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GNSS Best Practices for AFC and AP Location Deployments

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Document History

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• Initial version

GNSS Deployment Best Practices

The use of 6-GHz Standard Power requires Automated Frequency Coordination (AFC). AFC provides a coordinated channel and power to a Standard Power-mode network to ensure that Wi-Fi services do not interfere with incumbent services in the 6GHz space. For more information about AFC, see the <u>Automated Frequency Coordination</u> guide for cloud and on-premises deployments.

As per FCC regulations, access points (APs) operating at Standard Power must automatically obtain geolocation coordinates using an external or internal Global Navigation Satellite System (GNSS) module. The AP's location is obtained automatically through the CW-ACC-GPS1, a GNSS module that attaches to the USB port of any Cisco Wi-Fi 6E AP.

Once installed, position the AP on the floor of a building near a window with a clear line of sight to the sky. Within 10 minutes, the GNSS module acquires a satellite signal and shares the AP's location with the Cisco Catalyst 9800 Series Wireless Controllers or the Cisco Meraki dashboard. When connected to an external antenna, the module acquires satellite signals of up to 32 satellites which is then used to compute GPS location, constellation, orientation, and time.





The key requirements for operational stability when planning a site deployment for 6 GHz Standard Power are GNSS signal health and satellite distribution. GNSS signal health and quality varies greatly depending on the GNSS module's location within a floorplan. Before Standard Power operation is enabled within a floorplan, it is crucial to identify installation points within a building where the module receives a stable GPS reception. It is

important to determine the placement and quantity of GNSS modules for a floor plan to ensure stable Standard Power operation.

This guide provides a comprehensive approach to deploying GNSS modules for AFC and AP location services, with a focus on optimizing GNSS module performance. The goal is to ensure reliable and stable satellite signal reception by identifying optimal locations and implementing necessary adjustments in the field.

Firmware Requirements

- Cisco Catalyst 9800 Series Wireless Controllers running Cisco IOS XE 17.14.1 or a later release
- Cisco Meraki networks running MR 30.7+ or a later release

Supported APs

- Cisco Meraki MR57
- Cisco Catalyst C9163
- Cisco Wireless 9136 Series
- Cisco Wireless 9162 Series
- Cisco Wireless 9164 Series
- Cisco Wireless 9166 Series
- Cisco Wireless 9176 Series
- Cisco Wireless 9178 Series

Installation

Identify potential locations in a floor plan that provide the best signal health and stability for GNSS modules. The number and signal strength of satellites that the GNSS module can detect over a 24-hour period is a key metric for evaluating ideal GNSS installation points.



Geolocation Propagation



To conduct a preliminary GNSS site survey, it is recommended to have at least four modules to scope the proposed placement of APs on a floorplan, and the signal quality each module receives. If at least one AP nearby has a valid GPS signal, other neighboring APs can leverage the same GPS coordinates with a relative

measure of uncertainty. This process is known as geolocation propagation. It can be accomplished either through wired proximity on the same Layer 2 switch stack or through shared RF neighborship up to a calculated distance of up to 400 meters from an AP with a valid GPS signal.

Wireless propagation allows neighboring APs to see an AP with GNSS reception as its neighbor by hearing beacon frames and NDP messages transmitted on any band/ radio. For best results, the stronger the RF neighborship, the more consistent the results are likely to be. If the neighborship is weak and close to the noise floor, then the deployment is likely prone to gaps in neighborhood. They would also be susceptible to other variables at any given time that can hinder performance or limit geolocation propagation from working properly.

Target an RF neighborship of an RSSI of at least -75 dBm or better on any one of the 2.4 GHz, 5 GHz, or 6 GHz bands and an SNR of 15-20 or better for optimal and consistent results. Results will vary from one wireless environment to the next.

For GNSS APs to share their location via wired propagation, they need to be seen as neighbors in the CDP or LLDP table confirming that they are connected to the Layer 2 network. This neighborhood relation will give a wired distance between APs.



Figure 2. Geolocation Propagation Operation across an Indoor Floorplan

GPS Signal Lock

For the GNSS module to obtain a GPS signal, the AP must be powered on or the USB port must be enabled. The USB port is enabled either in the AP join profile on the wireless controller or in the port profile on the Meraki dashboard. After 10 minutes, the GNSS module attempts to retrieve a satellite signal and the LED on the side of the module blinks green. Once a GPS signal is achieved, the LED transitions to solid green.

