

DATA SHEET

**2.45 GHz ISM-band antenna for
Bluetooth and WLAN IEEE 802.11b
(Long Shape)**
Surface-mount ceramic
multilayer antennas

Product specification

2002 July 08 Rev.0

Surface-mount ceramic multilayer antennas

2.45 GHz ISM-band antenna for Bluetooth and WLAN IEEE 802.11b (Long Shape)

FEATURES

- Designed for 2.45 GHz ISM-band
- Simplifies antenna circuitry
- NiSn lead-free terminations
- suitable for wave and reflow soldering
- Supplied in tape on reel.

APPLICATIONS

- Telecommunications
- Computing (PCs, printers, PDAs)
- Wireless office data communications including WLAN
- Consumer electronics (wireless headphones).

DESCRIPTION

This 2.45 GHz ceramic multilayer antenna has been designed to meet the requirements of the Bluetooth™⁽¹⁾ and IEEE 802.11b wireless communications protocol. It consists of a rectangular block of low-dielectric ceramic material and is fabricated in a water-based non-toxic process. The antenna is capable of providing good connectivity using near 50Ω microstrip directly onto the PC board.

ENVIRONMENTAL CARE



The foil making process uses an environment-friendly aqueous-solvent technology that fully complies with today's green-product design requirements. All terminations are lead-free. Packing materials can be recycled.

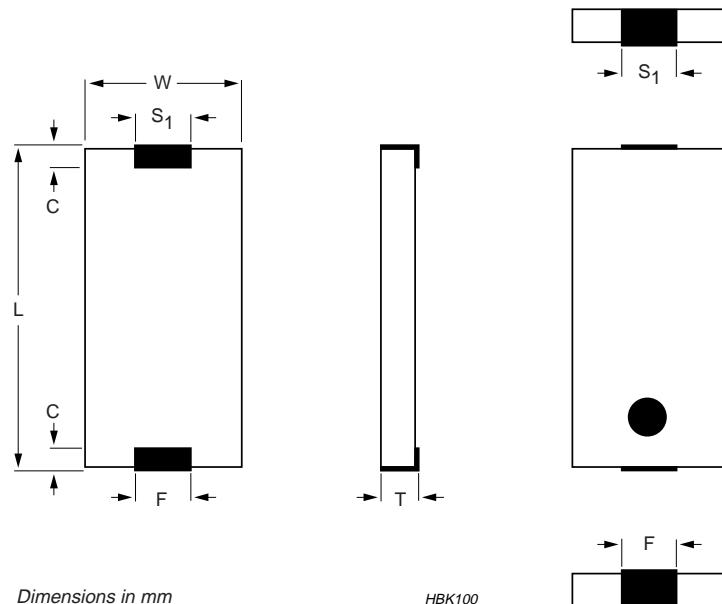
(1) Bluetooth is a trademark owned by Telefonieaktiebolaget L M Ericsson, Sweden.

QUICK REFERENCE DATA

DESCRIPTION	VALUE
Center frequency	2.45, 2.60 and 2.70 GHz
Bandwidth	100 MHz
Gain	0 dBi max.
VSWR	2 max.
Polarization	Linear
Azimuth beamwidth	Omni-directional
Impedance	50Ω
Power dissipation	1 W
Operating temperature	–55 to +125 °C
Terminations	NiSn
Resistance to soldering heat	260 °C for 10 s
Weight	0.16 g

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MECHANICAL DATA



For dimensions see Table 1.

Fig.1 Dimensional outline.

Physical dimensions

Table 1 Antenna dimensions

L	W	T	F	C	S ₁
-	-	-	feed termination	-	NC solder termination
Dimensions in millimetres					
8.0 ±0.25	3.5 ±0.2	0.9 ±0.2	1.25 ±0.25	0.5 ±0.3	1.25 ±0.35

Device marking

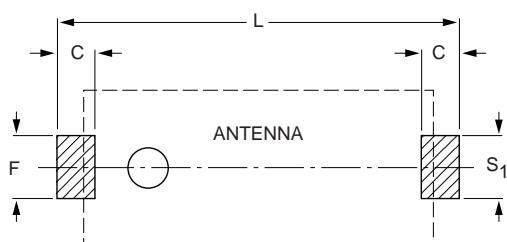
CENTER FREQUENCY (GHZ)	MARKING CODE
2.45	no marking
2.60	6
2.70	7

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ELECTRICAL CHARACTERISTICS

DESCRIPTION	VALUE
Center frequency	2.45, 2.60 and 2.70 GHz
Bandwidth	100 MHz
Gain	0 dBi max.
VSWR	2 max.
Polarization	Linear
Azimuth beamwidth	Omni-directional
Impedance	50 Ω
Power dissipation	1 W
Operating temperature	-55 to +125 °C
Terminations	NiSn
Resistance to soldering heat	260 °C, 10 sec.

