

# SL1203 - (GeoHelix<sup>®</sup> - P2)



## Rugged Passive Antenna

### Product Specification



SL1203A/SL1203C variant



SL1203D variant

#### Product Description

Built on patented PowerHelix<sup>®</sup> filtering antenna technology, the Ruggedised SL1203 GPS antenna is the smallest quadrifilar helix antenna available, providing high performance in difficult GPS applications. The Ruggedised SL1203 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 externally mounted and in close proximity to other antennas, e.g., on top of a two way radio or tactical radio close to transmitting antennas;
- the device is used in a harsh environment, subjected to force, dust and moisture; or
- the orientation of the device is random.

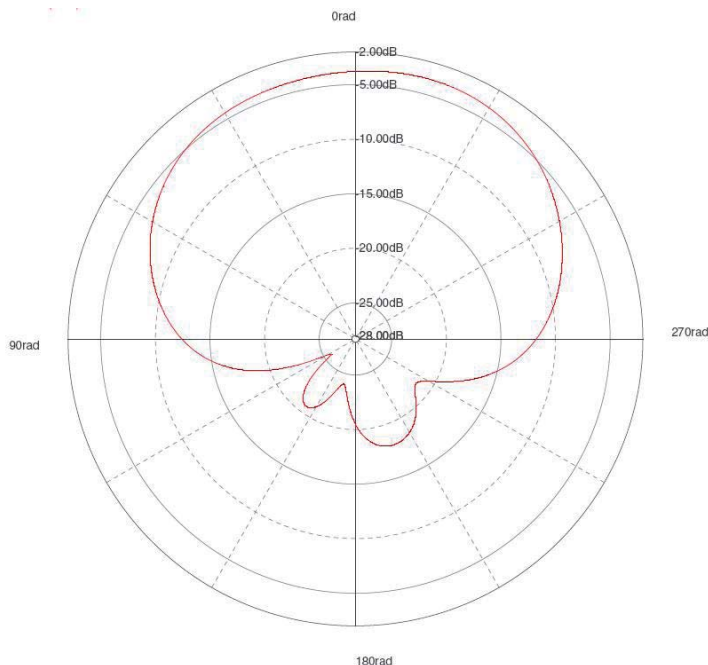
The Ruggedised SL1203 antenna is balanced, which isolates it from the device and enables the antenna to reject common mode noise resident on the device ground plane. The construction and materials of the antenna constrain its near-field to a very small volume, therefore materials near the antenna have negligible de-tuning effects and the antenna maintains its pattern and efficiency in the presence of dielectric loading. As a dielectrically-loaded antenna, the Ruggedised SL1203 acts as its own filter, attenuating signals from common GSM and ISM frequencies by as much as 30dB without external filtering. The SL1203 has a built in DC Block to enable direct connection to receivers with DC on their input pin.

The SL1203A and SL1203C have the same external dimensions with the only difference being the integrated O-ring on the SL1203C. The SL1203D also has the integrated O-ring and different external profile.

#### Specifications

	Minimum	Typical	Maximum	Unit
Part Number	SL1203A/SL1203C/SL1203D			Each
Type	Quadrifilar Helix			
Connector Type	SMA			
Embedded Frequency	1573.42	1575.42	1577.42	MHz
Polarization	Right-hand circular polarized			
Gain		-2.8		dBic @ zenith
Efficiency		27%		Total spherical
Efficiency		50%		Upper hemishpere
Beamwidth		135		Degrees
Bandwidth (3dB)		20		MHz
Axial Ratio		<1.5		@Zenith
VSWR		<2.0:1	2.3:1	
Impedance		50		
Operating Temperature	-40	+20	+85	°C
Overall Dimensions	See mechanical drawings			mm
Weight	14			grams

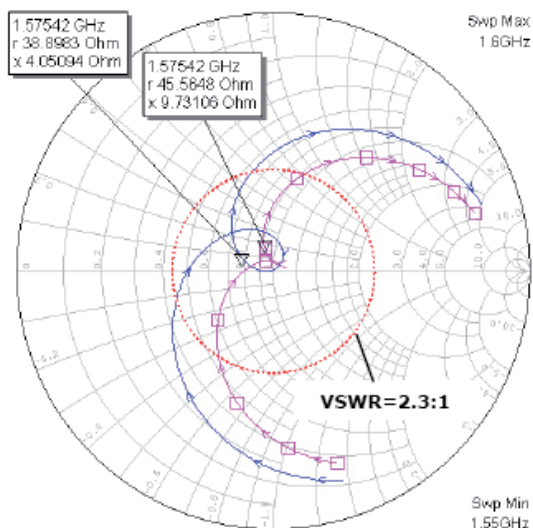
## Radiation Pattern (dBic)



