

# Ripcord2™ UWB IC DVK - Theory of Operation

## Ripcord2™ UWB IC DVK – Wireless USB Development Kit

From its inception, Staccato Communications has dedicated itself to the UWB market by driving global standards activities, creating industry momentum, and engaging in cutting-edge technological development. Staccato provides a broad portfolio of single-chip, all-CMOS solutions for WiMedia Ultra-Wideband applications, including Certified Wireless USB, High-Speed Bluetooth, WLP (IP-Over-WiMedia), and Wireless Audio/Video.

Staccato's Ripcord™2 product family offers the highest level of integration, smallest form-factor and lowest power consumption solutions. The highly-integrated UWB solution includes RF, digital baseband, MAC, memory, processor, I/O and encryption. The various supported I/O are USB 2.0 Host, USB 2.0 Device, and SDIO 2.0 Device. Staccato's Ripcord™2 is the leading UWB solution for personal computing, consumer electronics, and mobile devices.

At the heart of the Ripcord™2 UWB IC DVK (SC4113D) is Staccato's Ripcord2™ SC4502 silicon. Operating in WiMedia Band Groups 1, 3 and 6, the SC4502 integrates the RF front end, digital Baseband, MAC, and USB 2.0 Host/Device interface providing a complete single-chip UWB solution. Implemented in a leading 65nm standard CMOS process technology, with inherently superior size and power, the SC4502 supports all mandatory and optional data rate modes (from 53.3 Mbps to 480 Mbps) and all data communication is supported over a secure wireless link using 128-bit AES hardware encryption. The SC4502 is offered in a tiny 5mm x 5mm x 0.55mm WCSP package.

The SC4113D DVK includes hardware, software, and full documentation to accelerate the development cycle. At the core of the SC4113D DVK is the Ripcord Control Library (RCL). RCL is a fully abstracted software library that provides simple services to interface to the Ripcord2 solution allowing easy integration on a variety of platforms. Additionally, the SC4113D allows developers to access and evaluate WiMedia MAC and PHY characteristic. The kit also includes a Single-Board Computer (SBC) running embedded Linux.

Staccato's Ripcord™2 SC4502 series silicon transmits WiMedia UWB signals that have instantaneous bandwidth (BW) greater than 500MHz or fractional occupied BW greater than 20 percent as defined by the FCC Report and Order for UWB Communications. The frequency plan is as follows:

Band Group	Band 1 $f_{\text{center}}$ (MHz)	Band 2 $f_{\text{center}}$ (MHz)	Band 3 $f_{\text{center}}$ (MHz)
1	3432	3960	4488
3	6600	7128	7656
6	7656	8184	8712

Ripcord™2 transmits either by band switching between the 3 bands or remaining stationary in each band, known as TFI or FFI respectively. Ripcord™2 occupies approximately 1584MHz while band switching in TFI mode (528MHz instantaneously) and the average transmitted power is approximately -9.3dBm (or -14dBm when stationary operating in FFI mode).

FCC Part 15 regulation in Subpart F, Section 15.517 and 15.519 specifies maximum average Equivalent Iso-tropically Radiated Power (EIRP) of – 41.3dBm (53.9dBuV/m) measured using a resolution bandwidth of 1MHz. EIRP in dBm converts to a field strength, in dBuV/m at 3 meters, by adding 95.2dB. One hundred twenty two modulated Orthogonal Frequency Division Multiplexed (OFDM) sub-carriers comprise the 528MHz wide signal of each band.