Technical Whitepaper

HP Wireless Wakeup

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Version 2.0

Document version history

Version No.	Version date	Revised by	Approved by	Affected section and description of change
1.0	08/11/2017	Danny Meng		
1.1	08/19/2017	Danny Meng		Incorporated feedbacks
1.2	11/01/2017	Danny Meng		Included marketing name
1.3	11/01/2018	Danny Meng		Updated 2018 platforms and Intel integrated WiFi limitations on DC
2.0	09/01/2020	Danny Meng		Updated current support scope

* Action types: Approve, Review, Inform, File, Action Required, Attend Meeting, Other (please specify)

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1 HP Wireless Wakeup

1.1 Purpose

The purpose of this white paper is to describe the HP Wireless Wakeup feature and how to configure it on supported HP notebook systems.

1.2 HP Wireless Wakeup Overview

HP Wireless Wakeup, also commonly known as Wake on Wireless LAN (WoWLAN), is a technology that can be used to remotely wake up computers connected to a wireless network in order to facilitate IT administration and system management. This HP Wireless Wakeup technology is based on the same concept as Wake on LAN that is used in a wired network. An encoded broadcast packet, known as a wakeup magic packet, is sent from a remote system management application to wake up the client computer from a system power saving state. The industry standard wakeup magic packet is a broadcast frame containing 6 bytes of all 255 (FFh) and sixteen repetition of the target client computer's MAC address. It is sent typically as a UDP packet to port 7 or 9.

To support wake in a wireless environment, there are several dependencies

- Client devices must be designed to be able to wake from a power saving mode by a wireless network adaptor.
- Client devices must be designed to maintain power to the wireless network adaptor during system power saving states such that the wireless network adaptor is able to keep its association with a wireless access point.
- The OS must allow the configuration of the wireless network adaptor to enable WoWLAN function.
- The client device wireless network adaptor must be associated with a wireless access point prior to entering a system power saving state and the association must be persistent while staying in the system power saving state such that the adaptor can listen for a wakeup packet. If the client device loses its association with the wireless access point for any reason (for example, if the client device is moved out of access point's range) while in a system power saving state then the wake function will no longer be available.
- Network infrastructure must be configured to allow wireless broadcast packets to traverse the network in order for the wake magic packet to reach the client devices.

Typically, after a client system is awakened, a separate management solution is used to perform administrative actions such as system update or patch, inventory, policy update, etc. The configuration and operation of these IT administration and management application suites are beyond the scope of this white paper.

1.3 HP Notebook Support

In order for the wireless network adaptor to control the power state of the system, the wireless adaptor must be integrated with the motherboard power connector design of a notebook system. Therefore, external wireless adaptors cannot be supported.

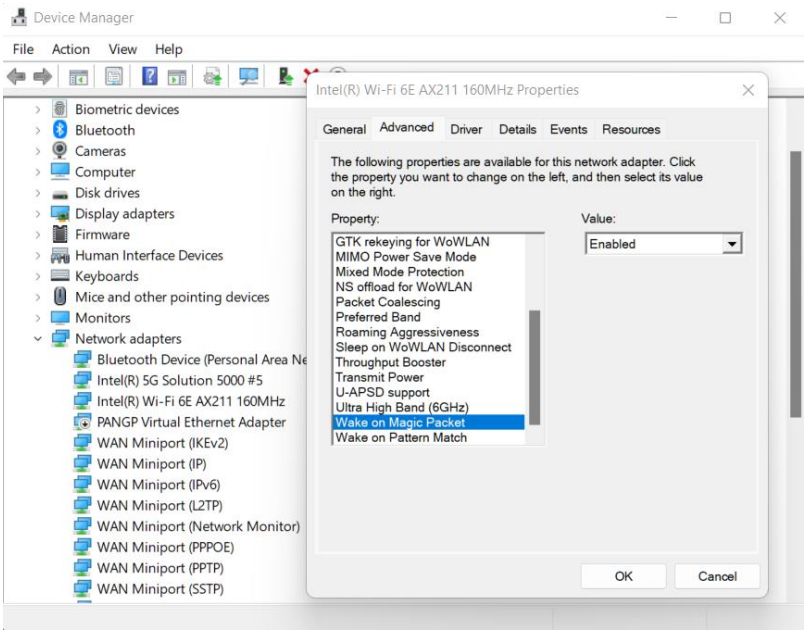
Starting with Windows 10, Microsoft introduced a new system power mode, Modern Standby, that replaced traditional S3 standby state. All currently shipping HP notebooks supports Modern Standby.

When a notebook system is connected to the AC power, Windows OS maintains the WLAN connection when transitioning to Modern Standby. The notebook is therefore capable to receiving wake magic packet.

When a notebook system is on DC battery power, Windows OS will terminate the WLAN connection when transitioning to Modern Standby. The WLAN connection is also not maintained during the S4 hibernation and S5 state on Modern Standby systems, therefore, the notebook is not capable of receiving wake magic packet in these situations.

1.4 Wireless Network Adaptor Support and OS Configuration

A wireless network adaptor that supports wake will expose the wake on magic packet configuration to the Windows OS. From the wireless adaptor properties dialog in Windows device manager, verify that the wake on magic packet option is set to Enabled.



On a system where Wake on Magic Packet option for the wireless network adaptor is not present, Wake on WLAN is not supported.

1.5 Network Support and Configuration

When a notebook client is in a power saving state, the OS IP network stack is no longer active and therefore it may not be able respond to any Address Resolution Protocols (ARPs) from a router. Hence, a wakeup magic packet must be transmitted as a local subnet broadcast packet addressed with a client's wireless adaptor's MAC address. The network administrator must configure network devices and firewalls to not block the wakeup magic packet.

A system in a broadcast domain (subnet) can be assigned as a wake server to generate the broadcast wakeup packet. Generally, there is no issue if the targeted client computer to be awakened is in the same subnet as the server. If the wake server does not reside in the same broadcast domain, then the network must be configured to enable and forward directed broadcasts to allow wakeup magic packets to traverse across broadcast domains.

Modern enterprise WLAN networks often block broadcast traffics to prevent denial of service attacks. Directed broadcast capability is typically disabled by default. The configurations of various network environment and equipment are beyond the scope of this white paper. It is advisable to contact the wireless network infrastructure provider to assist in the configuration for a specific network design to enable WoWLAN and to limit the direct broadcast traffic to only specific sources, such as the wake server's IP address.

An example of network configuration:

https://www.cisco.com/c/en/us/support/docs/switches/catalyst-3750-series-switches/91672-catl3-wol-vlans.html

1.6 Feature Scope Summary

Supported HP Notebooks	All commercial notebooks that have wireless network adaptor with wake on magic packet configuration option enabled
Supported OS	Windows 10 or later
Supported Wake from System Power Saving Mode	Modern Standby
Supported System Power Source	AC only

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