

FCC Required Exhibit 14

nanoPAN 5375 RF Module
Antenna Specification
(AntSpec)

Version 1.0

NA-09-0256-0011-1.0

FCC ID: SIFNANOPAN5375V1

Document Information

nanoPAN 5375 RF Module Antenna Specification (AntSpec)



Document Information

Document Title: nanoPAN 5375 RF Module Antenna Specification (AntSpec)

Document Version: 1.0

Published (yyyy-mm-dd): 2009-03-18

Current Printing: 2009-3-18, 10:35 am

Document ID: NA-09-0256-0011-1.0

Document Status: Released

Disclaimer

Nanotron Technologies GmbH believes the information contained herein is correct and accurate at the time of release. Nanotron Technologies GmbH reserves the right to make changes without further notice to the product to improve reliability, function or design. Nanotron Technologies GmbH does not assume any liability or responsibility arising out of this product, as well as any application or circuits described herein, neither does it convey any license under its patent rights.

As far as possible, significant changes to product specifications and functionality will be provided in product specific Errata sheets, or in new versions of this document. Customers are encouraged to check the Nanotron website for the most recent updates on products.

Trademarks

nanoNET® is a registered trademark of Nanotron Technologies GmbH. All other trademarks, registered trademarks, and product names are the sole property of their respective owners.

This document and the information contained herein is the subject of copyright and intellectual property rights under international convention. All rights reserved. No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical or optical, in whole or in part, without the prior written permission of Nanotron Technologies GmbH.

Copyright © 2009 Nanotron Technologies GmbH.

Life Support Policy

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Nanotron Technologies GmbH customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Nanotron Technologies GmbH for any damages resulting from such improper use or sale.

Electromagnetic Interference / Compatibility

Nearly every electronic device is susceptible to electromagnetic interference (EMI) if inadequately shielded, designed, or otherwise configured for electromagnetic compatibility.

To avoid electromagnetic interference and/or compatibility conflicts, do not use this device in any facility where posted

notices instruct you to do so. In aircraft, use of any radio frequency devices must be in accordance with applicable regulations. Hospitals or health care facilities may be using equipment that is sensitive to external RF energy.

With medical devices, maintain a minimum separation of 15 cm (6 inches) between pacemakers and wireless devices and some wireless radios may interfere with some hearing aids. If other personal medical devices are being used in the vicinity of wireless devices, ensure that the device has been adequately shielded from RF energy. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

CAUTION! Electrostatic Sensitive Device. Precaution should be used when handling the device in order to prevent permanent damage.



FCC User Information

Statement according to FCC part 15.19:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Statement according to FCC part 15.21:

Modifications not expressly approved by this company could void the user's authority to operate the equipment.

RF exposure mobil:

The internal / external antennas used for this mobile transmitter must provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

Statement according to FCC part 15.105:

This equipment has been tested and found to comply with the limits for a Class A and Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide

reasonable protection against harmful interference in a residential installation and against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions as provided in the user manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to connected.
- Consult the dealer or an experienced technician for help.

Antenna Specifications for Model 17010.10 and 11

This section provides the specifications for the antenna used by the *nanoNET TRX* transceiver, namely, one of two 2.4 GHz antennas with omnidirectional radiation pattern in horizontal plane (azimuth), which are model 17010.10 or model 17010.11, as shown below:



Figure 1: Model 17010.10



Figure 2: Model 17010.11

Note: The specifications are identical for both antennae types.

Electrical Specifications

Table 1: Electrical specifications

Electrical Items	Specifications
Model	17010.11
Type of antenna	Sleeve dipole antenna
Frequency range	2.40~2.48 GHz
Electrical length	1 / 2 λ
Nominal impedance	50 Ω
Polarization	Vertical
	Less than 2.0
Gain	2.15 dBi

Mechanical Specifications

Table 2: Mechanical specifications

Mechanical Items	Specifications
Element	\varnothing 0.1x7 CuAg -wire
Sleeve	Urethane (black)
Connector	SMA-male (right angle)
Antenna total length	90 \pm 2mm

Vertical Diagram for Model 17010.10 and 11

The following shows the vertical diagram for the antenna model 17010.10 and 11 measured at 2.40 GHz, 2.45 GHz, and 2.50 GHz.

