NEWSLETTER 2019.0
ANTENNA MAGUS VERSION 2019.0 RELEASED

November 2018

Version 2019.0 includes various features and improvements as well as a number of new antennas. This newsletter will discuss the new antennas as well as a selection of the features and extensions that have been made available. For more comprehensive information, please visit the Antenna Magus website or read the full release notes.

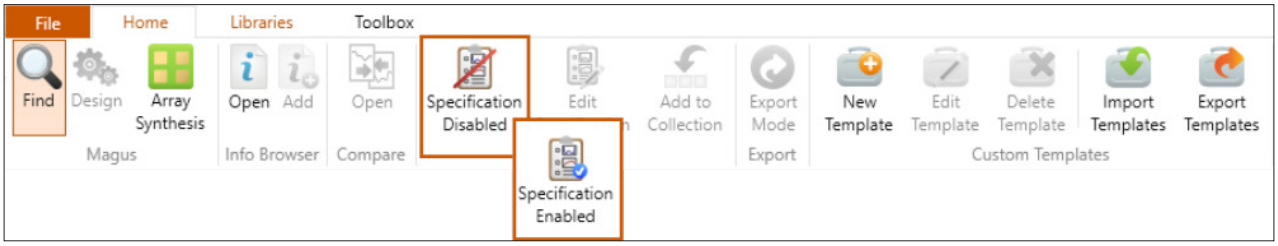
NEW FEATURES

No Specification Workflow

We have introduced a No Specification state for both Find Mode and Design Mode, which is useful in workflows where a particular Specification is not required.

When selecting Find Antenna from the Start Page, Find Mode is launched in Specification Disabled state. Prototypes added to the Collection while in this mode will have no initial linkage to a Specification and no Reference Design.

Specification workflows may be Enabled/Disabled as needed using a button available on the Ribbon. The selected state can be changed independently in Find Mode and for each Prototype.

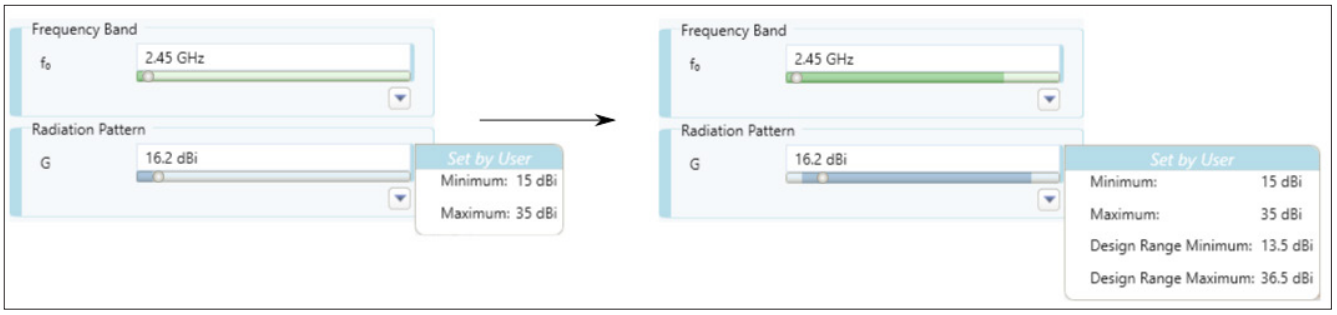


Ribbon button indicating the state of the Specification.

Design Range Extrapolation

In some cases, the design range limits imposed by Antenna Magus may be too restrictive. Design Range Extrapolation (DRE) has been introduced to extend the supported design range of all devices. While DRE is enabled, sliders for design objectives as well as range tooltips indicate the extended range. DRE is active by default and may be disabled/enabled by navigating to Start Page > Settings > Design and Estimation. Currently only a single objective may be in the extended range for any given design.

The DRE employs a two-tier design approach, using a direct design with Objective values outside of the validated range, followed by a second extrapolation phase based on designs within the validated range to find the best possible design prediction. While the DRE approach generates good first-order designs for almost all cases, there are cases where the DRE may suggest sub-standard designs. Should the DRE fail to find a valid design, a message is displayed.



