# 802.11n 속도 문제 해결

# 목차

<u>소개</u> <u>사전 요구 사항</u> <u>요구 사항</u> <u>사용되는 구성 요소</u> <u>표기 규칙</u> <u>배경 정보</u> <u>11n 속도에 대한 컨트롤러 트러블슈팅</u> <u>iPerf를 통한 처리량 계산 방법</u> <u>신호에서 광고되는 기능</u> <u>관련 정보</u>

# <u>소개</u>

이 문서에서는 무선 처리량 문제를 해결할 때 고려해야 할 일반적인 문제를 다룹니다.이 문서에서 는 유사한 테스트 환경에서 Cisco 1252 AP와 비교하여 다양한 벤더 802.11n 액세스 포인트(AP)를 포함하는 무선 네트워크의 성능 및 처리량을 측정하는 툴을 사용합니다.

# <u>사전 요구 사항</u>

## <u>요구 사항</u>

Cisco에서는 다음과 같은 요구 사항을 충족하는 것이 좋습니다.

- iPerf와 같은 툴 및 OmniPeek 및 Cisco Spectrum Analysis와 같은 네트워크 분석
- 802.11n 지원 1140, 1250, 3500 및 1260 Series AP

## <u>사용되는 구성 요소</u>

이 문서의 정보는 다음 소프트웨어 및 하드웨어 버전을 기반으로 합니다.

- 소프트웨어 버전 6.0.182을 실행하는 WS-SVC-WiSM 컨트롤러
- AIR-LAP1142-A-K9 AP

### <u>표기 규칙</u>

문서 규칙에 대한 자세한 내용은 <u>Cisco 기술 팁 표기 규칙을 참고하십시오.</u>

## <u>배경 정보</u>

802.11n은 AP의 프레임 어그리게이션에 대한 여러 변경 사항으로 인해 탄생했습니다.A-MPDU 및 A-MSDU.

- 블록 ACK 크기
- MCS 및 채널 본딩
- MIMO
- 5GHz를 2.4GHz 이상 사용:5GHz에서 채널 본딩을 인증하는 Wi-Fi도 언급함

## <u>11n 속도에 대한 컨트롤러 트러블슈팅</u>

다음 단계를 완료하십시오.

 컨트롤러에서 802.11n 지원이 활성화되었는지 확인합니다. (WiSM-slot3-2) > show 802.11a 802.11a Network..... Enabled 11nSupport..... Enabled 802.11a Low Band..... Enabled 802.11a Mid Band..... Enabled 802.11a High Band..... Enabled 802.11a Operational Rates 802.11a 6M Rate..... Mandatory 802.11a 9M Rate..... Supported 802.11a 12M Rate..... Disabled 802.11a 18M Rate..... Supported 802.11a 24M Rate..... Mandatory 802.11a 36M Rate..... Supported 802.11a 48M Rate..... Supported 802.11a 54M Rate..... Supported 802.11n MCS Settings: MCS 0..... Supported MCS 1..... Supported MCS 2..... Supported MCS 3..... Supported MCS 4..... Supported MCS 5..... Supported

2. N율은 두 가지 방법으로 달성됩니다.채널 본딩을 사용하지 않고도 MCS(Modulation Coding Scheme) 7까지 속도를 높일 수 있습니다.MCS 속도가 7보다 크고 최대 15인 경우 채널 결합 을 활성화해야 합니다.컨트롤러에서 다음 show 명령을 사용하여 채널 본딩이 활성화되었는지 확인할 수 있습니다.

(WiSM-slot3-2) >show advanced 802.11a channel
Automatic Channel Assignment
Channel Assignment Mode AUTO
Channel Update Interval 600 seconds [startup]
Anchor time (Hour of the day) 0
Channel Update Contribution SNI.
Channel Assignment Leader
Last Run 371 seconds ago
DCA Sensitivity Level STARTUP (5 dB)
DCA 802.11n Channel Width 40 MHz
Channel Energy Levels
Minimum unknown
Average unknown
Maximum unknown
Channel Dwell Times
Minimum unknown
Average unknown
Maximum unknown
802.11a 5 GHz Auto-RF Channel List

