TITLE

2.4GHZ/5GHZ CERAMIC SMT ANTENNA

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2.4GHZ/5GHZ CERAMIC SMT ANTENNA

1.0 SCOPE

This product specification covers the mechanical, electrical and environmental performances specification for 2.4GHz/5GHz Ceramic SMT antenna.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER (S)

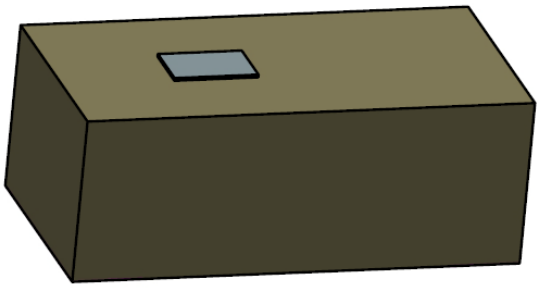
Product name: 2.4GHz/5GHz Ceramic SMT antenna.
Series Number: 211964****

2.2 DESCRIPTION

211964 is 2.4GHz/5GHz ceramic loop antenna. It works very well when being placed at PCB Center-edge. With applying different matching setup, it supports 2.4GHz single band or 2.4/5GHz dual band.

2.3 FEATURES.

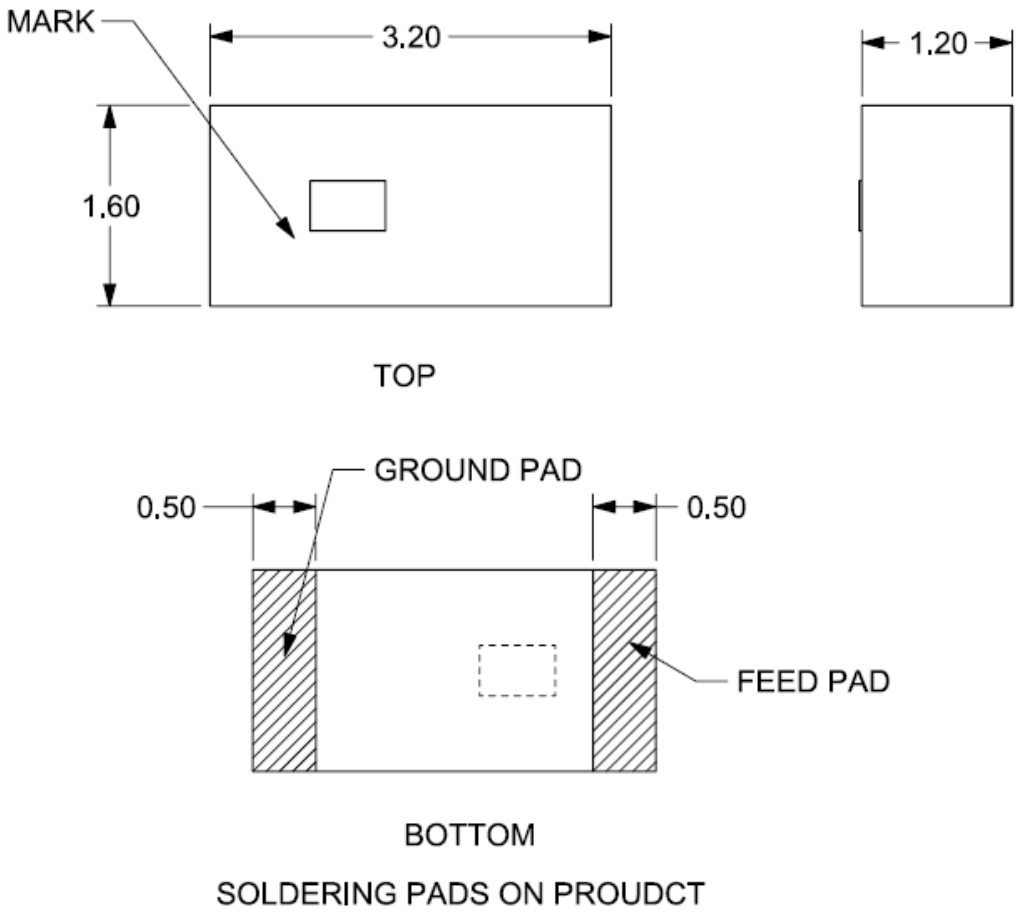
- Working frequency 2.4GHz and/or 5GHz with high efficiency (more than 65%)
- Antenna size 3.2x1.6x1.2mm, PCB keep-out area 6x4mm
- Linear polarization
- RoHS Compliant



