September 2016

Multilayer Antenna

For 2400-2484MHz

ANT016008LCS2442MA2

1.6x0.8mm [EIA 0603]*

*** Dimensions Code JIS[EIA]**

Multilayer Antenna

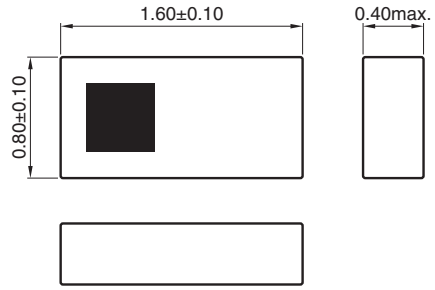
Conformity to RoHS Directive

For 2400-2484MHz

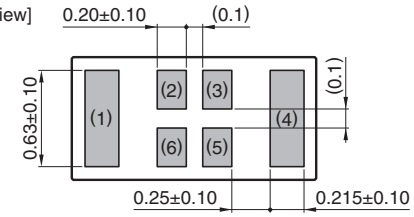
ANT016008LCS2442MA2

SHAPES AND DIMENSIONS

[Top view]



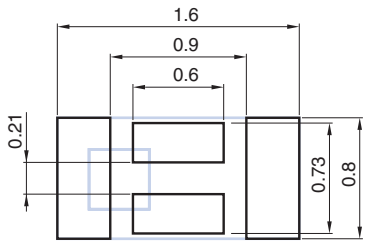
[Bottom view]



Terminal functions	
1	Radiator electrode
2	Dummy pad
3	Dummy pad
4	Feed point
5	Dummy pad
6	Dummy pad

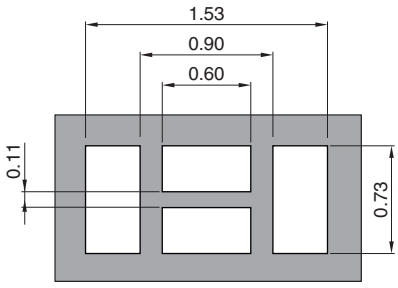
Dimensions in mm

RECOMMENDED LAND PATTERN



Dimensions in mm

SOLDER RESIST PATTERN



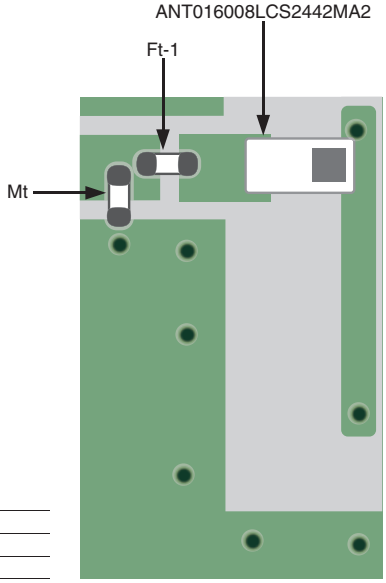
Dimensions in mm

○RoHS Directive Compliant Product: See the following for more details.https://product.tdk.com/info/en/environment/rohs/index.html

ANT016008LCS2442MA2

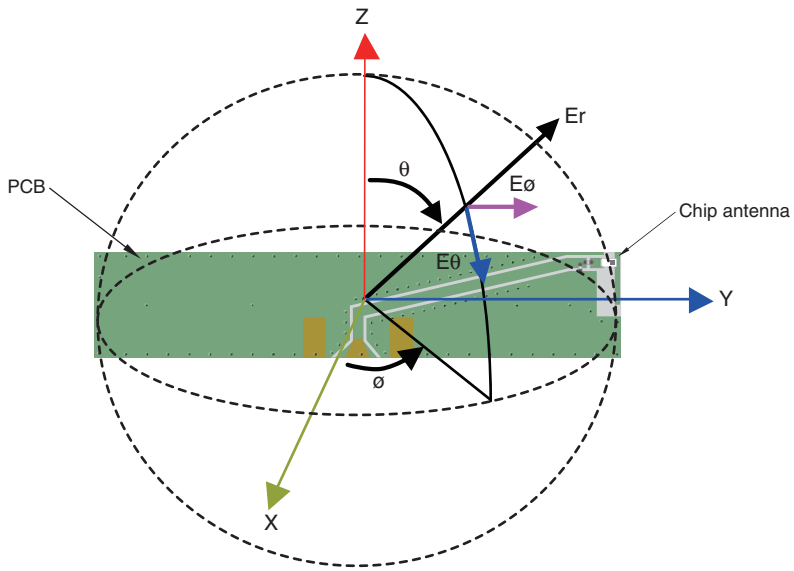
EVALUATION BOARD

PCB size : 50mm x 10mm x 1mm
Antenna area : 6 x 2.5 mm



	Component P/N
Ft-1	2.0nH(MLG0603P2N0:TDK)
Mt	3.0nH(MLG0603P3N0:TDK)

□Measurement condition for Radiation Pattern



ANT016008LCS2442MA2

ELECTRICAL CHARACTERISTICS

Item	Frequency Range (MHz)	Min.	Typ.	Max.
VSWR	2400 to 2484	—	1.60	3.0
Polarization			Linear	
PCB size (mm)			50×10	
Antenna keep-out area (mm)			6×2.5	
Characteristic Impedance (Ω)			50 (Nominal)	