#### 3. 다음 명령을 사용하여 AP당 채널 너비를 구성할 수도 있습니다. (WiSM-slot2-2) >config 802.11a disable AP0022.9090.8e97 (WiSM-slot2-2) >config 802.11a chan\_width AP0022.9090.8e97 40 Set 802.11a channel width to 40 on AP AP0022.9090.8e97

### 4. 가드 간격 및 해당 MCS 속도는 802.11n 클라이언트에 표시되는 데이터 속도를 결정하는 데 도움이 됩니다.다음은 이 컨피그레이션을 확인하는 명령입니다.

(WiSM-slot3-2) > show 802.11a 802.11a Network..... Enabled 11nSupport..... Enabled 802.11a Low Band..... Enabled 802.11a Mid Band..... Enabled 802.11a High Band..... Enabled 802.11a Operational Rates 802.11a 6M Rate..... Mandatory 802.11a 9M Rate..... Supported 802.11a 12M Rate..... Disabled 802.11a 18M Rate..... Supported 802.11a 24M Rate..... Mandatory 802.11a 36M Rate..... Supported 802.11a 48M Rate..... Supported 802.11a 54M Rate..... Supported 802.11n MCS Settings: MCS 0..... Supported MCS 1..... Supported MCS 2..... Supported MCS 3..... Supported MCS 4..... Supported MCS 5..... Supported MCS 6..... Supported MCS 7..... Supported MCS 8..... Supported MCS 9..... Supported MCS 10..... Supported MCS 11..... Supported MCS 12..... Supported MCS 13..... Supported MCS 14..... Supported MCS 15..... Supported 802.11n Status: A-MPDU Tx: Priority 0..... Enabled Priority 1..... Disabled Priority 2..... Disabled Priority 3..... Disabled Priority 4..... Disabled Priority 5..... Disabled Priority 6..... Disabled Priority 7..... Disabled Beacon Interval..... 100 CF Pollable mandatory..... Disabled CF Poll Request mandatory..... Disabled --More-- or (q)uit CFP Period..... 4 CFP Maximum Duration..... 60 Default Channel..... 36 Default Tx Power Level..... 1 DTPC Status..... Enabled Fragmentation Threshold..... 2346

Pico-Cell Status Disabled
Pico-Cell-V2 Status Disabled
TI Threshold50
Traffic Stream Metrics Status Disabled
Expedited BW Request Status Disabled
World Mode Enabled
EDCA profile type default-wmm
Voice MAC optimization status Disabled
Call Admission Control (CAC) configuration
Voice AC - Admission control (ACM) Enabled
Voice max RF bandwidth
Voice reserved roaming bandwidth 6
Voice load-based CAC mode Enabled
Voice tspec inactivity timeout Disabled
Video AC - Admission control (ACM) Disabled
Voice Stream-Size
Voice Max-Streams 2
Video max RF bandwidth Infinite
Video reserved roaming bandwidth 0

A-MPDU 패킷 집계를 확인합니다.최선의 노력을 위해 다음 명령을 통해 QoS 레벨을 활성화 합니다.config 802.11a 11n지원 a-mpdu tx priority 0 enableconfig 802.11b 11n지원 a-mpdu tx priority 0 enable

5. A 라디오의 안테나 세 개를 모두 사용해야 합니다.안테나가 동일한 모델인지 확인합니다.

6. 클라이언트 연결을 위해 구성된 WLAN에서 WMM을 허용하거나 요구해야 하며, AES 또는 개 방형 암호화만 사용해야 합니다.이 명령은 다음 명령 출력을 사용하여 확인할 수 있습니다. (WiSM-slot2-2) >show wlan 1

WLAN Identifier	1
Profile Name	wlab5WISMip22
Network Name (SSID)	wlab5WISMip22
Status	Enabled
MAC Filtering	Disabled
Broadcast SSID	Enabled
AAA Policy Override	Disabled
Network Admission Control	
NAC-State D:	isabled
Quarantine VLAN 0	
Number of Active Clients	0
Exclusionlist Timeout	60 seconds
Session Timeout	1800 seconds
CHD per WLAN	Enabled
Webauth DHCP exclusion	Disabled
Interface	management
WLAN ACL	unconfigured
DHCP Server	Default
DHCP Address Assignment Required	Disabled
Quality of Service	Silver (best effort)
WMM	Allowed
CCX - AironetIe Support	Enabled
CCX - Gratuitous ProbeResponse (GPR)	Disabled
CCX - Diagnostics Channel Capability	Disabled
Dot11-Phone Mode (7920)	Disabled
Wired Protocol	None
IPv6 Support	Disabled
Peer-to-Peer Blocking Action	Disabled
Radio Policy	All
DTIM period for 802.11a radio	1
DTIM period for 802.11b radio	1
Radius Servers	
Authentication Glo	obal Servers
Accounting Dis	sabled
Local EAP Authentication	Disabled
Security	