FOOTPRINT DIMENSIONS



Dimensions in mm

HBK101

For dimensions see Table 2.

Fig.2 Recommended dimensions of solder lands.

Physical dimensions

Table 2 Recommended solder land pattern

L	F	C	S ₁
-	feed pad	-	NC mounting pad
Dimensions in millimetres			
9.0 ±0.10	1.40 ±0.10	0.90 ±0.10	1.40 ±0.10

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STANDARD TEST BOARD FOR RADIATION PATTERN AND SWR MEASUREMENTS

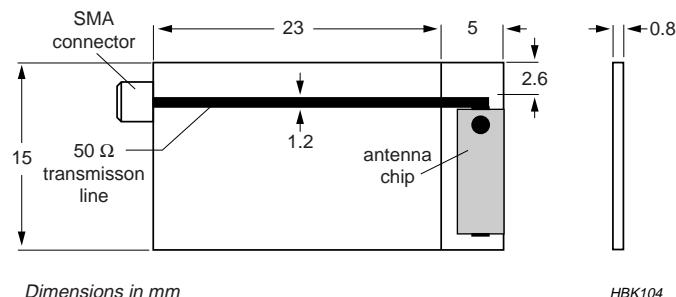
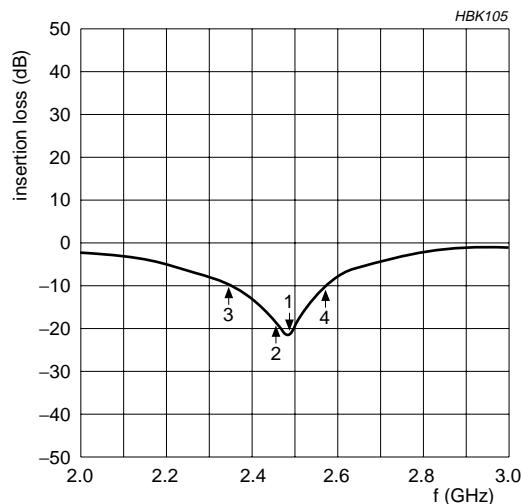
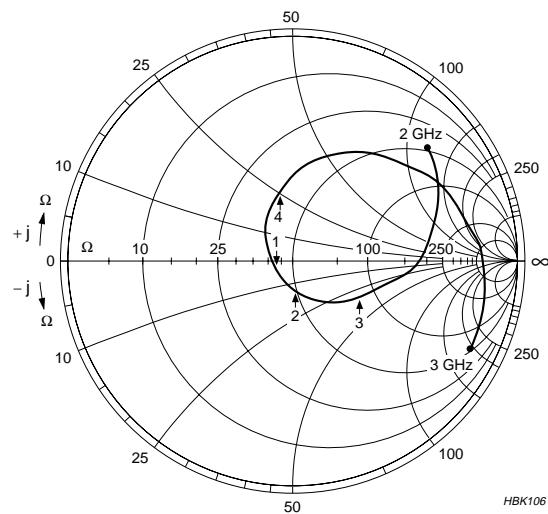


Fig.3 Typical FR4 test board.



CH1 Marker data:
Min.
BW: .225952238 GHz
Cent: 2.4551577144 GHz
Q: 10.866
1 loss: -21.413 dB.



Marker data:
1: 42.73 Ω/-3.05 Ω; f = 2.485 GHz
2: 47.69 Ω/-11.76 Ω; f = 2.455 GHz
3: 82.08 Ω/-28.19 Ω; f = 2.34 GHz
4: 37.24 Ω/-25.78 Ω; f = 2.568 GHz.

Fig.4 Typical SWR and characteristic impedance measurements.

