

## **FCC Required Exhibit 14**

### **nanoPAN 5375 RF Module Antenna Specification (AntSpec)**

**Version 1.0**

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**FCC ID: SIFNANOPAN5375V1**



Chirp it.

## Document Information

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### 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 which it is 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	$1 / 2 \lambda$
Nominal impedance	50 $\Omega$
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.

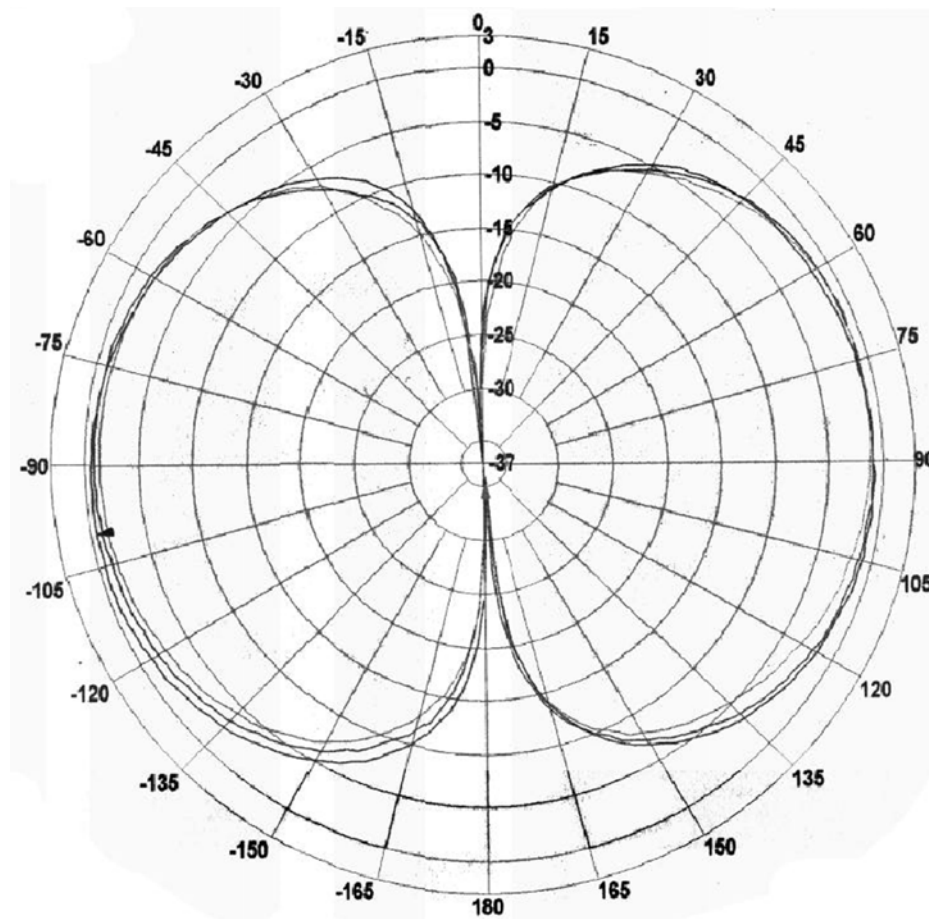


Figure 3: Vertical diagram for antenna model 17010.10 and 11

## 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

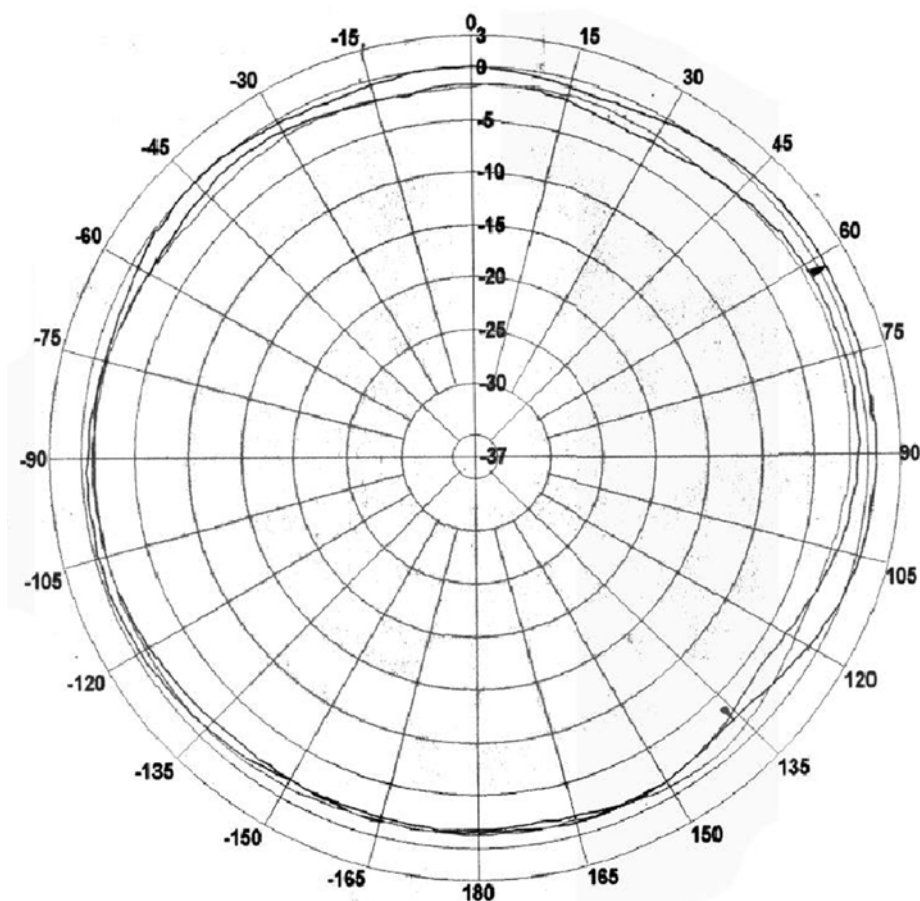
## Null Depth Values

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

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## 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

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