The strength of the PowerHelix antenna technology is its immunity to de-tuning in the presence of dielectric loading, like human tissues. GeoHelix antennas 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 Ruggedised SL1203 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.

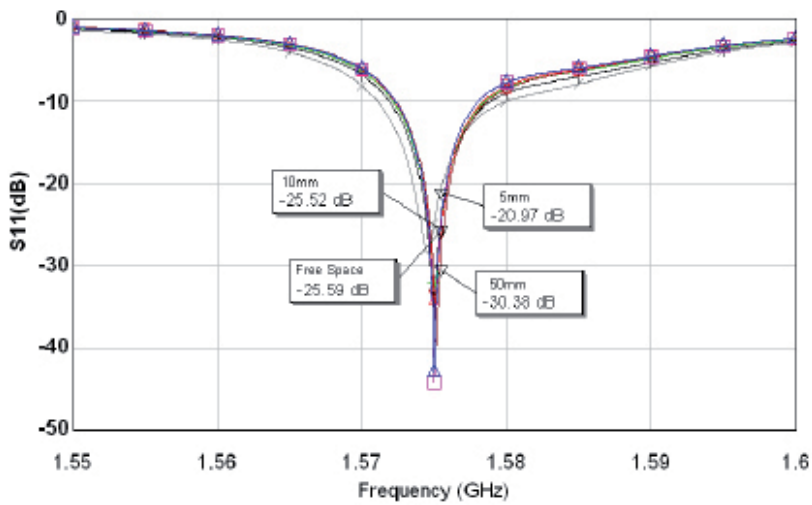
## Typical Impedance



The Ruggedised SL1203 antenna is optimized for 50Ω impedance to simplify the matching process. The Smith chart showing a typical impedance plot of the antenna has been normalized to 1. The resonant frequency of the antenna is shown at the marker, and the bandwidth of the antenna is shown by the dimensions of the loop. 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.