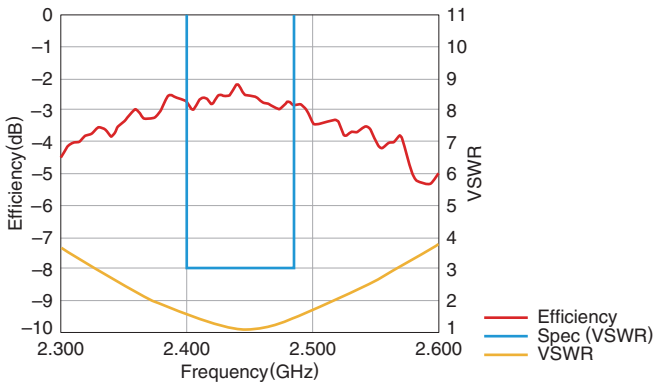
・This is typical antenna performance with the standard PCB.

TEMPERATURE RANGE

Operating temperature (°C)	Storage temperature (°C)
–40 to +85	–40 to +85

FREQUENCY CHARACTERISTICS

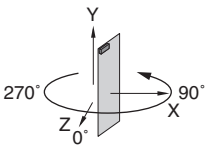
EFFICIENCY AND VSWR

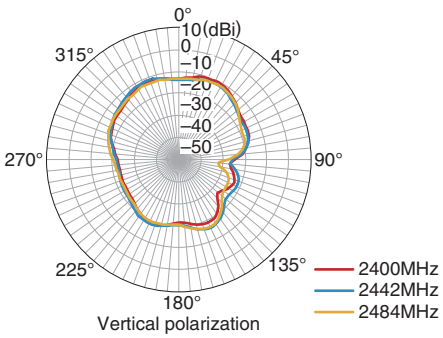


• Tested antenna has been soldered. Evaluation board size is 50x10x1 mm.

ANT016008LCS2442MA2

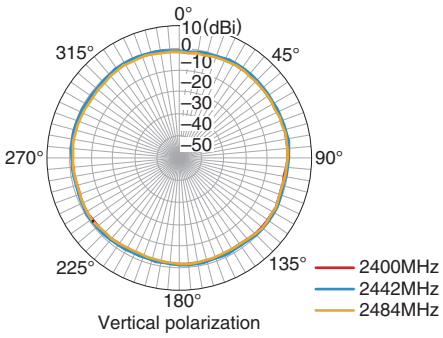
RADIATION PATTERNS





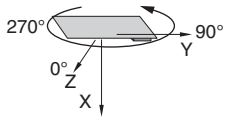
Vertical polarization

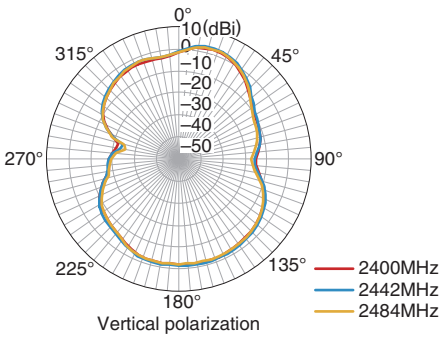
Frequency(MHz)	2400	2442	2484
Average(dBi)	–16.1	–16.0	–16.4
Maximum(dBi)	–10.5	–11.3	–11.7
Minimum(dBi)	–26.9	–26.5	–31.9



Vertical polarization

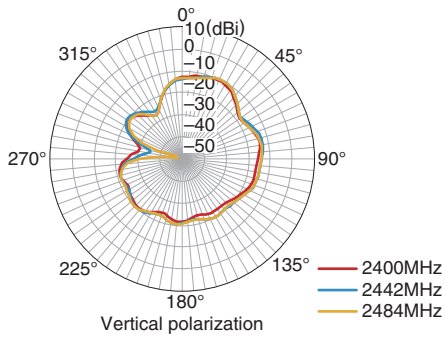
Frequency(MHz)	2400	2442	2484
Average(dBi)	–1.4	–0.8	–1.6
Maximum(dBi)	–0.5	0.0	–0.9
Minimum(dBi)	–2.4	–2.1	–3.0





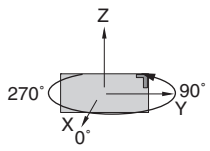
Vertical polarization

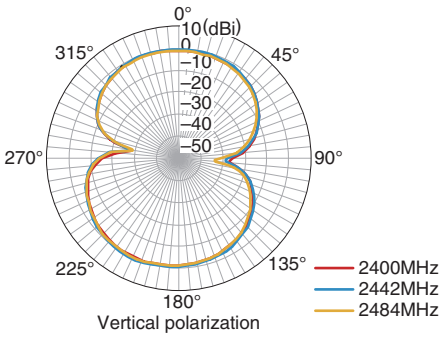
Frequency(MHz)	2400	2442	2484
Average(dBi)	–4.3	–3.6	–4.2
Maximum(dBi)	1.6	2.5	2.0
Minimum(dBi)	–21.9	–24.0	–25.5



