WHAT'S NEW IN VSS 2007?

Visual System Simulator™ 2007 (VSS 2007) version 7.51 software includes the following new features, enhancements, and user interface changes.

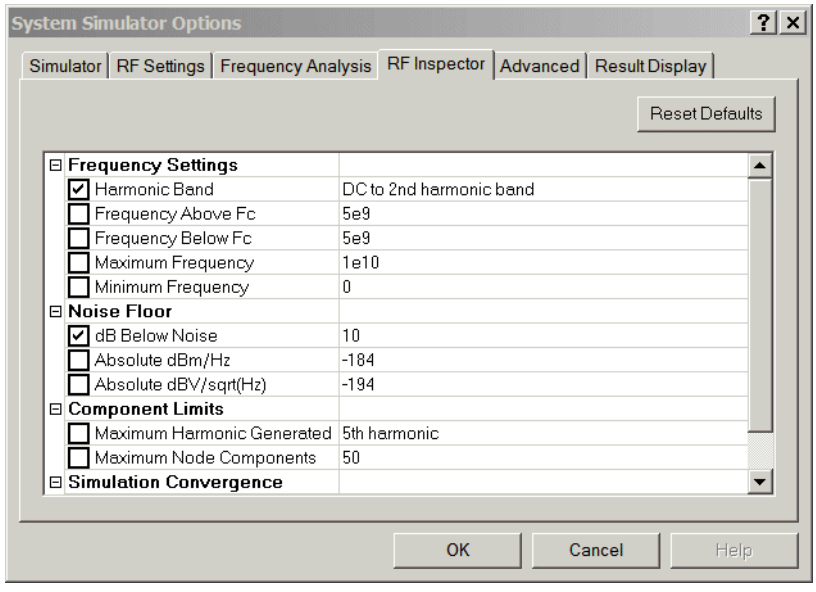
Please note that future updates will be included in the AWR® Knowledgebase. http://www.appwave.com/download/kb.aspx

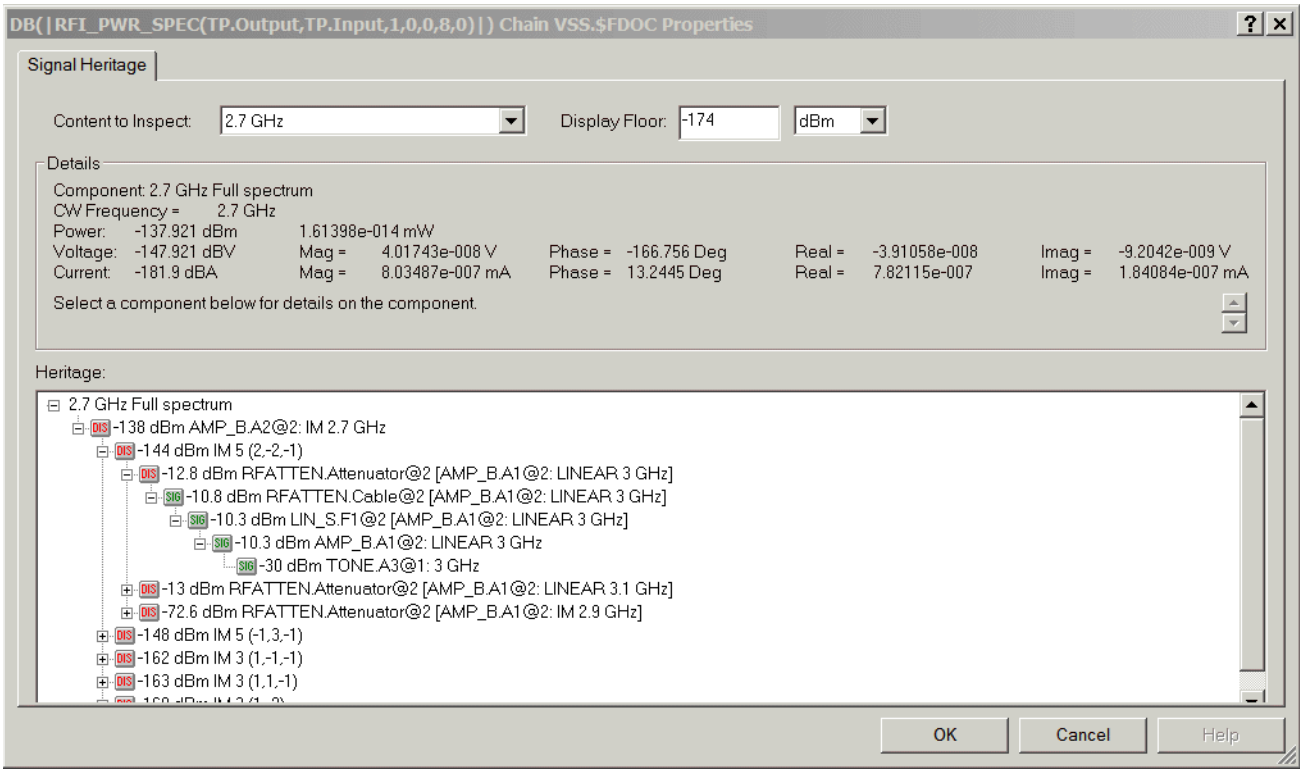
For more information on the system blocks listed, see the corresponding Help in the online *VSS System Block Catalog*.