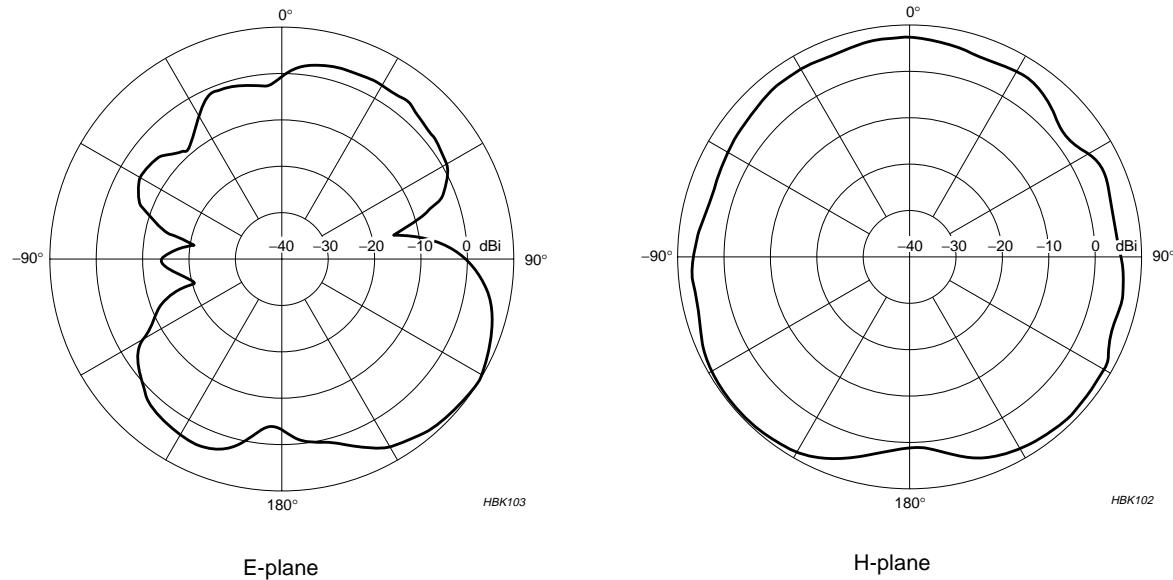
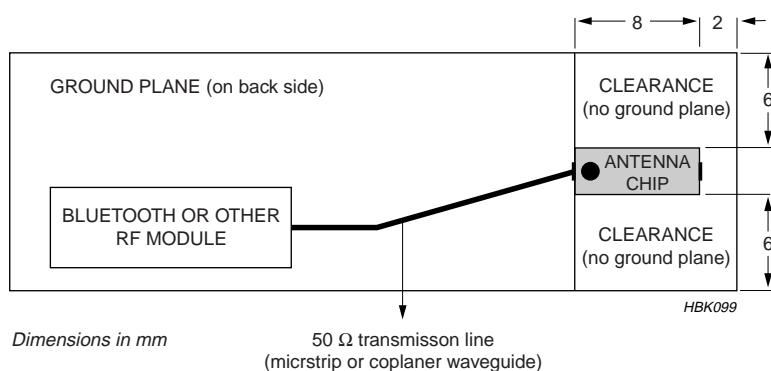
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Fig.5 Typical radiation patterns.

APPLICATION EXAMPLE



Note:
The ground termination can be
optionally connected to RF ground.

Fig.6 Suggested layout.

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ORDERING INFORMATION

Components may be ordered by using either a simple 16-digit clear text code or Phycomp's unique 12NC.

Ordering example for a 2.45 GHz antenna, 1000 pieces supplied in blister tape on 180 mm reel.

