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		

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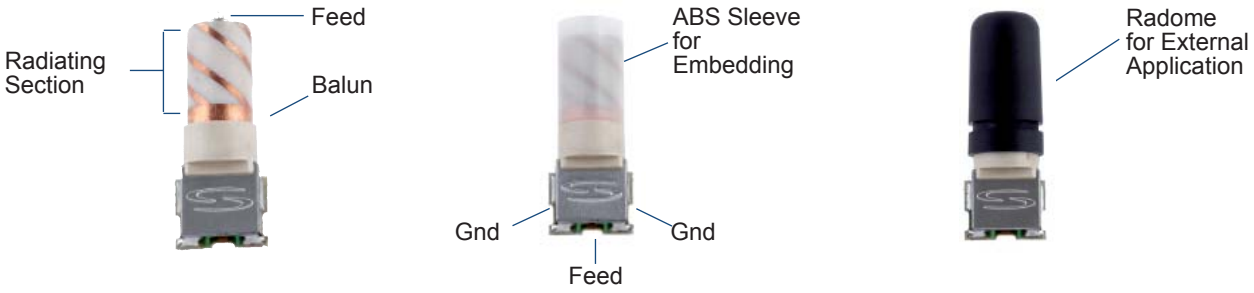
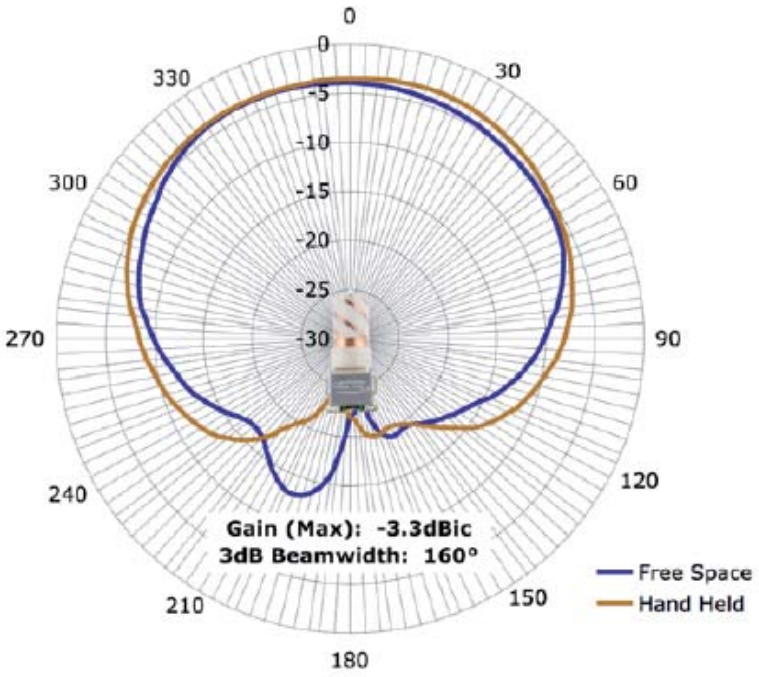
v1 Iss 09-06 © Sarantel Ltd. 2005



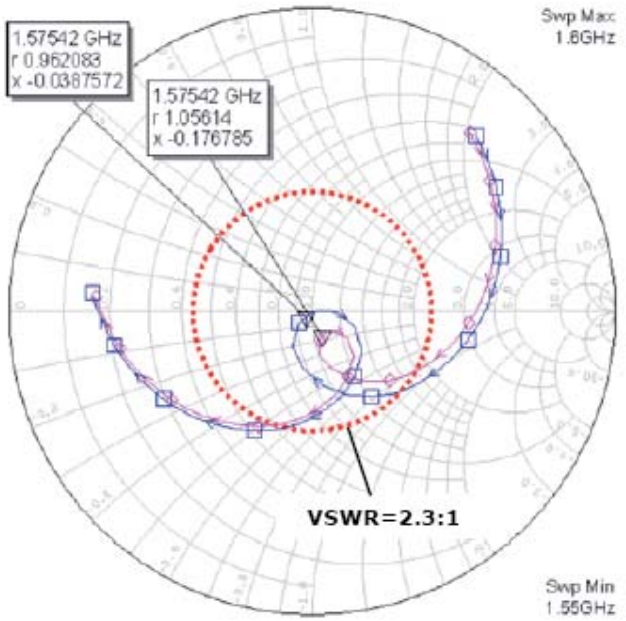
Radiation Pattern (dBic)



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.