802.11 Authentication:..... Open System Static WEP Keys..... Disabled 802.1X..... Disabled Wi-Fi Protected Access (WPA/WPA2)..... Enabled WPA (SSN IE)..... Disabled WPA2 (RSN IE)..... Enabled TKIP Cipher..... Disabled AES Cipher..... Enabled Auth Key Management 802.1x.... Enabled PSK..... Disabled CCKM..... Disabled FT(802.11r).... Disabled FT-PSK(802.11r).... Disabled FT Reassociation Timeout..... 20 FT Over-The-Air mode..... Enabled FT Over-The-Ds mode..... Enabled CKIP ..... Disabled IP Security..... Disabled IP Security Passthru..... Disabled Web Based Authentication..... Disabled Web-Passthrough..... Disabled Conditional Web Redirect..... Disabled Splash-Page Web Redirect..... Disabled Auto Anchor..... Disabled H-REAP Local Switching..... Enabled H-REAP Learn IP Address..... Enabled Infrastructure MFP protection..... Enabled (Global Infrastructure MFP Disabled) Client MFP..... Optional Tkip MIC Countermeasure Hold-down Timer..... 60 Call Snooping..... Disabled Band Select..... Enabled Load Balancing..... Enabled

7. 안테나 다양성:어떤 이유로든 안테나 2개만 사용하는 경우 송신기/수신기 포트에 안테나 A와 B를 사용해야 합니다.

### 클라이언트 측:

- 무선 카드를 제어하는 데 사용되는 서 플리 컨 트가 무선 카드에 서 플리 컨 트의 판매자와 일 치시키는 것이 좋습니다.
- 클라이언트 드라이버:무선 카드에서 최신 클라이언트 드라이버가 실행 중인지 확인해야 합니다.
- 3. 무선 어댑터 공급업체에 문의하십시오.
- 4. 11n 인증 어댑터를 사용하여 11n 데이터 속도를 달성해야 합니다.

### Wi-Fi 인증 제품:

http://www.wi-fi.org/certified\_products.php

### 성능 향상 방법:

- Channel utilization(채널 사용률) 네트워크 분석기는 프레임을 송수신하는 데 소요되는 시간 의 백분율로 채널 사용률을 보고합니다.이렇게 하면 액세스 포인트와 거리가 떨어져 있는 잠 재적인 속도 차이를 측정할 수 있습니다.이는 예를 들어, 1Mbps의 속도로 전송이 완전히 사용 되고 있는 채널이 100% 활용률에서 0.94Mbps로 작동하는 경우를 모니터링하고 확인하는 데 도움이 됩니다.
- 2. 무선에 사용되는 물리적 매체도 성능을 좌우합니다.802.11b를 통해 802.11g 또는 802.11a를

사용하면 802.11b보다 처리량이 훨씬 높고, 802.11b보다 30Mbps까지 높은 처리량을 얻을 수 있습니다. 이 경우 6mpbs 무선 용량이 모든 연결된 스테이션으로 나누어집니다.

- Cell Sizes(셀 크기) 클라이언트가 가능한 한 AP에 가깝게 있도록 셀 크기를 축소하는 것이 좋습니다.이렇게 하면 클라이언트가 AP에 연결할 수 있는 데이터 속도가 향상됩니다.이를 위 해서는 AP의 전력 수준을 가장 낮은 수준으로 낮추어야 합니다.
- 4. 셀 크기를 줄이면 공동 채널 간섭도 감소합니다.RRM을 사용하는 경우 AP는 구축별로 동적으 로 채널을 선택해야 합니다.그러나 동적 채널 할당을 구현하는 경우, 동일한 채널 바로 옆에 고 전력 레벨의 AP가 2개 없는지 확인합니다.
- 5. 또한 보호는 처리량 적중을 유발합니다.

iPerf를 통한 처리량 계산 방법

<u>Iperf 설치 팁</u>

Chariot를 소유하지 않은 고객이나 테스터에게는 Iperf를 대신 사용할 수 있습니다 .http://www.macalester.edu/crash/software/pc/iperf/kperf\_setup.exe에서 확인할 수 <u>있습니다</u>.

