

v1.20_AirTune

- AirTune
 - - - /
 - API AirTune EMS
 - - TPC/DCA
 - Load Balance
 - AirTune
 - AirTune
 - - AirTune
 - AirTune
 - AirTune

AirTune

Enterprise&High-Density Wi-Fi AirTune, , Radio Resource Management (RRM).


Radio Resource Management . **AirTune** , , .

- :
- Dynamic Channel Assignment (DCA) - ;
 - Transmit Power Control (TPC) - "" , ;
 - Load Balancing - . , , 1 , .

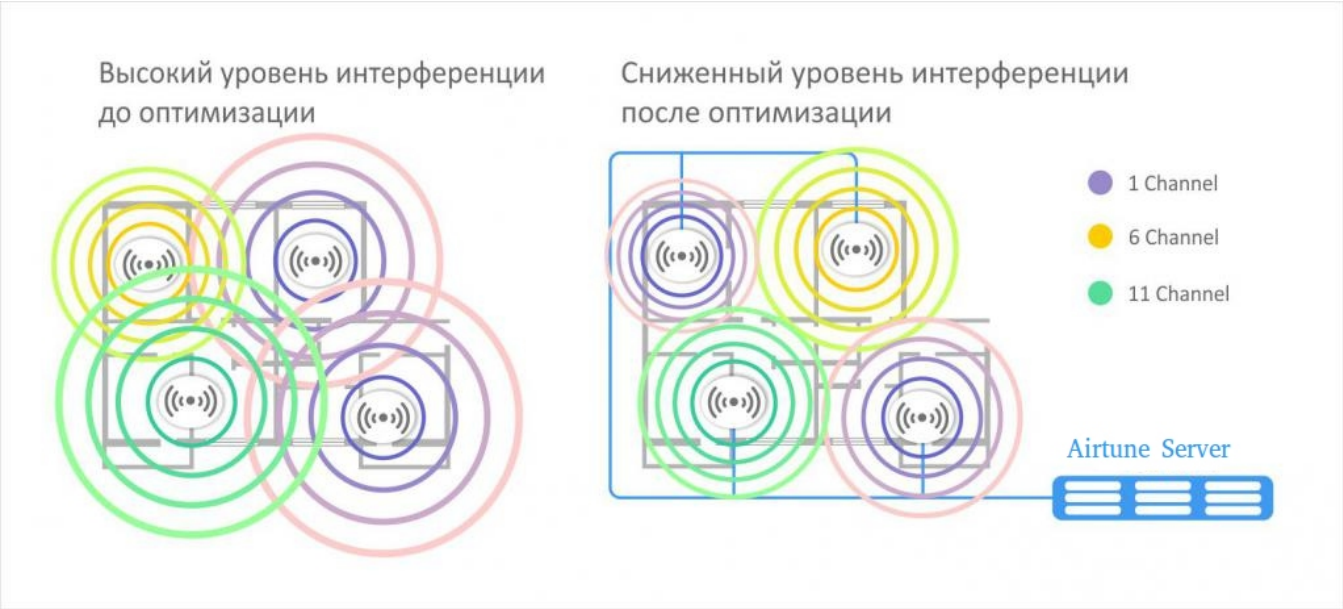
- :
- ;
 - ("");
 - ;
 - « » ;
 - ;
 - "" ;
 - "" « »;
 - .

TPC/DCA (Action Frame) . , " " , .

802.11k, , .

 802.11k .


(DCA+TPC):



, AirTune.


"licence.xml" :

- /usr/lib/eltex-ems/conf/licence/
- /etc/eltex-airtune/

 , EMS , AirTune(licence.xml, licence-1.xml ..)

EMS AirTune :

```
service eltex-ems restart
service eltex-airtune restart
```

 / .