For the GNSS module to achieve a stable GPS lock, the module must be in sight of at least 4 satellites. However, for greater location accuracy, it is advised to have a reception of 6-8 satellites at any given time. If an AP's internal or external GPS module acquires a signal, then the location type indicates "GNSS". If the AP uses either wired or wireless geolocation propagation techniques obtain location from a neighboring GNSS AP, then its location type will be "Derived".



Figure 3. GNSS Module: LED status

For Cisco Catalyst 9800 Series Wireless Controller-based deployments, the AP's **Location Type** can be found either under **General > 360 View > Click here to view Geolocation Information > AP Geolocation Information** or under **Edit AP > Geolocation**.

General									
360 View AFC	+ Power	AP CAC	QOS	Sensor Statistics	TrustSec E	oGRE BLE			
(e) ••	AP Nam CW91 Ethernet CC9c.	e 166i_FE.0E.2 MAC 3ef4.ebd0	• 🐝		Ŷ	Athome Drive	ι.		
Location	default l	ocation				© Open	StreetMap		
IP Address	192.168	3.10.221			Click here to v	ew Geolocation inf	formation		
Model	CW9166	6I-B		WPA3 Capability	Enabled				
Serial Number	KWC260	07014T		AP VLAN Tag	0				
Power Status	H PoE/	Full Power		DHCP Server	Disabled				
Fabric	Disabled	1		Software Version	17.12.3.31 (8	Boot Version: 1.1.2.4	1)		
Rogue Detection	Enabled			LED State	· Enabled				
BLE Antenna Type	Internal			Up Time	1 hour 26 mi	nutes 22 seconds			
Antenna Monitoring	Not Sup	ported		tain Data and Time		A 0 10-02-42			
AP Country Code	US - Un	ited States		aWIPS	Enabled, 0				
		Slot 0 (2.4 0	iHz)	Slot 1 (5 GHz)	Slot 2 (6 GHz)			
Radio Type		802.11ax - 2.4	802.11ax - 2.4 GHz 802.11ax - 5 GHz 802.11ax						

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Inverse Saing value Inverse Saing value Inverse Saing value Inverse Saing value Inverse Invere	(Uchogon (Uchogon (Uchogon Uchogon Uchogon Undraw Kensuchy (Uchogon Uchogon Uchogon (Uchogon Uchogon Uchogon (Uchogon) (Uchogon (Uchogon) (Uchogon	Orento Offanes Montreal Offanes Montreal Penerginas	n me disana di Barana Marina M
Ackansas Memphis	Charlotte A	Anth Caroling	
Musinsippi Loumana	Atlanta South Carr Alaguno Georgen	ing fr	Bermuda © OpenStreetMap
Geolocation Statistics	Atlanta Ausonno Georgia	Manual Height Statis	Bermuda © OpenStreetMap tics
Geolocation Statistics Center Point - Longitude (Uncertainty)	Adanta Cerryo -77.437986 ± (15m)	Manual Height Statis Height (Uncertainty)	Bermuds © OpenStreetMap tics 1m ± (1m)
Geolocation Statistics Center Point - Longitude (Uncertainty) Center Point - Latitude (Uncertainty)	-77,437986 ± (15m) 33,449546	Manual Height Statis Height (Uncertainty) Height Type	Eermuds © OpenStreetMap tics 1m ± (1m) Above Ground Level (AGL)
Geolocation Statistics Center Point - Longitude (Uncertainty) Center Point - Latitude (Uncertainty) GNSS Present	Adanta Cerryo On Cer -77.437986 ± (15m) 39.449546 ± (11m) No	Manual Height Statis Height (Uncertainty) Height Type Last Update	Eermuds © OpenStreetMap tics 1m ± (1m) Above Ground Level (AGL) 03/26/2024 18:50:53
Geolocation Statistics Center Point - Longitude (Uncertainty) Center Point - Latitude (Uncertainty) GNSS Present Source	Adanta Corryo -77,437986 ± (15m) 39,449546 ± (11m) No Derived	Manual Height Statis Height (Uncertainty) Height Type Last Update	Eermus © OpenStreetMap tics 1m ± (1m) Above Ground Level (AGL) 03/26/2024 18:50:53
Geolocation Statistics Center Point - Congitude (Uncertainty) Conter Point - Latitude (Uncertainty) GNSS Present Source Derived From	Adanta Cerryn -77.437986 ± (15m) 39.449546 ± (11m) No Derived CW9166[_43.7F.20	Manual Height Statis Height (Uncertainty) Height Type Last Update	Eermuda © OpenStreetMap tics 1m ± (1m) Above Ground Level (AGL) 03/26/2024 18:50:53
Geolocation Statistics Center Point - Longitude (Uncertainty) Center Point - Latitude (Uncertainty) GNSS Present Source Derived From Derivation Technique	Adanta Cerryo On Cer -77.437986 ± (15m) 39.449546 ± (11m) No Derived CW9166i_43.7F.20 NDP	Manual Height Statis Height (Uncertainty) Height Type Last Update	tics 1m ± (1m) Above Ground Level (AGL) 03/26/2024 18:50:53