Vertical polarization

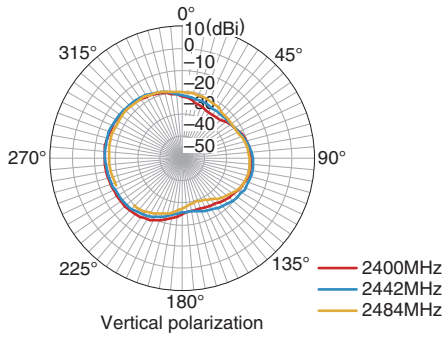
Frequency(MHz)	2400	2442	2484
Average(dBi)	–17.5	–16.8	–17.0
Maximum(dBi)	–11.1	–10.4	–10.4
Minimum(dBi)	–30.4	–36.3	–53.3





Vertical polarization

Frequency(MHz)	2400	2442	2484
Average(dBi)	–3.9	–3.3	–4.0
Maximum(dBi)	–0.5	0.2	–0.3
Minimum(dBi)	–29.4	–28.7	–34.7



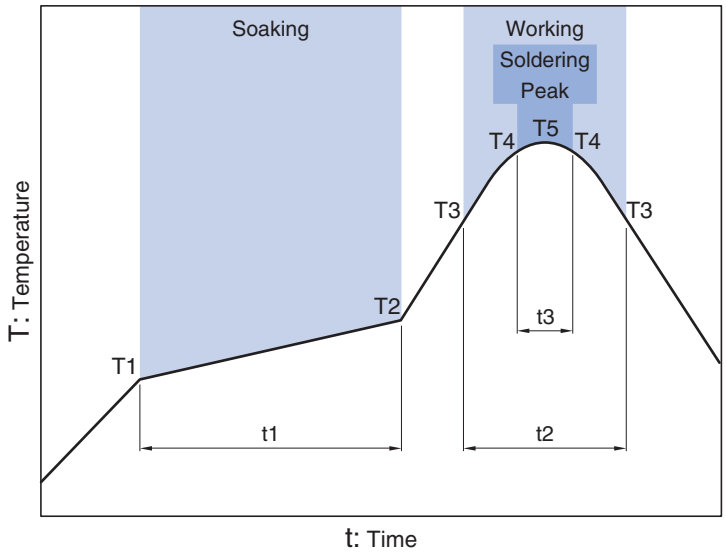
Vertical polarization

Frequency(MHz)	2400	2442	2484
Average(dBi)	–18.7	–18.6	–19.8
Maximum(dBi)	–14.8	–15.0	–16.7
Minimum(dBi)	–26.3	–25.3	–29.1

• Tested antenna has been soldered. Evaluation board size is 50x10x1 mm.

ANT016008LCS2442MA2

RECOMMENDED REFLOW PROFILE

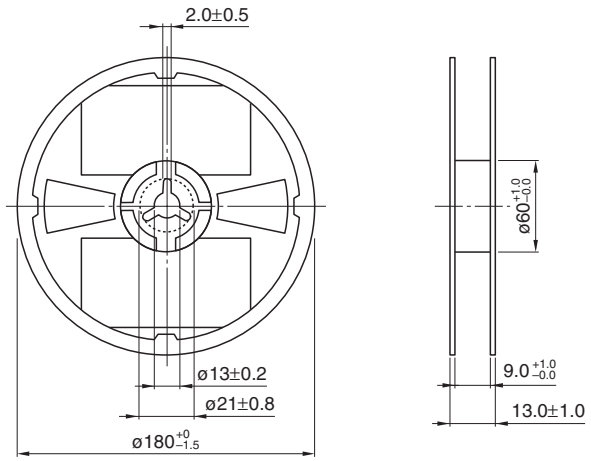


Soaking			Working		Soldering Peak		
Temp.		Time	Temp.	Time	Temp.	Time	Temp.
T1	T2	t1	T3	t2	T4	t3	T5
150°C	180°C	60 to 120s	230°C	30 to 60s	247 to 253°C	within 10s	260°C max.

ANT016008LCS2442MA2

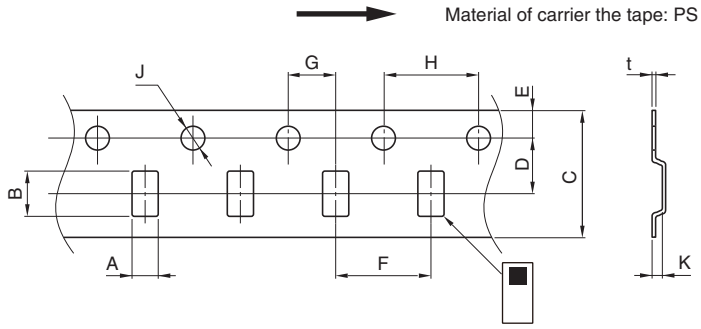
■PACKAGING STYLE

□REEL DIMENSIONS



Dimensions in mm

□TAPE DIMENSIONS



Dimensions in mm

A	B	C	D	E	F	G	H	J	K	t
0.97±0.05	1.8±0.05	8.0±0.2	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.05	4.0±0.1	1.5+0.1/-0	0.55max.	0.25±0.05

■PACKAGE QUANTITY

Standard package quantity (pieces/reel)
4,000

REMINDERS FOR USING THESE PRODUCTS

Before using these products, be sure to request the delivery specifications.

SAFETY REMINDERS

Please pay sufficient attention to the warnings for safe designing when using these products.

⚠ REMINDERS

The products listed on this catalog are intended for use in general electronic equipment (AV equipment, telecommunications equipment, home appliances, amusement equipment, computer equipment, personal equipment, office equipment, measurement equipment, industrial robots) under a normal operation and use condition.
The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property.
Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below or for any other use exceeding the range or conditions set forth in this catalog.

