

Positioning Statement on Cisco Wireless LAN and Distributed Antenna Systems

Executive Summary

802.11-based Wi-Fi systems are fundamentally different from other wireless technologies and have some unique design and deployment characteristics. Distributed Antenna Systems (DAS) are an approach to offering multiple wireless technologies within a facility. Some DAS vendors offer Wi-Fi as part of their solutions. Cisco does not certify, endorse or support any DAS vendors' Wi-Fi solution. Cisco Wi-Fi customers may choose to deploy Wi-Fi over a DAS solution, but these customers should fully understand the caveats and design, deployment, and support implications. Some 802.11 features may not work as designed over a DAS. When Cisco Wi-Fi is deployed over a DAS, Cisco supports all Cisco hardware and software per the customer's support agreement, but the Wi-Fi RF and Wi-Fi RF coverage are the responsibility of the DAS vendor. Cisco highly recommends that the appropriate design, deployment, and site surveys be performed to ensure proper network operation and support of 802.11 specifications, but Cisco provides no design, deployment, or site survey guidance for Wi-Fi over DAS; customers should look to the DAS vendor or qualified systems integrator for these services.

Introduction

This document contains Cisco's position on Wi-Fi over DAS and offers Cisco recommendations and considerations for customers choosing to deploy Wi-Fi over DAS. This document does not define the variants of DAS implementation or explain how DAS technologies work. DAS vendors take different design and deployment approaches in receiving and radiating RF signals for Wi-Fi. In some deployments, the Wireless LAN is distributed as an independent, overlay network to the DAS, while in other cases it is distributed over the DAS. Cisco does not endorse a DAS vendor or approach to deploying Wi-Fi over DAS. Cisco recommends appropriate design, deployment, and post-deployment considerations around all Wi-Fi technologies, especially when deploying Wi-Fi over DAS. Special consideration should be given to 802.11n Multiple Input Multiple Output (MIMO), Radio Management (RM), Wi-Fi-based Location-Based Services (LBS), as well as other Cisco Wi-Fi features. These considerations ensure that applications have adequate capacity and coverage for acceptable performance.

Certification and TAC Support

Cisco does not certify, endorse or provide RF support for Wi-Fi deployments over ANY Distributed Antenna system.

The DAS vendor and/or systems integrator is solely responsible for the support of the DAS products and for providing adequate RF coverage and supporting any RF-related issues. This support includes, but is not exclusive to location accuracy, RF coverage, roaming issues related to RF, multipath issues, and scalability. Additionally, the DAS vendor and/or systems integrator is responsible for understanding that the deployed DAS system meets the requirements of all of the customer's Wi-Fi devices and applications over the DAS system; this statement includes, but is not exclusive to, all VoWLAN and medical devices.

While Cisco Technical Assistance Center (TAC) and Cisco field teams do not provide support for RF issues that arise in a Cisco WLAN used over a DAS, they will however, provide support for non-RF related issues in Cisco products per the customer's support agreement with Cisco Systems.

Third party components in a Cisco Network are covered by the Cisco's Product Warranty statement found here:

http://www.cisco.com/en/US/products/prod_warranties_item09186a00800b5594.html

Cisco Recommended Considerations for a Distributed Antenna System with 802.11 WLANs

Cisco recommended design considerations when working with a DAS vendor include:

- **Design and Deployment:** Wi-Fi over DAS technology requires thorough design, 802.11 WLAN, and RF expertise. A Wi-Fi over DAS system must be professionally designed, installed and configured by an experienced, fully trained and qualified vendor and/or systems integrator.
- **Signal Coverage:** Select a vendor with a solution that fully supports the best practices of signal quality and signal coverage. Care should be taken to review the design processes that the vendor uses to ensure that DAS antenna element density and placement will support the RF power and coverage requirements of 802.11 applications. Customers should also take care in selecting only a fully qualified partner for installation and systems integration when deploying Wi-Fi over DAS.
- **Capacity—AP to Client Density:** Care should be taken in reviewing the Wi-Fi over DAS design to ensure that the DAS channel and RF design will adequately support the traffic capacity requirements of the 802.11 devices and applications.
- **Client Roaming:** Care should be taken in reviewing the Wi-Fi over DAS design to ensure that DAS channel and RF design will adequately support the roaming requirements of the 802.11 applications.
- **Location Based Services (LBS):** LBS systems are designed by the manufacturer to work within specific deployment parameters. Customers with a requirement for LBS either at the time of the installation or in the near future should carefully specify their requirements to the DAS vendor and/or systems integrator to confirm that the design will adequately support LBS, and any claims to location accuracy using the DAS antenna system with a Wi-Fi over the DAS solution.
- **Radio Management (RM):** Wi-Fi over DAS solutions likely require static configuration of AP channel and transmit power levels. Certain value-add dynamic radio management features, including RM, rogue AP detection, and wireless intrusion protection may not work as designed when Wi-Fi is deployed over DAS. Customers choosing Wi-Fi over DAS should carefully review the total WLAN solution offering to insure that all systems functionality meets their requirements.
- **802.11n MIMO:** Some DAS vendors have implementations for supporting 802.11n MIMO. Customers should carefully evaluate and validate that these systems meet their requirements and perform to expectations. Reduced MIMO support will affect overall performance of the WLAN.

