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WLC version 8.6 Spectrum Intelligence on Cisco Wave 2 Aps

This feature enables non-wifi interference scanning at the chipset software level to detect the presence of certain Non-WiFi waveforms/devices.

The following Cisco APs support Spectrum Intelligence:

- Cisco 1542 Series APs
- Cisco 1800 Series APs
- Cisco 1810 Series APs
- Cisco 1815 Series APs
- Cisco 1832 Series APs
- Cisco 1852 Series APs

Spectrum Intelligence should not be confused with Cisco CleanAir feature set. SI is based on the inherent abilities of the QCA chipset. SI is supported in both Standalone and ME controllers running version 8.6 with AP's connected in either Local or Flex mode.

Spectrum Intelligence Restrictions

SI is not the same as CleanAir, but it is easy to think of SI as similar or even the same as CleanAir as they both do similar tasks. It is very important to understand the limitations that come with SI vs CleanAir. SI is derived from completely different hardware and software than CleanAir - and the following caveats should be understood in order to correctly set expectations.

- There is no integrated mitigation of interference - normal RRM management of noise is expected to manage this
- Only 3 Interference types are detected
 - Microwave Oven (2.4 GHz only)
 - Continuous Wave (2.4 and 5 GHz)
 - SI-FHSS (2.4 and 5 GHz)
- SI cannot differentiate between multiple devices of the same type - BlueTooth, Dect Phone, and FHSS are all SI-FHSS and only one alert will be displayed regardless if there is 1 device or 10
- Device classifications are limited to presence - the waveform is present, or it is not
- SI does not calculate Air Quality (AQ)
- SI does not provide a Severity or Duty Cycle metric
- SI information is only visible at the controller - it is not sent off the controller to CPI, CMX, or MSE and is not coordinated between controllers

- SI information is 1 for 1 reporting - every AP that hears a device will report. There is no grouping algorithm to coordinate multiple reports into a single alert as CleanAir does
- An AP in client serving mode (local or Flex connect) will only report 1 interference type even if multiples are present
- An AP in Monitor Mode can report all 3 types if present

Configuring Spectrum Intelligence

Spectrum Intelligence as a new feature – is disabled by default. In order to use SI you will need to enable it Globally as well as on the radio interfaces themselves. For ME installations, see CLI configuration below.

From the GUI

- 1 Navigate to Wireless > 802.11a/b > CleanAir

Wireless

802.11a > CleanAir

CleanAir/Spectrum Intelligence Parameters

CleanAir	<input checked="" type="checkbox"/> Enabled
Spectrum Intelligence ³	<input checked="" type="checkbox"/> Enabled
Report Interferers ¹	<input checked="" type="checkbox"/> Enabled
Persistent Device Propagation	<input type="checkbox"/> Enabled

Interferences to Ignore

Interferences to Detect

- TDD Transmitter
- Jammer
- Continuous Transmitter
- DECT-like Phone
- Video Camera

Trap Configurations

- 2 Select Spectrum Intelligence–Enable for both the 802.11a and the 802.11b band – this enables SI reporting at the global WLC level

Next you will need to enable SI on the radio interface of your SI capable AP's

- 1 Navigate to Wireless > Access Points 802.11a/b

802.11b/g/n Radios

Current Filter: None

AP Name	Radio Slot#	Base Radio MAC	Sub Band	Admin Status	Operational Status	Channel	CleanAir/SI Admin Status	CleanAir/SI Oper Status	Mesh Radio Role	Radio Role	Power Level	Antenna
1852L_FD.2FC8 \$	0	e8:65:49:1c:43:20	-	Enable	UP	NA	Disable	DOWN	NA	Monitor	NA	Internal
3800c_df.7e:e0	0	58:ac:78:df:7e:e0	-	Enable	UP	1 *	Enable	UP	NA	Client Serving (Local)	1 *	External
1810W_main \$	0	00:eb:c5:11:6f:a0	-	Enable	UP	NA	Disable	DOWN	NA	Monitor	NA	Internal
AP_2702E_2	0	a8:9d:21:72:14:80	-	Enable	UP	1 *	Enable	UP	NA	Client Serving (Local)	1 *	External

* global assignment
\$ Denotes Spectrum Intelligence capable



Note Spectrum Intelligence Capable interfaces are identified by the presence of a \$ sign placed after the AP name

- 2 Select the radio button on the far-right side of the screen for the desired interface and choose configure

802.11a/n Cisco APs > Configure

General

AP Name	1852i_FD.2FC8
Admin Status	Enable ▾
Operational Status	UP
Slot #	1

11n Parameters

11n Supported	Yes
---------------	-----

Spectrum Intelligence

Spectrum Intelligence Capable	Yes
Spectrum Intelligence Admin Status	Enable ▾

** Spectrum Intelligence enable will take effect only if it is enabled on this band.*

- 3 Set the Spectrum Intelligence Admin Status to “Enable”

Spectrum Intelligence should now be enabled for SI capable AP's on your WLC.

