 Port to DUT respectively
3. Measure the data of coupling through port 1 to port 4(S41).
4. Measure the data of transmission through port 1 to port 3(S31).
5. Measure the data of isolation through port 1 to port 2(S21).
6. Measure the data of phase port 4 & port 3(port 1 feeding).
7. Measure the data of return loss port 1, port 2, port 3 & port 4.
8. According to the above data to calculate insertion loss, amplitude balance & phase.

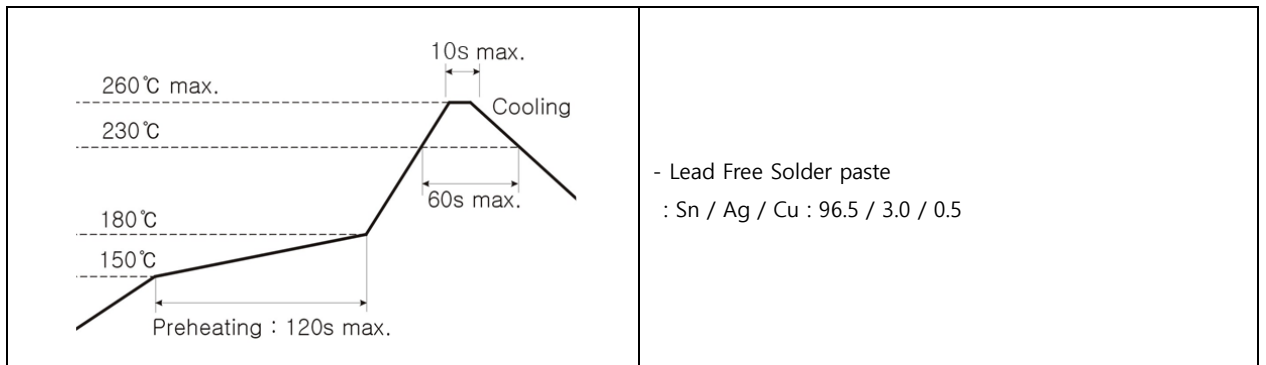


6. Soldering (Reflow soldering)

6.1. PCB pattern design condition (recommended)



6.2. Soldering condition



Follow the recommended soldering conditions to avoid degradation of performance .

- This product is designed for reflow soldering only. Do not use flow soldering.
- Use non-activated flux. (Max. Cl content less than 0.2%)
- Reflow cycle times should be done less than 3 times.

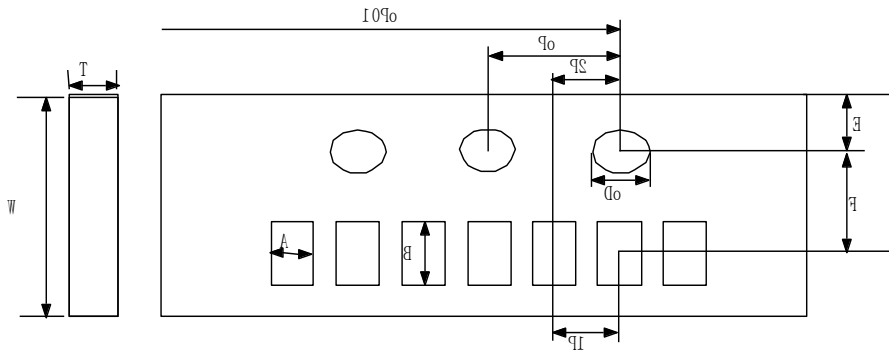
7. Caution

- 1) Storage environment : $-5 \sim 40^{\circ}\text{C}$ temperature, 20~70% humidity (MSL Level 1)
- 2) Do not use in high temperature/high humidity and a corrosive atmosphere like sulfide, chloride gas which could damage the solderability.
- 3) Do not expose to mechanical shock to avoid crack.
- 4) Use chips within 6 months. If over 6 months, check solderability before use.