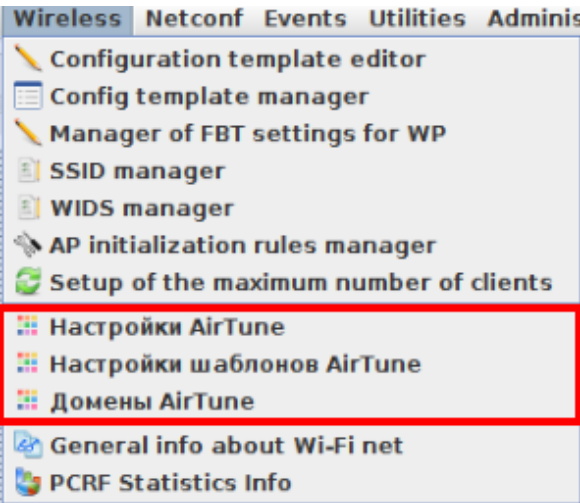
GUI EMS ->, /usr/lib/eltex-ems/conf/licence/licence.xml

Number	Group	Devices	Restriction	Use devices
1	AIRTUNE	AIRTUNE	200	13

/usr/lib/eltex-ems/conf/licence/licence-dist.xml

```
<group>
  <title>AIRTUNE</title>
  <count>200</count>
  <typeList>
    <type>AIRTUNE</type>
  </typeList>
</group>
```

Airtune , GUI EMS "Wireless" , :



AirTune EMS .

- Ubuntu Server 16.04 LTS/ Ubuntu Server 18.04 LTS

, (VM):

	CPU core, Xeon	RAM, Gb	HDD, Gb
10 200	4, 64-bit x86 CPUs	4	40
200 500	6, 64-bit x86 CPUs	6	80
500 1000	6, 64-bit x86 CPUs	8	120
1 . 2 .	8, 64-bit x86 CPUs	12	200
2 . 4 .	8, 64-bit x86 CPUs	16	350



1.19.0, AirTune 1.3.0 SoftWLC 1.17

:

- SoftWLC + AirTune;
- , ;
- , ;
- URL AirTune , .

(WebSocket) "subscribe-request", , :

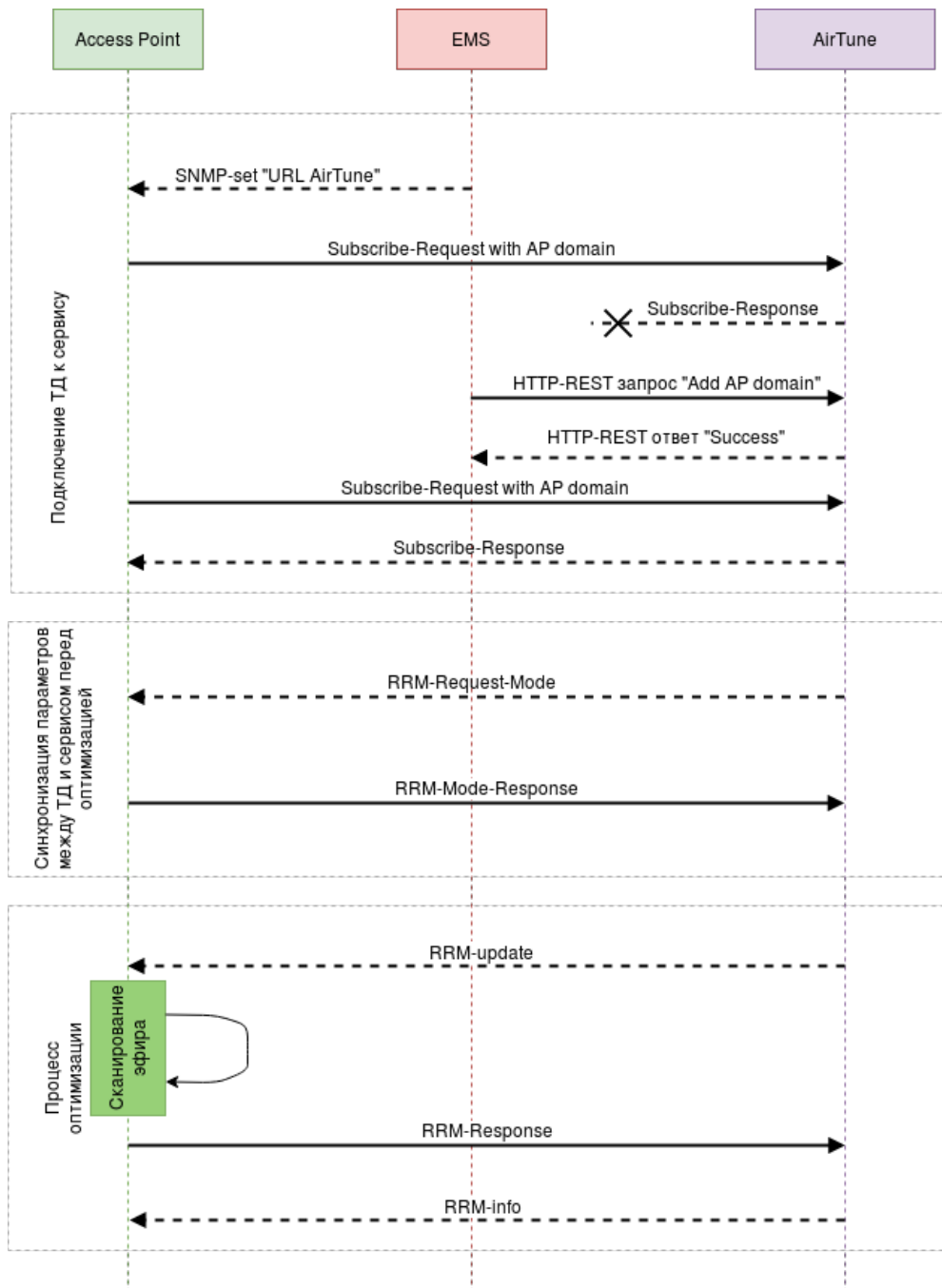
- (, ,);
- ();
- (,);
- SSID;
- .