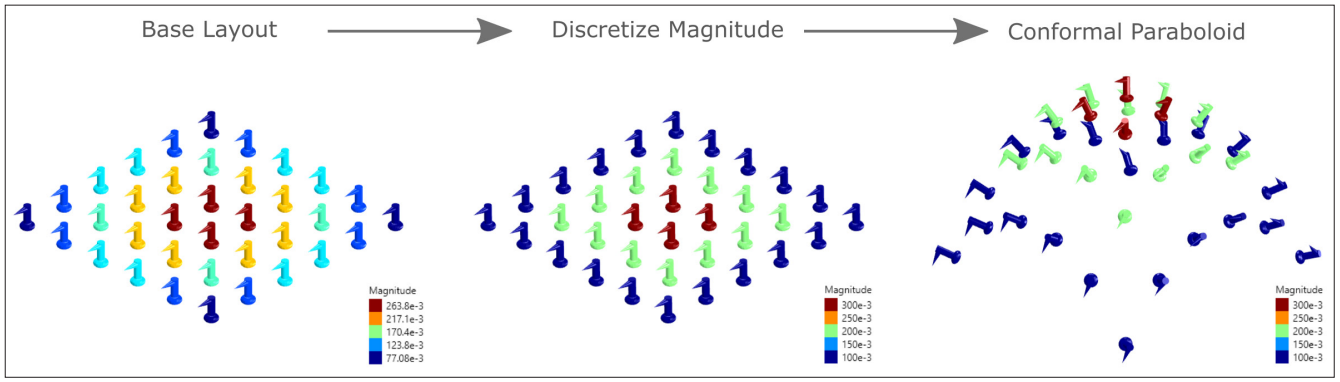
Indicators for objectives with DRE disabled (left), and enabled (right) .

ARRAY OPERATORS

Various Array Operators have been added to the Array Synthesis Tool. These operators enable the transformation of basic layouts (created in Antenna Magus or imported using the *.tsv array layout format) to more advanced ones. Multiple array operators may be applied sequentially in a specific order to achieve the desired layout.

The operators include:

- Basic operators such as rotation, translation and scaling.
- Conformal operators that allow layouts to be draped or projected onto a geometric surface such as a paraboloid or sphere.
- Discretize operators that may be used to discretize phase and magnitude.
- Special operators that perform array manipulations, such as the Circular Segmented operator, which attempts to duplicate and arrange multiple base layouts in a segmented circular pattern.



Discretize and Conformal Paraboloid operators applied to a planar array.