Figure 4. Cisco Catalyst 9800 Series Wireless Controller Dashboard: Geolocation information under the 360 View tab

In the Cisco Meraki dashboard, from the AP's overview page, go to the **AFC** tab. In the **AFC defined AP Location** section, you can find details of the AP's GNSS location such as:

- the Location Type,
- its coordinates (latitude and longitude), and
- the level of **Uncertainty** in its positioning.



Location type:	GNSS
Lat, Long:	(37.413736, -121.933631)
Uncertainty:	10 meters



Figure 5. Cisco Meraki dashboard: GNSS location information

Currently, the Meraki dashboard does not report the exact number of satellites the GNSS module sees at any given time. During a preliminary site visit, it is advised to use a handheld GPS receiver to see the expected satellite constellations and relative signal strength the modules will receive at a planned installation point.

After identifying possible installation points, ensure that the GNSS module can maintain a stable GPS lock with at least 6-8 satellites over a 15-minute window. A location that maintains a stable lock with 6 or more satellites during this period is likely to remain stable over 24 hours, ensuring consistent 6-GHz Standard Power operation.



Figure 6. Satellite Constellation Seen on a Handheld GPS Receiver

For controller-based GNSS deployments, run the **show gnss info** command on the AP's CLI to assess the realtime availability and attributes of satellites seen by the AP's GNSS module. This command provides information about the number of satellites the GNSS module is detecting, constellation pattern, position, and signal health.

774												
115	AP9166#sh gnss info											
116	Characteria Ctorted											
119	ExternalAntenna: true											
110	Externatantenna: true Fix: 3D_Fix ValidFix: true Time: 2024_09 12 01:12:22											
120	Fix: 50-Fix ValidFix: true Time: 2024-08-13 01:13:32											
121	HorAcc: 13 320574 bDOP: 1 12											
122	Incertainty Filinse											
123	Major axis: 23.329574 Minor axis: 23.329574 Orientation: 0											
124	Altitude	MSL: 19	9.666	AE: -	8.506	VertAcc:	26.63	6				
125	NumSat: 7	Rangel	Res: 6	GpGstl	Rms: 2	2.9		1 0				
126	pD0P: 2.1	1 hDOP	: 1.12	vDOP:	1.79	DOP: 0.	88 eD0	P: 0.7 al	DOP: 0	tDOP	: 0	
127	LastFixTi	me: 202	24-08-3	13 01:	13:31			.				
128	SatelliteCount: 14											
129												
130	Const.	SatId	CN0	Elev.	Azim.	Signal	Used	Health	Band	LT0	CBEE	
131	GPS	3	29	74	178	CCLTS	Yes	Good	L1	No	Yes	
132	GPS	4	19	63	334	CCLTS	Yes	Good	L1	No	Yes	
133	GPS	6	11	18	304	CCLTS	No	Good	L1	No	Yes	
134	GPS	7	28	19	235	CCLTS	No	Good	L1	No	Yes	
135	GPS	9	30	33	298	CCLTS	Yes	Good	L1	No	Yes	
136	GPS	26	28	37	67	CCLTS	Yes	Good	L1	No	Yes	
137	GPS	31	29	30	48	CCLTS	Yes	Good	L1	No	Yes	
138	GPS	3	10	74	178	Search	No	Good	L5	No	Yes	
139	GPS	4	28	63	334	Avail	Yes	Good	L5	No	Yes	
140	GPS	6	27	18	304	Avail	Yes	Good	L5	No	Yes	
141	GPS	9	27	33	298	Avail	Yes	Good	L5	No	Yes	
142	GPS	26	17	37	67	Search	No	Good	L5	No	Yes	
143	Galileo	13	30	23	220	CCLTS	Yes	Good	L1	No	No	
144	Galileo	13	26	23	220	CCLTS	Yes	Good	L5	NO	NO	
145		n										
140	GNSS_POST	Process	50F:	700407	Lanati		21 010	1663063	206			
147		1 03050	00/003	28407	Longi	cude: -1	21.919	51003002	280			
140	HUTACC: I	+1 211	inco:	-: 0.0	05760							
150	Major av	ic · 77	716136	5 Mino	r avic	· 20 751	236 Or	ientatio	n 5 0	08642	л	
151		MSI • 1/	4 3610	18 HAF		rtAcc: 0	230 01.	relicació	1. 5.0	50042		
152	ALLEUGE	1321 1-	+13013.									
153	CiscoGNSS											
154	Latitude:	37.420	012031	767181	7 Lona	itude: -	121.91	97608062	745			
155	HorAcc: 9	.128268	B hDOP	1.20	97641							
156	Uncertain	tv Ell:	ipse:									
157	Major ax	is: 19	128268	3 Mino	r axis	19.128	268 Or:	ientatio	n: 0			
158	Altitude	MSL: 5	864723	38 HAE	: 0 Ve	rtAcc: 0						
159												
160	Last Loca	tion A	cquired	:t								
161	Latitude:	37.420	00716 I	ongit	ude: -:	121.9198	0029999	9998				
162	HorAcc: 9	.128268	B hDOP	: 1.07								
163	Uncertain	ty Ell:	ipse:									
164	Major ax	is: 19.	128268	3 Mino	r axis	: 19.128	268 Or:	ientatio	n:0			
165	Altitude	MSL: 18	8.0316:	11 HAE	: -10.3	140052 V	ertAcc	: 10.457	25			
166	Derivatio	n Type:	GNSS_	Receiv	ver							
167	Time: 202	4-08-13	3 01:12	2:54								
168												