Molex 2119640001 2.4GHz/5GHz Ceramic SMT antenna 3D View

2.4 PRODUCT STRUCTURE INFORMATION

P/N	2119640001



MECHANICAL STRUCTURE INFORMATION FOR 2119640001

3.0 APPLICABLE DOCUMENTS

DOCUMENT	NUMBER	DESCRIPTION
Sale Drawing(SD)	SD-2119640001	Mechanical Dimension of the product
Application Guide(AS)	AS-2119640001	Antenna Application and surrounding
Packing Drawing(PK)	PK-2119640001	Product packaging specifications

4.0 GENERAL SPECIFICATION

PRODUCT NAME	2.4GHz/5GHz Ceramic SMT antenna
PART NUMBER	2119640001
FREQUENCY RANGE	2400~2500MHz or 2400~2500MHz and 5150~5850MHz
POLARIZATION	Linear
IMPEDANCE WITH MATCHING	50 Ohms
STORAGE TEMPERATURE	-40℃ to 85℃
RELATIVE HUMIDITY	55%-75%
RF POWER	2 Watts
ANTENNA TYPE	LTCC
CERAMIC DIMENSION	3.2x1.6x1.2 mm
SINGLE WEIGHT	0.0192g/ pcs

Note: if you plan to re-use the products that be taken out from packaging. Suggest to re-pack them within 24 hours by re-seal with vacuum packaging to prevent oxidation. Product should be used within six months of receipt.

5.0 ANTENNA SPECIFICATION

All measurements are done of the antenna mounted on reference PCB (40*20*0.8mm) with VNA Agilent E5071C and Over-The-Air (OTA) chamber.

5.0.1 ANTENNA PERFORMANCE	**Requirements (For Configure 1)**	**Requirements (For Configure 2)**	
P/N	2119640001		
FREQUENCY RANGE	2.4-2.5GHz	2.4-2.5GHz	5.15-5.85GHz
PEAK GAIN(MAX)	2.7dBi	2.1dBi	2.2dBi
AVERAGE TOTAL EFFICIENCY	>80%	>70%	>65%
RETURN LOSS	< -6 dB	< -5 dB	< -5 dB

Note that the above antenna performance is measured with just the antenna mounted on a reference PCB (40*20*0.8mm) in free space. When implement into the system, the frequency resonant might be off-tune due to the loading of surrounding components especially metal plane. This off-tune can be compensated through matching. Although module manufacturers specify a peak gain limit, it is based on free-space conditions. The peak gain will be degraded by 1 to 2dBi in the actual implementation as the radiation pattern will change due to the surround components. As such, during selection of antenna, you can select one with high peak gain to compensate for the loss. Molex can offer assistant to choose the best location and best tuning in-order to meet this peak gain requirement.

