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BLUETOOTH® SPECIFICATION VERSION 3.0

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BLUETOOTH SPECIFICATION VERSION 3.0

The following summary outlines the prior Bluetooth Core Specification release features and their applicability

- The latest version of the Bluetooth standard is version 3.0 + HS. HS stands for high speed – meaning high data rate. Bluetooth 3.0 was previously known as the Seattle Core Release. The following table identifies the features being added to the Bluetooth core specification in the Seattle core release as well as a brief description of the feature. Enabling high speed solutions is the primary objective for the Seattle core release. Therefore, the hallmark features for the Seattle core release consists of the Generic AMP and at least one of the alternate MAC/PHYs (AMPs). It also enables faster data rates, new and enhanced use cases, lower power consumption, as well as advanced topology. The specification was adopted on the 21st of April 2009.

IMPACT ON HEADSETS AND HANDS FREE PRODUCTS

The new features have no direct impact on headsets and speakerphone product performance at this point in time. However, the improved options for power control will be improvements for headsets. In particular class 1 products (long range).

Bluetooth products qualified to BT v 3.0 will start to hit the market in 2009. But for the majority of new products, 2010 will be the shift from 2.1 to 3.0.

More details on rev 3.0 below:

GENERIC ALTERNATE MAC/PHY

Higher data rates will be enabled through the development of the Generic AMP feature and integrated with one or more AMPs. The first plug-in AMPs are known as the UWB AMP and 802.11 AMP. The ultimate goal is to work towards an architecture that allows devices to take advantage of higher data rates for use cases requiring that speed while maintaining backward compatibility with existing Bluetooth devices on the market and future products not requiring the higher data rate. This must be a low cost radio+baseband. The solution must maintain robust and ad hoc characteristics by using existing Bluetooth wireless technology.

USE CASE(S) ENABLED BY GENERIC ALTERNATE MAC/PHY

The Generic AMP feature enables alternate radio technologies to be utilized while maintaining backwards compatibility with existing Bluetooth devices. This feature does not enable new use cases as a standalone feature, but enables new use cases when combined with an alternate radio technology. This solution shall continue to support use cases offered today such as audio (stereo and mono) headsets and human interface devices (such as mice and keyboards).

V3.0 + HS BLUETOOTH CORE SPECIFICATION RELEASE

NAME	RATIONALE	USE CASE
Generic Alternate MAC/PHY (AMP)	Enables Bluetooth profiles and protocols to take advantage of higher data rates using one or more alternate high speed radio technologies	Enables use of alternate radio technologies
Enables use of alternate radio technologies	Enables the Generic AMP feature to be used with an 802.11 radio	Fast file transfer, synchronization, video sharing
Unicast Connectionless Data	Reduces latency for applications that intermittently need to quickly connect and send small amounts of data by eliminating the L2CAP channel setup process. Enables some devices to remain disconnected more often, thereby reducing power	Reduces latency and power consumption
Enhanced Power Control	Improves power control for devices supporting more than one modulation scheme	Maximizes range
Read Encryption Key Size	Enables a host to determine the negotiated encryption key size to determine security requirements	Enhanced security

SUPPORT

UWB ALTERNATE MAC/PHY

The UWB AMP provides support for the UWB MAC/PHY for use with the Generic AMP feature. The UWB AMP utilizes the ECMA-368 version of ultra-wideband (UWB). Due to the complexity of this feature, regulatory standardization, and development effort commitments, this feature is at risk of being decoupled from the Seattle core release in the future and adopted as a stand alone feature when finalized.

USE CASE(S) ENABLED BY UWB ALTERNATE MAC/PHY

Sending large files between Bluetooth devices will be significantly improved by reducing the time required to perform this task. This will also enable new use cases including the synchronization of music and video files and the ability to stream real time video streams between Bluetooth devices.

ALTERNATE MAC/PHY

The 802.11 AMP provides support for the 802.11a/b/g radios for use with the Generic AMP feature. The feasibility of supporting the 802.11n radio will be investigated and may be enabled. The AMP will be defined and developed in three components consisting of an AMP HCI, Protocol Abstraction Layer (PAL), and Physical Layer (PHY). Only the AMP HCI and PAL will be developed within the Bluetooth SIG for the 802.11 AMP feature.

USE CASE(S) ENABLED BY 802.11 ALTERNATE MAC/PHY

Sending large files between Bluetooth devices will be significantly improved by reducing the time required to perform this task. This will also enable new use cases including the synchronization of music and video files and transfer large digital files between Bluetooth devices.

ENHANCED POWER CONTROL

The Enhanced Power Control feature enhances the power control for devices supporting more than one modulation scheme. This feature also introduces acknowledgements to confirm that the new power level has taken effect.

