RF Blockset Release Notes

These Release Notes describe the changes introduced in the RF Blockset Version 1.1 for Release 14 with Service Pack 2. The following topics are discussed in these notes:
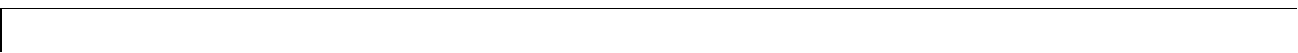
- "New Features" on page 1-2
- "Major Bug Fixes" on page 1-4
- "Known Software and Documentation Problems" on page 1-5

The RF Blockset Release Notes also provide information about recent versions of the product, in case you are upgrading from an earlier version.

- "RF Blockset 1.0.2 Release Notes" on page 2-1
- "RF Blockset 1.0.1 Release Notes" on page 3-1
- "RF Blockset 1.0 Release Notes" on page 4-1

Printing the Release Notes

If you would like to print the Release Notes, you can link to a PDF version.

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RF Blockset 1.1 Release Notes

New Features

This section summarizes the new features and enhancements introduced in the RF Blockset 1.1.

New Blocks

The RF Blockset contains the following new blocks.

Block	Library	Description
Series RLC	Physical / Ladder Filters	Model a series RLC network
Shunt RLC	Physical / Ladder Filters	Model a shunt RLC network

Support for Generic Real-Time (GRT) Targets

You can use Real-Time Workshop with the RF Blockset to generate standalone executables for GRT targets.

Improved Nonlinear Behavior for Physical Mixers and Amplifiers

Previously, the nonlinear algorithm that was used by the physical mixer and amplifier blocks was appropriate only for high powered amplifiers (HPAs), which operate close to the saturation point. The new nonlinear algorithm can also be used for mixers and amplifiers that operate far below the saturation point and yield very weak intermodulation products. As with the old algorithm, the saturated output power of the new algorithm is 8.3dB below the third-order output intercept point (OIP3). Where the previous algorithm was piecewise linear, the new nonlinear algorithm uses a linear plus cubic curve of amplitude-in versus amplitude-out to simulate the behavior of systems that operate far below the saturation point.

Where the previous algorithm assumed a third-order intercept point (IP3) reference impedance of 50 ohm that was irrespective of the S-parameter reference impedance, the new algorithm assumes that the S-parameter reference impedance is the same as the IP3 reference impedance used to convert from IP3 to the amplitude-related constants in the model.

Note The corresponding Z and Y algorithms still assume a fixed 50 ohm conversion factor from specified power to modeled amplitude.

Major Bug Fixes

The RF Blockset Version 1.1 does not contain any major bug fixes. If you are upgrading from a version earlier than Version 1.0.2, you should also see "Major Bug Fixes" on page 2-3 in the Version 1.0.2 Release Notes.

Known Software and Documentation Problems

This section describes the known software and documentation problems in RF Blockset Version 1.1.

Blocks Incur Delay During Simulation

All RF Blockset physical blocks incur a modeling delay during simulation. You must take this delay into consideration when using these blocks in feedback configurations.

RF Blockset 1.0.2 Release Notes

New Features

The RF Blockset, Version 1.0.2, includes bug fixes but no new features.

Major Bug Fixes

The RF Blockset 1.0.2 includes bug fixes made since Version 1.0.1. This section describes the particularly important Version 1.0.2 bug fixes.

RF Physical Blocks in Subsystems Sometimes Did Not Produce Correct Results

In the RF Blockset 1.0.1, if you ran a model that you had previously run and saved, RF physical blocks that were part of a subsystem in that model sometimes did not produce the correct results. In Version 1.0.2, this problem has been fixed.

RF Blockset 1.0.1 Release Notes

New Features

The RF Blockset Version 1.0.1 includes bug fixes but no new features.

Major Bug Fixes

These Release Notes describe the RF Blockset, Version 1.0.1. This release includes several bug fixes introduced since Version 1.0 (Release 14), but no new features. This section describes the particularly important Version 1.0.1 bug fixes.

If you are viewing these Release Notes in PDF form, please refer to the HTML form of the Release Notes, using either the Help browser or the MathWorks Web site and use the link provided.

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RF Blockset 1.0 Release Notes

Introduction to the RF Blockset

The RF Blockset is a tool for design, analysis, and simulation of RF communications systems. It uses baseband equivalent behavioral modeling to model and analyze RF systems in the time domain.

The RF Blockset enables you to assemble complex RF systems from libraries of RF components such as ladder filters, transmission lines, black box elements, amplifiers, and mixers. You can include Simulink®, DSP Blockset, and Communications Blockset blocks in your model, as well as blocks from other MathWorks blocksets.

The RF Blockset contains

- Physical blocks. These blocks describe network components in terms of their geometry, physical interactions, and measured data. Internally, the RF Blockset characterizes these RF components in terms of their network parameters, and constructs the behavioral model for an RF subsystem from those parameters.
- Mathematical blocks. These are Simulink style blocks that describe components in mathematical terms. Each block models the component's behavior according to predefined mathematical relationships.

Two specialized blocks let you include mathematical and physical blocks in the same model by providing transitions from the mathematical environment into the RF Blockset physical modeling environment and back again into the mathematical environment. These blocks also enable you to specify certain parameters that are common to a physical modeling subsystem.

The RF Blockset works with the RF Toolbox. You can create complex topologies with the RF Toolbox, then use them in RF Blockset blocks for inclusion in an RF model.

This introduction includes these topics.

RF Blockset Libraries

The RF Blockset has two main libraries, Physical and Mathematical.

The Physical library includes the following sublibraries. Use blocks from these sublibraries to model the physical or electrical structure of portions of an RF system.

- Amplifiers — RF amplifiers described by S-, Y-, or Z-parameters, noise figure, and IP3, or a data file containing these parameters
- Ladder Filters — RF filters whose network parameters can be calculated from their topologies
- Mixers — RF mixers described by S-, Y-, or Z-parameters and phase noise, or a data file containing these parameters
- Transmission Lines — RF filters whose network parameters can be calculated from their geometry
- Black Box Elements — Passive RF components described by S-, Y-, or Z-parameters, or a data file containing these parameters
- Input/Output Ports — Blocks that connect mathematical portions of the model to the physical portions. Mathematical portions of the model may also include blocks from Simulink and other blocksets that describe components in mathematical terms.

The Mathematical library includes amplifier, mixer, and filter blocks. These blocks provide mathematical equivalents of the RF components.

Data Visualization

The RF Blockset enables you to plot the network parameters of the component blocks in the Physical library. For each such block, you can generate an X-Y plane plot, polar plane plot, or Smith® chart of selected network parameters in a specified frequency range. The dialog box for each block contains the parameters you need to specify the plot.

The RF Blockset also provides a composite plot which includes four separate plots in one figure. This predefined combination of plots differs based on the type of block.

Data Format Support

The RF Blockset supports the Touchstone® S2P, Y2P, Z2P, and H2P data file formats. It also introduces the MathWorks AMP format for amplifier data. The AMP format is intended for use as input to the General Amplifier block. For more information about the AMP format, see AMP File Format in the RF Toolbox documentation.

Required Products

The RF Blockset requires MATLAB, Simulink, the RF Toolbox, and the Signal Processing Blockset. You may also find the Communications Blockset especially useful and it is highly recommended.

Note that the Signal Processing Blockset requires the Signal Processing Toolbox and the Communications Blockset requires the Communications Toolbox.

Demos

Demos of the RF Blockset capabilities are available on the Demos tab of the MATLAB Help browser. These demos show examples of linear filtering and nonlinear amplification, as well as transmitters and receivers.