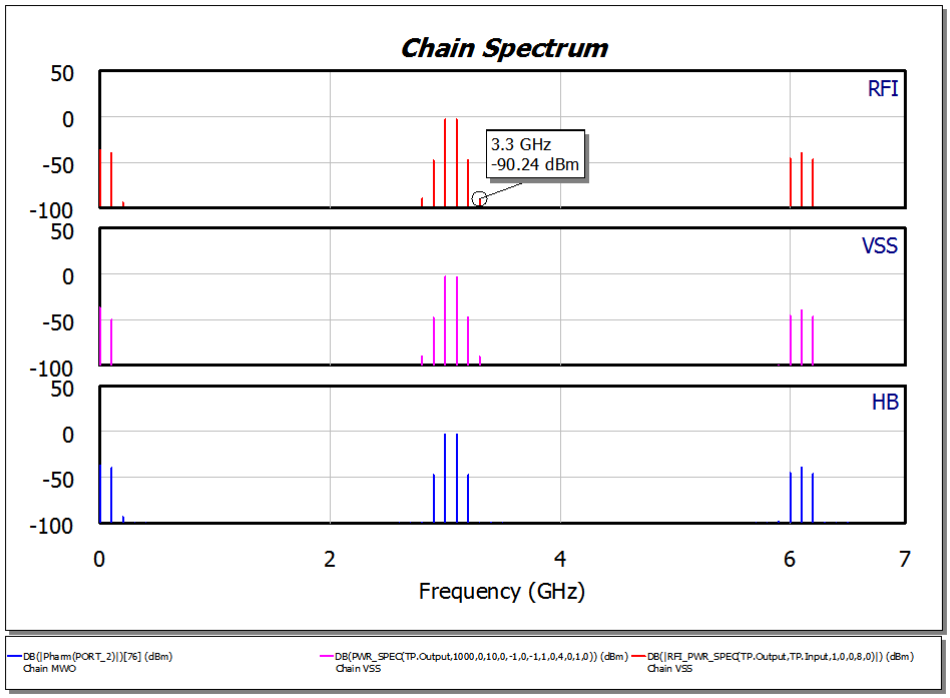
SIMULATOR ENHANCEMENTS

VSS 2007 includes the following significant enhancements to the core simulators:

- RF Inspector, or RFI, is a new system simulation tool that identifies individual spectral components in an RF link. Utilizing the same behavioral system blocks as VSS, it performs a frequency domain simulation rather than a time domain simulation. RFI is designed to support both tone (CW) signals and modulated signals. It classifies the heritage of inter-modulation products and contributors as signal, distortion, and interference components.







- RF Inspector, coupled with the existing RF Budget Analysis feature, makes up the RF Architect, or RFA, VSS-150 package. RFA is seamlessly integrated into AWR's VSS platform.

USER INTERFACE ENHANCEMENTS

VSS 2007 includes the following new user interface enhancements:

- A **LOAD** button on the toolbar for adding a LOAD block.
- A **Measurement Probe** (M_PROBE) button on the toolbar for RFI.

