

GeoHelix[®]–SMP

Passive GPS Antenna

Product Specification



Product Description

Built on patented PowerHelix[®] filtering antenna technology, the GeoHelix-SMP surface-mount GPS antenna is the smallest quadrifilar helix antenna available, providing high performance in difficult GPS applications. The GeoHelix-SMP antenna is ideal in applications where:

- the device is handheld, body-worn, or otherwise surrounded by high-dielectric materials that would de-tune conventional antennas;
- the antenna is tightly integrated with other antennas, e.g., Bluetooth[®]/GPS receivers or GPS/GSM mobile phones;
- there are tight constraints on the size of the device or the amount of space allocated to ground planes;
- the orientation of the device is random.

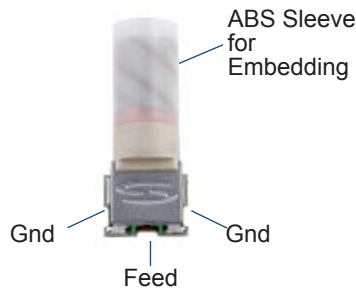
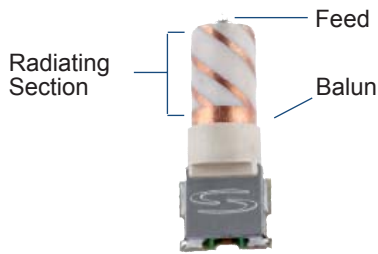
The GeoHelix-SMP antenna is balanced, which isolates it from the device and enables the antenna to reject common mode noise resident on the device ground plane. The construction and materials of the antenna constrain its near-field to a very small volume, therefore materials near the antenna have negligible de-tuning effects and the antenna maintains its pattern and efficiency in the presence of dielectric loading. As a dielectrically-loaded antenna, the GeoHelix-SMP antenna acts as its own filter, attenuating signals from common GSM and ISM frequencies by as much as 30dB without external filtering.

The GeoHelix-SMP antenna may be deployed in an external, “stub-style” configuration, but it is also a simple antenna to embed due to its isolation properties. The antenna is deployed with either a black radome or an ABS plastic sleeve, depending on customer device configuration.

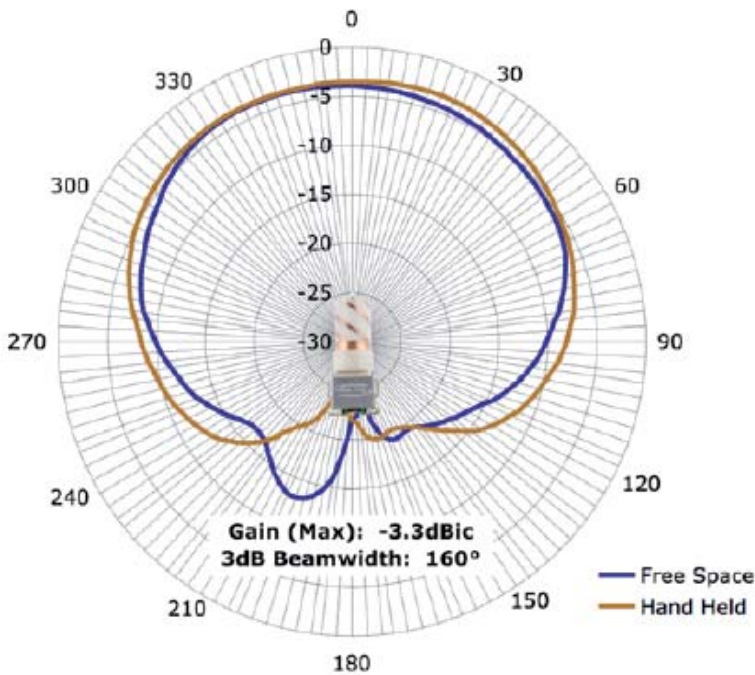


Specifications

	Minimum	Typical	Maximum	Unit
Part Number	1010004			Each
Type	Quadrifilar Helix			
Frequency	1573.42	1575.42	1577.42	MHz
Polarization	Right-hand circular polarized			
Gain	-5.5	-3.5		dBic
Efficiency		23%		Total spherical
Efficiency		45%		Upper spherical
Beamwidth		>120		Degrees
Bandwidth (3dB)		20		MHz
Axial Ratio		<2.0		@Zenith
VSWR		<2.0:1	2.3:1	
Impedance		50		
Operating Temperature	-40	+20	+85	°C
Element Dimensions	10 (diameter) x 17 (length)			mm
Overall Dimensions (w/radome)	12 (dia) x 14 (width) x 38 (length)			mm
Weight (excl radome or sleeve)	9			grams
Mounting	SMT			