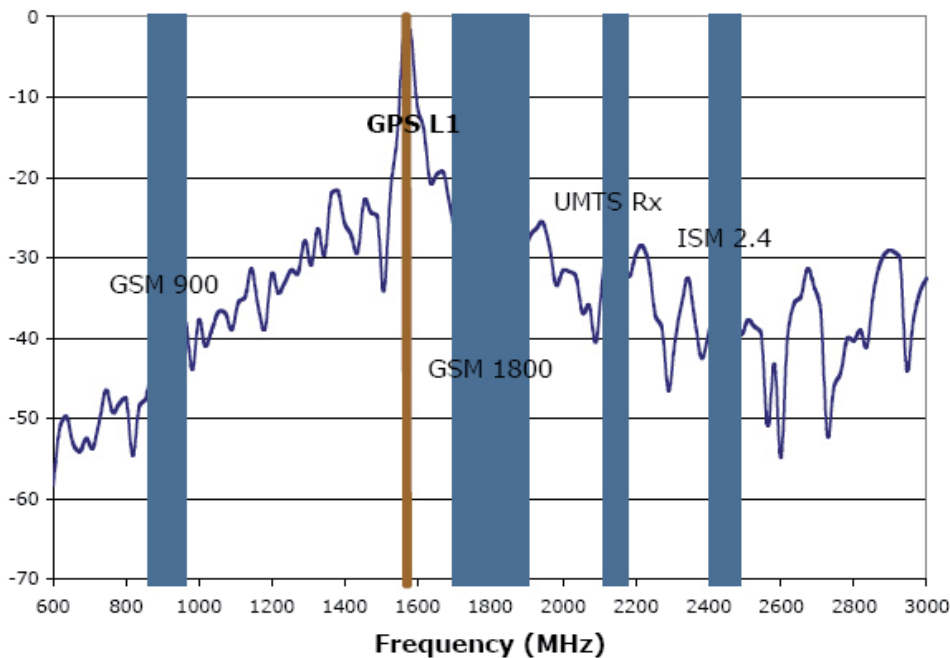
## Return Loss



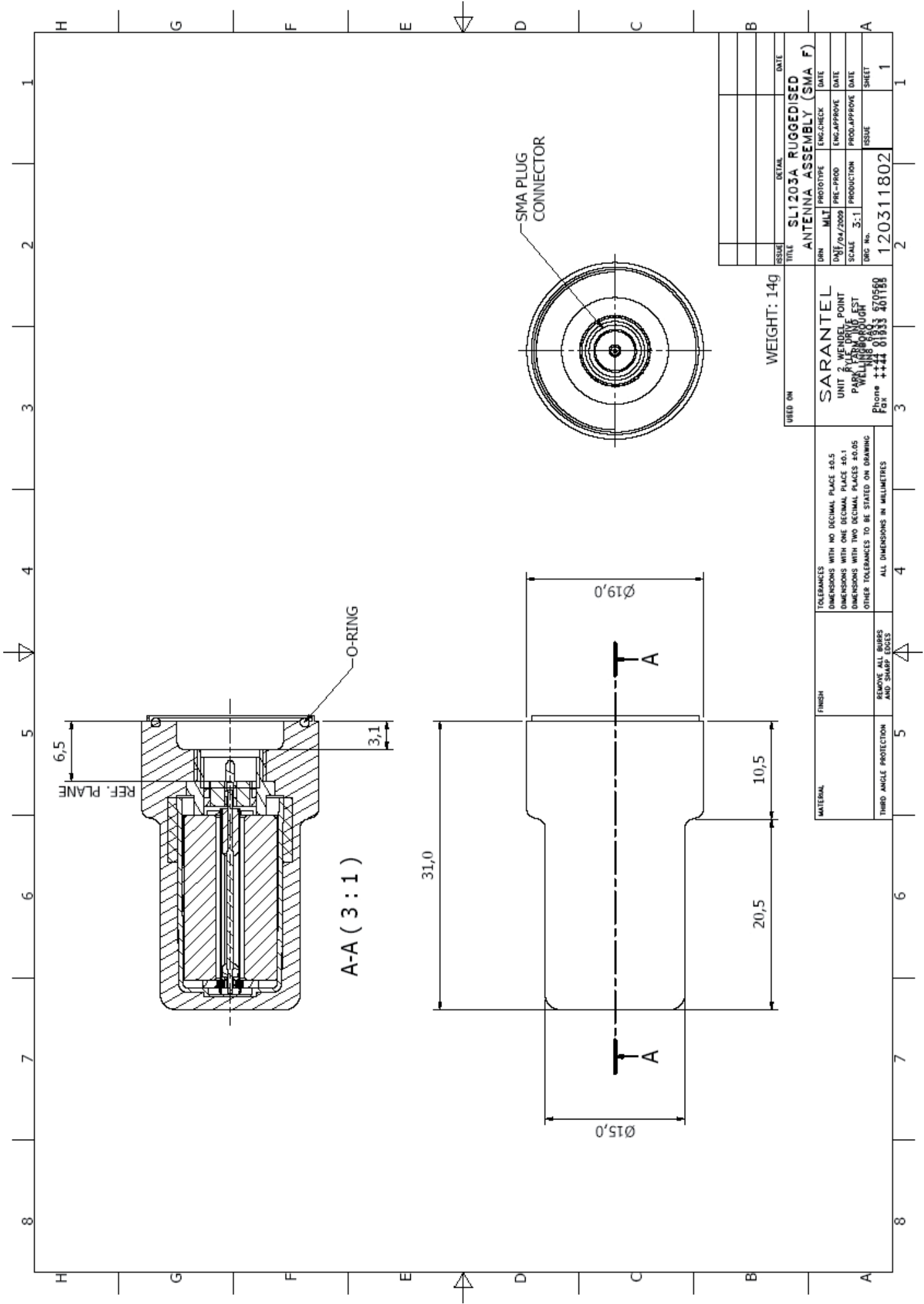
Immunity from bio-loading effects can be demonstrated effectively through the S11 plot. While some change in match is observed as a phantom hand is moved closer to the radiating section of the antenna, minimal de-tuning occurs.

