Best Practices for Deploying Arista C-360 Access Points

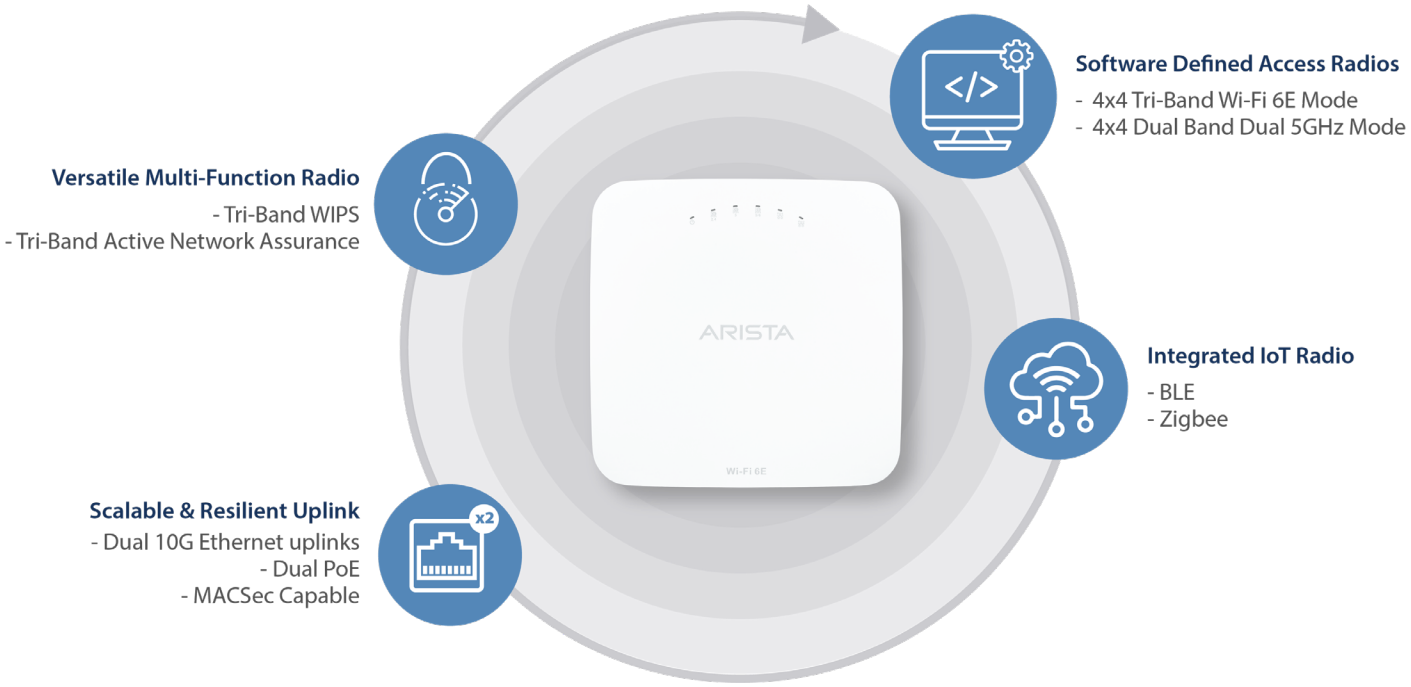
This document will talk about the best practices that one should follow while deploying AP C-360 in an indoor environment. Best practice to deploy this model is based on following considerations:

- Physical connectivity i.e. Power/Cabling
- Geography (country) where devices will be deployed
- Wi-Fi Coverage, density, throughput and latency requirements
- Client types by supported frequencies
- Security Modes
- SSID Type (use case)

C-360

C-360

The 360° Wi-Fi 6E Access Point



C-360 Overview

In order to understand the best practice to deploy C-360, it is necessary to understand the device radio configuration first:
This device has 3 access radios, 1 multi-function radio and 1 BLE/ZigBee radio. The 3 access radios are:

- Radio 1: 4x4:4 - 2.4GHz
- Radio 2: 4x4:4 - 5GHz
- Radio 3: 4x4:4 - 5GHz/6GHz SW switchable radio

Note: When Radio #3 is configured for 5GHz, then Radio #2 is locked to Lower 5GHz (and Radio 3 is locked to upper 5GHz.
Please see the Table 1 below:

Table 1

	Radio 1	Radio 2	Radio 3	
Radio frequency	2.4GHz	5GHz	5GHz	6GHz
Supported channels in tri-band operation	1-14	36-165	N/A	1-185*
Channel supported in Dual 5GHz Operation	1-14	36-64	100-165	N/A

*Channel in 6GHz range are numbered 1,5,9,13, etc.