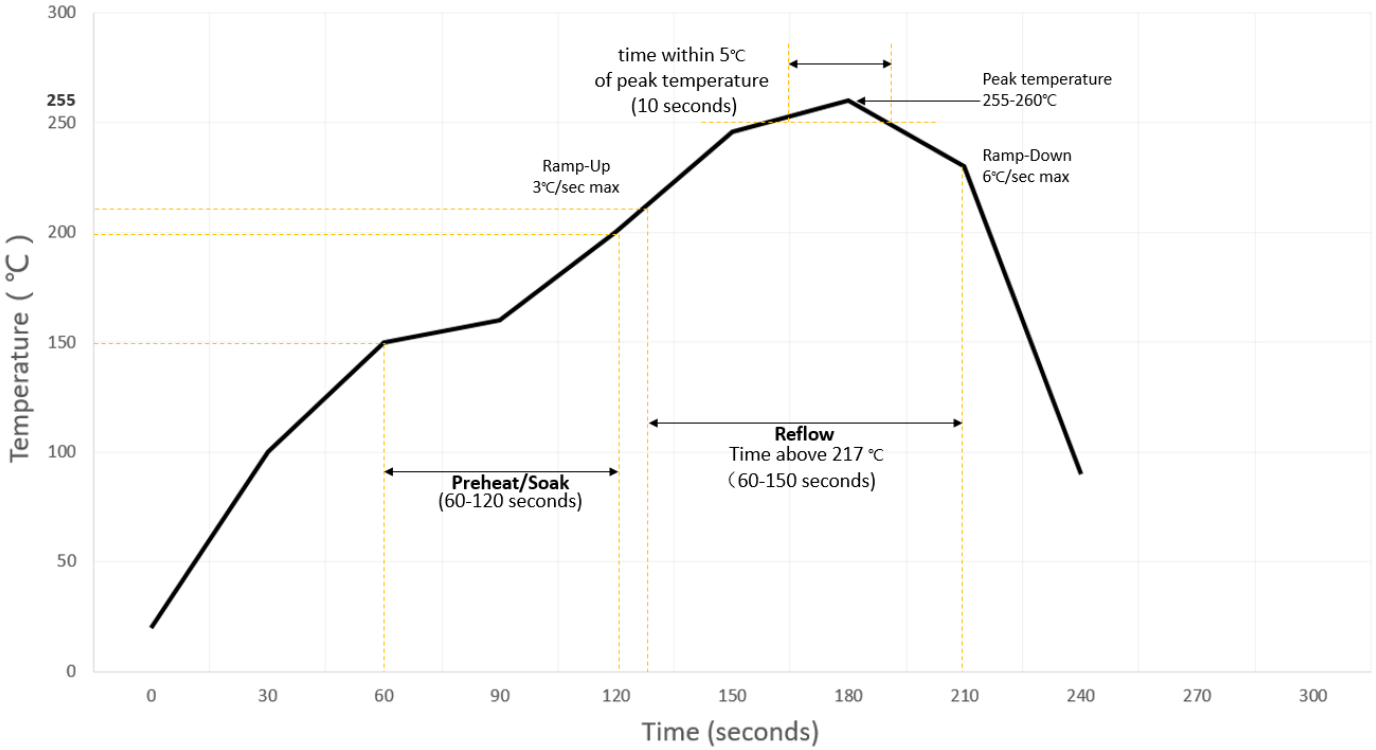
6.0 MECHANICAL REQUIREMENTS

DESCRIPTION	TEST CONDITION	TEST RESULT
SHEAR FORCE	Apply push force on parts soldered on the PCB at the speed rate of 25±3 mm/minute.	Shear force:＞10N

7.0 ENVIRONMENTAL SPECIFICATION

DESCRIPTION	SPECIFICATION
HUMIDITY TEST	1. The device under test is kept for 12 hours in an environment with a temperature of 55 degrees and a relating humidity of 95%. Thereafter for 12 Hours in an environment with a temperature of 25 degrees and a relative humidity of 95%. The cycle is repeated until a total of 6 cycles have been completed. Hereafter the conditions are stabilized at room temperature. 2. Parts should meet RF spec before and after test. 3. No cosmetic problem (No bubble issue、No plating peeling off issue、 No mechanical damage.)
TEMPERATURE CYCLING TEST	1. The device under test at -40 ℃⇔125 ℃ by 72 cycles, Dwell of 30 min, transition time between Dwell 15 sec (~ 61 min / cycle) and each item should be measured after exposing them in normal temperature and humidity for 24 h. 2. Part should meet RF spec before and after test. 3. No cosmetic problem (No bubble issue、No plating peeling off issue、 No mechanical damage.)
HIGH TEMPERATURE	1. Temperature:125℃, time:1008 hours 2. There is no substantial obstruction to air flow across and around the samples, and the samples are not touching each other 3. Parts should meet RF spec before and after test. 4. No cosmetic problem (No bubble issue、No plating peeling off issue、 No mechanical damage.)
SALT MIST TEST	1. The device under test is exposed to a spray of a 5% (by volume) resolution of NACL in water for 2 hours. Thereafter the device under test is left for 1 week in room temperature at a relative humidity of 95%. The cycle is repeated until a total of 2 cycles have been completed. Here after the conditions are stabilized at room temperature. 2. Parts should meet RF spec before and after test. 3. No visible corrosion and discoloration accept.