MEASUREMENT ENHANCEMENTS

VSS 2007 includes the following enhancements to measurement and annotation features:

- Many RF Budget Analysis measurements now include an option for displaying contribution as well as cumulative results.
- The following measurements now support specifying the frequency band center or measurement frequency using offsets from the signal center frequency:
  - **System > Noise >** PHS_NOISE
  - **System > NW Analyzer >** ACPR
  - **System > NW Analyzer >** AMtoAM_PS
  - **System > NW Analyzer >** AMtoPM_PS
  - **System > NW Analyzer >** EVM_PS
  - **System > NW Analyzer >** IPn
  - **System > NW Analyzer >** S21_PS

With this capability, measurements can now be performed in swept frequency simulations without requiring the signal to be at the center frequency.

Renamed / Relocated Measurements

- **System >** CH_PWR is now **System > Power >** PWR_vsT
- **System >** INST_PWR is now **System > Power >** PWR_INST
- **System >** FREQ is now **System >** FREQ_INST
- **System > RF Budget Analysis >** C_S21 is now **System > RF Budget Analysis >** C_GV.
  System > RF Budget Analysis > C_S21 is now equal to V_Reflected/V_Incident.
- **System > NW Analyzer >** S21_PS from 7.0x and earlier is now **System > NW Analyzer >** V_GAIN.
  System > NW Analyzer > S21_PS now measures V_Reflected/V_Incident. Both now support specifying separate measurement frequencies for the input and output.

System Spectrum Measurements

- PWR_SPEC: Added "Spectrum Analyzer Spectrum" to the y-axis output option, added flat top windowing option, and improved FFT windowing. The "Spectrum Analyzer Spectrum" option applies windowing similar to a spectrum analyzer, where the value read on the y-axis corresponds to the frequency content near the frequency bin even when spectral spreading

occurs. Computing the power within a frequency band requires adjustment by the noise power bandwidth of the window function. The "Power Spectrum" option, however, scales the window so the power within a frequency band can be computed by simply adding the power values of the FFT bins within the frequency band.

- V_SPEC: Added "Spectrum Analyzer Voltage Spectrum" to the y-axis output option, added flat top windowing option, and improved FFT windowing. The "Spectrum Analyzer Voltage Spectrum" option is similiar to the "Spectrum Analyzer Spectrum" option of PWR_SPEC. Added "VSD Peak (Vpeak/sqrt(Hz))" to the y-axis output option.
  - A flat top windowing option is added and other windowing functions are improved for the following measurements:
  - **System > Power >** PWR_vsT (formerly **System >** CH_PWR)
  - **System > NW Analyzer >** ACPR, AMtoAM_PS, AMtoPM_PS, S21_PS, IPn
  - **System > Noise >** PHS_NOISE
- You can now click and hold the cursor on the spectrum curve to view the RBW/#FFT Bins, number of averages, and windowing used by the following measurements:
  - **System > NW Analyzer >** ACPR
  - **System > NW Analyzer >** AMtoAM_PS
  - **System > NW Analyzer >** AMtoPM_PS
  - **System > NW Analyzer >** EVM_PS
  - **System > NW Analyzer >** IPn
  - **System > NW Analyzer >** S21_PS
  - **System > NW Analyzer >** V_GAIN
  - **System > Noise >** CINR_A
  - **System > Noise >** INTG_PHS_NOISE
  - **System > Noise >** PHS_NOISE
  - **System > Spectrum >** PWR_SPEC
  - **System > Spectrum >** PWR_SPECN
  - **System > Spectrum >** V_SPEC

NEW MEASUREMENTS

VSS 2007 introduces over 12 new system measurements. For measurement details, see the *VSS Measurement Reference* online Help.

System

NOISE

CINR_A: Swept Analog Carrier to Noise+Interference Ratio (C/(N+I))

INTG_PHS_NOISE: Swept Integrated Phase Noise

NF_TD: Swept Noise Factor/Figure (SNR In/SNR Out, Time Domain)

SNR_A: Swept Analog Signal to Noise Ratio (Time Domain)

NW ANALYZER

IMD: Swept Intermodulation Distortion (dBc)

POWER

PWR_MTR: Power Meter (Supports Sweeping)

RF BUDGET ANALYSIS

C_GV: Cascaded Voltage Gain

C_HDRM: Cascaded Operating Point Headroom

C_S21: Cascaded S21

SPWR_Node: Node Propagated Signal Power

RF INSPECTOR

RF_I_SPEC: RFI Current Spectrum

RF_PWR_BAND: RFI Power in Frequency Band

RF_PWR_SPEC: RFI Power Spectrum

RF_V_SPEC: RFI Voltage Spectrum

NEW STANDARDS (OPTIONAL)

VSS 2007 includes several new or updated standards, accessible via the Element Browser **Libraries** node.