AP to Wired Infrastructure Connections

- AP C-360 has two 10Gbps Ethernet ports and both support PoE. Both the ports are also capable of operating at lower link rates i.e 100Mbps / 1Gbps / 2.5Gbps / 5Gbps. However, to get optimal throughputs in high usage deployments, it is recommended to connect the AP to 5Gbps or to 10Gbps Ethernet ports.
- To get the optimal performance, it is strongly recommended to use Cat6a Ethernet cable to connect the AP to the switch. Lower grade cables might cause suboptimal performance and AP functionality reduction. Pay close attention to this recommendation when you are replacing and upgrading your older Wi-Fi network*. Below Table 2 highlights the cable comparison:

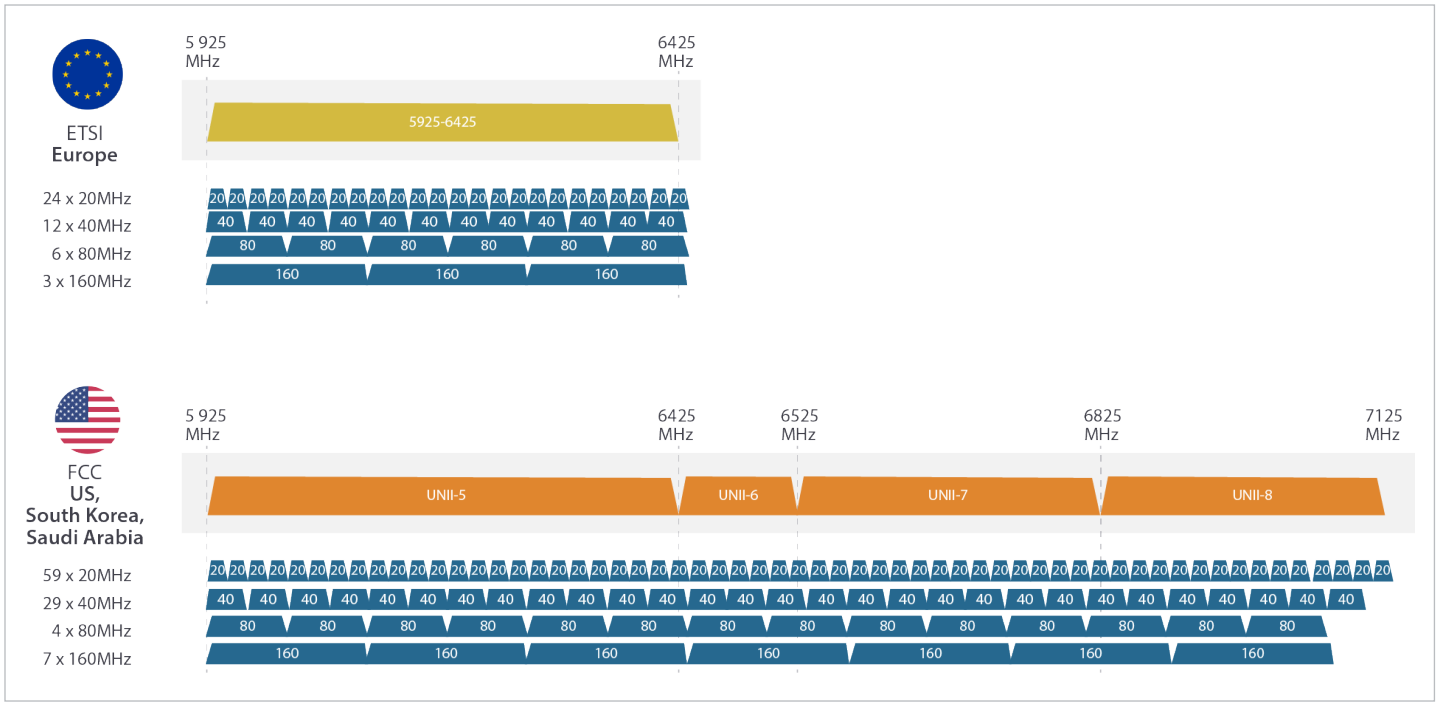
Table 2

	Cat 5e	**Cat 6**	**Cat 6a**
Support for 5G BaseT	Yes **Max Cable Length:** 30 metres	Yes **Max Cable Length:** 50 metres	Yes **Max Cable Length:** 70 metres
Support for 10G BaseT	No	Yes **Max Cable Length:** 50 metres	Yes **Max Cable Length:** 70 metres

*This is not related to C-360 only, it is a general recommendation for new 6GHz access points.

