



## 2.4GHz Flex PCB Magnetic Dipole Antenna

### Description

Occupying approximately one-third of a penny and implemented in ultra-thin 0.2mm flex PCB, BHWR250F is a complete, self-contained half-wavelength magnetic dipole antenna engineered for 2.4GHz embedded applications with the most stringent space limitations. BHWR250F can be simply connected to the RF port of any 2.4GHz systems using standard IPX/UFL cable assembly, without the need for any additional ground plane or impedance matching. The foldable, patent-pending design has overcome significantly the VSWR sensitivity typical of electrically small antennas (ESAs), and provides reliable, high efficiency radiation for a vast range of wireless solutions such as BLE audio, beacons, wearables, electronic shelf label (ESL), medical as well as Wi-Fi or any other wireless devices in the 2.4-2.5GHz frequency band.

### Key Features

- Foldable Flex PCB Design
- Miniature Size: 5x20x0.2mm
- 2.4-2.5GHz Operation Frequency Range
- VSWR < 2:1 over 2.4-2.5GHz
- High Efficiency: 56% at 2.45GHz
- Stable VSWR over Cable Assemblies
- No Need for Ground Plane for Operation

### Key Applications

- Bluetooth Embedded Solutions
- LE Audio, Auracast, ESL, Channel Sounding
- Wi-Fi 3/4/5/6/6E/7
- ZigBee/Thread/Matter IoT Devices
- Generic 2.4GHz Radio Designs
- FPC / LDS Antenna Alternatives

### Product Information



5x20x0.2mm Flex PCBA for IPX/UFL Cable Assembly

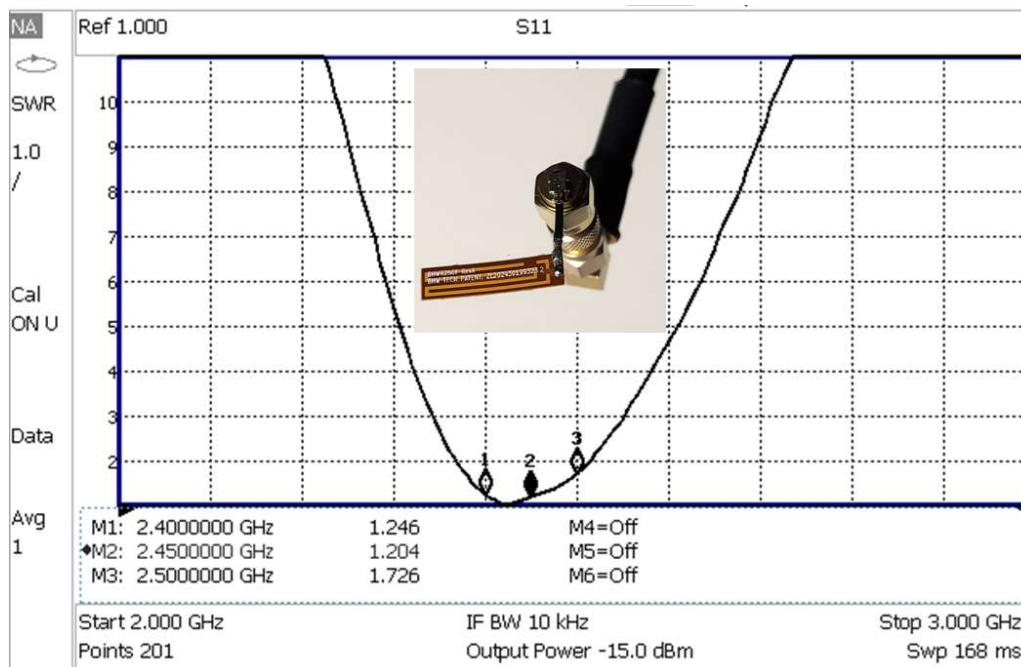


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### Electrical and Mechanical Specifications\*

Parameter	Condition	Specification			Unit
		Min.	Typ.	Max.	
Operating Frequency		2.4		2.5	GHz
Peak Gain			2.2	2.7	dBi
Radiation Efficiency			50	56	%
Input VSWR	Typical Cable & PCB Assembly		2:1	3:1	
Height	H		20		mm
Width	W		5		mm
Thickness	T		0.2		mm

