RF Blockset Release Notes

Contents

Summary by Version

This table provides quick access to what's new in each version. For clarification, see "About Release Notes" on page 1.

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Latest Version V1.3 (R2006a)	Yes Details	No	Bug Reports at Web site	Printable Release Notes: PDF V1.3 product documentation
V1.2 (R14SP3)	Yes Details	No	Bug Reports at Web site	No
V1.1 (R14SP2)	Yes Details	No	No bug fixes	No
V1.0.2 (R14SP1)	No	No	List of bug fixes	No
V1.0.1 (R14+)	No	No	Fixed bugs	No
V1.0 (R14)	Yes Details	Not applicable	No bug fixes	No

About Release Notes

Use release notes when upgrading to a newer version to learn about new features and changes, and the potential impact on your existing files and practices. Release notes are also beneficial if you use or support multiple versions.

If you are not upgrading from the most recent previous version, review release notes for all interim versions, not just for the version you are installing. For example, when upgrading from V1.0 to V1.2, review the New Features and Changes, Version Compatibility Considerations, and Bug Reports for V1.1 and V1.2.

New Features and Changes

These include

- New functionality
- Changes to existing functionality
- Changes to system requirements (complete system requirements for the current version are at the MathWorks Web site)
- Any version compatibility considerations associated with each new feature or change

Version Compatibility Considerations

When a new feature or change introduces a known incompatibility between versions, its description includes a **Compatibility Considerations** subsection that details the impact. For a list of all new features and changes that have compatibility impact, see the "Compatibility Summary for RF Blockset" on page 14.

Compatibility issues that become known after the product has been released are added to Bug Reports at the MathWorks Web site. Because bug fixes can sometimes result in incompatibilities, also review fixed bugs in Bug Reports for any compatibility impact.

Fixed Bugs and Known Problems

MathWorks Bug Reports is a user-searchable database of known problems, workarounds, and fixes. The MathWorks updates the Bug Reports database as new problems and resolutions become known, so check it as needed for the latest information.

Access Bug Reports at the MathWorks Web site using your MathWorks Account. If you are not logged in to your MathWorks Account when you link to Bug Reports, you are prompted to log in or create an account. You then can view bug fixes and known problems for R14SP2 and more recent releases.

The Bug Reports database was introduced for R14SP2 and does not include information for prior releases. You can access a list of bug fixes made in prior versions via the links in the summary table.

Related Documentation at Web Site

Printable Release Notes (PDF). You can print release notes from the PDF version, located at the MathWorks Web site. The PDF version does not support links to other documents or to the Web site, such as to Bug Reports. Use the browser-based version of release notes for access to all information.

Product Documentation. At the MathWorks Web site, you can access complete product documentation for the current version and some previous versions, as noted in the summary table.

Version 1.3 (R2006a) RF Blockset

This table summarizes what's new in V1.3 (R2006a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	Printable Release Notes: PDF V1.3 product documentation

New features and changes introduced in this version are described here:

Upper and Lower Power Limit Parameters Added to the Mathematical Amplifier Block

Two parameters have been added to the Amplifier block in the Mathematical sublibrary. The **Upper input power limit for AM/PM conversion (dBm)** and **Lower input power limit for AM/PM conversion (dBm)** specify the maximum and minimum input power for which AM/PM conversion scales linearly with input power value. Beyond these limits, AM/PM conversion is constant at the values corresponding to the upper and lower input power limits

Version 1.2 (R14SP3) RF Blockset

This table summarizes what's new in V1.2 (R14SP3):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	No

New features and changes introduced in this version are:

RLCG Transmission Line Block Added

An RLCG Transmission Line block has been added to the Transmission Lines sublibrary of the Physical library. This block lets you model RLCG transmission lines.

Frequency-Dependent Parameters Now Supported for the Transmission Line Block

The Transmission Line block's **Characteristic impedance**, **Phase velocity (m/s)**, and **Loss (dB/m)** parameters can now be frequency dependent.

Budget Plots Now Supported for the Output Port Block

You can now create system budget plots from the Output Port block.

Consistency Checking Added for Pin/Pout Data

The RF Blockset checks that the small signal gain calculated from the Pin/Pout data is the same as the gain (S_{21}) calculated from the S-parameters. If it is not, the blockset adjusts the Pin/Pout curve so that the small signal gain is the same as S_{21}.

Parameter Specifying the Impulse Response Length Renamed

The **Max length of impulse response** parameter has been renamed to **Finite impulse response filter length**. This change affects the Input Port, Lowpass RF Filter, Highpass RF Filter, Bandpass RF Filter, and Bandstop RF Filter blocks. The block behavior remains the same.

Error Messages Improved

The error and warning messages issued by the blockset are more descriptive.

Demos Improved

The RF Blockset demos have new documentation and can be accessed using an improved interface.

Version 1.1 (R14SP2) RF Blockset

This table summarizes what's new in V1.1 (R14SP2):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	No bug fixes	No

New features and changes introduced in this version are described here:

Series RLC Block Added

A Series RLC block has been added to the Ladder Filters sublibrary of the Physical library. This block lets you model a series RLC network.

Shunt RLC Block Added

A Shunt RLC block has been added to the Ladder Filters sublibrary of the Physical library. This block lets you model a shunt RLC network.

Output for Generic Real-Time (GRT) Targets Now Supported

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

Nonlinear Modeling of Physical Mixers and Amplifers Improved

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 8.3 dB 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.

Version 1.0.2 (R14SP1) RF Blockset

This table summarizes what's new in V1.0.2 (R14SP1):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	No	Yes, below	No

This version only includes bug fixes, listed here.

Physical Block Behavior in Saved Models Corrected

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.

Version 1.0.1 (R14+) RF Blockset

This table summarizes what's new in V1.0.1 (R14+):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	No	Fixed bugs	No

Version 1.0 (R14) RF Blockset

This table summarizes what's new in V1.0 (R14):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Not applicable	No bug fixes	No

The RF Blockset includes these features:

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 lets you 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®, Signal Processing Blockset, and Communications Blockset blocks in your model, as well as blocks from other MathWorks blocksets.

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

RF Blockset Libraries

In the RF Blockset, blocks are divided into two categories:

- Physical — Blocks that model physical and electrical components in terms of geometry, physical interactions, and measured data
- Mathematical — Blocks that model components in terms of mathematical relationships

The Physical library includes the following sublibraries. Use blocks from these libraries 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.

Note You must use the Input Port and the Output Port blocks to bound a physical system. They convert mathematical Simulink signals to and from the RF Blockset physical modeling environment. This lets you include physical and mathematical blocks in the same model.

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

Mathematical portions of an RF model may also include other Simulink blocks that describe components mathematically.

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 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.

Compatibility Summary for RF Blockset

This table summarizes new features and changes that might cause incompatibilities when you upgrade from an earlier version, or when you use files on multiple versions. Details are provided in the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
Latest Version V1.3 (R2006a)	None
V1.2 (R14SP3)	None
V1.1 (R14SP2)	None
V1.0.2 (R14SP1)	None
V1.0.1 (R14+)	None
V1.0 (R14)	None