

## Designing Cisco Wireless Enterprise Networks (300-360)

**Exam Description:** The Designing Cisco Wireless Enterprise Networks (WIDESIGN) exam (300-360) is a 90-minute, 60-70 question assessment that is associated with the CCNP Wireless certification. This exam tests a candidate's knowledge of identifying customer and application requirements, applying predictive wireless design principles and conducting site surveys needed to design and optimize Enterprise wireless networks.

The following topics are general guidelines for the content that is likely to be included on the exam. However, other related topics may also appear on any specific instance of the exam. To better reflect the contents of the exam and for clarity purposes, these guidelines may change at any time without notice. Candidates can prepare for this exam by taking the Designing Cisco Wireless Enterprise Networks (WIDESIGN) course.

- 12%**    **1.0**    **Obtaining Customer Requirements as Related to the WLAN Installation**
  - 1.1    Identify business and RF application needs
  - 1.2    Identify client density, capabilities and their impact on the wireless network
    - 1.2.a    Client quantity, radio type, spatial streams
  - 1.3    Identify the challenges of setting up a wireless network by various vertical markets
  - 1.4    Describe required site survey documentation
    - 1.4.a    Customer questionnaire
    - 1.4.b    Floor plans & their quality
    - 1.4.c    Describe the deliverables of the site survey
  - 1.5    Identify coverage area requirements
    - 1.5.a    Mesh
    - 1.5.b    High density
    - 1.5.c    Security sensitive
    - 1.5.d    Real time applications
- 12%**    **2.0**    **Determine Facility Type and Constraints Related to WLAN Deployments**
  - 2.1**    Describe impact of regulatory domains
    - 2.1.a    Mesh
    - 2.1.b    Channel and power
    - 2.1.c    Multi-national deployments
  - 2.2**    Identify deployment location safety considerations
  - 2.3**    Identify the impact of customer aesthetic limitations on the installation

- 2.4 Assess the existing wired and wireless infrastructure
  - 2.4.a Determine high-throughput and very high throughput (VHT) protocol (n/ac) impact
  - 2.4.b Determine existing wireless infrastructure if required
- 2.5 Identify impact of material attenuation
  - 2.5.a Walls, cubicles, and the likes
  - 2.5.b Single/multi-floor
  - 2.5.c Campus
  - 2.5.d Warehouse/retail
  - 2.5.e Subtitle number 2.2
- 14% 3.0 **WLAN Predictive Design**
  - 3.1 Select the criteria used for coverage design
    - 3.1.a Data vs voice vs video vs location
  - 3.2 Demonstrate the impact of frequency planning in a high density environment
    - 3.2.a Band select for high density
    - 3.2.b Optimize 2.4 GHz radio utilization
    - 3.2.c Legacy devices
    - 3.2.d Channel width
  - 3.3 Use PI and Ekahau planning tools to make network plan
    - 3.3.a Enter network requirements in the tool
      - 3.3.a.(i) Capacity requirements
      - 3.3.a.(ii) Coverage requirements
    - 3.3.b Define the environment
      - 3.3.b.(i) Maps and scale
      - 3.3.b.(ii) Types of RF obstacles
    - 3.3.c Place and configure simulated APs and antennas
      - 3.3.c.(i) Place simulated APs (manual, automatics)
      - 3.3.c.(ii) Adjust APs and Antennas / AP TX power height and down tilt
    - 3.3.d Analyze key network metrics using heat maps for 2.4 and 5GHz
      - 3.3.d.(i) Analyze coverage, SNR, and channel overlap
      - 3.3.d.(ii) Analyze AP placements in regards to real time handoffs around corner
- 14% 4.0 **Pre-Deployment Site Survey**
  - 4.1 Identify the appropriate site survey equipment and access requirements based on environmental needs
  - 4.2 Complete the Layer 2 site survey for indoor, and outdoor MESH environments
    - 4.2.a Select proper AP and antenna for conducting site survey
    - 4.2.b Configure AP
    - 4.2.c Survey for worst case client
  - 4.3 Complete Layer 1 survey (Cisco CleanAir, Metageek Chanalyzer)

- 15%** **5.0 Post-Deployment Site Survey**
  - 5.1 Verify RF coverage
    - 5.1.a Utilize tools (Ekahau) for audit
    - 5.1.b RRM, controller
    - 5.1.c Analyze SNR, channel overlap, and packet loss
  - 5.2 Verify network applications and performance
    - 5.2.a Apply PI tools (voice readiness, location readiness, site calibration)
  - 5.3 Reconcile any deployment issues
  - 5.4 Assemble and deliver installation report to customer
    - 5.4.a Indoor
    - 5.4.b Outdoor MESH
  
- 15%** **6.0 Design the Infrastructure of the Wireless Network**
  - 6.1 Determine physical infrastructure requirements
    - 6.1.a AC Power and POE
    - 6.1.b Understand cable plant considerations
    - 6.1.c Mounting considerations: NEMA
    - 6.1.d Outdoor grounding and lighting protection
    - 6.1.e Rack capacity
    - 6.1.f Switch port capacity
  - 6.2 Determine logical infrastructure requirements
    - 6.2.a Determine AP count, controller count, and license requirements
    - 6.2.b Decide the type of architecture for the deployment
  - 6.3 Describe IPv6 optimization on the WLC
    - 6.3.a RA filter
    - 6.3.b DHCP Server guard
    - 6.3.c DHCPv6 Source guard
  
- 18%** **7.0 Describe and Design Wireless Architecture for Real time Applications**
  - 7.1 Describe the relationship between real time applications & the wireless networks
    - 7.1.a Packet Error Rate (PER)
    - 7.1.b RF Coverage
    - 7.1.c Bit Error Rate (BER)
    - 7.1.d QoS
    - 7.1.e Call Admission Control (CAC)
    - 7.1.f Client roaming decision algorithm
  - 7.2 Describe voice and video as they apply to the wireless network
    - 7.2.a Device capabilities (hardware and software)

- 7.2.b Call setup/data flow overview
- 7.2.c Other wireless voice and video services (i.e. Jabber, Lync, Skype, Viber, Facetime)
- 7.2.d Standards and WIFI Alliance (WFA) certifications (.11r, .11e, .11n/ac, .11k, CCKM, voice enterprise, voice personal, WMM, UAPSD)
- 7.2.e Cisco Compatible Extensions (voice features)
- 7.2.f Voice and video codecs
- 7.2.g Skinny Client Control Protocol (SCCP)
- 7.2.h Session Initiation Protocol (SIP)
  
- 7.3 Describe real time applications (other than voice and video) as they apply to the wireless network
  - 7.3.a Session based and non-session based
  - 7.3.b Roaming sensitivity
  - 7.3.c Disconnection issue
  
- 7.4 Design wireless roaming parameters for supporting real time applications
  - 7.4.a 802.11 r/k, CCKM, OKC, mobility groups, interface groups,
  - 7.4.b Tuning RF parameters
  - 7.4.c AP placement considerations
  
- 7.5 Design wireless parameters for supporting real time applications
  - 7.5.a Minimum speed requirements—RSSI and SNR
  - 7.5.b Client transmit and receive sensitivity / mismatch with AP
  - 7.5.c Cell overlap requirements
  - 7.5.d Cell separations
  - 7.5.e Traffic control and management, QoS, VLAN, WMM, AVC
  - 7.5.f Delay and jitter requirements
  - 7.5.g CAC and TSPEC
  - 7.5.h Spectrum
  - 7.5.i 802.11n/ac enhancements
  - 7.5.j Concurrent client connections
  - 7.5.k Band select