

# Spirent Vertex® High Frequency Converter

## Enabling Channel Emulation for 5G Applications

The Vertex® High Frequency Converter (HFC) extends the Vertex channel emulator frequency range from Radio Frequency (RF) bands to higher mmWave frequency bands for 5G applications.

The Vertex HFC was developed to bring advanced channel emulation test capabilities to 5G applications. It converts the traditional RF range of 2GHz to 3GHz to the mmWave (mmW) range of 27.5GHz to 28.5GHz and vice versa, allowing channel characteristic simulation in millimeter band scenarios required for 5G implementation. It can also be customized to support other mmW frequencies.

### Key Features

- Supports basic 2x2 MIMO or massive MIMO applications at mmW bands
- RF range: 2GHz to 3GHz
- mmW range: 27.5GHz to 28.5GHz
- Customizable to support other mmW bands
- Supports internal or external local oscillator (LO)

### Available in Two Configurations

The Vertex HFC is available in two options to best suit the application; for smaller capacity implementations, the streamlined instrument accommodates up to 4 channels while the high capacity version accommodates up to 20.



- 4-channel unit addresses entry level (2x2 bidirectional) tests
- 20-channel unit has an internal combiner for multi-Vertex instrument applications: stackable from 16x4 bi-directional (2 Vertex + 1 HFC) to 64x4 bidirectional (8 Vertex + 4 HFC)

### Typical Application Scenarios

The Vertex HFC can be used to inject RF channel emulation between a mmW band eNodeB (eNB) and mmW band device (Figure 1). Other scenarios include upconverting from an RF band network emulator or eNB to a mmW band device (Figure 2).

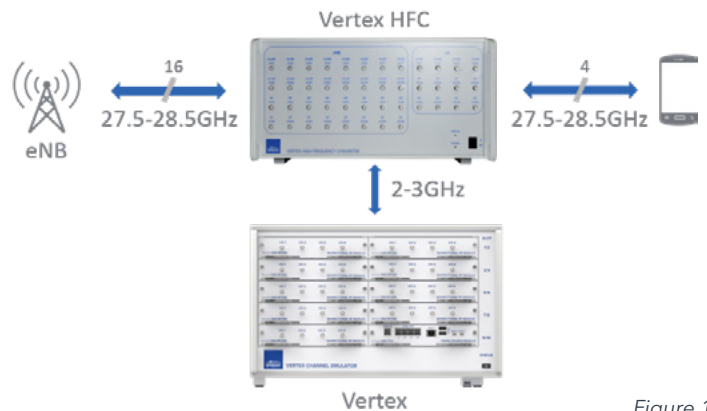


Figure 1

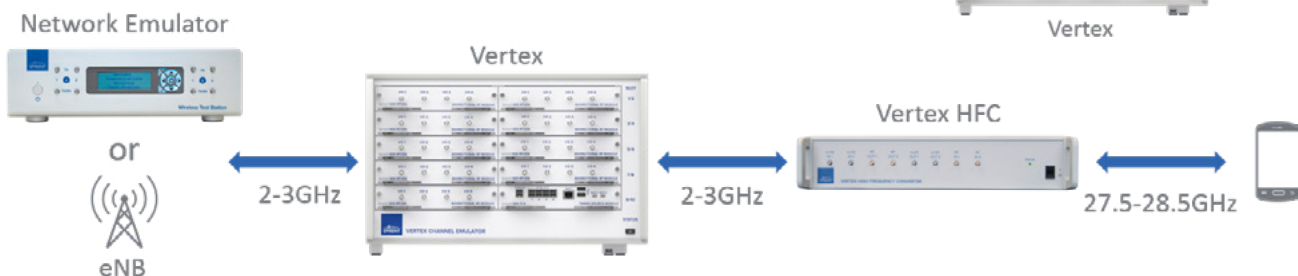


Figure 2

## About Spirent Communications

Spirent Communications (LSE: SPT) is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks.

We help bring clarity to increasingly complex technological and business challenges.

Spirent's customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled.

For more information, visit: [www.spirent.com](http://www.spirent.com)

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Technical Specifications		
	4-Channel Vertex HFC	20-channel Vertex HFC
RF I/O ports	4 RF I/O ports (eNB or device)	16 eNB RF I/O ports, 8 device RF I/O ports
mmW I/O ports	4 mmW I/O ports	16 eNB mmW I/O, 4 mmW RF I/O ports
Local oscillator (LO)	Internal (25.5GHz) and External	Internal (25.5GHz) and External
Phase noise of internal LO	Typical -110 dBc/Hz (@ 100KHz)	Typical -110 dBc/Hz (@ 100KHz)
External LO level	4dBm	10dBm
Internal RF filter	DC to 3GHz (>30dB rejection at >3.5GHz)	DC to 3GHz (>30dB rejection at >3.5GHz)
Internal mmW filter	27.5GHz to 28.5GHz (>20dB rejection at <27GHz or >29GHz)	27.5GHz to 28.5GHz (>20dB rejection at <27GHz or >29GHz)
RF/mmW in-band flatness	+/- 1dB (over 100MHz bandwidth) +/- 3dB (over 1GHz bandwidth)	+/- 1dB (over 100MHz bandwidth) +/- 3dB (over 1GHz bandwidth)
Input frequency	2GHz to 3GHz	2GHz to 3GHz
RF input power level	<5dBm	<5dBm
mmW input power level	<5dBm <sup>1</sup>	<5dBm <sup>1</sup>
Conversion loss	<20dB	eNB Ports <20dB; device Ports <26dB
10MHz reference	External	External
In-band spurious emission	-40dBc	-40dBc
Impedance	50 ohms	50 ohms
Input VSWR	<1.5	<1.5
Physical dimensions	3.5"H x 17"W x 13"D	8.7"H x 17"W x 13"D

<sup>1</sup> An external amplifier is needed if the mmW input power level will be <-30dBm. This may occur when working with the Vertex channel emulator, as its input range is +10 to -50dBm.

## Ordering Information:

Part Number	mmWave Range	LO	mmWave BPF Filter	RF BPF Filter
VCE6-HFC-4C-28GHZ	27.5GHz to 28.5GHz	25.5GHz Internal	27.5GHz to 28.5GHz	DC to 3GHz
VCE6-HFC-20C-28GHZ	27.5 GHz to 28.5GHz	25.5GHz Internal	27.5GHz to 28.5GHz	DC to 3GHz
VCE6-HFC-4C-CUST	customer specified	customer specified	customer specified	DC to 3GHz
VCE6-HFC-20C-CUST	customer specified	customer specified	customer specified	DC to 3GHz