To configure from CLI:

- Configure global radio or AP radio by entering this command:

```
config {802.11a | 802.11b} SI {enable | disable} network | ap-name
```

- View global admin status by entering this command:

```
show {802.11a | 802.11b} SI config
```

- View interferences by AP by entering this command:

```
show {802.11a | 802.11b} SI device ap ap-name
```

- View interferences by interferer type by entering this command:

```
show {802.11a | 802.11b} SI device-type interferer_type_name
```



Note ME configuration of SI is strictly from the CLI.

Viewing and Understanding SI information

SI detections will be presented in the same screens on the controller that CleanAir is reported in today. Spectrum Intelligence AP's are differentiated from CleanAir AP's by the addition of a \$ to the AP name. No Severity or Duty Cycle will be reported as SI cannot calculate these values.

To view SI reports, navigate to in the GUI:

Monitor/CleanAir/802.11a/b/Interference devices

AP Name	Radio Slot#	Device Type	Affected Channels	Severity	Duty Cycle(%)	RSSI	DevID	ClusterID
AP_2702E_2	0	DECT phone	1	4	1	-39	0x2004	20:2e:00:00:00:08
AP_2702E_2	0	BT Link	1	2	1	-81	0x2407	20:2e:00:00:03:4e
AP_2702E_2	0	BT Link	1	2	1	-88	0x242b	20:2e:00:00:03:4e
AP_2702E_2	0	BT Link	1	2	1	-55	0x242c	20:2e:00:00:03:62
AP_2702E_2	0	BT Link	1	2	1	-88	0x242d	20:2e:00:00:03:63
1852L_FD_2FC8 \$	0	SI_FHSS	1,2,4,8,9,11	NA	NA	-39	0xc001	20:2e:00:00:03:66
1810W_main \$	0	SI_FHSS	1,3,5,7,9	NA	NA	-39	0x7002	20:2e:00:00:03:65

The above display shows both CleanAir and SI detections. Note that there are 5 interference sources being displayed for the 2702E CleanAir output. There is one each of SI-FHSS for the SI AP's. Both Dect Phone and Bluetooth are Frequency Hopping Spread Spectrum (FHSS) waveforms. In this screenshot - it is reasonable to assume that the SI-FHSS detections are both capturing the DECT Phone, since we know that the DECT Phone is positively classified by CleanAir and has an RSSI of -39 dBm.

SI provides a binary indication of a type of waveform (non-WiFi) that is present. Detection depends on the signal to noise ratio, and the relative Channel Utilization in the environment - as it also does in CleanAir. The busier the network, the less steady the detection will likely be. It is useful information to know.

In ME, SI Interference information is displayed in the main menu-Access Point View.

Tunning SI

In certain environments, there will always be certain waveforms - and while they consume some of the same airtime that we want to use for Wi-Fi, they are not necessarily destructive. For instance,

- Many retail locations will see many SI-FHSS detections (BlueTooth) from customers in their or others nearby facilities.
- A restaurant will have commercial Microwave ovens in the kitchen – and they will run most of the time.

To manage this, SI allows you to configure what interference sources you want reported Just like in Cleanair. Note that some of the interference types are shared between CleanAir and SI - and disabling that type for one - will also disable it for the other.

SI-FHSS–Unique to SI 2.4 and 5 Ghz

Microwave Oven–Shared, 2.4 GHz only

Continuos TX–Shared

To disable an interference type for reporting to the controller, go to Wireless=>802.11a/b=>Cleanair

[MONITOR](#)[WLANS](#)[CONTROLLER](#)[WIRELESS](#)[SECURITY](#)[MANAGEMENT](#)[COMMANDS](#)[HELP](#)

802.11b > CleanAir

CleanAir/Spectrum Intelligence Parameters

CleanAir☒ Enabled

Spectrum Intelligence³☒ Enabled

Report Interferers¹☒ Enabled

Persistent Device Propagation☐ Enabled

Interferences to Ignore

WiFi Inverted
WiFi Invalid Channel
BLE Beacon

>
<

Interferences to Detect

Canopy
Xbox
WiMax Mobile
WiMax Fixed
SI_FHSS

Trap Configurations

And select the interference type you wish to suppress and add it to the interference to ignore column. This will suppress any reports of interference of this type from AP's attached to this controller moving forward.



Note If you have both CleanAir and SI capable AP's - de-selecting Continuous TX or Microwave Oven works against both AP types.

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