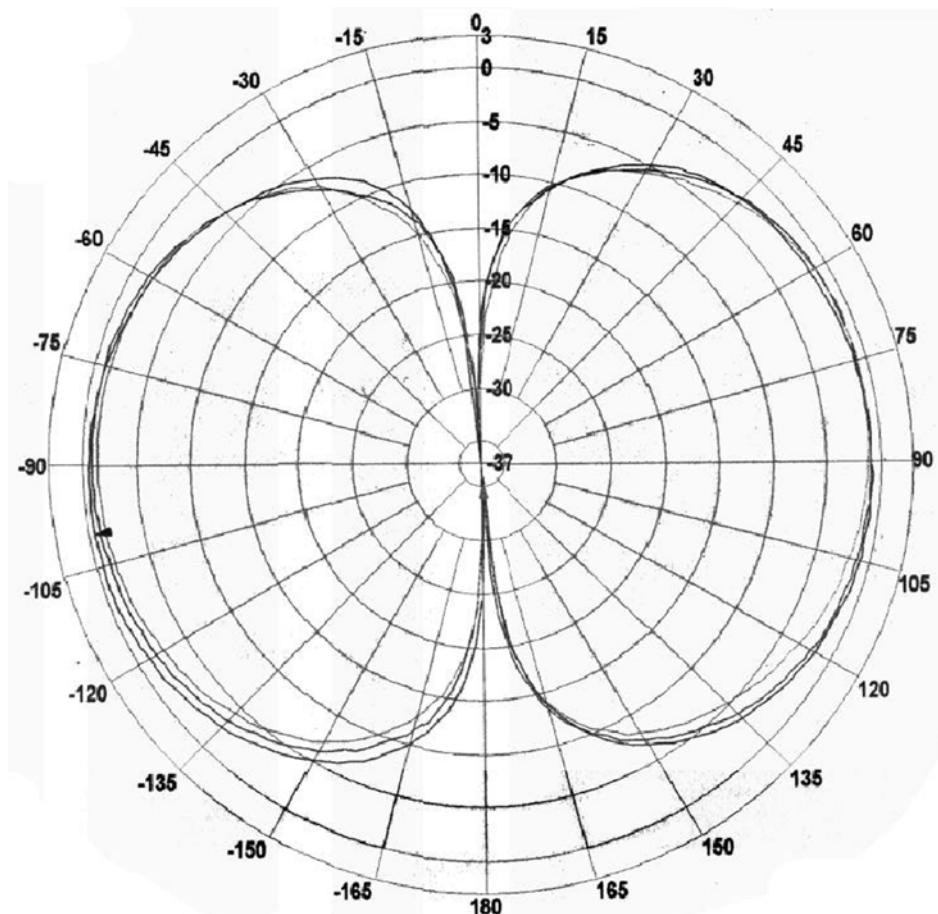


Figure 3: Vertical diagram for antenna model 17010.10 and 11

Beam Peak Values

Table 3: Beam peak values

Frequency	[dB]	at [deg]
2.40 GHz	-0.61	-99.94
2.45 GHz	-0.74	81.95
2.50 GHz	-0.64	67.96

