

SerDesDesign.com Typical-View-SParameters-Characteristics-and-Displays

Subject: Typical View S-Parameters Characteristics and Displays

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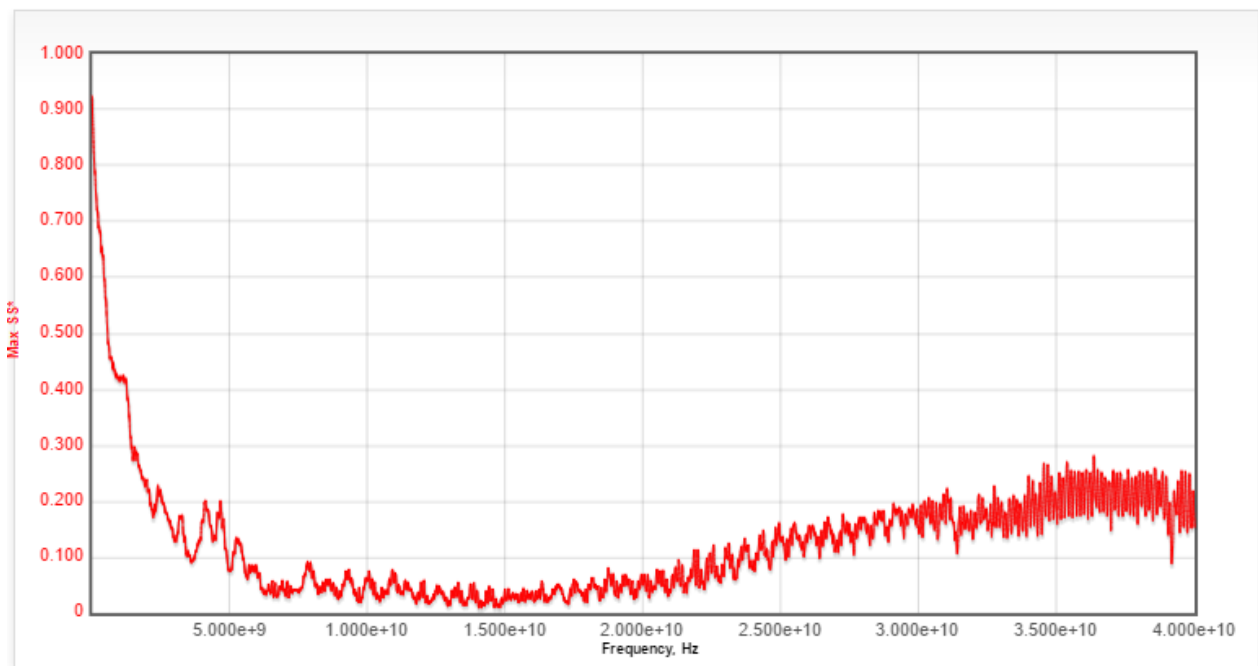
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This section discusses typical View S-Parameters Tool characteristics and displays. Let us know if you would like the View S-Parameters Tool enhanced with additional capability.

A typical SerDes channel, with about 18 nsec time delay, defined for use with serial data at a bit rate of 25 Gbps has its hardware 4-Port S-parameters measured from 10 MHz to 40 GHz in steps of 3.125 MHz.

For this example S-Parameter file, and with all 4 ports selected for measurement with phase unwrapped, the S-Parameter characteristics can be displayed in graphs selected to be opened.