, AirTune . , , AirTune .

AirTune , "subscribe-response" с (DCA, TPC, Load Balance) .


(DCA, TPC) :

DCA/TPC:



1) AirTune, SNMP-set URL AirTune;

- 2) , Subscribe-Request/ Subscribe-Response, . , , . , .
- 3) "rrm-request-mode", , .. , ;
- 4) "rrm-response-mode", ;
- 5) "rrm-update". eltex-rrm-scan "" () , action , , ;
- 6) "rrm-response";
- 7) , , , "rrm-info";
- 8) , .



:

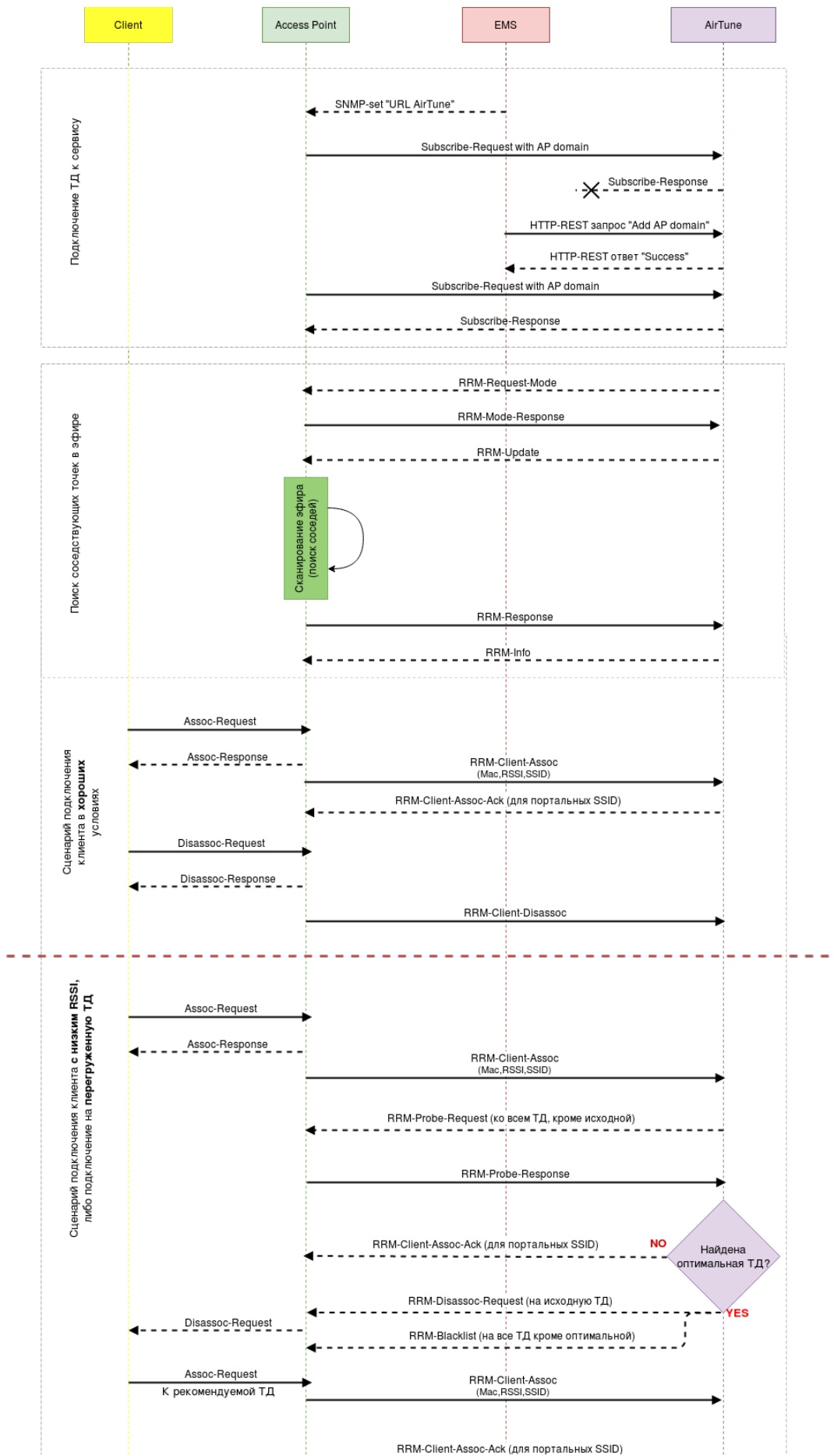
- ;
- ;
- ;
- (Optimization interval);
- .

:

- ;
- ;
- .

:

:





1) , TPC/DCA , "Use all AP for Balance", ;

 , "Use all AP for Balance" AirTune, , , ;


2) . "rrm-client-assoc", - , SSID . , , "RRM-Client-Assoc-Ack" , ();


3) () , ;

4) "", SSID "rrm-probe-request", " " ;





5) "rrm-probe-response", RSSI;

6) , . , "rrm-disassoc-request", , , "rrm-blacklist", 1 ().

 (2.4 5).
2.4 , 5 , (2.4).

 :
mac- Probe Request', , .. - (Probe request).

/

	service eltex-airtune status	<div> eltex-airtune is running</div>
		<div> eltex-airtune is not running</div>
	service eltex-airtune start	<div> Starting eltex-airtune ... eltex-airtune started</div>
		<div> eltex-airtune is already running</div>

	service eltex-airtune stop	<div><div></div><div>Stopping eltex-airtune ... eltex-airtune stopped</div></div> <div><div></div><div>, ... eltex-airtune is not running rm: cannot remove '/var/run/eltex-airtune.pid': No such file or directory</div></div>
	service eltex-airtune restart	<div><div></div><div>Stopping eltex-airtune ... eltex-airtune stopped Starting eltex-airtune ... eltex-airtune started</div></div>

API AirTune EMS

AirTune EMS . GUI EMS " " " " .
"airtune", , , AirTune.

Host IP , AirTune.
IP EMS AirTune, AirTune

GenericAp

airtune

apb

dhcp

esr

ftpserver

linuxServerCommon

monitoring

mysql

netconf

passwordGenerator

pcrf

portal

radius

softwlc.nbi

system

tftpserver

tl1

wep

wirelessCommon

wop

Protocol

http

Host

192.168.1.100

Port

8089

Connection Timeout, s

300

Request Timeout, s

5

Protocol		Http/Https	Http
Host	API AirTune	ASCII	localhost
Port	API AirTune	0 - 65535	8089
Connection Timeout, s	AirTune	0 - 65535	10