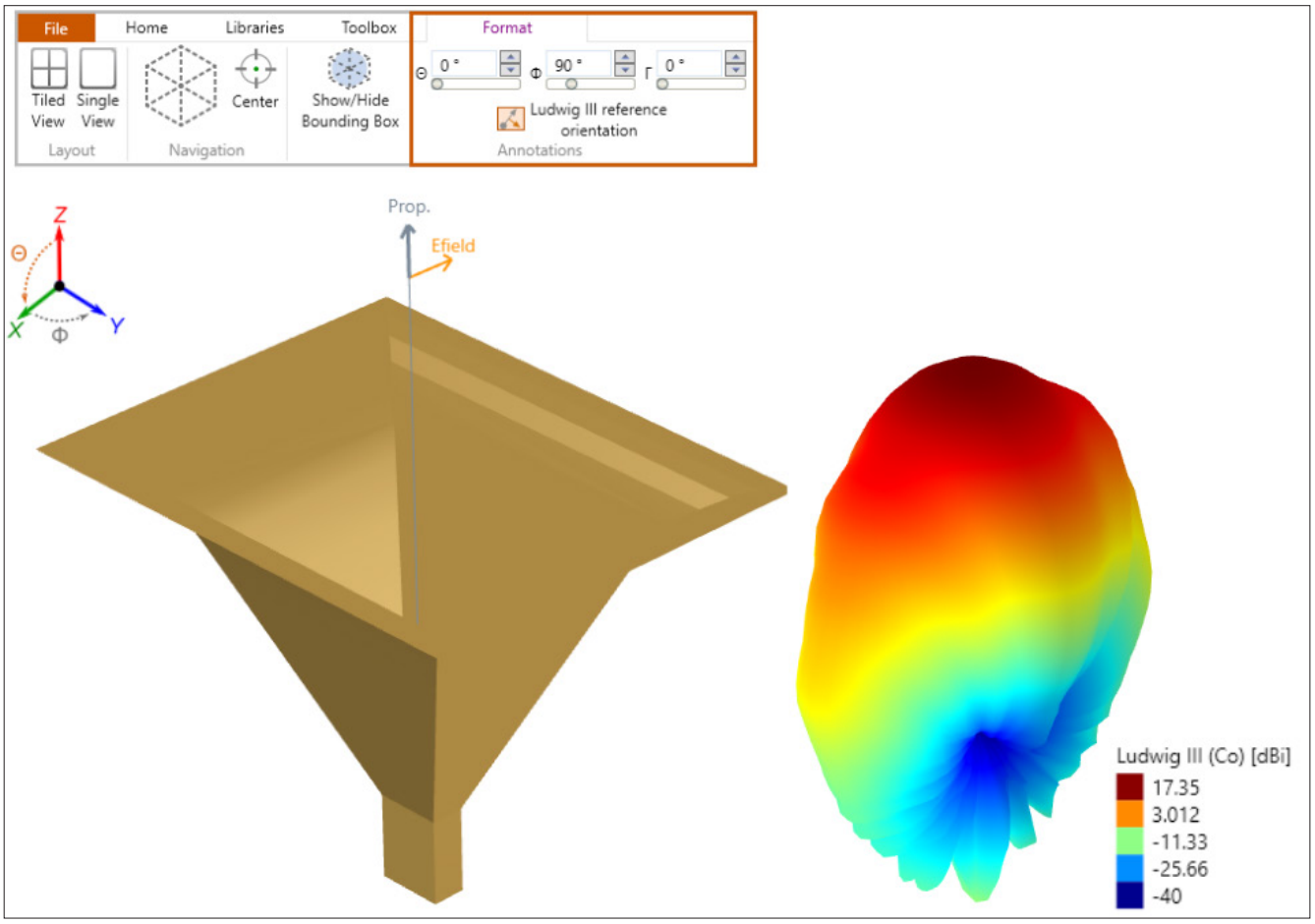
NEAR-FIELD SOURCE EXPORT

The calculation and export of equivalent near-field data for each 3D far-field is now possible for most Designs and Tweaks. Near-field data cannot be visualized in Antenna Magus, but may be exported in a format compatible with CST Studio Suite field-sources. As the near-field calculation may slow down Performance Estimation, near-field calculation is disabled by default and must be enabled in the Settings. No data will be available for Design and Tweaks estimated while this setting is off.

LUDWIG III AXIS ROTATION

The Ludwig III visualization provides a method of comparing simulated far-field radiation patterns with measured patterns in a typical laboratory measurement setup. The co- and cross-polarization options provided by Antenna Magus (according to the 3rd coordinate system transformation described in the paper: Arthur C. Ludwig, "The Definition of Cross Polarization", IEEE Transactions on Antennas and Propagation, January 1973) assumes propagation in the Z-direction and the E-field oriented along the Y-axis.

Since not all antennas in Antenna Magus are orientated according to this definition, plotting of co- and cross-polarization in the expected coordinate orientation was not always possible. To address this problem Antenna Magus has added an additional setting, which allows the user to define the orientation of the coordinate system to be used for the Ludwig III visualization relative to the global coordinate system.



Ludwig III axis settings with Φ = 90° and resultant co-pol pattern.