(1) Aerospace/Aviation equipment
(2) Transportation equipment (cars, electric trains, ships, etc.)
(3) Medical equipment
(4) Power-generation control equipment
(5) Atomic energy-related equipment
(6) Seabed equipment
(7) Transportation control equipment
(8) Public information-processing equipment
(9) Military equipment
(10) Electric heating apparatus, burning equipment
(11) Disaster prevention/crime prevention equipment
(12) Safety equipment
(13) Other applications that are not considered general-purpose applications

When using this product in general-purpose applications, you are kindly requested to take into consideration securing protection circuit/equipment or providing backup circuits, etc., to ensure higher safety.

STUDY | PCB DIMENSION (Length)

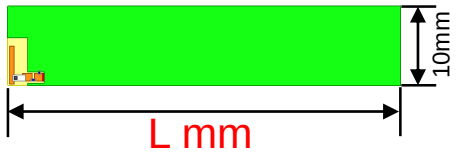
ANT016008LCS2442MA2

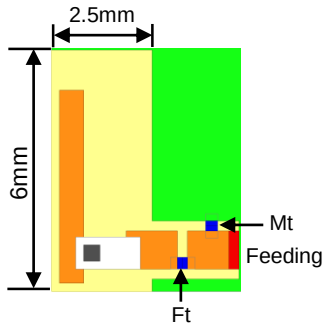
Dimensions (mm)

L	W	T
1.60	0.80	0.40
±0.10	±0.10	Max.

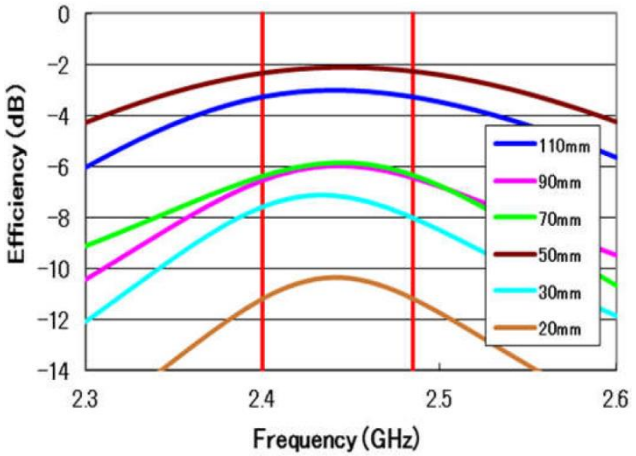
EVALUATION BOARD

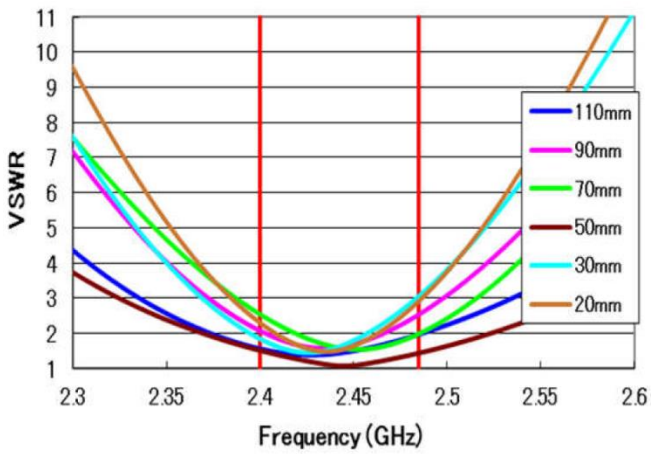
Antenna Location: Corner
Board size: L x 10 x 1 mm²
Antenna keep out area: 6 x 2.5 mm²





▶VSWR & EFFICIENCY (SIMULATION RESULTS)



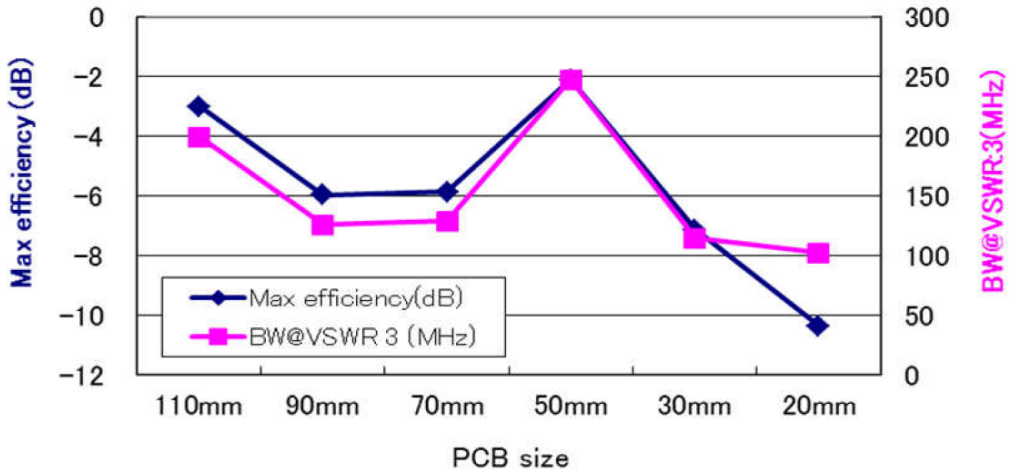


Item	VSWR			Efficiency(dB)		
Frequency(GHz)	2.4	2.442	2.485	2.4	2.442	2.485
L=110mm	1.6	1.4	2.0	−3.3	−3.0	−3.3
L=90mm	2.1	1.6	2.5	−6.6	−6.0	−6.5
L=70mm	2.5	1.6	2.0	−6.4	−5.9	−6.4
L=50mm	1.5	1.1	1.4	−2.3	−2.1	−2.3
L=30mm	1.8	1.6	3.1	−7.6	−7.2	−8.0
L=20mm	2.3	1.5	2.9	−11.2	−10.4	−11.2