ALL_Function

Only_Load_Balance

RRM_HD

RRM_full_air

Universal

common

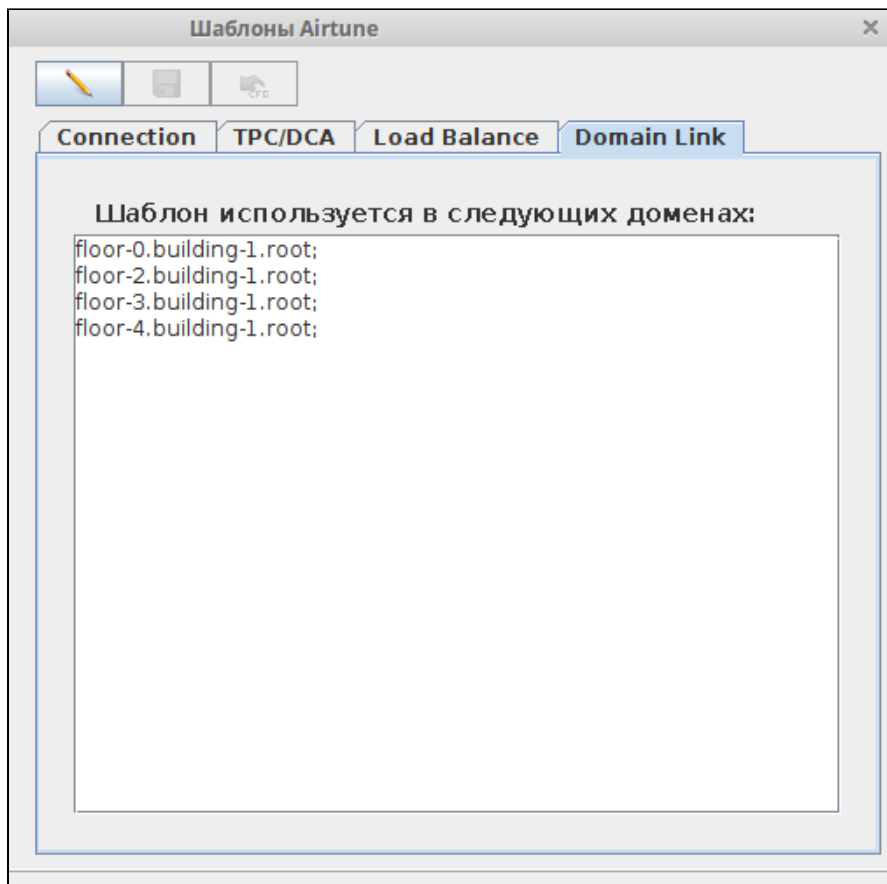
test-pattern



:



"Domain Link":



TPC/DCA

Connection
TPC/DCA
Load Balance
Domain Link

Use Eltex RRM scan
☒

Use Optimization time
☒

Optimization time
22:30

Use Optimization event
☒

Use RRM report
☒

Days to keep report
30

TPC Configure

Use TPC
☒

Use HD mode
☐

AP RSSI Threshold 2.4GHz, dBm
-60

AP RSSI Threshold 5GHz, dBm
-60

Hysteresis 2.4GHz, dBm
2

Hysteresis 5GHz, dBm
2

DCA Configure

Use DCA
☒

Use Eltex RRM scan	/ . Action- , . (1 - 50-60).	Up/Down	Up
Use Optimization time	/ .	Up/Down	Down
Optimization time	, .	00:00 - 23:59	00:00
Use Optimization event	/ : • ; • ; • 5 ; • .	Up/Down	Up
Use RRM report	/ RRM.	Up/Down	Up
Days to keep report	, , .	1-365	93
Use TPC	/ .	Up/Down	Up
Use HD mode	/ HD. .	Up/Down	Down
AP RSSI Treshold 2.4GHz	, 2.4 , . RSSI , RSSI Treshold (RSSI_ > RSSI_Treshold), (RSSI_ < RSSI_Treshold).	-1 - -100	-70
AP RSSI Treshold 5GHz	, 5 , . RSSI , RSSI Treshold (RSSI_ > RSSI_Treshold), (RSSI_ < RSSI_Treshold).	-1 - -100	-70
Hysteresis 2.4Ghz	2.4 . "" , RSSI Treshold+-2dbm, .	1-10	2
Hysterezis 5GHz	5 . "" , RSSI Treshold+-2dbm, .	1-10	2
Use DCA	/ .	Up/Down	Up