EXPORT MACRO

Design Variables can now be exported and saved in a macro/script format. This is possible from either Export Mode or Design Mode. Two formats are currently supported:

VBA macro (*.mcr – supported by CST Studio Suite)

LUA script (*.lua – supported by FEKO 14.0 and onward)

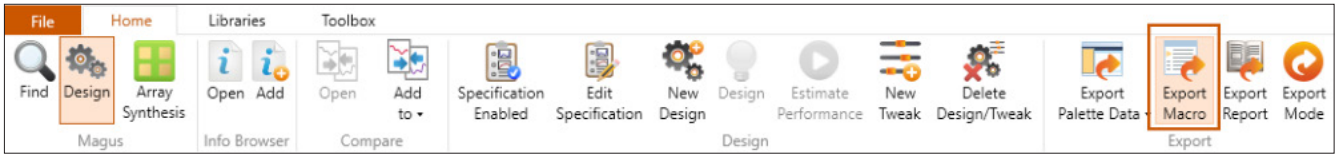
Running the macro/script (as described in the documentation of the supported tools) will update the values of all variables named according to the Antenna Magus Template in the project without influencing any other geometry or post-export modifications. This is particularly useful in cases where a model exported form Antenna Magus has been modified after export or forms part of a complex assembly.

START PAGE LAYOUT

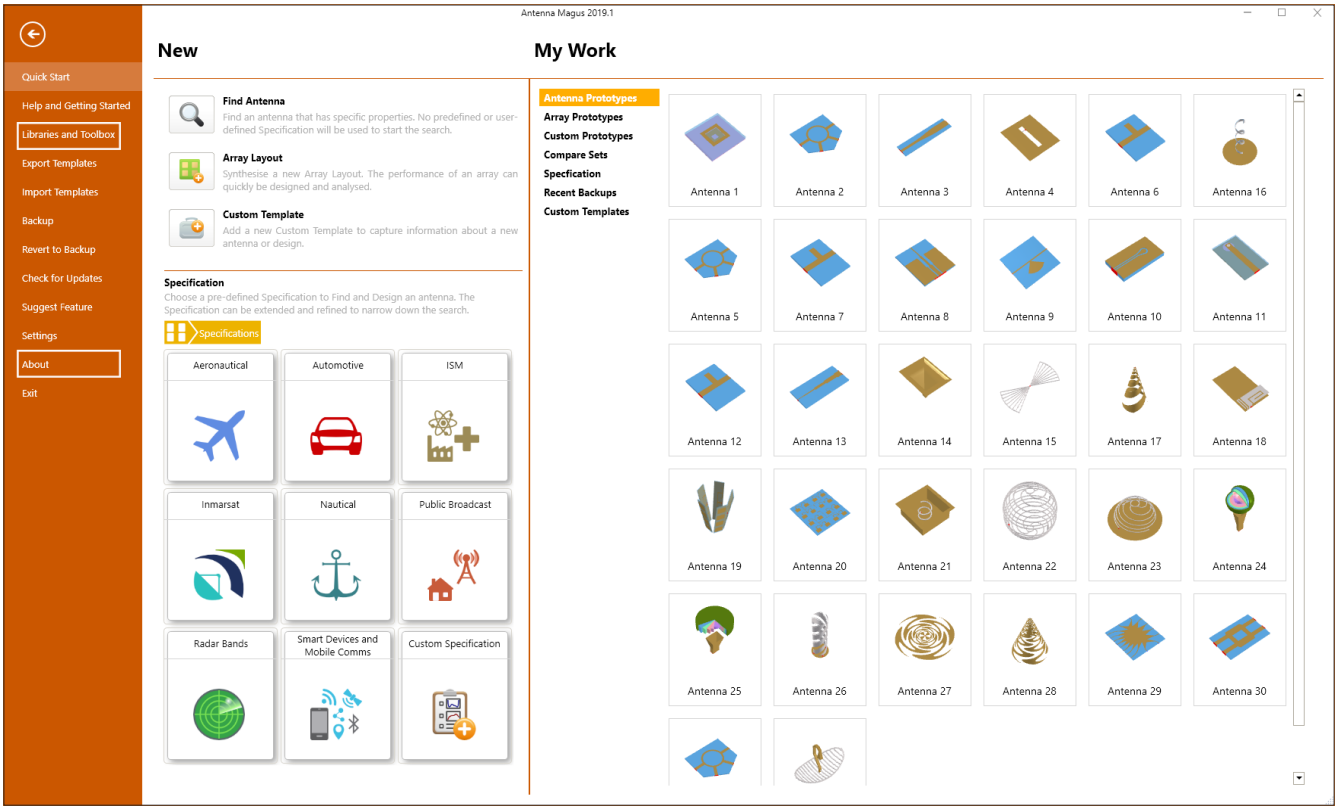
A new look Start Page enables users to more easily navigate to existing work or launch a new workflow – including No Specification workflows.