8.0 RECOMMENDED REFLOW CONDITION



Recommended solder paste: ALPHA CAP-390 SAC305;

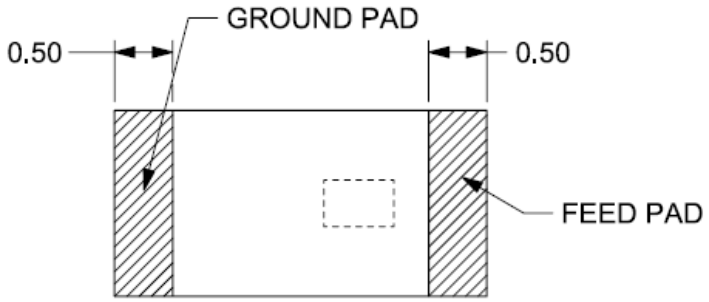
Recommended stencil thickness: 0.1MM≤ T ≤ 0.15MM;

For mechanically challenging applications. Molex recommends using surface mount glue (e.g. Loctite 3611) before reflow soldering process to ensure increased mechanical retention on the PCB.

	2.4G			5G											
				band 1			band 2			band 3			band 4		
Frequency(MHz)	2400	2450	2500	5150	5200	5240	5260	5300	5350	5470	5600	5725	5745	5800	5850
Peak Gain dBi	1.7	2.1	1.2	-0.2	0	-0.1	0.1	0.3	0.5	1.4	2.2	1.5	1.3	1.3	1.2