Figure 1: Passivity check

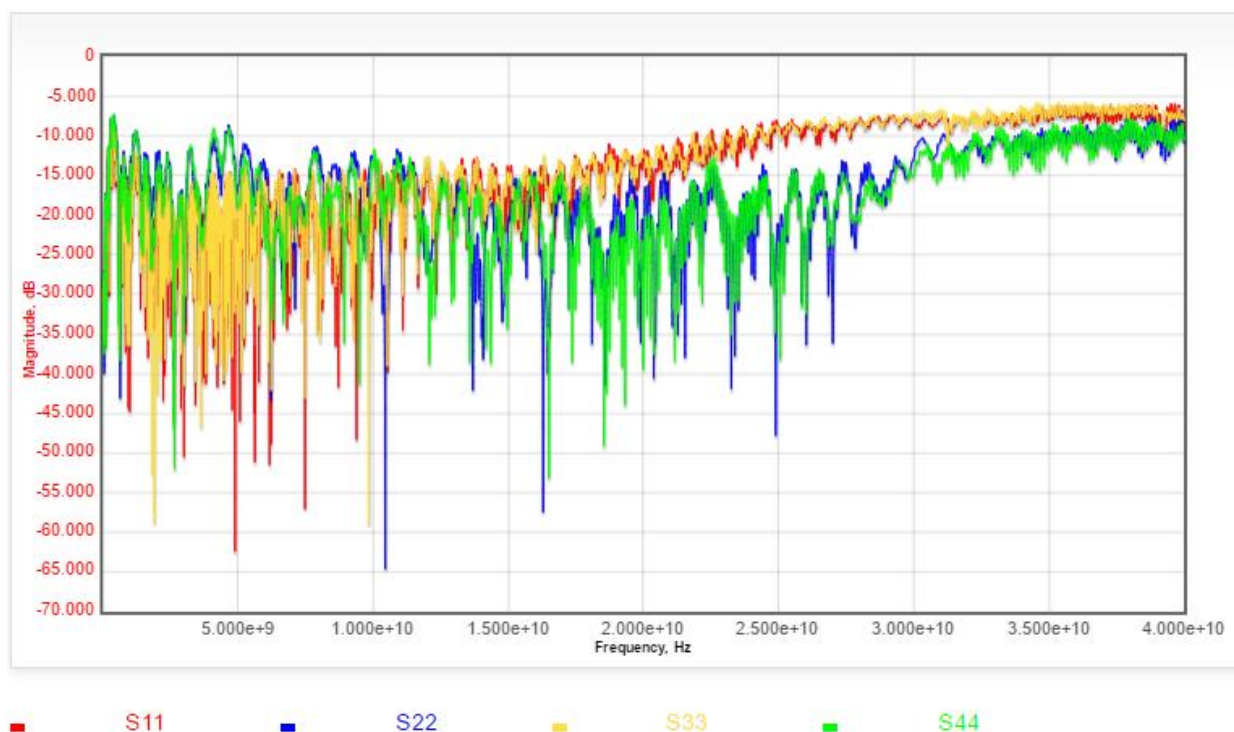


The passivity factor, at any frequency is calculated from the expression: $[S]^\dagger[S]$ where $[S]$ is the scattering matrix, and $\dagger$ denotes the conjugation and transposition of a matrix. The calculated passivity measure is the minimum eigenvalue of $[I]-[S]^\dagger[S]$ where $[I]$ is the identity matrix.

When this expression is greater than unity, the S-Parameters are non-passive.

Figure 2: Reflection Sii magnitude

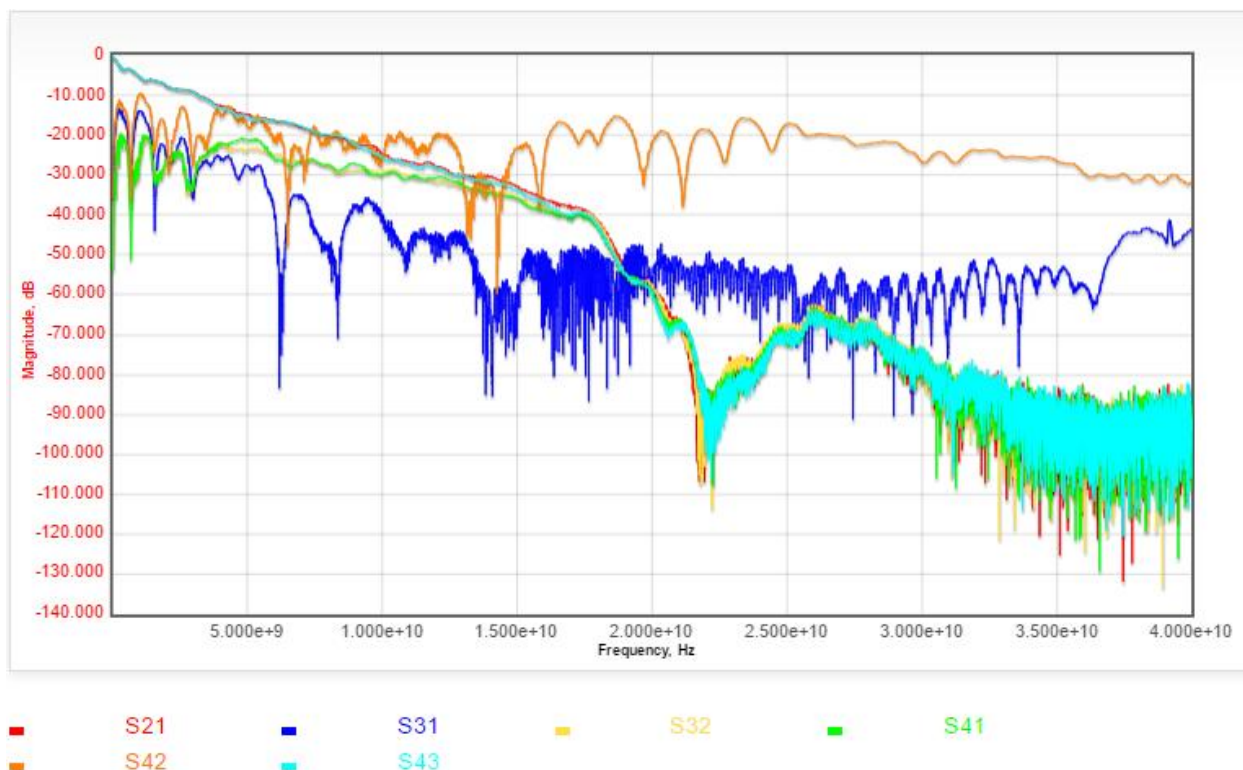
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Besides the magnitude response, the phase response can also be viewed. One can zoom in onto any area in the graph.

Figure 3: Transmission S_{ij} , $i > j$, magnitude

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Besides the magnitude response, the phase response can also be viewed. Additionally, the reverse transmission characteristic ($S_{ij}, i < j$) can be viewed. One can zoom in onto any area in the graph.

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