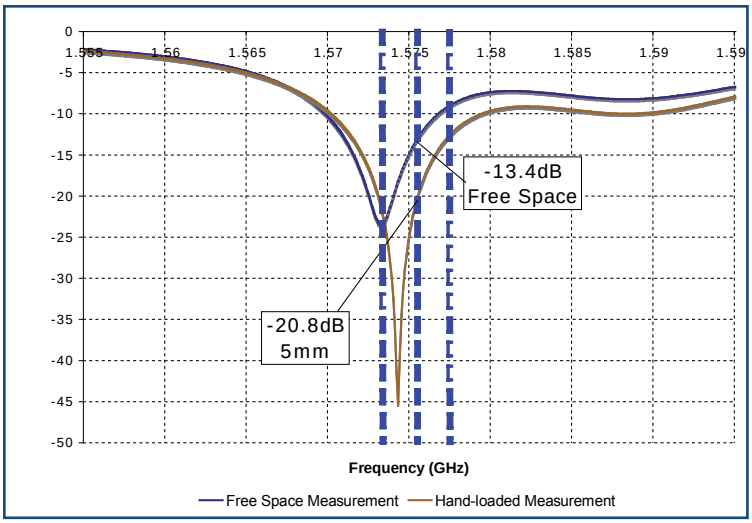
Typical Impedance



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.

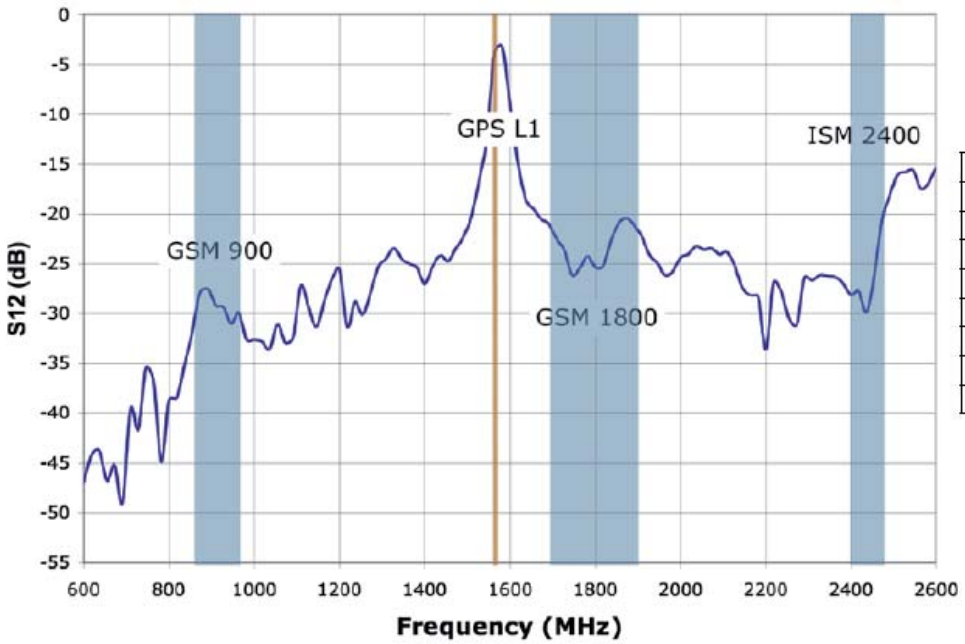
Return Loss



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.