TUNING COMPONENTS

PCB Size	110mm	90mm	70mm	50mm	30mm	20mm
Ft (nH)	1.5	1.5	1.5	1.3	1.6	1.7
Mt (nH)	2.2	1.8	1.8	2.2	1.6	1.5

MAX EFFICIENCY & BANDWIDTH (SIMULATION RESULTS)



PCB Size	110mm	90mm	70mm	50mm	30mm	20mm
Max efficiency(dB)	−3.0	−6.0	−5.9	−2.1	−7.1	−10.4
BW@VSWR 3 (MHz)	199.2	125.5	128.5	247.2	114.5	101.9

TECHNICAL REMARKS

- For maximum efficiency with corner mount antenna: length L = 50

STUDY | GND CLEARANCE (Corner of PCB)

ANT016008LCS2442MA2

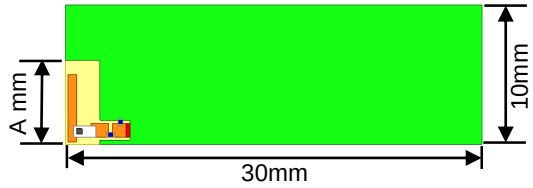
Dimensions (mm)

L	W	T
1.60	0.80	0.40
±0.10	±0.10	Max.

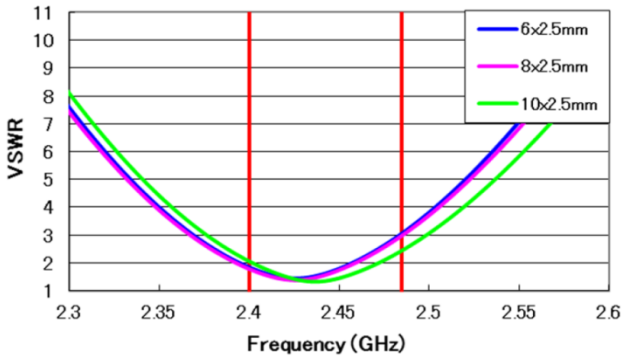
EVALUATION BOARD

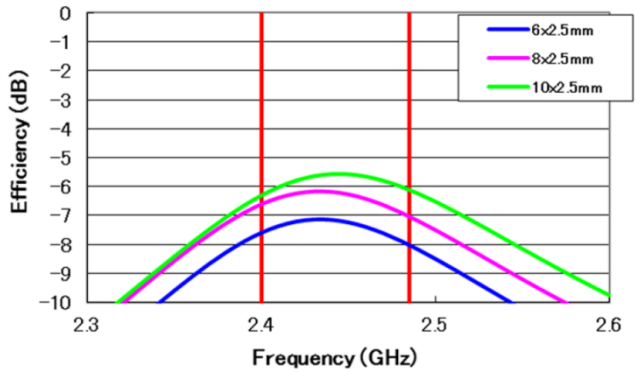
Antenna Location: Corner
Board size: 30 x 10 x 1 mm²
Antenna keep out area: A x 2.5 mm²

A = 6,8,10mm



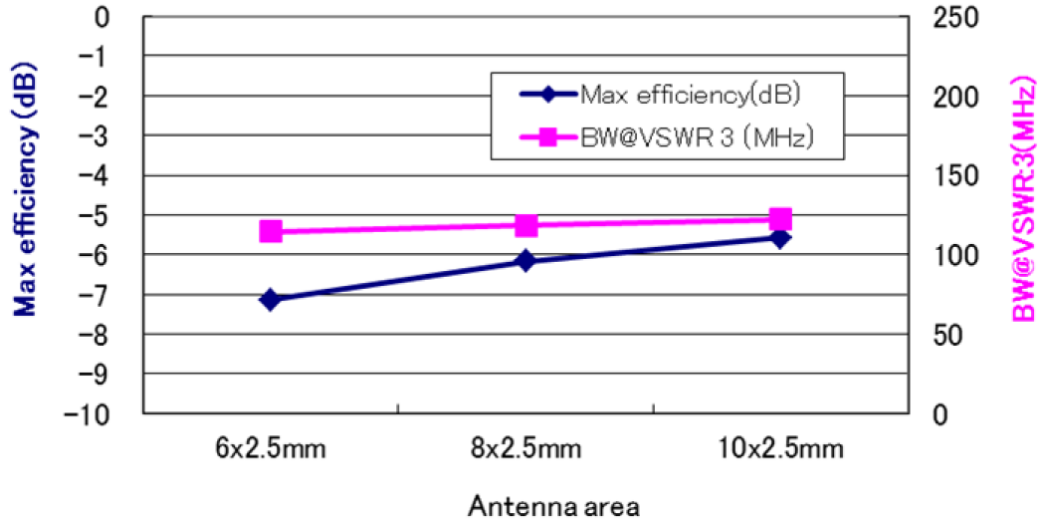
▶VSWR & EFFICIENCY (SIMULATION RESULTS)





