

Vertex High Frequency Converter

Enabling Channel Emulation for 5G FR2 Applications

The Vertex® Multi-Band High Frequency Converter (MB-HFC) was developed to bring advanced channel emulation test capabilities to 5G NR applications by extending the Vertex RF channel emulator frequency range from radio frequency (RF) bands to higher mmWave frequency bands. A single unit can support multiple 5G NR FR2 bands from 24.25 GHz to 48.2 GHz. FR2 bands can be switched remotely through Ethernet commands. It incorporates high gain low noise amplifiers which compensate the path loss for mmW device test in radiated OTA (over the air) mode.

Typical Application Scenarios

The Vertex MB-HFC can be used to inject RF channel emulation between a mmW band gNodeB (gNB) with Vertex RF channel emulator which natively supports a frequency range below 6 GHz.

The MB-HFC unit can be used for a mmW band device, end to end OTA test system, and or used between sub-6 GHz network emulator and mmW band device tests.

Key Features

- Six 5G NR FR2 bands: N257, N258, N259, N260, N261, N262
- Remote band switching and up/down configuration through ethernet control
- 4 Independent channels
- Embedded mmWave and RF amplifiers
- Lock detect, PA alarms, and temperature monitoring capabilities



Technical Specifications

5G NR FR2 Bands	N257	N258	N259	N260	N261	N262
Frequency range	26.5 - 29.5 GHz	24.25 - 27.5 GHz	39.5 - 43.5 GHz	37.0 - 40.0 GHz	27.5 - 28.35 GHz	47.2 - 48.2 GHz
LO	23.5 GHz	21.5 GHz	Split 37.5 - 43 GHz	43 GHz	23.5 GHz	43 GHz
Input frequency	3 - 6 GHz	2.75 - 6 GHz	2 - 6 GHz	3 - 6 GHz	4 - 4.85 GHz	4.2 - 5.2 GHz
Nominal and Maximum Input power level to any RF/mmWave port input - down-convert mode	-40/10 dBm	-40/10 dBm	-40/10 dBm	-40/10 dBm	-30/10 dBm	-30/10 dBm
Nominal and Maximum Input power to any IF port	-37/0 dBm	-37/0 dBm	-37/0 dBm	-37/0 dBm	-35/0 dBm	-35/0 dBm
Typical EVM for 5G NR 100 MHz with PAPR of 15 dB nominal input power (single channel)	<1.5%	<1.5%	<1.8%	<1.8%	<1.8%	<1.8%
Typical Up/Down Conversion gain simplex mode	32/30 dB	32/30 dB	33/30 dB	34/30 dB	22/20 dB	22/20 dB
Typical Up/Down Conversion gain Duplex mode	26/24 dB	26/24 dB	27/24 dB	28/24 dB	14/16 dB	14/16 dB
Typical in band ripple per 100 MHz band	2 dB	2 dB	3 dB	2 dB	3 dB	3 dB
10 MHz reference	External	External	External	External	External	External
In Band Spurious Emission	-40 dBc	-40 dBc	-40 dBc	-40 dBc	-40 dBc	-40 dBc
Impedance	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms
Input VSWR	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95

Note 1: When multiple HFCs are used in a system to increase channel capacity, please be sure their external clocks are all connected to the same qualified 10 MHz clock source.

Note 2: This product is not meant to be used in a standalone configuration, it must be used with Vertex Channel Emulator.

Note 3: There is a spectral inversion for band N260 and part of N259.



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