The Ruggedised SL1203 antenna also demonstrates a sharp filtering response in bands near the desired resonant frequency.

## Filtering Response



Frequency (MHz)		S <sub>12</sub> (dB)
860	GSM	-46
970	900	-40
<b>1575</b>	<b>GPS L1</b>	<b>-2</b>
1700		-26
1800	GSM	-36
1800	1800	-29
2110	3G Rx	-32
2170		-30
2400	ISM 2.4	-40
2480		-38



ISSUE	TITLE	DETAIL	DATE
	SL1203A RUGGEDISED ANTENNA ASSEMBLY (SMA F)		
DRN	MLT	PROTOTYPE	ENG.CHECK
DATE	DATE	DATE	DATE
04/2009	PRE-PROD	ENG.APPROVE	
SCALE	3:1	PRODUCTION	PROD.APPROVE
		ISSUE	SHEET
		120311802	1

USED ON

**SARANTEL**  
 UNIT 2 WENDEL POINT  
 RAIL DRIVE  
 PARK ROAD  
 WILLINGBROUGH  
 WILMINGTON  
 Phone +44 01333 570560  
 Fax +44 01333 401159

WEIGHT: 14g

TOLEANCES WITH NO DECIMAL PLACE ±0.5  
 DIMENSIONS WITH ONE DECIMAL PLACE ±0.1  
 DIMENSIONS WITH TWO DECIMAL PLACES ±0.05  
 OTHER TOLERANCES TO BE STATED ON DRAWING