Item	VSWR			Efficiency(dB)		
Frequency(GHz)	2.4	2.442	2.485	2.4	2.442	2.485
6x2.5mm	1.8	1.6	3.1	−7.6	−7.2	−8.0
8x2.5mm	1.8	1.6	3.0	−6.6	−6.2	−7.0
10x2.5mm	2.1	1.3	2.4	−6.3	−5.6	−6.1

MAX EFFICIENCY & BANDWIDTH (SIMULATION RESULTS)



PCB Size	6x2.5mm	8x2.5mm	10x2.5mm
Max efficiency(dB)	−7.1	−6.2	−5.6
BW@VSWR 3 (MHz)	114.5	118.1	122.2

STUDY | GND CLEARANCE (Corner of PCB)

ANT016008LCS2442MA2

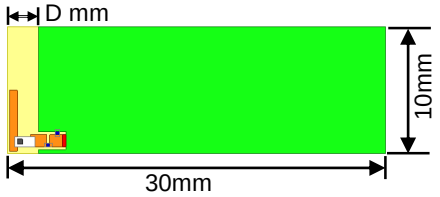
Dimensions (mm)

L	W	T
1.60	0.80	0.40
±0.10	±0.10	Max.

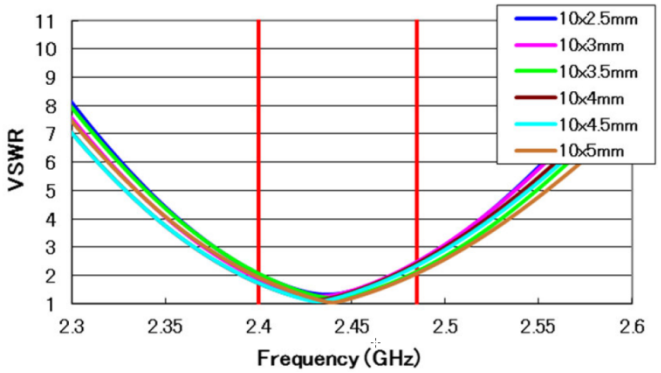
EVALUATION BOARD

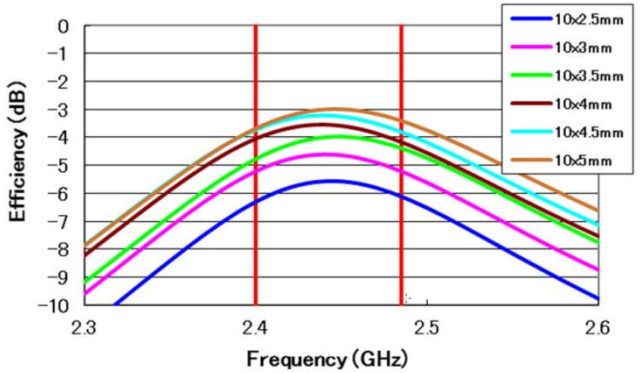
Antenna Location: Corner
Board size: 30 x 10 x 1 mm²
Antenna keep out area: 10 x D mm²

D=2.5, 3, 3.5, 4, 4.5, 5mm



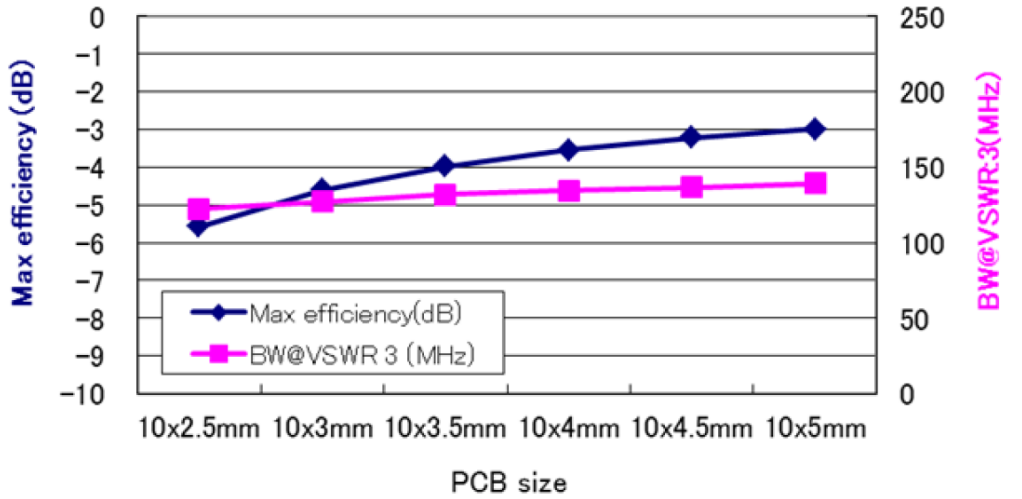
▶VSWR & EFFICIENCY (SIMULATION RESULTS)