<u>TCP 처리량 측정</u>

서버 측에서 이 명령을 실행합니다.

Iperf -s -w 256k 클라이언트 측에서 이 명령을 실행합니다.

Iperf -c -P 6 -w 256k -r -t 60

Server TCP wi	listening on T ndow size: 256	CP port 5001 KByte				
Client TCP wi	connecting to : ndow size: 256	10.10.10.10, 1 KByte	ICP port 5001			
[1788] [1820] [1868] [1836] [1804]	local 10.10.10 local 10.10.10 local 10.10.10 local 10.10.10 local 10.10.10	.20 port 1155 .20 port 1153 .20 port 1150 .20 port 1152 .20 port 1152 .20 port 1154	connected with connected with connected with connected with connected with	10.10.10.10 10.10.10.10 10.10.10.10 10.10.10.10 10.10.10.10 10.10.10.10	port port port port port	5001 5001 5001 5001 5001
[1852] [ID] [1788] [1868] [1820] [1804] [1852]	local 10.10.10 Interval 0.0-60.1 sec 0.0-60.1 sec 0.0-60.2 sec 0.0-60.1 sec 0.0-60.1 sec	.20 port 1151 Transfer I 124 MBytes 123 MBytes 110 MBytes 84.6 MBytes 89.2 MBytes	connected with Bandwidth 17.3 Mbits/sec 17.1 Mbits/sec 15.4 Mbits/sec 11.8 Mbits/sec 12.4 Mbits/sec	10.10.10.10	port	5001
[1836] [SUM] [1952] [1832]	0.0-60.2 sec 0.0-60.2 sec local 10.10.10 local 10.10.10	86.3 MBytes 617 MBytes 8 .20 port 5001 .20 port 5001	12.0 Mhits/sec 36.0 Mbits/sec connected with connected with	10.10.10.10 10.10.10.10	port port	2663 2664
[1748] [1732] [1800] [1812] [ 1D]	local 10.10.10 local 10.10.10 local 10.10.10 local 10.10.10 local 10.10.10	.20 port 5001 .20 port 5001 .20 port 5001 .20 port 5001 Transfer	connected with connected with connected with connected with Bandwidth	10.10.10.10 10.10.10.10 10.10.10.10 10.10.10.10	port port port port	2665 2666 2667 2668
[1800] [1812] [1952] [1748] [1732]	0.0-60.0 sec 0.0-60.0 sec 0.0-60.1 sec 0.0-60.1 sec 0.0-60.1 sec	114 MBytes 117 MBytes 89.6 MBytes 129 MBytes 111 MBytes	15.9 Mbits/sec 16.3 Mbits/sec 12.5 Mbits/sec 18.1 Mbits/sec 15.5 Mbits/sec			
[1832] [SUM]	0.0-60.1 sec 0.0-60.1 sec	112 MBytes 672 MBytes 9	15.6 Mbits/sec 73.8 Mbits/sec			

이 이미지의 첫 번째 원 안의 숫자는 업스트림 처리량을 나타내며, 두 번째 원 안의 숫자는 다운스트 림(AP-클라이언트) 처리량을 나타냅니다.

#### <u>UDP 처리량 측정</u>

서버와 클라이언트 측 모두에서 이전 Iperf 애플리케이션을 닫습니다.둘 다 다시 설정해야 하지만 이번에는 UDP 성능 테스트를 위해 설정해야 합니다.

서버 측에서 이 명령을 실행합니다.

Iperf -s -u -1 56k 클라이언트 측에서 이 명령을 실행합니다.

Iperf -c -u -b 50M -1 56k -P 다음은 집계 MAC 서비스 데이터 유닛을 분석하기 위한 Omnunipeek 캡처의 예입니다.

A-MSDU 추적은 하나의 패킷을 보여줍니다.