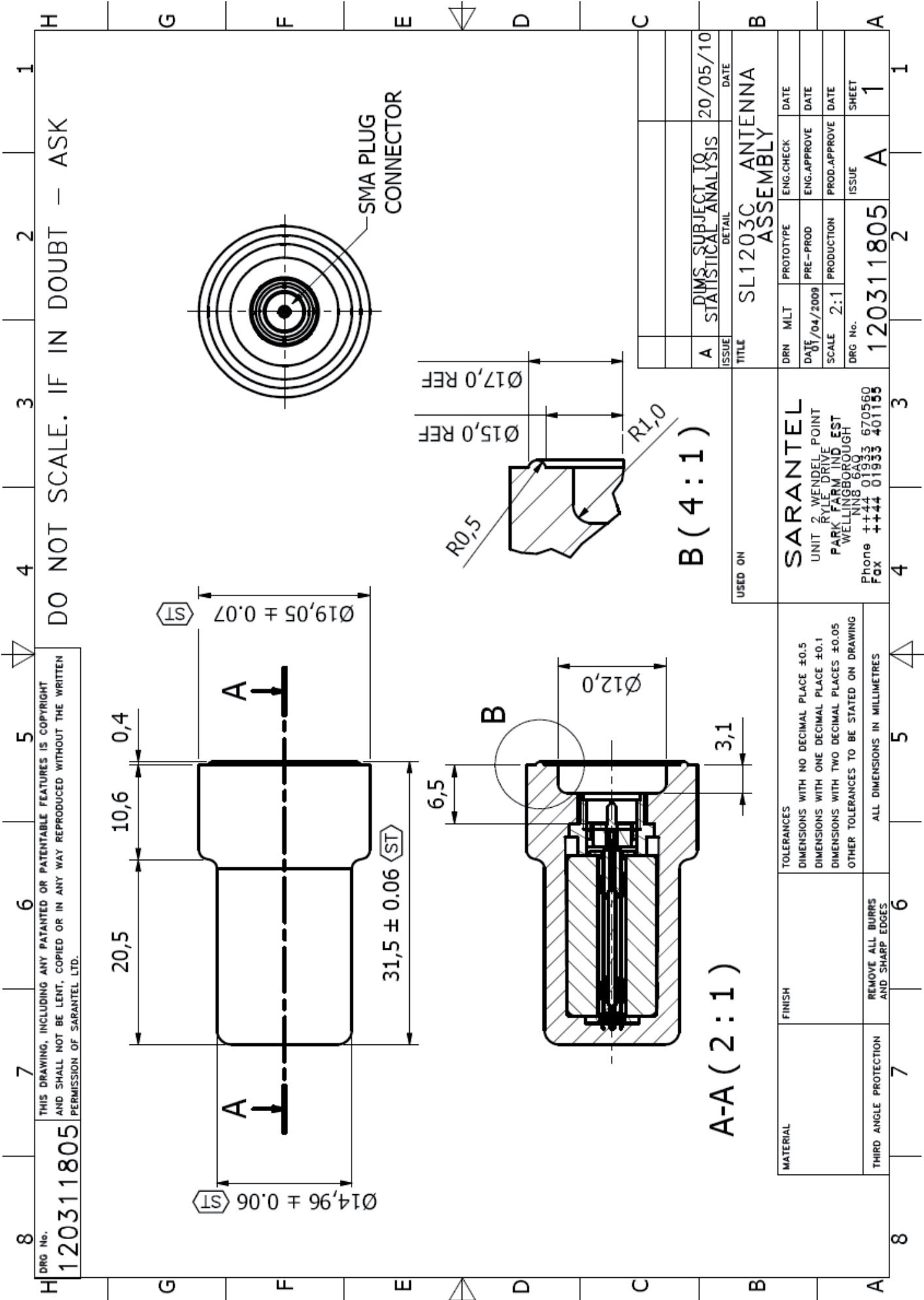
FINISH

MATERIAL

THIRD ANGLE PROTECTION AND SHARP EDGES

REMOVE ALL BURRS AND SHARP EDGES

ALL DIMENSIONS IN MILLIMETRES



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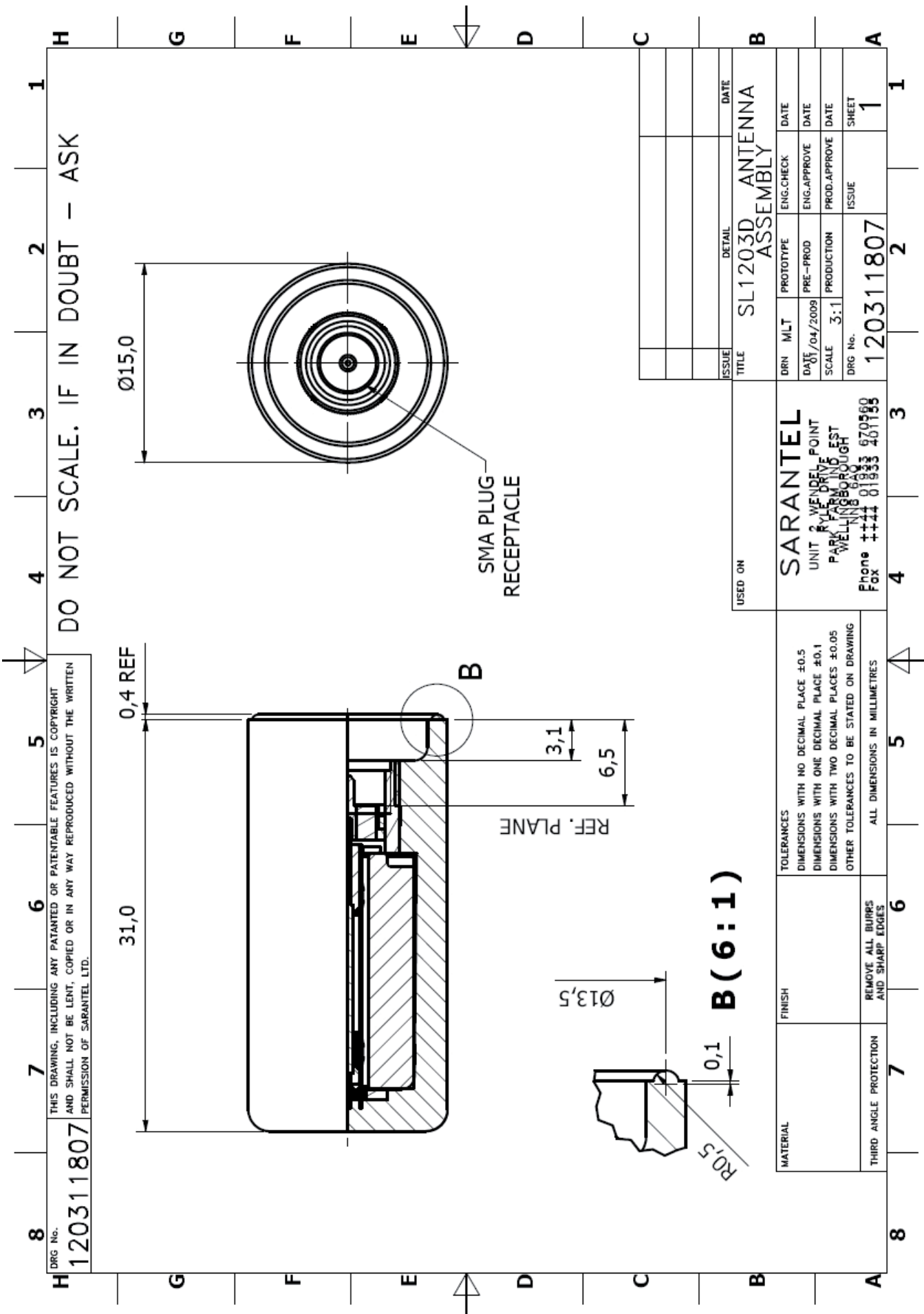
DO NOT SCALE. IF IN DOUBT - ASK