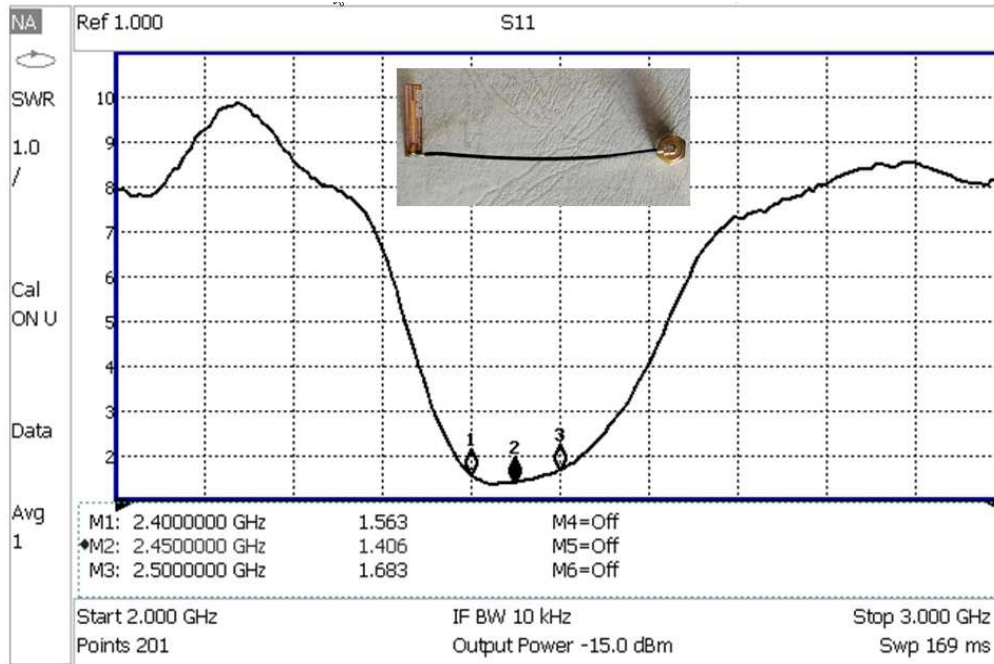
### Typical Input VSWR



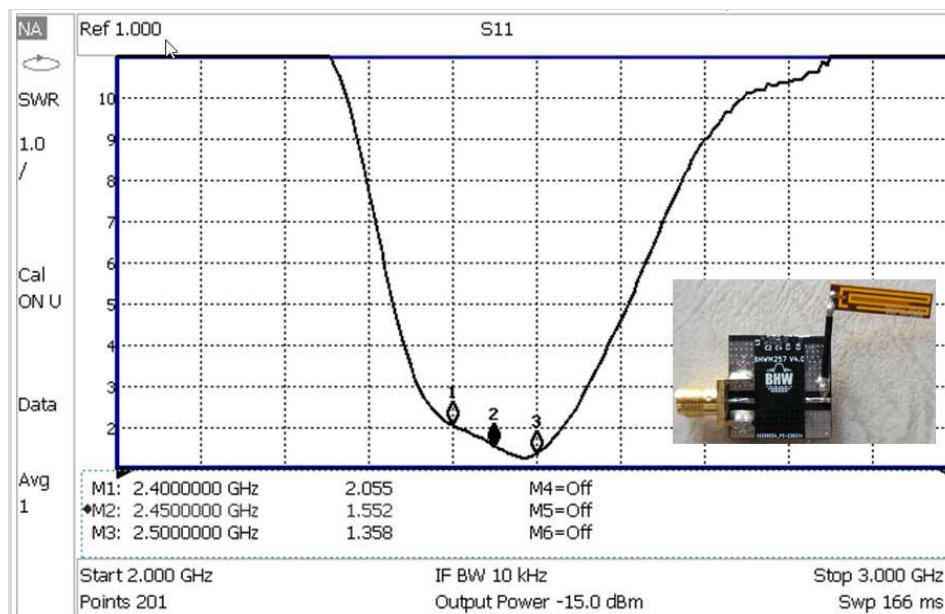
Typical measured standalone VSWR with short IPX cable and IPX-to-SMA adapter