9.0 LAYOUT DIMENSIONS

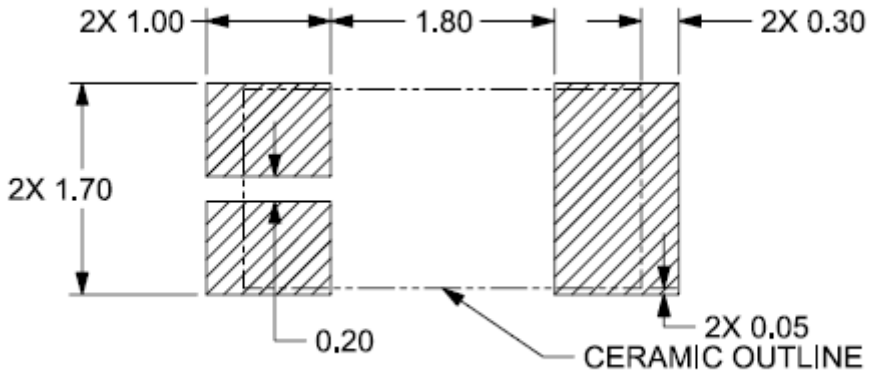
9.1 PADS OF PRODUCT FOR SOLDERING



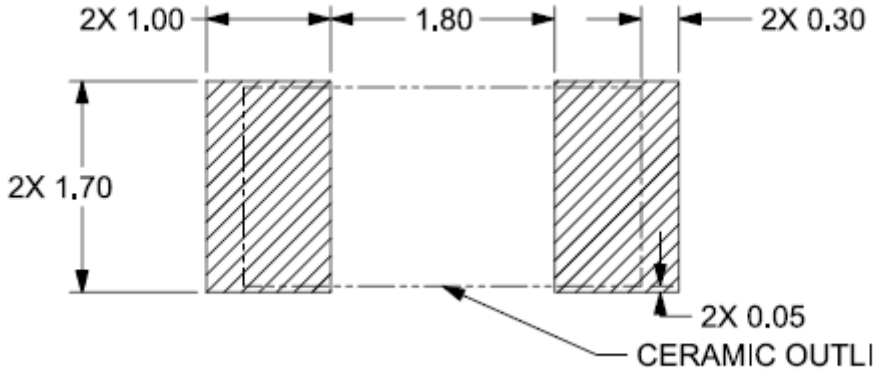
BOTTOM

SOLDERING PADS ON PROUDCT

9.2 RECOMMENDED FOOTPRINT ON PCB FOR SOLDERING IN TWO CONFIGS

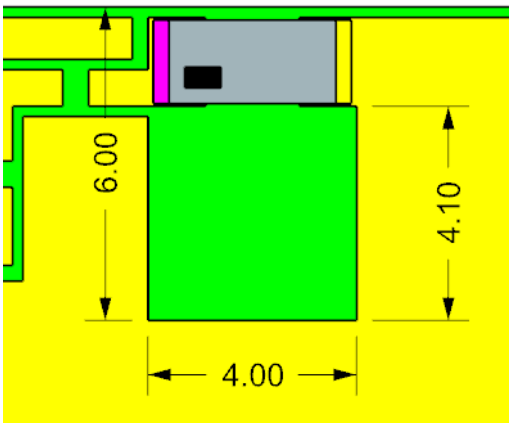


CONFIG1: RECOMMENDED PCB LAYOUT FOR 2.4GHZ BAND

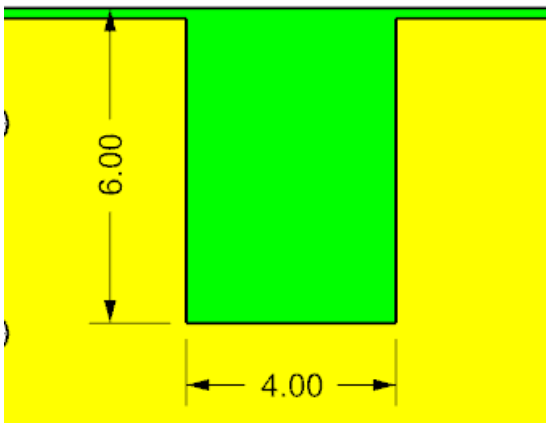


CONFIG2: RECOMMENDED PCB LAYOUT FOR 2.4/5GHZ BAND

9.3 RECOMMENDED PCB CLEARANCE KEEP OUT AREA FOR TWO CONFIGS



Front side of PCB

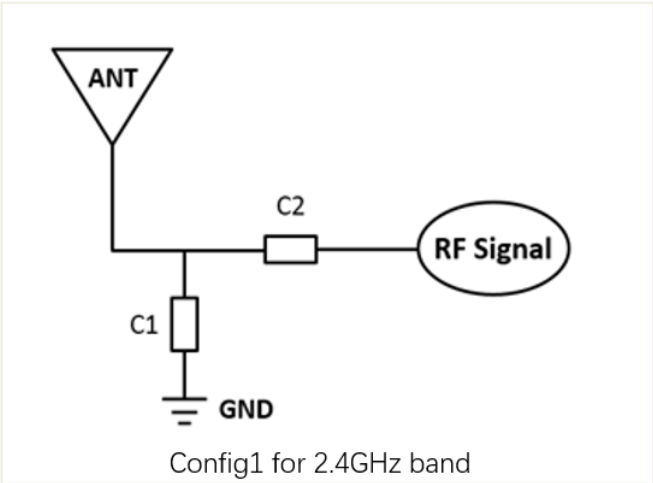


Back side of PCB

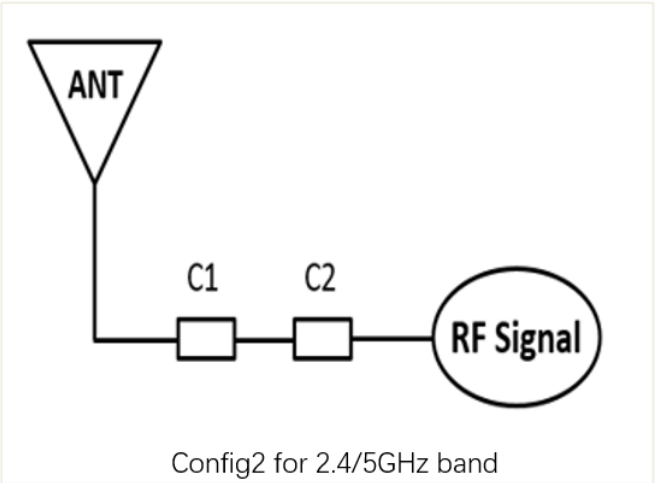
Recommended PCB keep out area = 6x4mm
Clearance area :4.00x4.10mm (Front Side)

9.5 MATCHING NETWORK DESCRIPTION

The recommended matching network shown in Figure below.