8. Packaging specification

8.1 Carrier tape Specification

8.1.1. Size



Unit: mm

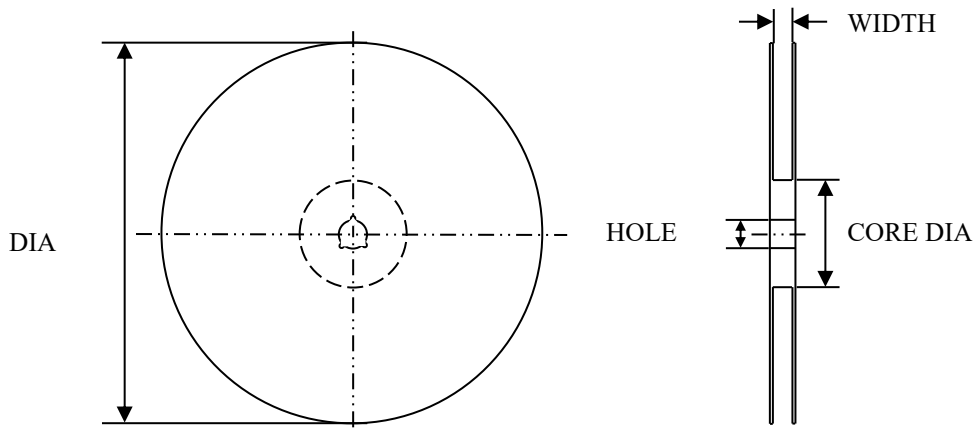
	T	W	A	B	DO	F	P2	P1	E	PO	10PO
SPEC	0.75	8.00	1.55	2.30	1.55	3.50	2.00	4.00	1.75	4.00	40.00
Tolerance	±0.05	±0.10	±0.05	±0.05	±0.03	±0.05	±0.05	±0.10	±0.05	±0.10	±0.20

8.1.2. Material

- 1) Pater carrier tape : Laminated virgin pulp
- 2) Top tape : Polyester film
- 3) Bottom tape : Adhesive coated paper

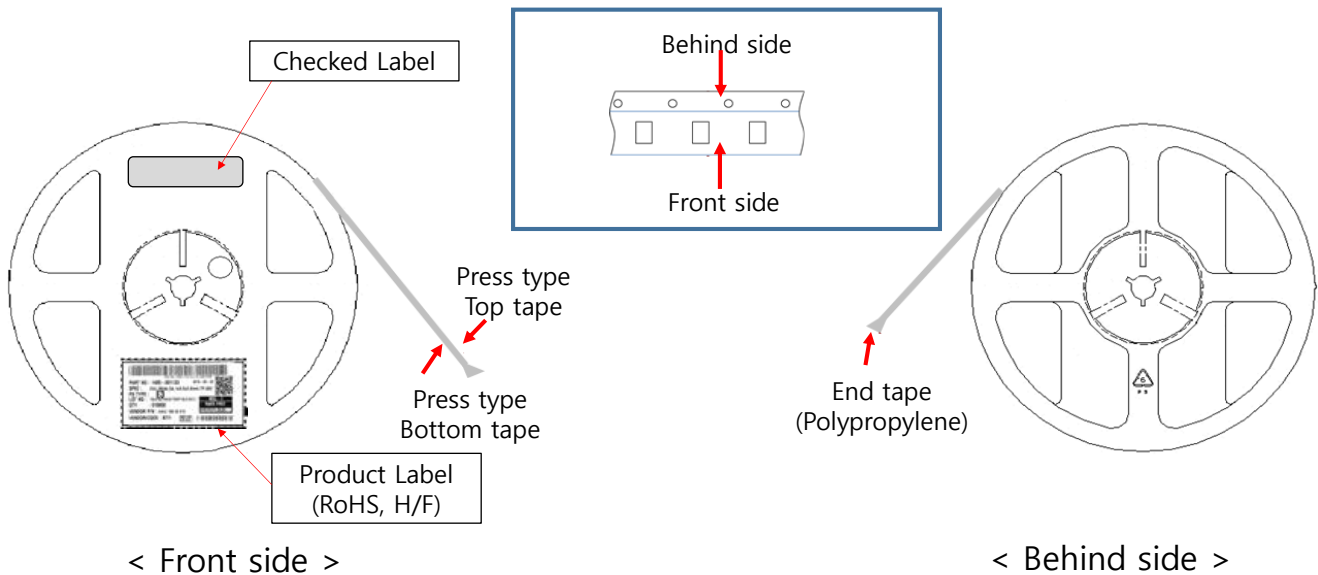
8.2. Reel Specification

8.2.1. Size




Item	DIA	WIDTH	CORE DIA	HOLE
Size (mm)	178.0±0.5	9.0±0.5	60.0±1.0	13.2±0.3

8.2.2. Label adherence and winding direction



8.2.3. Material

- Plastic reel : GPS(General Purpose Styrene)

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8.3 Box packaging Specification

Size (mm)	Thickness typ. (mm)	Quantity (EA) / Reel	Quantity
		7"/180mm (Material)	/ Polybag
2.04 x 1.29	0.59	4,000 (Paper)	
			-

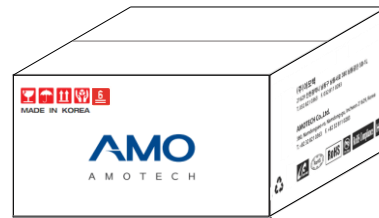
a) Reel packing

- ① 5 Reels per Inner box (7" Reel)
- ② 10 Inner boxes per Out box

b) Box type



(Inner Box)



(Out box)