Figure 7. AP CLI: Output of show GNSS info command

In the **SatelliteCount** subsection of the command output, the current count of satellites visible to the GNSS module along with the satellite constellation is listed.

SatelliteCount:		14								
Const.	SatId	CN0	Elev.	Azim.	Signal	Used	Health	Band	LT0	CBEE
GPS	3	29	74	178	CCLTS	Yes	Good	L1	No	Yes
GPS	4	19	63	334	CCLTS	Yes	Good	L1	No	Yes
GPS	6	11	18	304	CCLTS	No	Good	L1	No	Yes
GPS	7	28	19	235	CCLTS	No	Good	L1	No	Yes
GPS	9	30	33	298	CCLTS	Yes	Good	L1	No	Yes
GPS	26	28	37	67	CCLTS	Yes	Good	L1	No	Yes
GPS	31	29	30	48	CCLTS	Yes	Good	L1	No	Yes
GPS	3	10	74	178	Search	No	Good	L5	No	Yes
GPS	4	28	63	334	Avail	Yes	Good	L5	No	Yes
GPS	6	27	18	304	Avail	Yes	Good	L5	No	Yes
GPS	9	27	33	298	Avail	Yes	Good	L5	No	Yes
GPS	26	17	37	67	Search	No	Good	L5	No	Yes
Galileo	13	30	23	220	CCLTS	Yes	Good	L1	No	No
Galileo	13	26	23	220	CCLTS	Yes	Good	L5	No	No

Figure 8. show gnss info command: Satellite constellation seen in the command output

The **GNSS_Post Processor** output is the collective readings of reported satellites by the GNSS module. These readings are aggregated to determine the precise location of the GNSS module along with a measured level of uncertainty.

```
GNSS_PostProcessor:
Latitude: 37.42007063728407 Longitude: -121.91981663062286
HorAcc: 11.838588 hDOP: 6.803786
Uncertainty Ellipse:
Major axis: 22.716136 Minor axis: 20.754236 Orientation: 5.0986424
Altitude MSL: 14.361918 HAE: 0 VertAcc: 0
```

Figure 9. show gnss info command: GNSS_Post Processor output

The **CiscoGNSS** shows the satellite measurements calculated by the Cisco GNSS Processor. This is obtained by fine tuning the GNSS Post Processor output over 24 hours.

CiscoGNSS: Latitude: 37.420120317671817 Longitude: -121.9197608062745 HorAcc: 9.128268 hDOP: 1.2097641 Uncertainty Ellipse: Major axis: 19.128268 Minor axis: 19.128268 Orientation: 0 Altitude MSL: 5.8647238 HAE: 0 VertAcc: 0



GNSS Signal Considerations

If the number of satellite constellations visible is less than four, then the GNSS module will experience unstable satellite reception. If more than four satellites are seen in a constellation but no GNSS signal is received, then this can be due to poor signal health. Reposition the AP within the floor plan to improve the GNSS module's line of sight to the sky.