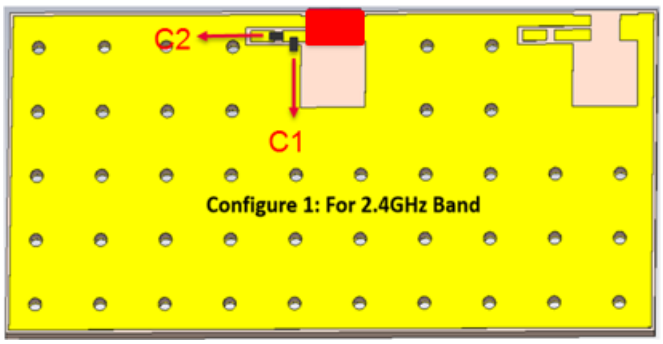


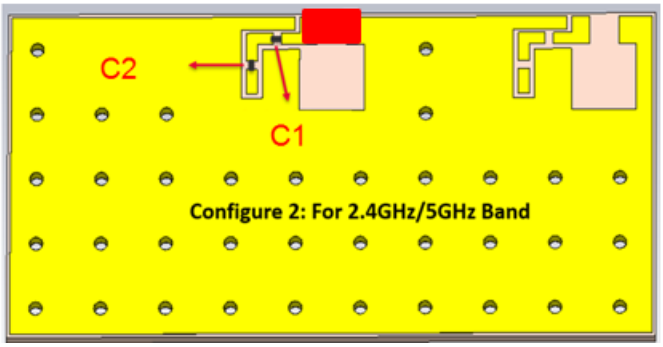
Config1 for 2.4GHz band



Config2 for 2.4/5GHz band

RECOMMENDED MATCHING CIRCUIT SCHEMATIC



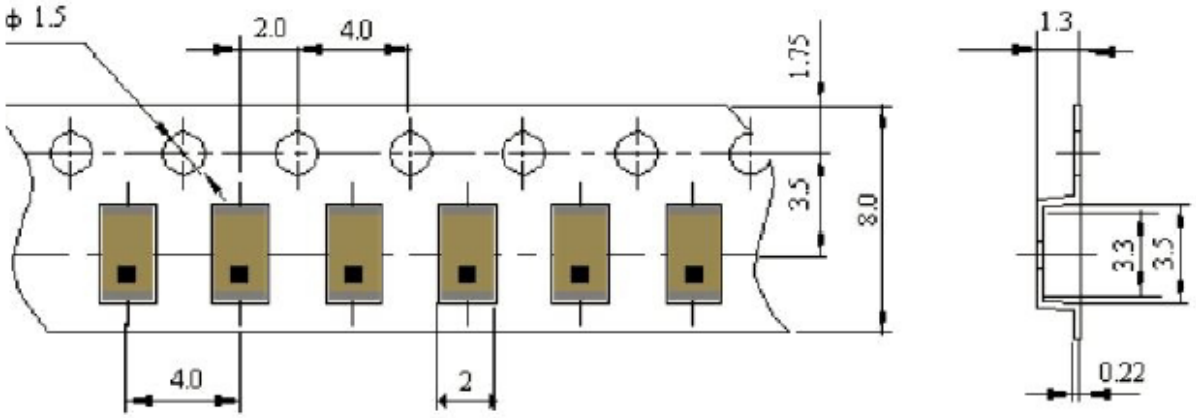


Component	Configure 1	Configure 2
C1	2.7pF	4.7nH
	Murata (PN: GRM1555C1H2R7WA01)	Murata (PN: LQW15AN4N7B00)
C2	0Ω	0.6pF
		Murata (PN: GRM1555C1HR60BA01D)