Load Balance

Connection

TPC/DCA

Load Balance

Domain Link

Use Load Balance

☒

Blacklist high threshold, dBm

-65

Blacklist low threshold, dBm

-75

Load balance high STA threshold

20

Load balance low STA threshold

5

Use All AP for Load balance

☐

Use 802.11k

☒

Use Load Balance	/ , , .	Up/Down	Up
Blacklist high threshold	RSSI , "" .	-1 - -100	-65
Blacklist low threshold	RSSI , , "" . "" , .	-1 - -100	-75
Load balance high STA threshold	, .	1-100	20
Load balance low STA threshold	, (,). - .	1-100	5
Use All AP for Load balance	/ , . - , (,). , , (,).	Up/Down	Down
Use 802.11k	/ 802.11k.	Up/Down	Down

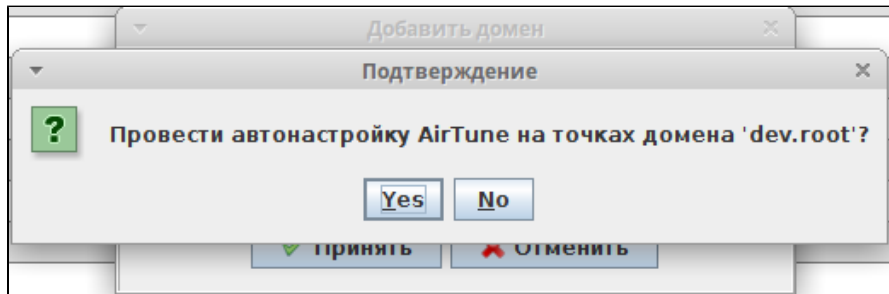
AirTune

"Wireless" "AirTune".

AirTune , () AirTune.

“ ” “ ” “ ” “ ”
AirTune , ().

- AirTune , "" URL , AirTune, "" :



- Wireless , , , :

Шаблон конфигурации для Universal

Вкладка: AirTune сервис

Status: Up

Service URL: ws://100.110.1.23:8099/apb/rrm

- , AirTune , Service URL = ws://<IP AirTune>:8099/apb/rrm, <IP AirTune> - AirTune, .

Описание	Пользователи Wi-Fi	Мониторинг конкурентных ТД	Мониторинг	Конфигурация
Сеть				
Беспроводной доступ				
Доступ				
Радио интерфейсы				
Виртуальные точки доступа				
Z-Wave				
Key holder data				
Global RADIUS				
QoS. Main				
QoS. EDCA parameters				
Client QoS. Global				
Client QoS. Class Map				
Client QoS. Policy Map				
WDS				
Captive Portal. Global				
Captive Portal. Instance				
Cluster. Main				
AirTune сервис				
Системное время				
Системные события				
SNMP				
SNMP trap				
CLI/telnet				
CLI/ssh				

Обновить Редактировать В XML

Status: Up

Service URL: ws://100.110.1.23:8099/apb/rrm

CLI:

```
set rrm rrm-service up
set rrm rrm-service-url ws://<IP AirTune>:8099/apb/rrm
```

"Wireless" .

3 RRM, :

AirTune

, , AirTune .

:

- , , ;
- 2.4 5, mac- ;
- , .