B (4 : 1)

A-A (2 : 1)

USED ON		SARANTEL UNIT 2, WENDEL POINT RYLE DRIVE PARK FARM IND EST WELLINGBOROUGH NN8 6AQ Phone +44 01933 670560 Fax +44 01933 401155	
DRN	MLT	PROTOTYPE	ENG.CHECK
DATE	01/04/2009	PRE-PROD	ENG.APPROVE
SCALE	2:1	PRODUCTION	PROD.APPROVE
DRG No.	120311805	ISSUE	SHEET
			1

MATERIAL	FINISH	TOLERANCES	ALL DIMENSIONS IN MILLIMETRES
		DIMENSIONS WITH NO DECIMAL PLACE $\pm 0.5$ DIMENSIONS WITH ONE DECIMAL PLACE $\pm 0.1$ DIMENSIONS WITH TWO DECIMAL PLACES $\pm 0.05$ OTHER TOLERANCES TO BE STATED ON DRAWING	
THIRD ANGLE PROTECTION	REMOVE ALL BURRS AND SHARP EDGES		



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**120311807**

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SCALE		3:1	PRODUCTION	PROD.APPROVE	DATE
DRG No.		120311807		ISSUE	SHEET
					<b>1</b>

MATERIAL	FINISH	TOLERANCES
		DIMENSIONS WITH NO DECIMAL PLACE ±0.5
		DIMENSIONS WITH ONE DECIMAL PLACE ±0.1
		DIMENSIONS WITH TWO DECIMAL PLACES ±0.05
		OTHER TOLERANCES TO BE STATED ON DRAWING
THIRD ANGLE PROTECTION	REMOVE ALL BURRS AND SHARP EDGES	ALL DIMENSIONS IN MILLIMETRES

## Ordering Guide for the SL1203 antenna

<b>Part Number</b>	<b>Description</b>	<b>MOQ</b>	<b>Pack Size</b>
SL1203A	GeoHelix® Ruggedised SL1203 Antenna	60	60
SL1203C	GeoHelix® Ruggedised SL1203 Antenna	60	60
SL1203D	GeoHelix® Ruggedised SL1203 Antenna	60	60

### Notes

1. Orders placed for below MOQ or not in multiples of pack quantities will be subject to a \$20 handling fee
2. For further guidance on selecting the correct part number please contact Sarantel distributors or [info@sarantel.com](mailto:info@sarantel.com)



SARANTEL LTD  
Unit 2, Wendel Point  
Ryle Drive, Park Farm South  
Wellingborough, NN8 6BA  
UK  
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Fax: +44 1933 401155  
Email: [enquiry@sarantel.com](mailto:enquiry@sarantel.com)  
Web: [www.sarantel.com](http://www.sarantel.com)

## 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 1<sup>st</sup> July 2006)
- 1907/2006 Regulation on the registration, evaluation and authorisation of Chemicals (REACH)

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 diphenol ethers) and PBB (polybrominated biphenyls).

Also in accordance with Article 33 of REACH we will supply relevant data on the composition of any Articles containing substances of Very High Concern (SVHCs).