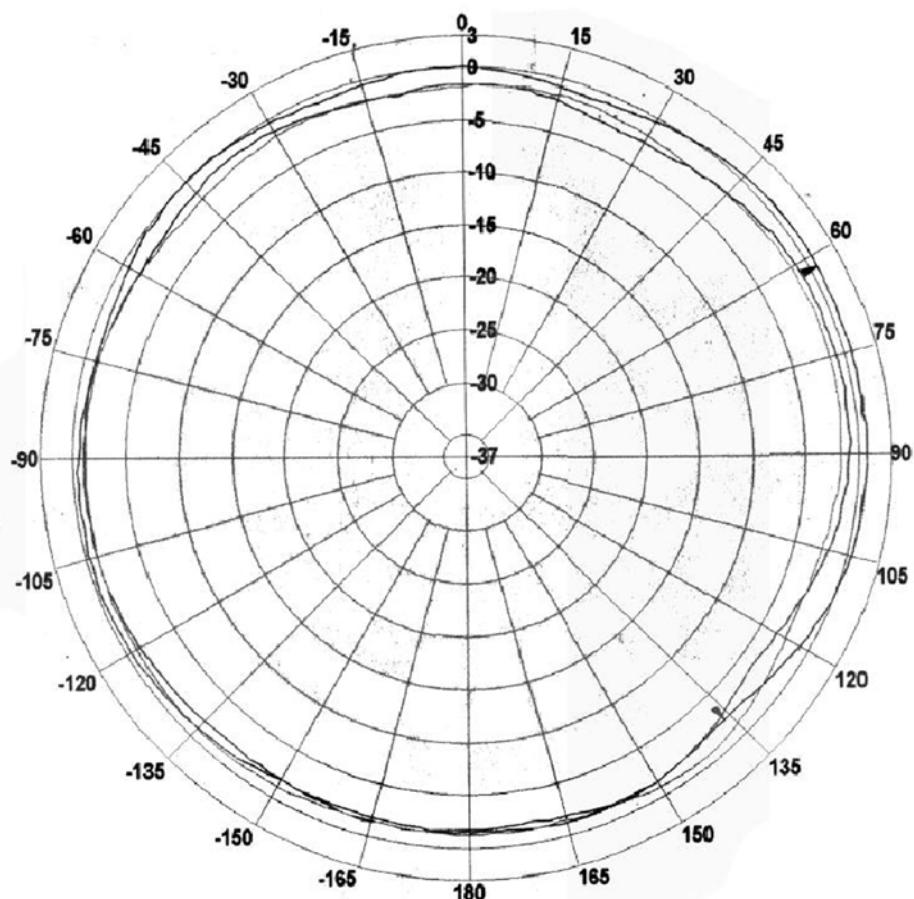
Null Depth Values

Table 4: Null depth values

Frequency	[dB]	at [deg]
2.40 GHz	-38.47	-4.00
2.45 GHz	-53.94	-2.00
2.50 GHz	-41.44	177.90

Azimuth Diagram for Model 17010.10 and 11

The following shows the Azimuth diagram for the antenna model 17010.10 and 11 measured at 2.40 GHz, 2.45 GHz, and 2.50 GHz



Figure

Azimuth diagram for antenna model 17010.10 and 11

Beam Peak Values

Table 5: Beam peak values

Frequency	[dB]	at [deg]
2.40 GHz	0.85	61.97
2.45 GHz	-0.38	111.94
2.50 GHz	-0.69	143.92

Null depth values

Table 6: Null depth value

Frequency	[dB]	at [deg]
2.40 GHz	-2.26	135.92
2.45 GHz	-3.57	125.93
2.50 GHz	-2.59	113.94

Intentionally Left Blank

Revision History

Version	Date	Description/Changes
1.0	2009-03-18	Initial version.

About Nanotron Technologies GmbH

Nanotron Technologies GmbH develops world-class wireless products for demanding applications based on its patented Chirp transmission system - an innovation that guarantees high robustness, optimal use of the available bandwidth, and low energy consumption. Since the beginning of 2005, Nanotron's Chirp technology has been a part of the IEEE 802.15.4a draft standard for wireless PANs which require extremely robust communication and low power consumption.

ICs and RF modules include *nanoNET TRX Transceiver*, *nanoLOC TRX Transceiver*, and ready-to-use or custom wireless solutions. These include, but are not limited to, industrial monitoring and control applications, medical applications (Active RFID), security applications, and Real Time Location Systems (RTLS). *nanoNET* and *nanoLOC* are certified in Europe, United States, and Japan and supplied to customers worldwide.

Headquartered in Berlin, Germany, *Nanotron Technologies GmbH* was founded in 1991 and is an active member of IEEE and the ZigBee alliance.

Further Information

For more information about this product and other products from Nanotron Technologies, contact a sales representative at the following address:

Nanotron Technologies GmbH
Alt-Moabit 60
10555 Berlin, Germany
Phone: +49 30 399 954 - 0
Fax: +49 30 399 954 - 188
Email: sales@nanotron.com
Internet: www.nanotron.com