RI 241 Fading Emulator 140 MHz

High performance Fading Emulator with high dynamic range

Features:

- 140 ± 56 MHz IF bandwidth (1)
- Supports 112 MHz channel spacing
- Flat fade
- 43 dB notch depth
- 1 kHz notch frequency resolution
- Up to 4 fading channels
- Optional built-in C/N generator with AWGN
- Meny system on 7" touch LCD
- 19", 3HU rack mountable

Ranatec RI 241 is a modular, multi-channel Fading Emulator suitable for radio link testing in laboratory environment.

Overview

The Ranatec RI 241 is a multichannel high performance Fading Emulator occupying only 3HU in a 19" rack.
It can be equipped with up to 4 completely independent fading channels.
Each channel can emulate multipath fading according to Rummler's model which is relevant for microwave radio links.
A built-in C/N generator with AWGN is available as an option. The C/N generator function measures the modulated carrier power and adjust the AWGN so the wanted C/N_0 ratio is obtained. The C/N generator function is implemented in the digital domain of an FPGA, which gives unprecedented accuracy of the set C/N_0 ratio.

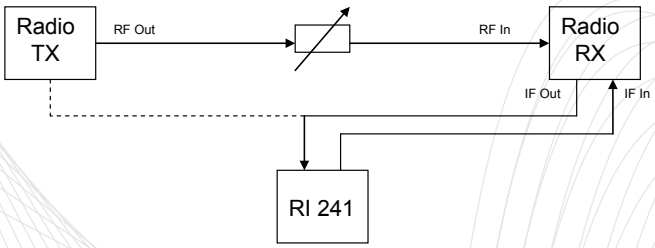

Fig. 1 *Ranatec RI 241 can be connected either RF back-to-back or in an IF loopback configuration.*

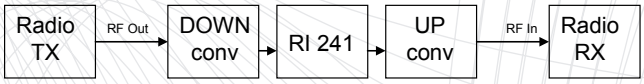

Fig. 2 *If the IF interface is not accessible, RI 241 can be connected in the RF path using proper down- and up-converters.*

Hardware

The Ranatec RI 241 is a modular instrument and can be equipped with up to 4 pcs RI 1241 Fading Emulator Channels. Optional C/N generator can be added to each RI 1241.

Applications

The RI 241 Fading Emulator is designed for applications such as:

- Radiolink testing
- Satellite radiolink testing

Compatibility

The RI 241 Fading Emulator is designed to replace the obsolete Agilent 11757B.

(1) -2 dB bandwidth

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High performance measurement solutions

Electrical Specification

Number of channels	1-4
Impedance	50 Ω
IF bandwidth	140 ± 56 MHz [2]
Notch frequency range	140 ± 56 MHz
Notch frequency resolution	1 kHz
Notch frequency accuracy	± 20 kHz @ 140 MHz
Notch depth	0 to 43 dB
Notch depth resolution	0.1 dB
Notch depth accuracy	± 0.5 dB (relative the flat fade level at the notch frequency)
Noise figure @ Pin= -10 dBm	14 dB
Two-tone IMD3	60 dB typ
SFDR including H2, H3 [3]	70 dB typ
Input CW power range	-35 to +10 dBm
Output CW power range	-63 to +1 dBm

[2] -2 dB bandwidth
[3] H2 and H3 are the second and third order harmonic folded around half the sampling frequency

Flat fade

Resolution	0.1 dB
Accuracy (0 ~ 40 dB flat fade)	± 2 dB
Group delay variation	± 1 ns @ ±20 MHz

Sweep

Sweep time range	10 ms to 99.9 s
Resolution	0.01 s
Sweep frequency range	84 ~ 196 MHz
Maximum slew rate	
- Notch frequency	10000 MHz/s
- Notch depth	4300 dB/s
- Gain/attenuation	6500 dB/s

C/N generator

Set parameter is C/N_0 [4]	
C/N_0 range	min [5] ~ 140 dB
Type of noise	AWGN
Flat Noise frequency range	140 ± 70 MHz
Crest Factor of noise	18.3 dB
C/N ratio accuracy	± 0.2 dB@NBW=40MHz

Absolute Maximum Ratings

Maximum input DC voltage	+30 VDC
Maximum DC voltage applied to output	+30 VDC
Maximum input power	+18 dBm
Maximum power into output	+20 dBm

[4] C/N_0 is Carrier-to-Noise density
[5] The min level of C/N_0 depends of how close the carrier level is to full scale of the IF output DAC

Mechanical specification

Size	19”, 3 HU
IF input connectors	BNC 50 Ω
IF output connectors	BNC 50 Ω

Environmental specification

Operating temperature	0 to 55 °C
Storage temperature	-40 to 80 °C
Relative humidity	10 to 90 %

Interfaces

Remote control	SCPI/Ethernet (RJ-45)

Ordering

RI 241	Fading Emulator Mainframe incl. 1 Fading Channel
RI 1241	Extra Fading Emulator Channel 140 MHz
RI 1241-C/N	Optional C/N generator added
RI 1295-xxxx	Optional 112 MHz BW down- and up-converter, where xxxx is the RF center frequency in MHz, see fig. 2

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