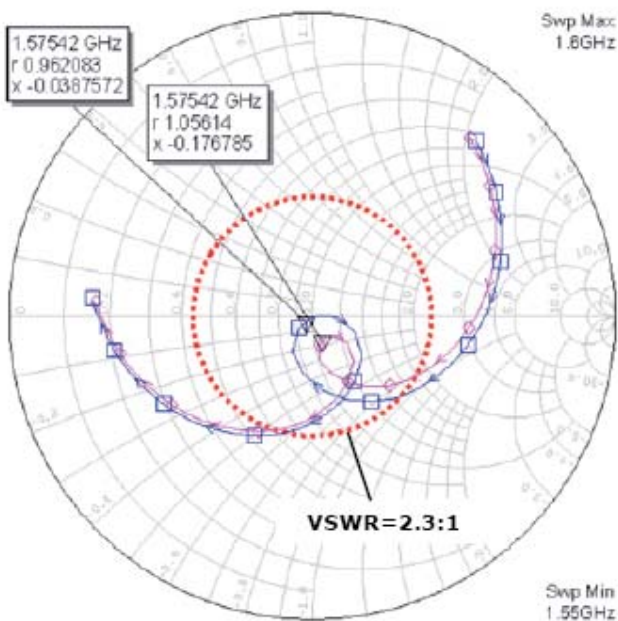
Radiation Pattern (dBic)



The strength of the PowerHelix antenna technology is its immunity to de-tuning in the presence of dielectric loading, like human tissues. The GeoHelix-SMP antenna retains efficiency and polarization near the human body. Conventional antennas lose 5-10dB of gain in similar circumstances.

Though it will not electrically couple with a ground plane, the GeoHelix-SMP antenna can be expected to increase efficiency by up to 100% when mounted over a ground plane due to near-field signal reflections. Configuration and orientation of the ground plane with respect to the antenna will vary results, but efficiency will not decrease.

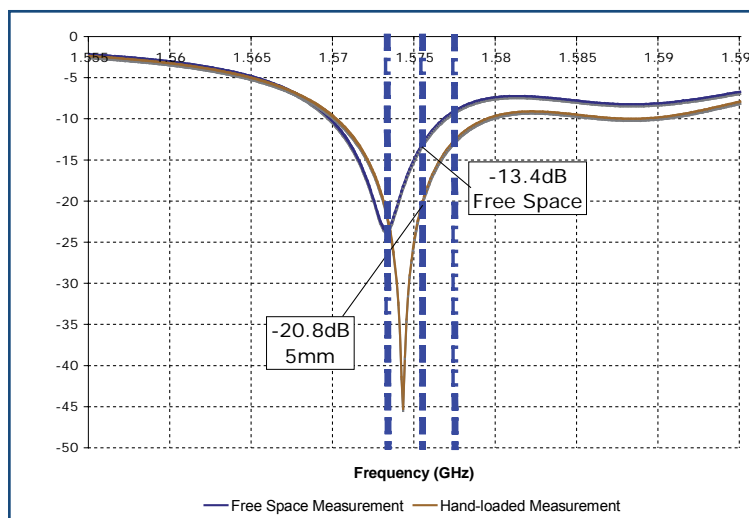
Typical Impedance



The GeoHelix-SMP antenna is optimized for 50 Ω impedance to simplify the matching process. The Smith chart showing a typical impedance plot of the GeoHelix-SMP has been normalized to 1. The resonant frequency of the antenna is shown at the markers, and the bandwidth of the antenna is shown by the dimensions of the loops. The red circle shows the VSWR<=2.3:1 impedance mask.

As with the pattern chart, it is important to note the immunity of the antenna to loading factors in close proximity. It can be seen that the impedance of the antenna changes very little until a phantom hand is placed inside a radius of 10mm from the antenna.