Описание	Активные аварии	Список устройств	Пользователи Wi-Fi	Мониторинг конкурентных ТД	Wireless	Статистика RRD	Доступ					
Узлы туннелей												
Список ТД узла тун.												
Список устройств AirTune												
Отчеты AirTune												
Гистограммы AirTune												
Поиск по MAC устройствам: <input type="text"/> <input type="checkbox"/> 2.4 GHz <input type="checkbox"/> 5 GHz												
<input type="button" value="Изменить поля"/> <input type="button" value="Обновить"/> <input type="button" value="Запустить оптимизацию"/> Оптимизировано Записей: 20												
MAC-адрес...	Тип устрой...	Домен	Диапазон	MAC-адрес...	Сост...	Заблокиро...	Заблокиро...	Клиенты	Текущий к...	Ширина по...	Мощность ...	Доступ...
E0:D9:E3:8F:...	WEP-2ac Smart	floor-4.building-2....	5 GHz	E0:D9:E3:8F:...	Вкл.	0	0	4	56	20	19	36, 40, 4...
E0:D9:E3:8F:...	WEP-2ac Smart	floor-4.building-2....	2.4 GHz	E0:D9:E3:8F:...	Вкл.	0	0	1	11	20	16	1, 6, 11
E0:D9:E3:4E:...	WEP-2ac Smart	floor-4.building-2....	5 GHz	E0:D9:E3:4E:...	Вкл.	0	0	5	36	20	19	36, 40, 4...
E0:D9:E3:4E:...	WEP-2ac Smart	floor-4.building-2....	2.4 GHz	E0:D9:E3:4E:...	Вкл.	0	0	1	6	20	16	1, 6, 11
E0:D9:E3:8F:...	WEP-2ac Smart	floor-4.building-2....	5 GHz	E0:D9:E3:8F:...	Вкл.	0	0	2	60	20	19	36, 40, 4...
E0:D9:E3:8F:...	WEP-2ac Smart	floor-4.building-2....	2.4 GHz	E0:D9:E3:8F:...	Вкл.	0	0	0	1	20	16	1, 6, 11
E0:D9:E3:8F:...	WEP-2ac Smart	floor-4.building-2....	5 GHz	E0:D9:E3:8F:...	Вкл.	0	0	1	36	20	19	36, 40, 4...
E0:D9:E3:8F:...	WEP-2ac Smart	floor-4.building-2....	2.4 GHz	E0:D9:E3:8F:...	Вкл.	0	0	0	11	20	16	1, 6, 11
E0:D9:E3:4E:...	WEP-2ac Smart	floor-4.building-2....	5 GHz	E0:D9:E3:4E:...	Вкл.	0	0	3	44	20	19	36, 40, 4...
E0:D9:E3:4E:...	WEP-2ac Smart	floor-4.building-2....	2.4 GHz	E0:D9:E3:4E:...	Вкл.	0	0	0	6	20	16	1, 6, 11
E0:D9:E3:4E:...	WEP-2ac Smart	floor-4.building-2....	5 GHz	E0:D9:E3:4E:...	Вкл.	0	0	4	48	20	19	36, 40, 4...
E0:D9:E3:4E:...	WEP-2ac Smart	floor-4.building-2....	2.4 GHz	E0:D9:E3:4E:...	Вкл.	0	0	3	6	20	16	1, 6, 11
E0:D9:E3:91:...	WEP-2ac-Z	floor-4.building-2....	5 GHz	E0:D9:E3:91:...	Вкл.	0	0	2	64	20	19	36, 40, 4...
E0:D9:E3:91:...	WEP-2ac-Z	floor-4.building-2....	2.4 GHz	E0:D9:E3:91:...	Вкл.	0	0	0	1	20	16	1, 2, 3, 4...
E0:D9:E3:4F:...	WEP-2ac Smart	floor-4.building-2....	5 GHz	E0:D9:E3:4F:...	Вкл.	0	0	0	52	20	19	36, 40, 4...
E0:D9:E3:4F:...	WEP-2ac Smart	floor-4.building-2....	2.4 GHz	E0:D9:E3:4F:...	Вкл.	0	0	0	11	20	16	1, 6, 11
E0:D9:E3:91:...	WEP-2ac-Z	floor-4.building-2....	5 GHz	E0:D9:E3:91:...	Вкл.	0	0	0	64	20	19	36, 40, 4...
E0:D9:E3:91:...	WEP-2ac-Z	floor-4.building-2....	2.4 GHz	E0:D9:E3:91:...	Вкл.	0	0	0	1	20	16	1, 6, 11
E0:D9:E3:4E:...	WEP-2ac Smart	floor-4.building-2....	5 GHz	E0:D9:E3:4E:...	Вкл.	0	0	4	64	20	19	36, 40, 4...
E0:D9:E3:4E:...	WEP-2ac Smart	floor-4.building-2....	2.4 GHz	E0:D9:E3:4E:...	Вкл.	0	0	2	1	20	16	1, 6, 11

MAC-	Mac- .
	.
	().
	, .
MAC-	Mac- (2.4 5).
	.
TPC	AirTune, WDS/Mesh/WGB.
DCA	AirTune, WDS/Mesh/WGB.
	.
	.
	.
	.
	(Limit channels).