Item	VSWR			Efficiency(dB)		
Frequency(GHz)	2.4	2.442	2.485	2.4	2.442	2.485
10x2.5mm	2.1	1.3	2.4	−6.3	−5.6	−6.1
10x3mm	1.9	1.3	2.5	−5.2	−4.6	−5.2
10x3.5mm	2.1	1.2	2.1	−4.8	−4.0	−4.4
10x4mm	1.7	1.3	2.4	−4.0	−3.6	−4.2
10x4.5mm	1.7	1.2	2.4	−3.7	−3.2	−3.8
10x5mm	1.9	1.1	2.1	−3.7	−3.0	−3.4

MAX EFFICIENCY & BANDWIDTH (SIMULATION RESULTS)



PCB Size	10x2.5mm	10x3mm	10x3.5mm	10x4mm	10x4.5mm	10x5mm
Max efficiency(dB)	−5.6	−4.6	−4.0	−3.5	−3.2	−3.0
BW@VSWR 3 (MHz)	122.2	127.0	131.7	134.5	136.6	139.3

STUDY | ANTENNA LOCATION

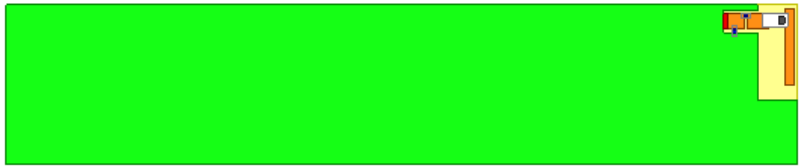
ANT016008LCS2442MA2

Dimensions (mm)

L	W	T
1.60	0.80	0.40
±0.10	±0.10	Max.

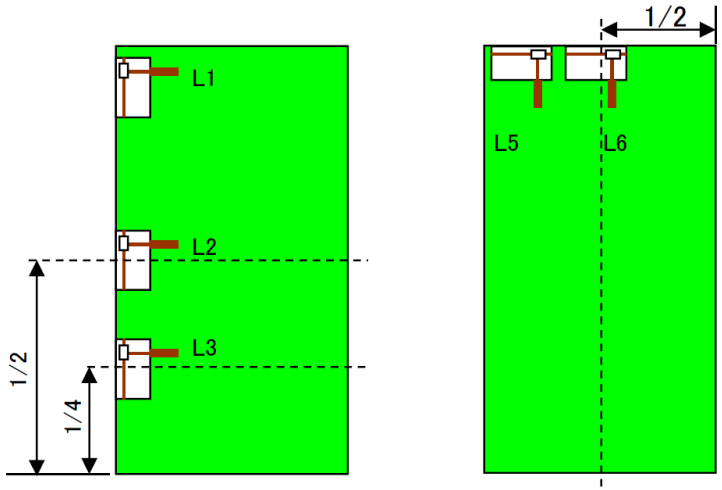
EVALUATION BOARD

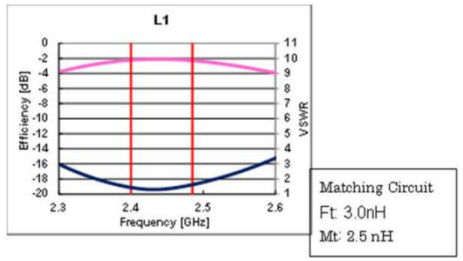
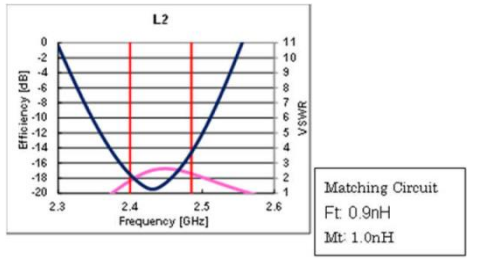
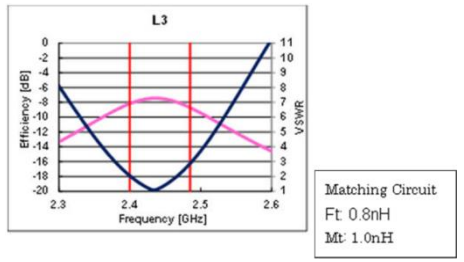
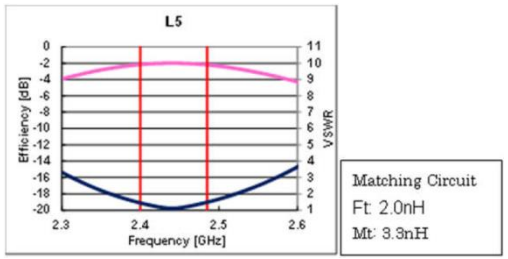
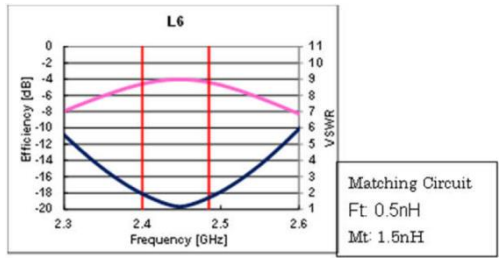
Antenna Location: Corner
Board size: 50 x 10 x 1 mm^2
Antenna keep out area: 6 x 2.5 mm^2



▶SIMULATION RESULTS

Antenna Locations



L1(Recommend)	L2	L3
		
Matching Circuit Ft: 3.0nH Mt: 2.5 nH	Matching Circuit Ft: 0.9nH Mt: 1.0nH	Matching Circuit Ft: 0.8nH Mt: 1.0nH
	L5(Recommend)	L6
		