USE CASE(S) ENABLED BY ENHANCED POWER CONTROL

The Enhanced Power Control feature does not enable new use cases, but delivers engineering improvements to Bluetooth wireless technology. These improvements include the ability for some modulation schemes to have a higher power level than others which results in maximizing the range of a Bluetooth device. This feature can also aid in reducing the power control response time by notifying the receiving device to restart their RSSI measurements.

READ ENCRYPTION KEY SIZE

With existing Bluetooth wireless technology, the negotiated encryption key size is not known to the host. Therefore, the host cannot determine whether or not the security requirements for profiles have been met. The Read Encryption Key Size feature enables the host to determine this negotiated encryption key size.

USE CASE(S) ENABLED BY READ ENCRYPTION KEY SIZE

The Read Encryption Key Size feature does not enable new use cases, but is a security improvement to existing Bluetooth wireless technology. This feature enables a host to determine the negotiated encryption key size to determine security requirements.

TOPOLOGY MANAGEMENT

The topology management feature aims to remove the ambiguity when two devices both prefer to be master and resolve any contention in a predictable and consistent manner. This feature would enable devices to exchange information about the complexity of its piconet and determine when a role switch is necessary through the development of unambiguous decision criteria.

USE CASE(S) ENABLED BY TOPOLOGY MANAGEMENT

Topology management will enable more efficient use of over the air bandwidth. This feature will benefit all Bluetooth devices and will improve the user experience in multipoint use cases particularly in audio streaming and low latency applications.

LOW LATENCY RECONNECTION

The low latency reconnection feature enables low power devices such as HID devices and sensors to disconnect and reconnect quickly. Bluetooth devices using this reconnection model will be able to reconnect to another Bluetooth device in significantly lower latency if the channel environment has not changed and reduce overall power consumption.

USE CASE(S) ENABLED BY LOW LATENCY RECONNECTION

The low latency reconnection feature optimizes existing use cases associated with reconnections and disconnections and is a power savings feature. The Bluetooth devices anticipated to utilize this feature include Bluetooth HID devices and sensors.

BLUETOOTH SPECIFICATION VERSION 2.1

The most recent product releases from GN Netcom are qualified to Bluetooth rev. 2.1 + EDR. The Hall mark features of this release are seen below. The Bluetooth rev. 2.1 was adopted on the 26th of July, 2007.

IMPACT

IMPACT ON HEADSETS AND HANDS FREE PRODUCTS

The one feature with the primary impact on headset products is the Secure Simple Pairing. This feature simplifies the pairing process. And at the same time take more advantage of the built in security features

V2.1 + EDR BLUETOOTH CORE SPECIFICATION RELEASE

NAME	RATIONALE	USE CASE
Secure Simple Pairing (SSP)	Enables easier connectivity between devices and better use of security features	Usability and security
Quality of Service (QoS): *Packet Boundary Flag (PBF) *Erroneous Data Reporting (ED) *Sniff Subrating (SSR)	Improves performance when audio and/or HID and/or bulk traffic are present in the same piconet and improves performance when SCO and eSCO links are present (i.e. Wideband Speech)	Multiple profiles, Multi-player gaming
Encryption Pause/Resume (EPR)	Ensures privacy of data during master/slave switch and allows devices to change the link key during an active connection	Security improvement
Extended Inquiry Response (EIR)	Reduces requirements to make baseband connections during device discovery	Usability improvement
Link Supervision Timeout (LSTO)	Enhances the user experience where the link supervision timeout might be changing	Multiple profiles

BLUETOOTH SPECIFICATION VERSION 2.0

Most of the current Bluetooth products being sold are qualified to the Bluetooth rev. 2.0 + EDR. The Hall mark features of this version of the Bluetooth standard is listed below:

V2.0 + EDR BLUETOOTH CORE SPECIFICATION RELEASE

Bluetooth v2.0 + EDR implemented errata and introduced the Bluetooth Enhanced Data Rate (EDR) feature. Devices that implement EDR features can take advantage of:

- Increased data rates up to 3 times the previous level
- Reduced power consumption and increased battery life
- Improved Bluetooth experience by running multiple Bluetooth devices simultaneously and transferring large files
- Improved use cases including, especially for streaming audio, digital image transfer, and laser printing

Even with the Enhanced Data Rate feature, Bluetooth v2.0 + EDR remain backwards compatible with Bluetooth v1.1 and later devices.

BLUETOOTH LOW ENERGY WIRELESS SPECIFICATION

Bluetooth SIG is also working on a specification on Bluetooth low energy wireless specification. This extension to the Bluetooth technology is targeted for sensor applications of all kinds. Currently none of them are applicable to headsets or hands free products. But this could change over time.

FOR MORE INFO ON BLUETOOTH LOW ENERGY WIRELESS TECHNOLOGY SEE:

http://www.bluetooth.com/Bluetooth/Products/More_about_emBluetoothem_low_energy_technology.htm