On the Quick Start page, the New section includes direct access to the Specification Chooser as well as Find Antenna (No Specification), Array Layout and Custom Template workflow starting points. The My Work section provides easy access to existing work in the current state of Antenna Magus.

Links to the various Libraries and Toolboxes as well as an About section – indicating the current release and build versions as well as links to the Antenna Magus website, licensing terms and legal notices – have also been added.



Export Macro button.



New Start Page layout.

SETTINGS MENU AND ADDITIONAL SETTINGS

The Settings Menu has been reorganized to accommodate additional settings for new features. These are explained in detail below.

Design and Estimation

New settings for Design Range Extrapolation and Near-Field Source Export have been added to the Design and Estimation tab. Both are described in more detail in their respective sections of this newsletter.

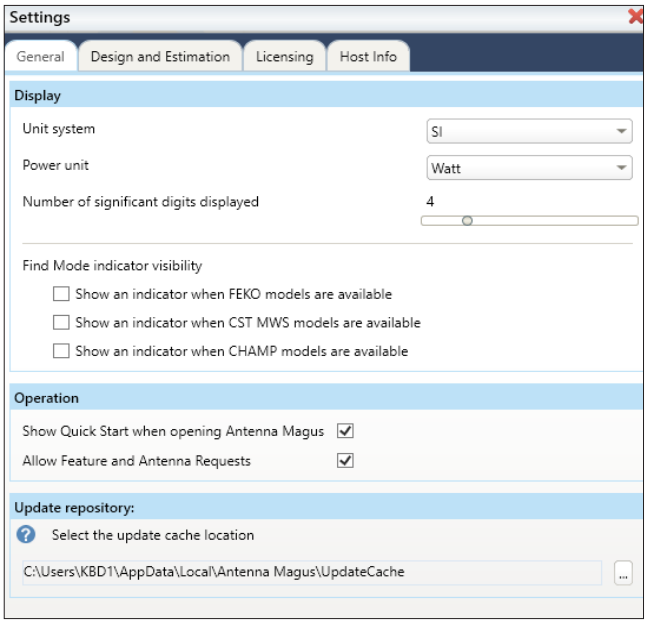
Host Info

Support for a new compact machine codes format has been added to the Host Info tab. This new format may be used to identify a host for licensing as with previous versions of Antenna Magus.

Licensing

The installation and integration to allow Antenna Magus to be licensed using a CST Studio Suite (FlexLM) license with the Antenna Magus module has been improved. Settings have been extended to support this.

In the Licencing tab the user can now specify an Antenna Magus Floating License server or a CST License Server (FlexLM). For the CST License Server, a single hostname and port or a list of redundant License Servers (comma-delimited) may be used.



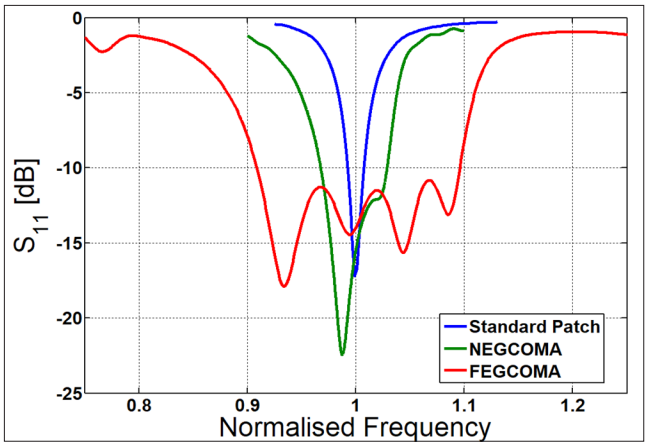
New settings menu.