Note: Satellite distribution plays a critical role in the AFC location process. Better accuracy is achieved when satellites are widely distributed rather than clustered together. While satellite distribution cannot be influenced, the satellite lock can be improved by installing the GNSS module with a wider view of the sky.

When conducting the preliminary site assessment, it is important to consider potential sources of interference in the environment. Transmit and receive radio signals are susceptible to RF obstructions and common sources of interference that can reduce or reflect satellite signals the GNSS module is able to receive.

Select install locations away from metal obstructions such as heating and air-conditioning ducts, large ceiling trusses, building superstructures, and major power cabling runs.

For indoor GNSS deployments, building glass with UV filtering film will completely block the GPS signal from reaching the module. In such cases where the signal is significantly degraded, you can improve GNSS reception by attaching the CW-ANT-GPS1-M-00 external antenna to the GNSS module.

CW-ANT-GPS1-M00 Overview



Figure 11. Mounting the CW-ANT-GPS1-M00

The CW-ANT-GPS1-M-00 external antenna is designed for use with the CW-ACC-GPS1 accessory module. It should be mounted clear of any obstructions to the sides of the radiating elements. Generally, the higher an antenna is above the floor, the better it performs. If possible, find a mounting place directly above your wireless device to ensure the lead-in cable is as short as possible.

Connect the antenna to the AP using the MMCX connector and the provided 32.80-ft. (10 m) plenum cable.

GNSS modules located around 13 meters inside a carpeted building register an average satellite count of 3. This limited signal reception results in the GNSS module being unable to maintain a stable GPS lock. To extend the module's reception range in such scenarios, use the CW-ANT-GPS1-M00 external antenna. Once the external antenna is securely attached to the GNSS port located on the left side of the CW-ACC-GPS1, the GNSS module should be able to receive a greater number of satellite constellations, allowing for stable GPS reception.

Signal reception is immediately improved when the antenna is attached to the GNSS module, as the antenna receivers provide stronger GNSS reception than the module alone. Note that the antenna can be routed up to 10 meters to a secondary installation point away from the AP to clear line of sight to the sky.



Figure 12. GNSS module positioned ~13 meters within a carpeted office space.

The output of the **show gnss info** in the figures below highlights the enhanced signal reception the GNSS module can achieve with an attached **CW-ANT-GPS1-M00** external antenna.

173	AP9166#sl	how gns	s inf	D.									
174													
175	GnssState: Started												
176	ExternalAntenna: false												
177	Fix: No-Fix ValidFix: false Time: 2024-08-08 18:38:39												
178	Latitude: 0 Longitude: 0												
179	HorAcc: 3530033.6 hDOP: 99												
180	Uncertainty Ellipse:												
181	Major a	xis: 35	30033	.6 Mino	r axis	: 353003	3.6 Or	ientatio	n: 0				
182	Altitude	MSL: -	12 HA	E: 0 Ve	rtAcc:	160000							
183	NumSat:	0 Range	Res:	Ø GpGst	Rms: 0								
184	pDOP: 14	Ø hDOP:	99 v	DOP: 99	nDOP:	99 eDOP	: 99 g	DOP: 0 t	DOP: 0				
185	LastFixT	ime:											
186	Satellite	eCount:	3										
187													
188	Const.	SatId	CNO	Elev.	Azim.	Signal	Used	Health	Band	LT0	CBEE		
189	GPS	27	22	-128	-1	CCLTS	No	Good	L1	No	Yes		
190	Galileo	21	23	-128	-1	CCLTS	No	NoInfo	L1	No	No		
191	Galileo	21	9	-128	-1	Search	No	NoInfo	L5	No	No		
192													
193	GNSS_Pos	tProces	sor: 1	N/A									
194													
195	CiscoGNS	S: N/A											
196													
197	Last Loca	ation A	cauir	ed: N/A									
198													
199													

Figure 13. Satellite coverage seen from the install location (Figure 12) without an attached external antenna