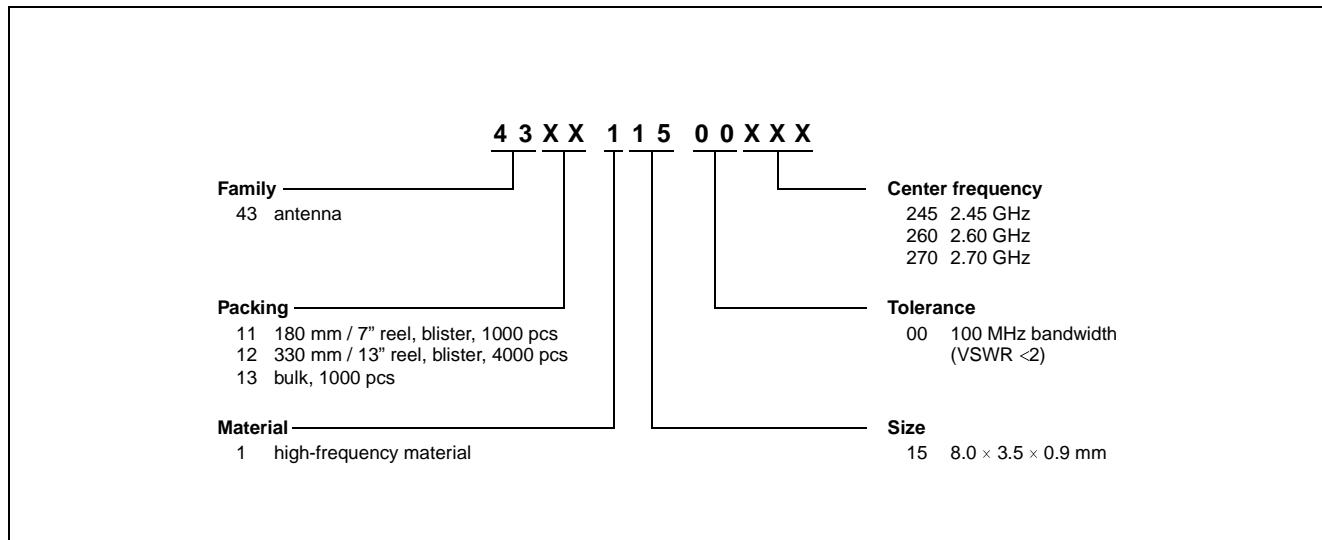
Clear text ordering code

EXAMPLE: AN2450000708031K

PRODUCT	CENTER FREQUENCY	BANDWIDTH	MATERIAL	SIZE	QUANTITY	PACKING
AN	2450	00	07	0803	1	K
AN = antenna	2450 = 2.45 GHz 2600 = 2.60 GHz 2700 = 2.70 GHz	00 = 100 MHz	07 = K7	0803 = 8.0 × 3.5 × 0.9 mm	1 = 1000 pcs 4 = 4000 pcs	K = 180 mm; 7" blister F = 330 mm; 13" blister B = bulk case

12NC ordering code

EXAMPLE: 4311 115 00245



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TESTS AND REQUIREMENTS

Table 3 Test procedures and requirements

IEC 60 384-10 CECC 32 100 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
4.4		mounting	The antenna may be mounted on a printed-circuit boards or ceramic substrates by applying wave soldering, reflow soldering (including vapour phase soldering) or conductive adhesive	no visual damage
4.5		visual inspection and dimension check	any applicable method using $\times 10$ magnification	no cracks or fissures larger than 4 mm
4.6.1		antenna	frequency: 2.45 GHz @ 20 °C	standard test board from Fig.3
4.8		adhesion	a force of 5 N applied for 10 s to the line joining the terminations and in a plane parallel to the substrate	no visible damage
4.9		bond strength of plating on end face	mounted in accordance with CECC 32 100, paragraph 4.4	no visible damage
			conditions: bending 1 mm at a rate of 1 mm/s; radius jig: 340 mm; 2 mm warp on FR4 board of 90 mm length	no visible damage
4.10	20 (Tb)	resistance to soldering heat	260 ± 5 °C for 10 ± 0.5 s in a static solder bath	the terminations shall be well tinned after recovery; center frequency shift within $\pm 6\%$
		resistance to leaching	260 ± 5 °C for 30 ± 1 s in a static solder bath	using visual enlargement of $\times 10$; dissolution of the terminations shall not exceed 10%
4.11	20 (Ta)	solderability	zero hour test and test after storage (20 to 24 months) in original packing in normal atmosphere; unmounted chips completely immersed for 2 ± 0.5 s in a solder bath at 235 ± 5 °C	the terminations must be well tinned for at least 75%
4.12	4 (Na)	rapid change of temperature	-55 °C (30 minutes) to +125 °C (30 minutes); 100 cycles	no visual damage; center frequency shift within $\pm 6\%$
4.14	3 (Ca)	damp heat	500 ± 12 hours at 60 °C; 90 to 95% RH	no visual damage; 2 hours recovery; center frequency shift within $\pm 6\%$
4.15		endurance	500 ± 12 hours at 125 °C	no visual damage; 2 hours recovery; center frequency shift within $\pm 6\%$

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REVISION HISTORY

Revision	Date	Change Notification	Description
Rev.0	2002 Jul 08	–	- First issue of this specification