NEW ANTENNAS

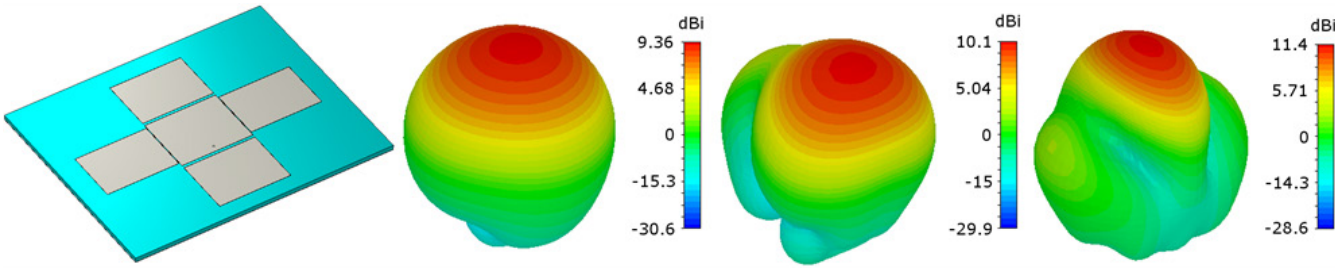
Pin-fed Four Edges Gap-Coupled Microstrip Antenna (FEGCOMA)

Although microstrip antennas are very popular in the microwave frequency range because of their simplicity and compatibility with circuit board technology, their limited bandwidth often restricts their usefulness.

Various methods have been suggested to overcome this limitation – including the use of gap- or direct-coupled parasitic patches. In the FEGCOMA, these parasitic patches are placed alongside all four edges of the driven patch element. The introduction of parasitic patches of slightly different resonant lengths yields further resonances improving the bandwidth and gain of the standard patch. In this case, the structure is optimized to obtain a well-defined, designable bandwidth with near-optimally spaced zeros. Typical gain values of 10 dBi may be expected, with a designable fractional impedance bandwidth between 12% and 30 %.



Reflection coefficient versus frequency comparison.



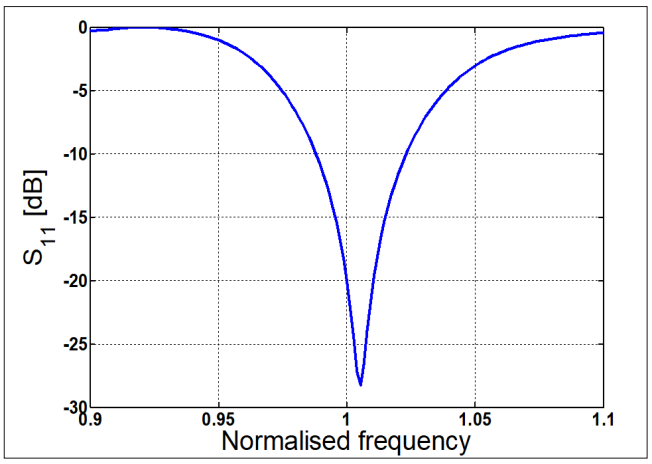
Typical total gain pattern at 0.9f0, f0 and 1.1f0