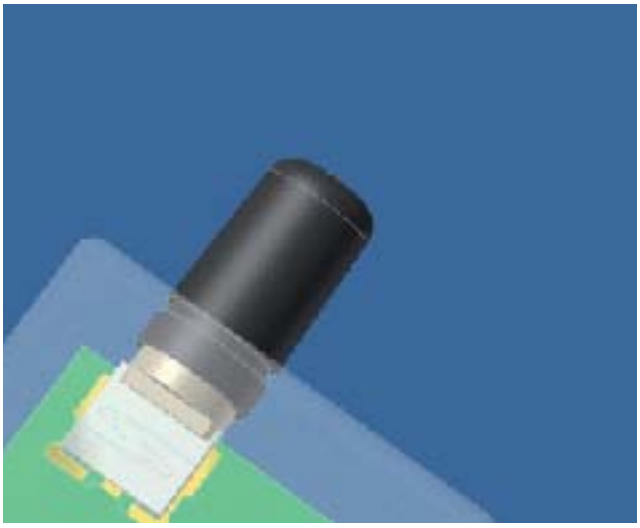
The GeoHelix-SMP antenna also demonstrates a sharp filtering response in bands near the desired resonant frequency.

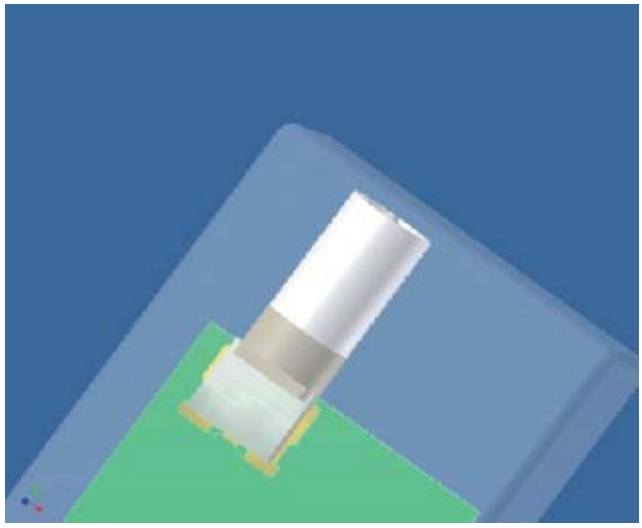
Filtering Response



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

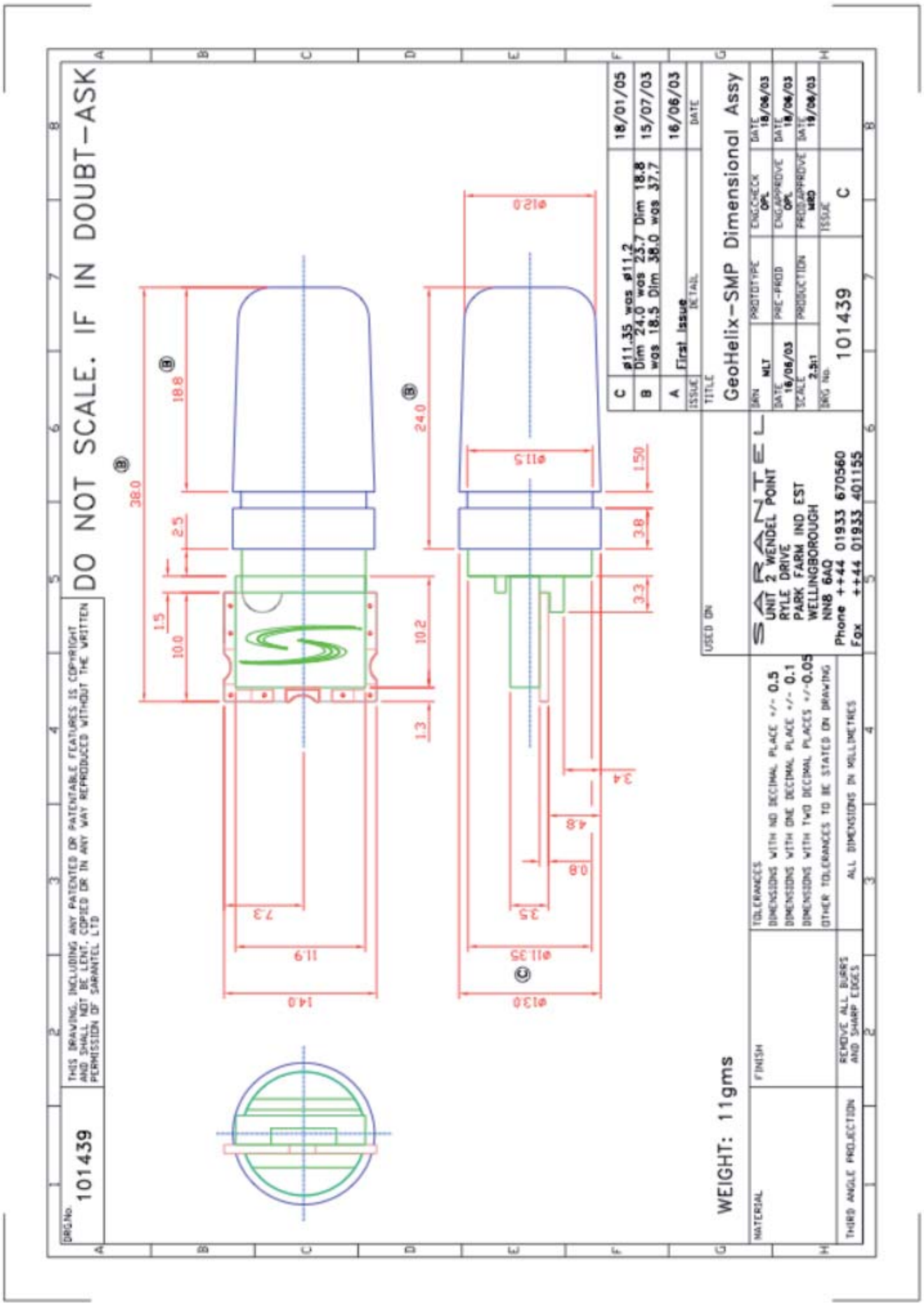
Emedding Information



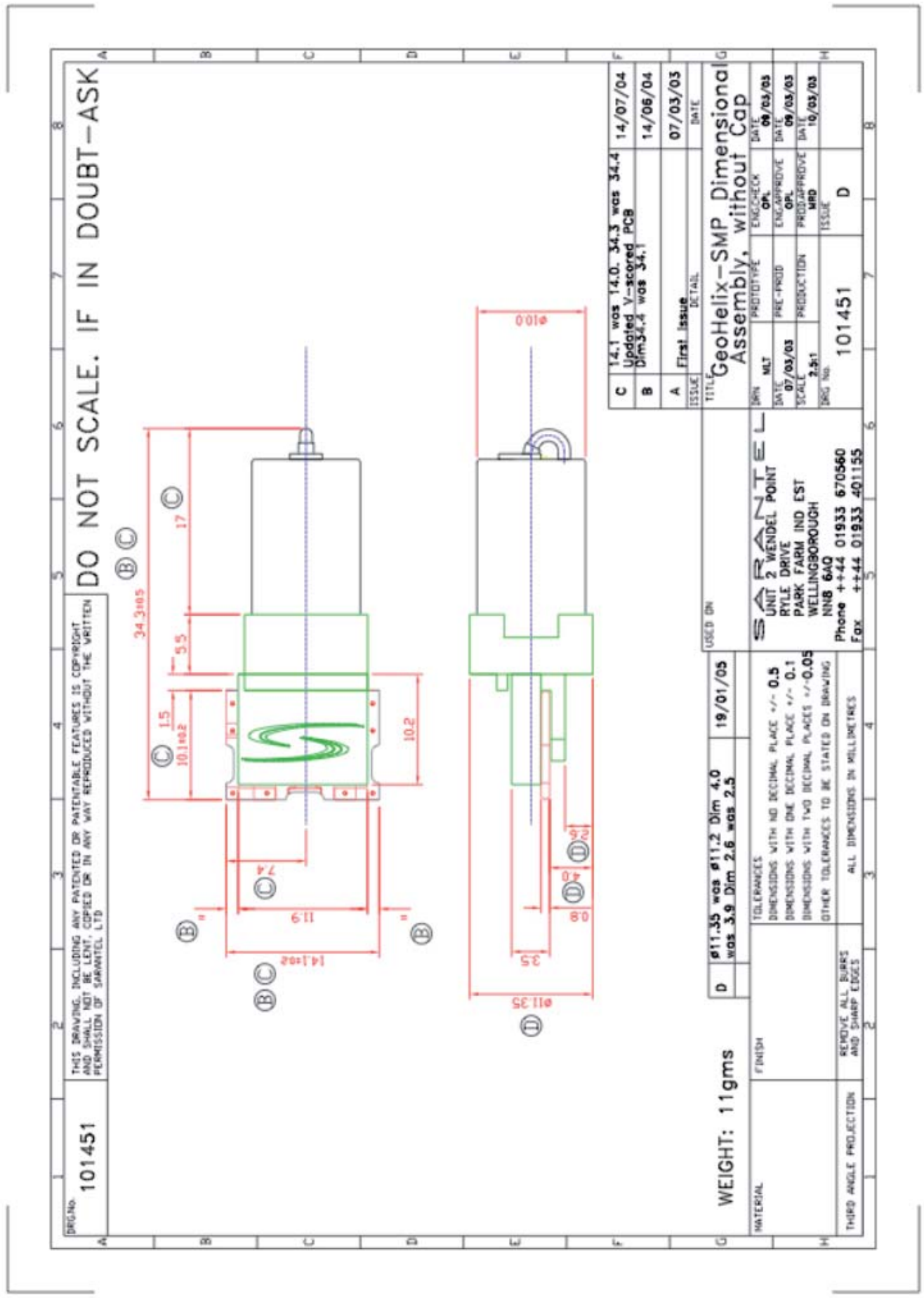


GeoHelix antennas may be mounted externally or embedded within a device. External applications will give the antenna the greatest field of view, however embedded applications can be designed with minimal impact on antenna performance. When mounting externally, the groove in the radome should be used 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.