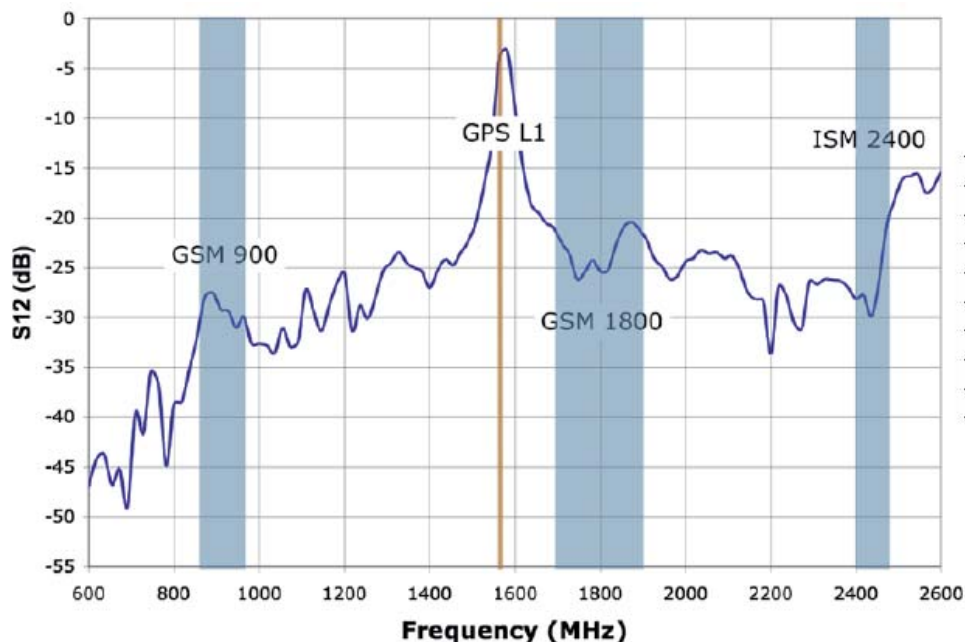
Return Loss



Immunity from bio-loading effects can be demonstrated effectively through the S₁₁ plot. While some change in match is observed as a phantom hand is moved closer to the radiating section of the antenna, minimal de-tuning occurs.

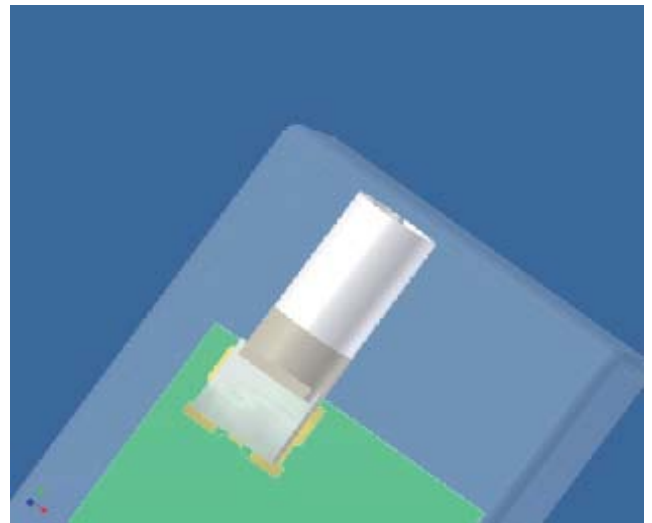
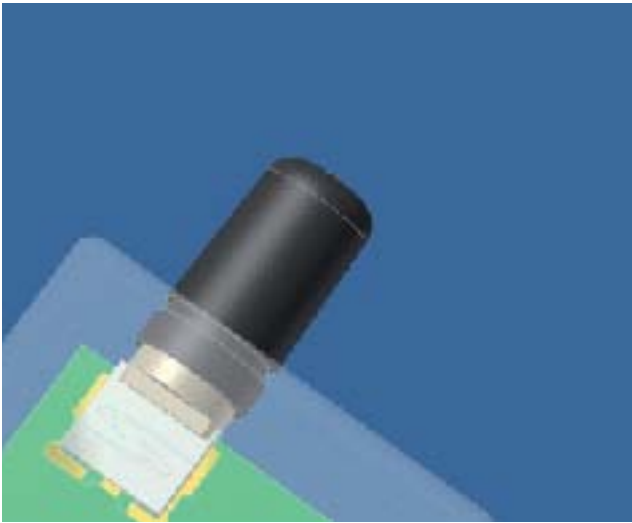
The GeoHelix-SMP antenna also demonstrates a sharp filtering response in bands near the desired resonant frequency.