Printed Self-Matched Normal Mode Helix Antenna

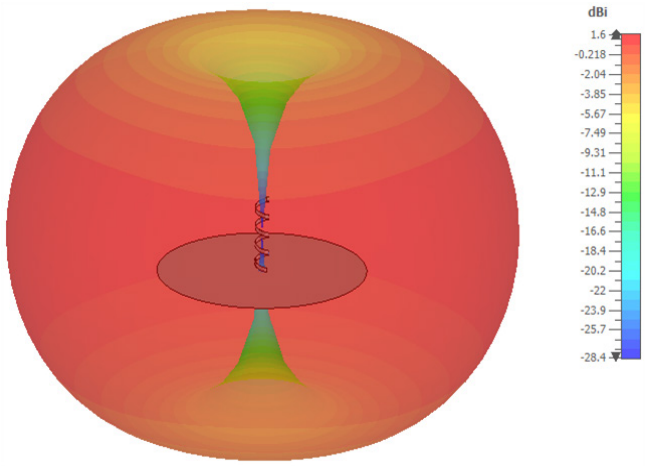
Normal mode helix antennas (NMHA) are often used for handheld radio transceivers and mobile communications applications. The printed self-matched NMHA is naturally matched to 50 Ω, thus avoiding the typical design challenge of matching similar structures at resonance.

It exhibits properties similar to other NMHAs, namely: It is compact (with the total height being typically 0.14 λ), it is vertically polarized and omni-directional and has a bandwidth of approximately 3%.

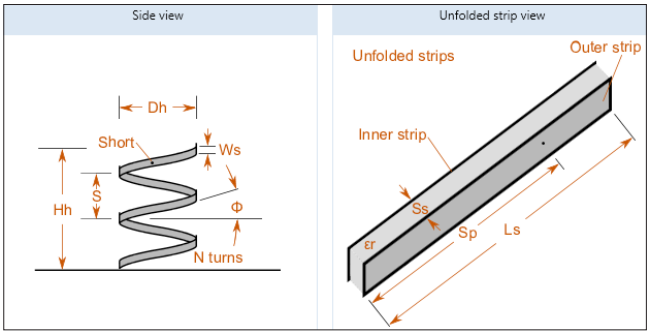
The helical structure consists of two (inner and outer) metallic helical strips of equal width, with a central dielectric section between them.



Typical reflection coefficient versus frequency referenced to 50 Ω.



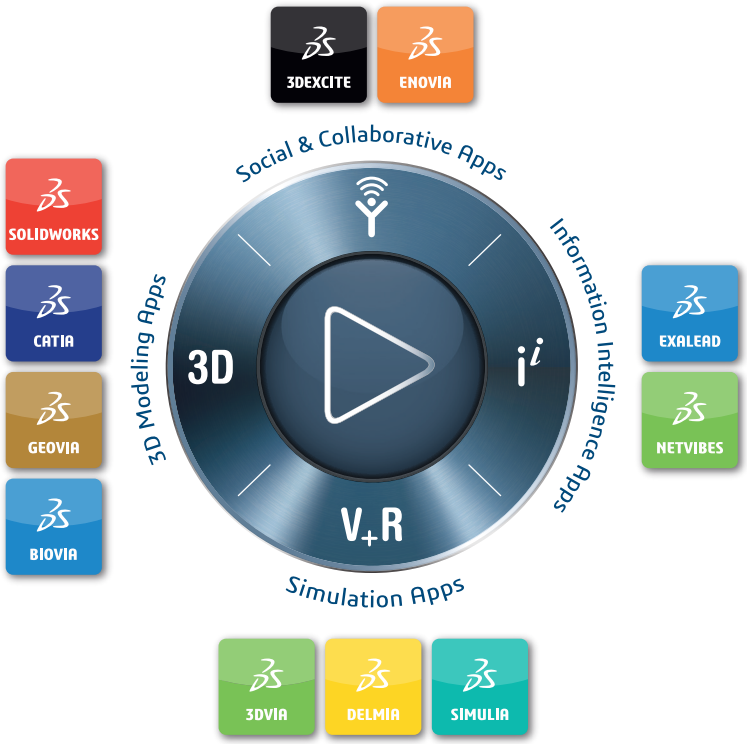
Typical gain at the center frequency.



Construction detail of the NMHA.

CONCLUSION

With the end of 2018 fast approaching, we would like to thank all our valued customers. We hope that you find the improvements and new antennas, arrays and tools which have been made available in Antenna Magus during the year useful and we look forward to more exciting growth in 2019.



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