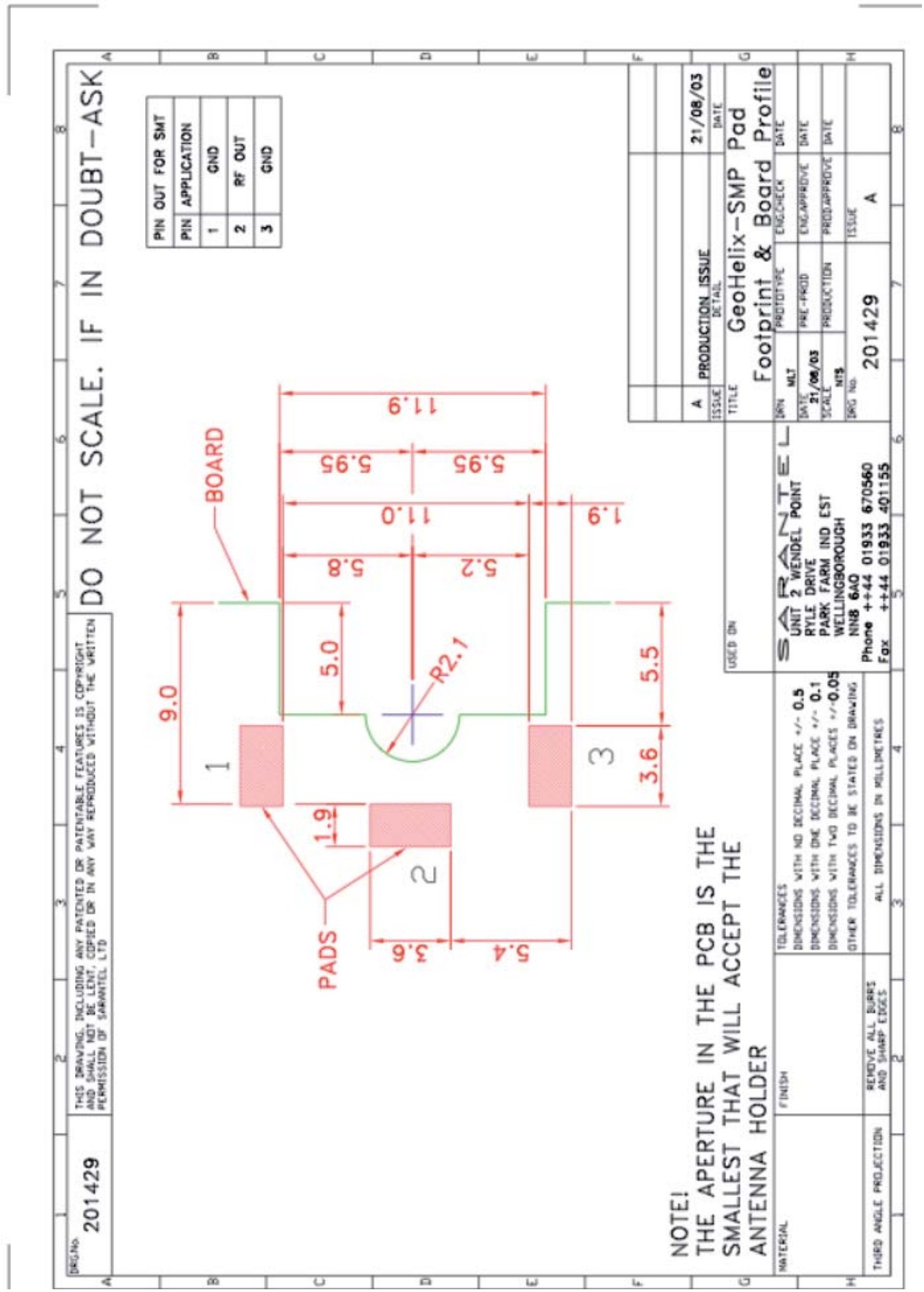
Mechanical Drawings - With Radome



Mechanical Drawings - No Radome



Mechanical Drawings - No Radome



RoSH Compliance Statement

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RoHS/Lead-Free Compliance

Dear Sir / Madam:

This letter is intended to answer questions from our customers, partners and suppliers regarding the compliance of Sarantel Ltd products with the following EU directives:

- 2006/96: Waste Electrical and Electronic Equipment (WEEE)
- 2000/53: End of Life Vehicle (ELV)
- 2002/95: Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS); (***effective 1st July 2006***)

The directives aim is to avoid or limit the use of hazardous materials such as lead, mercury, cadmium and hexavalent chromium, as well as brominated substances - PBDE (polybrominated diphenyl ethers) and PBB (polybrominated biphenyls).

Sarantel has shipped compliant product since ***1st January 2006*** and incorporated the requirements of 2002/95 into the product/technology development roadmaps. We are committed to the supply of lead-free/RoHS compliant devices in current and future product introductions.

Please contact your local sales representative should further information be required.

David Wither
Chief Executive Officer (CEO)

Bill Taylor
Chief Operating Officer (COO)

Andrew Christie
VP of Engineering

Ian Gerry
Director of Quality

Registered Office as above address.

6th June 2006

About Sarantel

Sarantel designs and manufactures dielectrically loaded antennas based on patented PowerHelix® filtering antenna technology. Sarantel's antennas are ideal for applications in which the radio device is small, handheld, or body-worn, or in devices with multiple transceivers and high levels of common mode noise. Sarantel antennas can be mounted externally or easily embedded within a device.

Sarantel antennas are protected by US patents 5854608, 5181297, 6424316, 5859621, 6369776; UK Patents 2297638, 2326532, 2326533, 2310543; and other granted or pending international patents.

GeoHelix®, PowerHelix®, and the Sarantel logo are registered trademarks of Sarantel Ltd.

Application Support

Sarantel are committed to our customers' success, and so offer a variety of support options for customers designing RF products.

Check the Sarantel web site at sarantel.com/technology for the latest production specifications, technical notes, and application guides for solutions to the most common antenna integration issues.

Contact our applications support group by email at info@sarantel.com, info-asia@sarantel.com, or info-usa@sarantel.com for detailed product specifications, including mechanical drawings, surface mount pad layout, embedding recommendations, and other application questions not answered in the technical literature.

For further support options, please contact your local sales representative at www.sarantel.com/wheretobuy.

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