Filtering Response

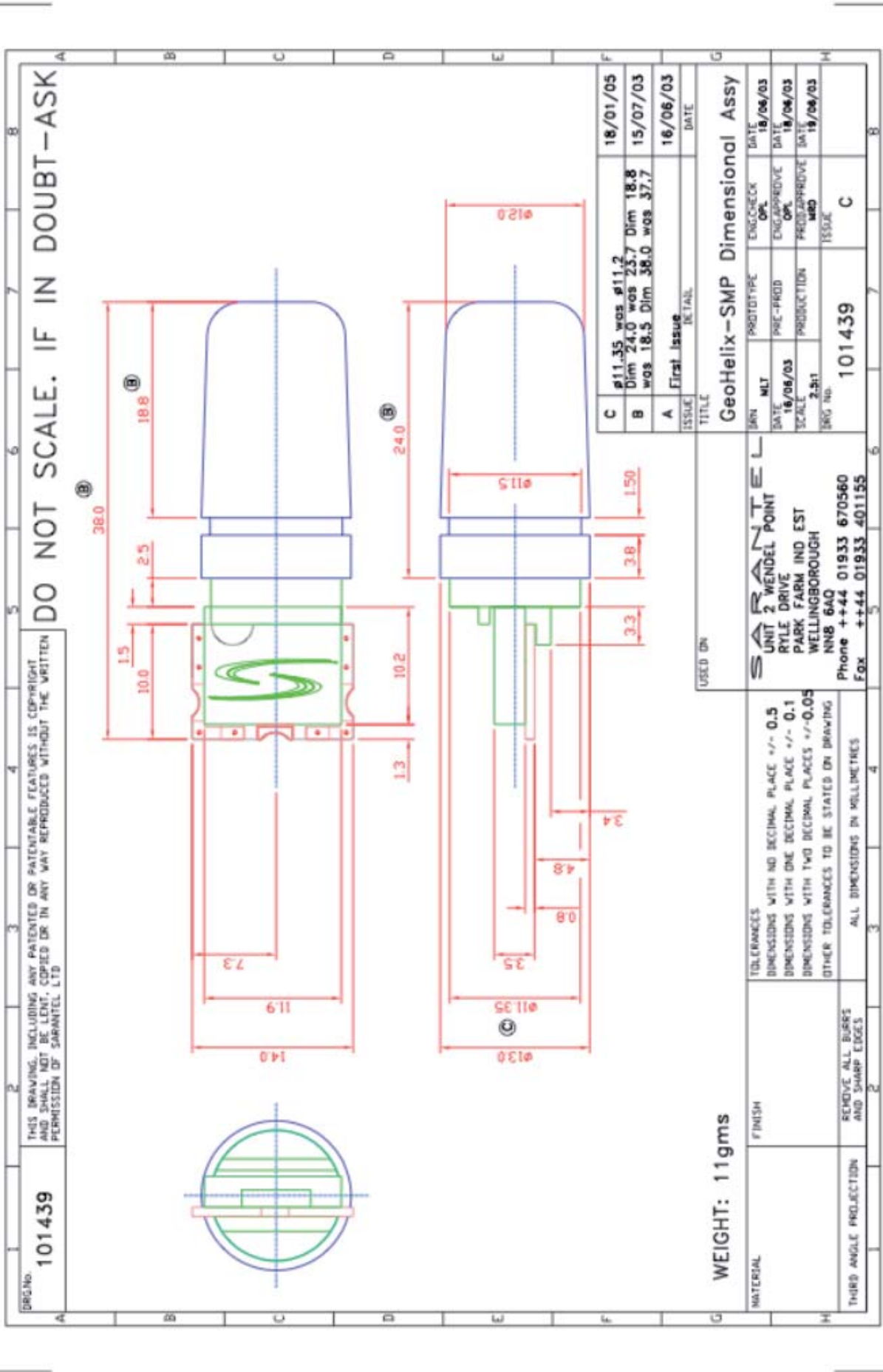


Frequency (MHz)		S ₁₂ (dB)
860	GSM	-31
970	900	-31
1575	GPS L1	-3
1700	GSM	-22
1800	1800	-25
1900		-22
2400	ISM 2.4	-28
2480		-20

Embedding Information



GeoHelix antennas may be mounted externally or embedded within a device. External applications will give the antenna the greatest field of view, however embedded applications can be designed with minimal impact on antenna performance. When mounting externally, the groove in the radome should be used as a mechanical support. When mounting internally, the ABS sleeve must be used to ensure on-frequency performance. For further information on embedding the GeoHelix antenna, see the embedding guideline documents.



Mechanical Drawings - No Radome