	Matching Circuit Ft: 2.0nH Mt: 3.3nH	Matching Circuit Ft: 0.5nH Mt: 1.5nH

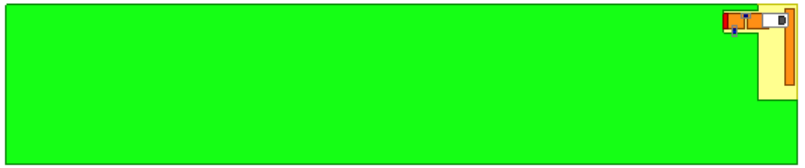
ANT016008LCS2442MA2

Dimensions (mm)

L	W	T
1.60	0.80	0.40
±0.10	±0.10	Max.

EVALUATION BOARD

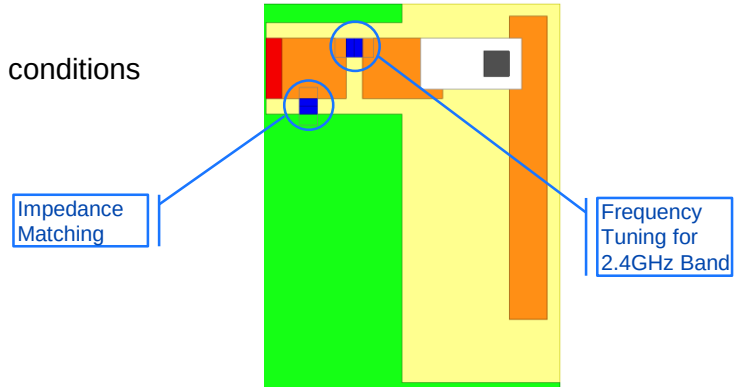
Antenna Location: Corner
Board size: 50 x 10 x 1 mm²
Antenna keep out area: 6 x 2.5 mm²



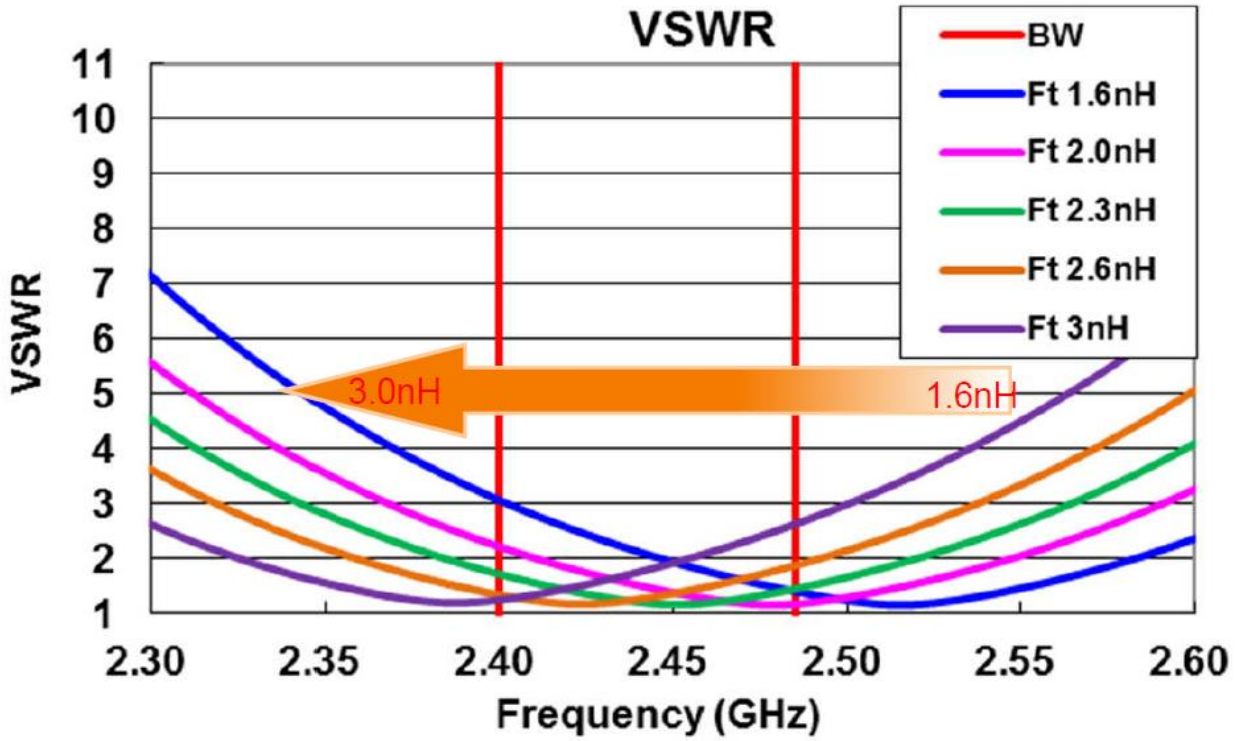
TECHNICAL REMARKS

Value of tuning components depend on:

- PCB Size
- Antenna Location
- Other mechanical conditions



▶FREQUENCY TUNING(SIMULATION RESULTS)



IMPEDANCE MATCHING (SIMULATION RESULTS)