Recommendations for Using a Cisco Unified Wireless Network with DAS

A Wi-Fi over DAS solution should first meet all the requirements of any 802.11 installation, including proper coverage design, site survey, and minimum signal levels for both AP and client. Links to Cisco documents detailing these requirements are provided below. In addition to the standard Cisco recommendations, customers should take the following points into consideration when looking into a Cisco Unified Wireless Network deployment over DAS:

- Wi-Fi over DAS technology requires thorough design, 802.11 WLAN, and RF expertise. A Wi-Fi over DAS system must be professionally designed, installed and configured by an experienced, fully trained and qualified vendor and/or systems integrator.
- DAS vendors may have solutions for supporting 802.11n MIMO. Reduced MIMO support will affect overall performance of the WLAN; when deploying an 802.11n MIMO solution with DAS, customers should verify that their WLAN network performance will provide satisfactory application performance. Certain Cisco specific 802.11n features, including CleanAir and ClientLink, may not work in a Wi-Fi over DAS deployment.
- Cisco's dynamic radio resource management (RRM) algorithms assume a micro-cell access point design; Cisco RRM is not designed for and is not supported with Wi-Fi over DAS. Manual configuration and maintenance of AP channel and transmit power will likely be required for the Wi-Fi over DAS to perform

properly. Cisco customers choosing Wi-Fi over DAS should carefully consult with their DAS vendor to verify the design and deployment meets the RF coverage requirements of their devices and applications in a sustainable and manageable way.

- Cisco's Location-Based Services (LBS) solution assumes a design and deployment in accord with Cisco documentation and deployment guides. Cisco only certifies and supports location accuracy claims and features when the LBS is deployed over a micro-cell AP or monitor-mode AP overlay architecture as specified in the Cisco documentation and deployment guides. Cisco does not certify any level of LBS accuracy when the data for the LBS engine is gathered from a Wi-Fi over DAS installation; customers with these deployments should look to DAS vendor to support their location accuracy requirements. To fully meet the LBS capabilities and requirements, customers deploying Wi-Fi over DAS may need to install additional monitor mode access points and wireless controllers in an overlay architecture.
- A post deployment assessment and qualification test should be done to verify adequate performance and RF coverage for all devices and applications. This post-deployment assessment and qualification test should include, but is not exclusive to, signal levels at both the device and AP, data throughput, voice quality, voice roaming, voice capacity, co-channel interference, shared channel areas, location accuracy, and overall systems performance. Cisco recommends that all sites deploying voice should be verified for voice performance when roaming from coverage area to coverage area. Voice verification should include MOS values, channel utilization and roam delay.

References

The Cisco WLAN related documents below should be reviewed and discussed with the DAS vendor and integrator.

Cisco Enterprise Mobility 4.1 Deployment guide:

<http://www.cisco.com/en/US/docs/solutions/Enterprise/Mobility/emob41dg/emob41dg-wrapper.html>

Cisco Voice Over Wireless 4.1 Deployment guide:

<http://www.cisco.com/en/US/docs/solutions/Enterprise/Mobility/vowlan/41dg/vowlan41dg-book.html>

Cisco Location deployments guides (2710 location appliance):

<http://www.cisco.com/en/US/partner/docs/wireless/technology/location/deployment/guide/depdgd.html>

Cisco Context Aware Mobility Solutions Guide (Mobility Services Engine):

http://www.cisco.com/en/US/products/ps9742/products_tech_note09186a00809d1529.shtml



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