Sarantel has shipped compliant product since 1<sup>st</sup> 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.

A handwritten signature in black ink, appearing to read 'David Wither', positioned above a horizontal dotted line.

David Wither  
Chief Executive Officer

A handwritten signature in black ink, appearing to read 'Mark Dowsett', positioned above a horizontal dotted line.

Mark Dowsett  
Director of Quality

Registration No.: 03960217

VAT No.: GB 754 6304 29



## 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.

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

## Contact Sarantel

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Web: [www.sarantel.com](http://www.sarantel.com)

## Global Distributors & Representatives

[www.sarantel.com/wheretobuy](http://www.sarantel.com/wheretobuy)

## 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 Applications Centre for the latest production specifications, technical notes, and application guides for solutions to the most common antenna integration issues.

<https://applicationcentre.sarantel.com>

Contact our applications support group by email at [info@sarantel.com](mailto:info@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](http://www.sarantel.com/wheretobuy).

Sarantel strongly believes in the value of intellectual property and the right of entrepreneurs to protect what they have created. Sarantel demonstrates its commitment to this principle by continuously developing its technology and then filing patents in a number of regions around the world. Additionally, Sarantel is constantly filing new patent applications and has a substantial portfolio of pending applications.

A list of Sarantel's granted patents:

**Australia:** 707488, 716542, 720873, 769570, 2004223229 **Austria:** 0791978 Brazil; PI9508769-9 **Canada:** 2198318, 2198375, 2245882, 2250790, 2272389, 2357041, 2373941, 2521493 **China:** ZL00136656.4, ZL00803562.8, ZL00808144.1, ZL95195772.4, ZL97181567.4, ZL97193099.6, ZL97194742.2, ZL99816387.2 **Denmark:** 0777922, 1088367 **Finland:** 0791978, 0876688, 0935826, 0941557, 1088367, 1098392, 1147571, 1153458, 1196963, 1609213 **France:** 0777922, 0791978, 0876688, 0935826, 0941557, 1081787, 1088367, 1098392, 1147571, 1153458, 1196963, 1609213 **Germany:** 60003157.8-0, 60029538.9-08, 60034042.2-08, 602004010085.4-08, 69535431.0-08, 69722590.9-0, 69723093.7-0, 69726177.8-0, 69730369.1-08, 69923558.8-08, 69930407.5-08 **India:** 193515, 193751, 193929, 195085, 206740 **Italy:** 0777922, 0791978, 0876688, 0935826, 1081787, 1088367, 1153458, 1196963 **Japan:** 3489684, 3489775, 3923530, 3946955, 4052800, 4057612, 4077197, 4099309, 4147260, 4159749, 4188412 **Malaysia:** MY-112473-A, MY-119077-A, MY-119465-A, MY-123075-A **Mexico:** 199890, 205239, 213947, 220048, 213633, 232437, 232438, 231633, 259577 **Netherlands:** 0791978, 1081787 **New Zealand:** 291852, 334614 **Philippines:** 1-1995-51169, 1-1997-55284, 1-1997-55978, 1-1997-58557, 1-1999-03167 **Russia:** 2173009, 2210146, 2339131 **Singapore:** 37745, 54891, 56480, 116791, 131698 **South Korea:** 348441, 366071, 446790, 458310, 523092, 625638, 650620, 650621, 650622, 663873, 667216, 667221, 709688, 767329 **Spain:** 0777922, 0791978, 1088367, 1196963 **Sweden:** 0777922, 0791978, 0876688, 0935826, 0941557, 1081787, 1088367, 1098392, 1147571, 1153458, 1196963, 1609213 **Switzerland:** 0791978, 1081787, 1196963 **Taiwan:** 094978, 108488, 123671, 144801, 156702, 285980, M 312023 **Thailand:** 17812, 19360, 19570, 23745 **United Kingdom:** 1081787, 1147571, 2292257, 2292638, 2309592, 2310543, 2311675, 2321785, 2326532, 2326533, 2338605, 2351850, 2356086, 2367429, 2383901, 2399948, 2419037 **USA:** 5854608, 5859621, 5945963, 5963180, 6181297, 6184845, 6300917, 6369776, 6424316, 6552693, 6690336, 6886237, 6914580, 7256752, 7372427, 7408515