- 39W is the maximum power consumption when operating in full function mode. Hence, it is recommended to connect the access point to a 60W capable (802.3bt) switch port. In case 60W power is not available the device is capable of operating at 30W (802.3at) with reduced functionality. Please refer to the datasheet for details.

Figure 1



Regulatory Domain Considerations

Many countries have fully or partially opened the 6GHz spectrum band for unlicensed use and many more countries are in the process of doing so. C-360 was designed with worldwide operation in mind it is necessary to understand how you can configure AP C-360 to meet the capacity and performance requirements and to stay within regulatory compliance at all times.

For example, the USA and some other countries currently have 1.2GHz of spectrum available in the 6GHz band and the EU currently has 500MHz available in this band. These differences in spectrum availability in different regulatory domains call for different radio configuration based on the country of operation. See the list of countries that support operation in the 6GHz band is available on the Wi-Fi Alliance website.

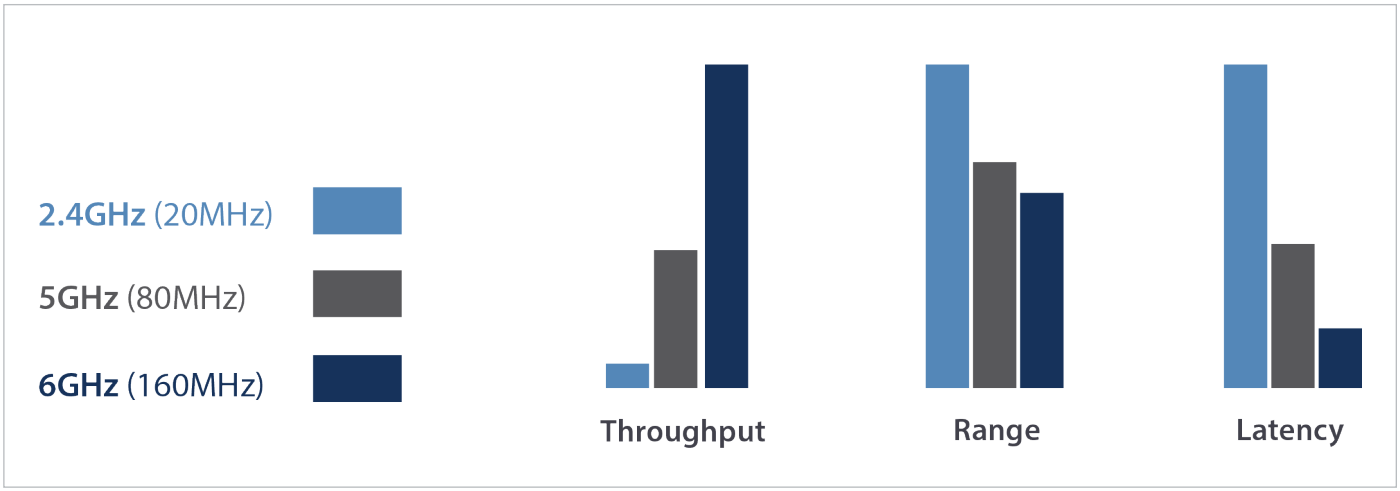
- As per Figure 1 , USA has 7 possible 160MHz channels and EU has 3 possible 160MHz channels. Based on the general Wi-Fi best practice, we shall have at least 5-6 collision domains for the optimal performance. That means in the EU region, for dense indoor deployment, it is recommended to use 20/40/80MHz channels only, to provide more non-overlapping channels and avoid co-channel interference. In the USA, one can choose to use 20/40/80 and/or 160MHz channels if enough clients support 160MHz channels .
- In regions where 6GHz spectrum is still not available for unlicensed use, it is recommended to configure the 3rd access radio to operate in the 5GHz band for providing dual 5GHz mode to meet the required capacity. In this case Radio#2 will lock on lower 5GHz and Radio#3 will lock on the upper 5GHz band to provide enough RF separation to avoid adjacent channel interference.

Coverage and Density

As AP C-360 supports all the three Wi-Fi frequency bands,it is very important to understand and clearly define the requirements of the business use case that has to be supported, application requirements and client capabilities.

