

Audio Analyzer R&S UPL

Multichannel audio measurements on surround sound decoders

Fitted with the new option R&S UPL-B23, the Audio Analyzer R&S UPL generates AC-3-coded test signals (Dolby Digital) directly with the built-in generator. This makes for convenient measurements on surround sound decoders when used with the Audio Switcher R&S UPZ.



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Multichannel measurements on audio/video receiver.

Coded audio signals

In the multichannel methods surround sound and 5.1 playback, the six channels commonly used are data-reduced for transfer and then decoded in the consumers' surround sound decoders for analog and multichannel replay. Up to now, measuring these decoders necessarily involved defining and storing coded test sequences on a DVD or the PC hard disk. The test signals were then decoded in the DUT and measured on the analog outputs by means of an audio analyzer. Since the test files and the measurements ran on different instruments, synchronization was difficult, leading to extended measurement times.

The R&S UPL is the only audio analyzer so far to generate AC-3-coded test signals directly with the built-in generator.

The new option R&S UPL-B23 offers numerous advantages:

- ◆ The internal synchronization enables considerably faster measurements
- ◆ Test sequences can be combined much more flexibly since the number of channels, frequency or level sweep, start and stop frequency/level as well as the number of sweep points can be set directly
- ◆ The test signals are no longer recorded on DVD/PC, thus saving time previously spent on combining and coding them
- ◆ Additional hardware, such as a PC or DVD player, is not required

To test 5.1 decoders, the six channels are connected to the Audio Analyzer R&S UPL via the Audio Switcher R&S UPZ (FIG). The R&S UPL controls the R&S UPZ directly via an RS-232-C inter-

face. For professional surround applications, the Audio Switcher R&S UPZ comprises eight channels, with two output channels for simultaneous use of the two R&S UPL measurement channels.

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Comprehensive data sheets "Multichannel audio measurements on surround sound decoders" and "R&S UPL" at www.rohde-schwarz.com



Data sheet R&S UPL



Data sheet Multichannel audio measurements...

A new firmware module has been developed for the R&S ESPI (FIG 1) that further facilitates EMI emission analysis. The advantages of the new functions are demonstrated by means of conducted EMI on a PC power supply. An external DC power supply and a battery pack are available for network-independent measurements (see box on right).

FIG 1 The Test Receivers R&S ESPI combine the advantages of analyzers and conventional test receivers.



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Precompliance Test Receiver R&S ESPI

Measurement of conducted EMI when using a switching power supply

Successful multitalents

The precompliance Test Receivers R&S ESPI 3 and R&S ESPI 7 [*] were introduced in 2001 as multitalents and fulfilled all expectations. They not only handle standard spectrum analyzer applications and thus basic measurement tasks – they are also used to prepare for EMI certification in your own lab. The market has responded very positively to such versatility coupled with numerous intelligent functions in the medium price range.

An application example consisting of an EMI measurement using a PC switching power supply is presented here to highlight important integrated functions of the R&S ESPI models. These time-saving instruments considerably simplify everyday measurements without compromising the required measurement reproducibility. On the basis of these precompliance measurements and the results obtained, confirmation by standard-conformant final tests at an accredited test house will be strictly a formality.

Overview measurements save time and costs

The appropriate means of interference suppression is determined by performing EMC testing of conducted EMI. Adequate suppression of conducted EMI should always be ensured before interference fields, i.e. radiated EMI, are analyzed.

The switching power supply in a PC or laptop is the main source of interference. To ensure that the switching power supply has proper EMC, it is

designed, for example, with lowpass filters consisting of series inductance and case capacitance. However, frequent improvements to circuit design or layout are very time-consuming and expensive. The R&S ESPI can drastically reduce this effort because it allows you to perform quick and easy overview measurements that can be used to record and evaluate the effects of precompliance interference suppression due to components, filters and shielding. Together with the V-Network R&S ESH 3-Z5, initial overview measurements can be easily performed on the lab bench to determine critical frequencies. Ideal test conditions, however, call for the use of a screened room, especially with a view to unimpaired reproducibility of test results (FIG 2).

Limit values specified in European standard

The European EN 55022 standard for limit values for maximum permissible EMI applies to switching power supplies in laptops. There are two limit values with parallel run and 10 dB offset for conducted EMI evaluation using the quasi-peak (QP) detector and the average (AVG) detector. To make sure that the limit lines are not exceeded in production, an offset of –3 dB to –6 dB from the limit lines is advisable to compensate for the production tolerances of the switching power supplies. To be on the safe side, a larger offset from the limit values should be selected in the case of lab bench results (safety margin for setup and parameter scatter). A higher offset, i.e. lower EMI, is desirable, but requires increased suppression and consequently higher production costs and is therefore economically not viable.