115	AP9166#sh	gnss i	info										
116	CoseState: Started												
118	Externalàntenna: true												
119	Eix: 3D-Eix ValidEix: true Time: 2024-00-13 01:13:32												
126	latitude: 37 4200716 Langitude: _121 0100002000000												
121	HarAcc. 13 320574 hDDP. 1 12												
122	Incertain	tu E111	inca-										
173	Major av	ic. 73	37057/	4 Mino	r avie	. 23 320	574 Or	iontatio	n- A				
123	Altitude	15. 23. MSI - 10	666	HAE: _S	8 586 V	(23:323.	26 63	tentatio					
125	NumSat: 7	Rannel	2051 B	GoGett	2mc - 20) a	20.05						
126	NUMSAT: / KANGEKES: 5 GDGSTRMS: 22.9												
127	pour: 2.11 nour: 1.12 vour: 1.79 nour: 0.88 cour: 0.7 goor: 0 tour: 0												
128	SatelliteCount: 14												
129	Jucoccaco	country											
130	Const.	SatId	CNO	Elev.	Azin.	Signal	Used	Health	Band	LTO	CBEE		
131	GPS	3	29	74	178	CCLTS	Yes	Good	11	No	Yes		
132	GPS	4	19	63	334	CCLTS	Yes	Good	11	No	Yes		
133	GPS	6	11	18	384	CELTS	No	Good	1.1	No	Yes		
134	GPS		28	19	235	CCLTS	No	Good	11	No	Yes		
135	GPS	ġ	30	33	298	CCLTS	Yes	Good	11	No	Yes		
136	GPS	26	28	37	67	CCLTS	Yes	Good	ī.ī	No	Yes		
137	GPS	31	29	30	48	CCLTS	Yes	Good	L1	No	Yes		
138	GPS	3	10	74	178	Search	No	Good	L5	No	Yes		
139	GPS	4	28	63	334	Avail	Yes	Good	1.5	No	Yes		
140	GPS	6	27	18	384	Avail	Yes	Good	1.5	No	Yes		
141	GPS	ă –	27	33	298	Avail	Yes	Good	1.5	No	Yes		
142	GPS	26	17	37	67	Search	No	Good	1.5	No	Yes		
143	Galileo	13	30	23	228	CCLTS	Yes	Good	11	No	No		
144	Galileo	13	26	23	220	CCLTS	Yes	Good	LS	No	No		
145													
146	GNSS_Post	Proces:	sor:										
147	Latitude:	37.420	3070637	728407	Longit	tude: -13	21.919	81663062	286				
148	HorAcc: 1	1.83858	38 hDOI	P: 6.80	33786								
149	Uncertain	ty Ell:	ipse:										
	Major ax	is: 22.	.71613	6 Mino	r axis:	: 20.754	236 Or.	ientatio	n: 5.0	986424	4		
	Altitude	MSL: 14	4.3619	18 HAE:	: 0 Ve	rtAcc: 0							
152													
153	CiscoGNSS												
154	Latitude:	37.42	912031	/6/181	/ Long:	⊥tude: —	121.91	97608062	/45				
155	HorAcc: 9	12826	s hDOP	: 1.209	97641								
156	Uncertain	ty Elli	ipse:										
157	Major ax	15: 19.	12826	B M100	r axis:	: 19.128	268 Ur.	ientatio	n: ø				
158	Altitude	MSL: 5	.86472	38 HAE	: Ø Vei	rtAcc: 0							
159	1.0.04 1.0.00												
100	Last Loca	27 A20	cquired	J: Longià:		123 0100		0000					
162	Hardcon 0	12026	2 kDOD	. 1 07	ue	121.9190	002333	3330					
162	Horacc: 9	*** E11	inco:	: 1.0/									
164	Major av	is• 10	12826	8 Mino	r avie	10,128	268 0.5	ientatio	n- 0				
165	Altitude	NSI 19	3, 0316	11 HAE	-10	140052 -	ertAcc	10.457	25				
166	Derivatio	n Type	GNSS	Receiv	ver	L10032 11	erenee	101437					
167	Time: 202	4-08-13	3 01:12	2:54									
168	LANGI LOL												

Figure 14. Satellite coverage seen from the install location (Figure 12) with an attached CW-ANT-GPS1-M00 external antenna

Conclusion

To learn more about monitoring AP location data on the Cisco Catalyst 9800 Wireless controller and Meraki dashboard, see the documents listed in the **References** section. Following these guidelines and best practices will help identify and maintain optimal GNSS module placement, ensuring consistent signal quality and reliability for long-term 6-GHz Standard power operation and AP AnyLocate deployments.

References

- <u>https://www.cisco.com/c/en/us/td/docs/wireless/controller/9800/17-12/config-guide/b_wl_17_12_cg/m_afc.html</u>
- <u>https://documentation.meraki.com/MR/Deployment_Guides/Automatic_Frequency_Coordination</u>
- https://www.cisco.com/c/en/us/products/collateral/wireless/catalyst-9100ax-access-points/ghzunlicensed-spectrum-reg-wp.html

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