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Typical measured standalone VSWR with 3-inch long IPX cable and IPX-to-SMA adapter

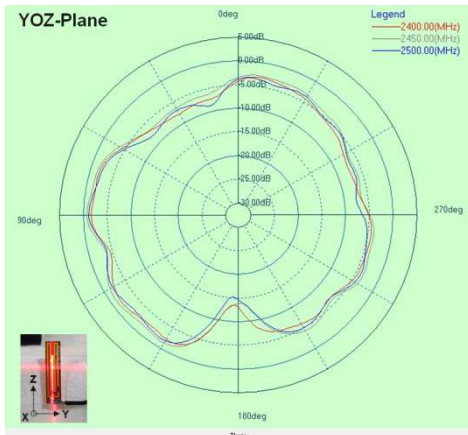
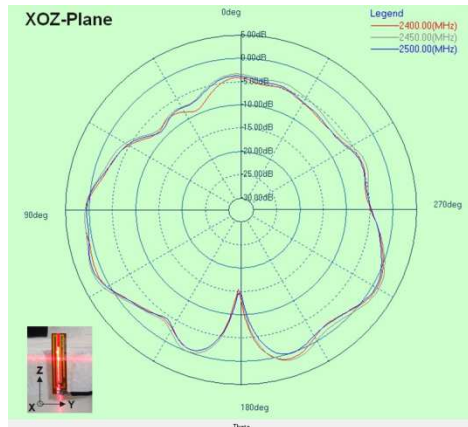
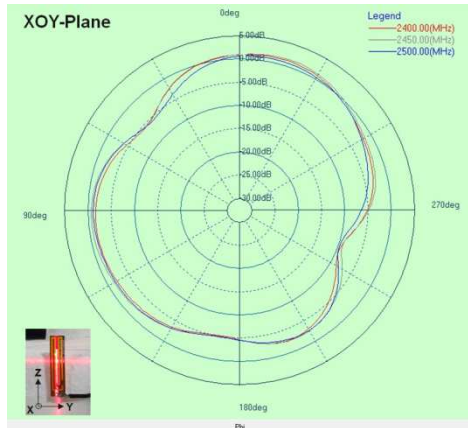


Typical measured VSWR when soldered directly to a 2x2cm PCB with a short IPX cable



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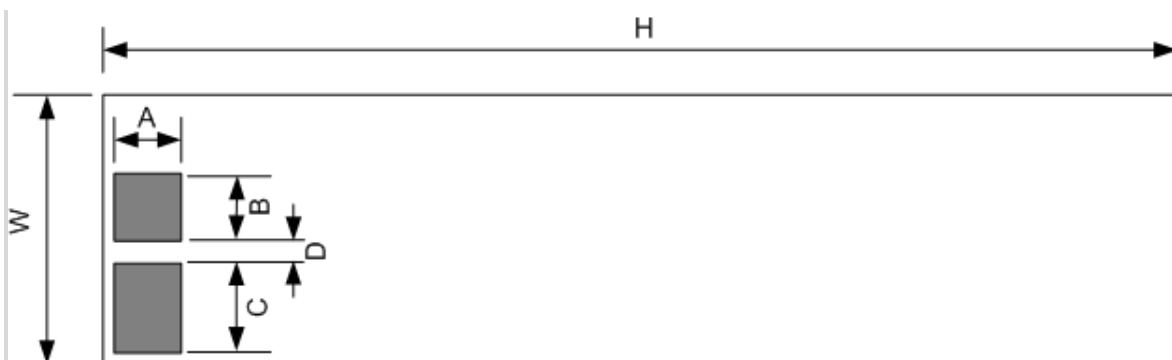
### Measured Radiation Patterns





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### Mechanical Drawings



Symbol	Min. (mm)	Typ. (mm)	Max. (mm)
A	1.2	1.3	1.4
B	1.2	1.3	1.4
C	1.5	1.6	1.7
D	0.5	0.6	0.7
H	19.9	20	20.1
W	4.9	5	5.1

Note: Grey area is solder mask opening for IPX/UFL cable assembly.