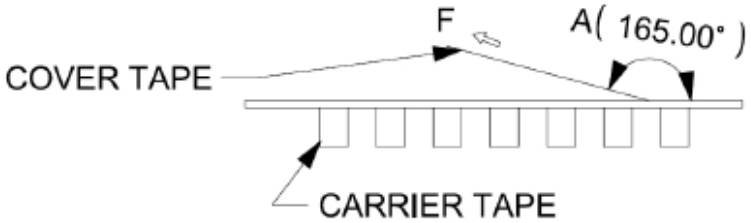
RECOMMENDED MATCHING CIRCUIT

10 PACKING

P/N	QTY/REEL	REEL/SMALL BOX	SMALL BOX/BIG BOX	SPQ
2119640001	3000	2	2	12000

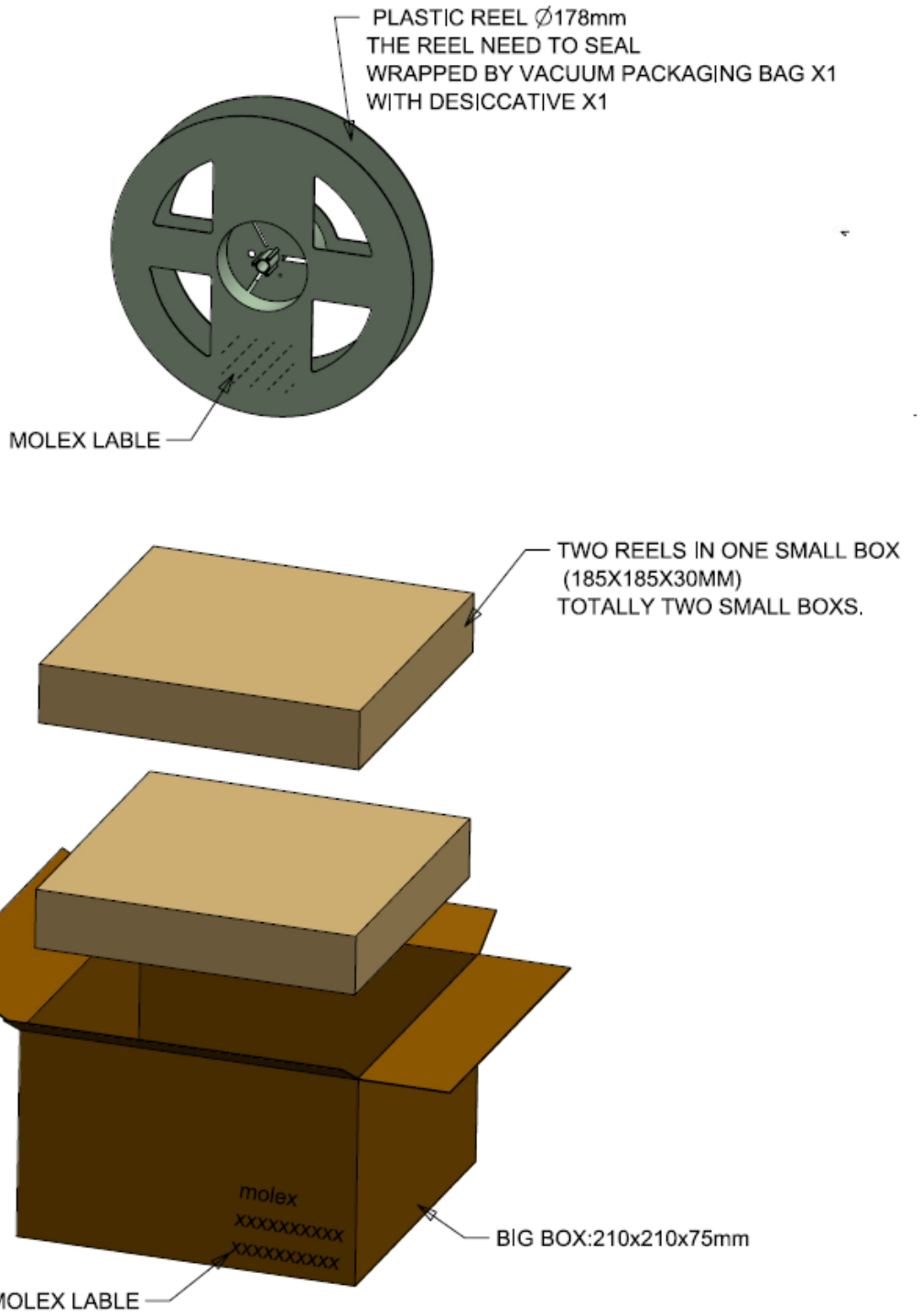


PEELING FORCE OF CARRIE TAPE:SEE TABLE BELOW;
PEELING SPEED 300M/MIN



A	165°~180°
F	0.1N~1.3N

NOTES:
1.PRODUCTS MUST BE PACKED IN CARTONS AND SEALED UP WITH TAPE.
2.STICK LABEL WITH PART NUMBER AND DATE CODE.
3.STANDARD PACKAGING QUANTITY:SEE TABLE.
4.LEAVE 150~200MM EMPTY CAVITY ON THE TAIL OF CARRIER TAPE; LEAVE 250~300MM EMPTY CAVITY ON THE FRONT END OF CARRIER TAPE.
5.THIS PACKAGINGSPECIFICATION TO BE USED FOR "2.4/5GHZ CERAMIC SMT ANTENNA".



PACKAGING INFORMATION FOR 2119640001