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WQST100ADA – Theory of Operation

WiQuest's Wireless USB external adapter ("USB dongle") is a cost-effective, highly-integrated design that provides wireless UWB high-speed services for wired USB devices. With this reference design, WiQuest enables equipment manufacturers to build a complete Device Wired Adapter (DWA) or Host Wired Adapter (HWA) solution from one common reference platform. The adapter design provides a complete end-to-end solution based on the Certified Wireless USB specification from the USB-IF while leveraging WiQuest breakthrough wireless performance.

The adapter reference design is shipped as a complete package including both hardware and software support. The hardware information includes a working adapter sample along with schematics, layout source files, a detailed bill-of-material, design manual, user's guide, and a quick-start guide. The software package includes a Host Wired Adapter (HWA) driver/firmware and DWA firmware along with the WiQuest Microsoft Windows-based utility which supports device discovery, multiple association options, field upgrade functionality, and comprehensive diagnostics.

The WiQuest Wireless USB Adapter is designed around WiQuest's WQST110 and WQST101, the industry's leading high-performance ultrawideband (UWB) chipset. The WQST110 includes a WiMedia-based ultrawideband media access controller (MAC) and physical layer (PHY) baseband processor. The WQST101 is a direct conversion UWB RF transceiver. These two devices and related components fit into a standard USB external adapter form factor.

WiQuest Communications Wireless USB Adapter/"Dongle" (WQST100ADA) Reference Design is an Ultrawideband (UWB) WiMedia Mode 1-compliant device that operates in the 3168-4752MHz Band group.

The WiQuest EVK transmits WiMedia UWB signal that has instantaneous bandwidth (BW) greater than 500MHz, or fractional occupied BW greater than 20 percent. The 1584MHz wide band represents 40 percent bandwidth (fractional bandwidth equals 2*(Fh-Fl)/(Fh+Fl), where Fh is upper boundary and Fl is lower boundary). Band Group 1 is divided into 3 individual bands, each 528MHz wide, with center frequencies of 3432MHz, 3960MHz and 4488MHz, respectively. The WiQuest EVK transmits either by hopping between the 3 bands or stationary on each band. 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 could be converted to a field strength, in dBuV/m at 3 meters, by adding 95.2dB.

Since the WiQuest Wireless USB Dongle (WQST100ADA) occupies approximately 1584MHz while hopping (528MHz instantaneously) the average transmitted power is on the order of -9.3dBm (or -14dBm when not hopping). The 528MHz wide signal is composed of 122 modulated Orthogonal Frequency Division Multiplexed (OFDM) sub-carriers.