Each Wi-Fi frequency band has advantage / disadvantage in terms of Throughput/ Range and Latency

Figure 2



Source: Broadcom

Let's examine different scenarios:

- 80% or more clients are 2.4/5GHz capable: In such scenarios it is recommended to do 5GHz coverage/density planning to get optimal performance in terms of throughput, latency and range .
- 50% or more clients are 6GHz capable and there is demand for high throughput and/or low latency: In such scenarios it is recommended to perform 6GHz density planning using 40/80/ and/or 160 MHz channels if enough clients support 160MHz channels .
- Environment where Wi-Fi will be used only by guests and IOT devices : In such scenarios it is recommended to do RF planning for 2.4GHz band to provide optimal range and connectivity to IOT devices as they only support 2.4GHz band and have low throughput demands. Additionally Provide 5GHz and 6GHzcoverage for guest users in designated areas.

Security Modes

WPA3 and OWE security modes are mandatory and no legacy security modes (WPA2, Open) are allowed in the 6GHz band. There are significant consequences of this requirement, especially in the tri-band operation mode. We predict confusion and interoperability issues especially when using the new 6GHz capable clients.

In order to provide the convenience of a single SSID and password that can be configured across all WPA3 and WPA2 clients WPA3 Transition mode was introduced which caters to both WPA3-Personal/Enterprise and WPA2-Personal/Enterprise clients. The transition mode is only supported in 2.4GHz and 5GHz bands.

Again, 6GHz clients must use OWE and/or WPA3 Personal/Enterprise modes.
Table 3 shows of all the supported modes:

Table 3

	WPA	WPA2	WPA/WPA2 Mixed Mode	WPA3	WPA3 Transition Mode	Open	OWE (Enhanced Open)	OWE Transition Mode
2.4GHz	Y	Y	Y	Y	Y	Y	Y	Y
5GHz	Y	Y	Y	Y	Y	Y	Y	Y
6GHz	N	N	N	Y	N	N	Y	N

Table 4

	WPA3 Transition Mode
2.4GHz Radio	WPA2/WP3 clients
5GHz Radio	WPA2/WPA3 clients
6GHz Radio	WPA3 Only clients

Table 5

	OWE Transition Mode
2.4GHz Radio	Open/OWE clients
5GHz Radio	Open/OWE clients
6GHz Radio	OWE only clients

Given the above scenario there are two recommendations.

- Heterogeneous environment i.e. environment where both WPA2 and WPA3 clients are present and single SSID is needed
  It is recommended to configure a Single SSID for 2.4GHz/5GHz/6GHz band with security mode as WPA3 personal/ Enterprise transition Mode when using CV-CUE to configure APs. CV-CUE will automatically configure the WPA3 Transition mode for 2.4 & 5GHz radios and configure WPA3 only mode for 6GHz radios when an SSID with WPA3 security is created and applied to the radios.
  Similar configuration behavior is followed for OWE transition mode i.e. CV-CUE will automatically apply the OWE Transition mode to 2.4 & 5GHz Band and Enhanced Open only mode for 6GHz band when an SSID with OWE is created and applied to the radios. Please refer to the Table 5.
- Homogeneous environment : Environment where all the clients support WPA3 Personal/Enterprise.
  A single SSID with Security mode as WPA3-Personal/Enterprise can be configured for all the bands i.e 2.4/5/6GHz .

Use Cases (SSID Types)

- **Corporate SSID:** This SSID will generally onboard corporate clients Like laptops/Tablets and Handheld devices. This use case will typically demand high throughputs and seamless roaming across AP's. Also most of the clients connecting to this SSID will support 5GHz/6GHz band. Table 6 describes the best practices while configuring a Corporate SSID.

Table 6

Parameter	Value
SSID	Corporate SSID
Security Mode	WPA2/WPA3 Mixed Mode
Type	WPA3 Enterprise
Channel Width	20/40/80MHz
Radios Configured	2.4/5/6GHz

- **Guest SSID:** This SSID will onboard visitors/Contractors's devices which could be any possible data devices like laptops,Phones, tablets etc supporting 2.4/5/6GHz band. Generally this use case does not have high throughput demands and may be confined to designated areas, Another very distinct nature of this use case is that guest users do not have domain credentials. Table 7 describes the best practices while configuring a Guest SSID.

Table 7

Parameter	Value
SSID	Guest SSID
Security Mode	OWE
Type	Transition Mode
Channel Width	20/40/80MHz
Radios Configured	2.4/5/6GHz

- **IoT SSID:** This SSID will onboard IoT devices like sensors, printers etc. Generally these devices only usually support 2.4GHz band and have very low bandwidth requirements. Secondly these devices only support PSK based onboarding. Table 8 describes the best practices while configuring an IoT SSID.

Table 8

Parameter	Value
SSID	IoT SSID
Security Mode	WPA2/WPA3 Mixed Mode
Type	WPA3 Personal
Channel Width	20MHz
Radios Configured	2.4GHz

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