AirTune

" AirTune" TPC/DCA, , .

:

- MAC- ;
- ;
- ;
- CSV-.

Описание	Активные аварии	Список устройств	Пользователи Wi-Fi	Мониторинг конкурентных ТД	Wireless	Статистика RRD	Доступ			
Узлы туннелей										
Список ТД узла тун.		Поиск по MAC устройств:	Дата:	2020-06-19 10:35:44	2020-07-03 16:59:45					
Список устройств AirTune		Изменить поля	Обновить	Экспорт	Записей: 12					
Отчеты AirTune										
Гистограммы AirTune										
		Дата	Домен	MAC-адрес ТД	MAC-адрес инте...	Мощность до	Мощность после	Канал до	Канал после	Доступные ка...
		2020-07-03 10:47:11 К...	floor-0.building-1.root	A8:F9:4B:B7:C0:80	A8:F9:4B:B7:C0:80	16	16	36	36	36 40 44 48
		2020-07-03 10:47:11 К...	floor-0.building-1.root	A8:F9:4B:B7:C0:80	A8:F9:4B:B7:C0:90	16	16	1	1	1 2 3 4 5 6 7 8 ...
		2020-07-03 10:47:11 К...	floor-0.building-1.root	E0:D9:E3:8A:01:60	E0:D9:E3:8A:01:60	19	19	48	48	36 40 44 48
		2020-07-03 10:47:11 К...	floor-0.building-1.root	E0:D9:E3:8A:01:60	E0:D9:E3:8A:01:70	16	16	13	13	1 2 3 4 5 6 7 8 ...
		2020-07-03 16:59:36 К...	floor-0.building-1.root	A8:F9:4B:B7:C0:80	A8:F9:4B:B7:C0:80	16	16	36	36	36 40 44 48
		2020-07-03 16:59:36 К...	floor-0.building-1.root	A8:F9:4B:B7:C0:80	A8:F9:4B:B7:C0:90	16	16	1	1	1 2 3 4 5 6 7 8 ...
		2020-07-03 16:59:36 К...	floor-0.building-1.root	E0:D9:E3:8A:01:60	E0:D9:E3:8A:01:60	19	19	48	48	36 40 44 48
		2020-07-03 16:59:36 К...	floor-0.building-1.root	E0:D9:E3:8A:01:60	E0:D9:E3:8A:01:70	16	16	13	13	1 2 3 4 5 6 7 8 ...
		2020-07-03 17:12:35 К...	floor-0.building-1.root	A8:F9:4B:B7:C0:80	A8:F9:4B:B7:C0:80	16	16	36	36	36 40 44 48
		2020-07-03 17:12:35 К...	floor-0.building-1.root	A8:F9:4B:B7:C0:80	A8:F9:4B:B7:C0:90	16	16	1	1	1 2 3 4 5 6 7 8 ...
		2020-07-03 17:12:35 К...	floor-0.building-1.root	E0:D9:E3:8A:01:60	E0:D9:E3:8A:01:60	19	19	48	48	36 40 44 48
		2020-07-03 17:12:35 К...	floor-0.building-1.root	E0:D9:E3:8A:01:60	E0:D9:E3:8A:01:70	16	16	13	13	1 2 3 4 5 6 7 8 ...

	. AirTune UTC , GUI .
	().
MAC-	Mac- .
MAC-	Mac- (2.4 5).
M	, dbm.
	, dbm.
	.
	.
	(Limit channels).

AirTune

" AirTune" DCA.

- :
- , 2.4 5;
 - , - " ", ();
- :