- WCDMA/HSDPA XML Library

  Created Downlink and Uplink transmitter and receiver blocks, based on the WCDMA/HSDPA specifications. Created standard-specific test model sources, defined for TX measurements. Added standard-specific propagation channels for birth-death and moving-propagation conditions.

- IS2000 (cdma2000) XML Library

  Created Forward Link and Reverse Link transmitter and receiver blocks, based on IS2000 specifications.

- WiMAX Fixed 802.16d XML Library

  Added a receiver implementation to the library. Updated transmitter blocks to be consistent with the format of the Mobile WiMAX.

- WiMAX Mobile 802.16e XML Library

  Created transmitter and receiver blocks based on WiMAX Mobile 802.16e specifications.

SYSTEM BLOCK ENHANCEMENTS

VSS 2007 includes the following general and specific system block enhancements:

General System Block Enhancements

- AMP_B, AMP_BV, and VGA_F now support frequency dependent VSWR, Reverse Loss, Reverse Isolation, S11, S22, and S12.
- LOAD now supports frequency dependent load impedances.
- REMOVE_DLY and REMOVE_DLY_FP now support advancing in samples via a DELAY_SMP parameter.
- NL_F now supports specifying the input and output values in Volts/dBV
- PHASE now presents the system characteristic impedance when impedance mismatch modeling is enabled. In version 7.0.x it was transparent.
- MIXER_B now has a PINUSE parameter that allows you to set the suppression levels for the higher order input spurs so they are relative to the PIN parameter. With this setting you can change the input power and conversion gain while maintaining the same spur suppressions.

Renamed System Blocks

- **RF Blocks > Impedance Mismatch >** GAMMA_L is now **RF Blocks > Impedance Mismatch >**RF_START.

NEW SYSTEM BLOCKS

VSS 2007 introduces over 20 new system block models. For system block details, see the *VSS System Block Catalog* online Help.

Communication Standards

CDMA-3G

HSDPA_SCRM: Scrambling Sequence Generator for WCDMA/HSDPA

IS2000_DLVR: IS2000 Standard, DeInterleaver

IS2000_ILVR: IS2000 Standard, Interleaver

OVSF_CODE: OVSF Code Generator for CDMA Standards

WALSH_CODE: Walsh Code Generator for CDMA Standards

WCDMA_SCRM: Scrambling Sequence Generator for WCDMA/HSDPA

WCDMA_SCRM: Scrambling Sequence Generator for WCDMA/HSDPA

WIMAX MOBILE

WiMAX_MBL_FASM: Frame Assembler for Mobile WiMAX

WiMAX_MBL_FDSM: Frame DisAssembler for Mobile WiMAX

Converters

BINARY

SYM2B_SFT: Convert Soft Metrics of M-ary Symbols to Soft Metrics of Binary Bits

Fixed Point

SIGNAL PROCESSING

REMOVE_DLY_FP: Remove Signal Delay Samples Fixed-Point

Modulation

QAM

QAM_SFTM: Soft Metric Calculation for M-ary Symbols of a QAM Constellation

RF Blocks

AMPLIFIERS

AMP_EQN: Equation-Based Nonlinear Amplifier

COUPLERS

DCOUPLER_3: Directional Coupler, 3-Port Internal Termination

DCOUPLER_4: Directional Coupler, 4-Port External Termination

IMPEDANCE MISMATCH

RF_END: End of RF Signal

PASSIVE

CIRC_12: RF Circulator, 1-Input 2-Output

CIRC_21: RF Circulator, 2-Input 1-Output

ISOLATOR: RF Isolator

SWITCH

RFSPDT_12ST: RF Single Pole Double Throw Switch (Static 1-Input 2-Output)

RFSPDT_21ST: RF Single Pole Double Throw Switch (Static 2-Input 1-Output)

Signal Processing

CHANGE_FC: Change Center Frequency

CHANGE_FS: Change Sampling Frequency

CORRELATOR: Performs correlation of the input signal with a secondary signal or sequence

REMOVE_DLY: Remove Signal Delay Samples