CardPeck - [AH50	00Packet	100]										
🔮 Ele Est New S	actue Ser	n <u>d ⊠onios I</u> aak <u>W</u> ikdow .	Help									_ 문 즈
🗋 - 🚳 - 🔛 🌫	2 2 5	1 🛋 📓 🏘 形 🔡 下	20000000	106								
<b>*</b>												>
Capture A	÷⇒ [3	🖹 🖹 📓 🔛 🔌 😵 -	16 16 16 18 18 18 18 18 18 18 18 18 18 18 18 18									
100,000	Rendet	Source	Destination	1053ID	Rep	Chancel	E gnal	Deta Rate	376	Relative Time	Protocol	Simony
E Parent	1	00:14:5E:87:7E:AL	01:12:28:36:19:37	00:16:01:6F:03:52	Å	1	1008	144.5	4350	0.000000	102.11 A-ESOU	FD F
Hero-che vi	2	💵 00:28:29:8c:15:77	10191590196F9U395E		1	L	THOSE	2 <b>4</b> . U	16	0.000005	502.11 Ack	PU=
والتركيب المتحدين	4				20.43	<b>21</b> - 1993	1000	120.45	1.45	ALC: NOT A DRIVE	Market Article Article	
											Packet/ 2	Duration (INTER1)
Done												ag hora

- 첫 번째 하위 프레임만 표시됩니다.
- 추가 하위 프레임을 보려면 16진수 덤프를 검사해야 합니다.

## 추가된 A-MSDU 다음 하위 프레임 표시

🔆 OuniPeek - [AMSDUPasket.apo - Pasket #1]	
🙍 Ele Er: Yew Cerue Send Yorke Isk Withow Hea	뮌즈
1.00.10 2.00	
· · · · · · · · · · · · · · · · · · ·	
Packet 4 [0] dr 2	
Le Xo TTP Options	-
H T and the Lager	
- Data Inves: (1.00 hytes)	
<ul> <li>Zatra žytas (Zatřína)/(2200 bytes)</li> <li>Hest Súžířnané Hender</li> </ul>	
B-T POS - Prane Check Sequence	
	Ξ
1410 C DE	-
LASSE WE GO TO	
15001 SA 18: 43 43 32 84 12 88 45 94 48 P8 48 28 49 10 20 47 99 33 8P 83 01 35 85 35 36 37 2P 20 17 58 50 18 1A 46 38 91 33 34 81 01 36 01 90 38 10 00 38 10 37 39 37 37 37 37 37 37 37 37 37 37 37 37 37	
1243: 10 47 67 68 44 00 12 25 35 10 17 10 14 52 57 12 41 04 24 48 57 12 41 04 24 48 50 01 01 00 05 00 45 10 14 20 47 50 40 00 80 05 17 42 01 45 44 52 01 45 44 55 10 14 10 14 10 14 10 14 10 14 14 14 14 14 14 14 14 14 14 14 14 14	
1593: AA 70 11 64 08 0F 3F 66 00 67 F4 20 10 24 20 10 24 10 96 00 00 EA 10 92 20 04 12 12 50 40 27 65 55 51 50 CB 52 27 0F AD 97 50 10 10, 0.14F)	2
For Help, press F1	- 10

- A-MPDU는 PHY에서 단일 PSDU로 전송되는 여러 MPDU를 포함하는 구조입니다.
- 패킷이 PLCP(Physical layer convergence procedure)의 Data A-MPDU임을 나타냅니다.



Originator

Recipient

다음은 집계 MAC 프로토콜 데이터 유닛을 분석하기 위한 Omnunipeek 캡처의 예입니다.

|--|

		•										
💯 OaniPeck - [AMP	OuraPeek - (AMPDUSebup apo)											
🔮 Ele - Ecc - New	을 Ele Est New Secure Seng Monitor Lok Ministry Heta											
🔄 - 🥴 - 🖬 🌫												
- <del>7</del> -												۵
L Laptore 🔺	$\sim \Rightarrow$	🗄 💽 📧 🚳 😵 🗄	16 🗟 16 🖉 🖗 🖉 .									
100000	Rendet	Source	Destination	0.000	Пар	Channel	- I gnal	Deta Rate	200	Relative Time	Protocol	Summery
- 100 T	1	10:17:17:A6:4C:90	F000:12:28:10:F0:55	E 00: 17: DF: A6: 40: 91	78		1005	130.0	37	0.000003	502.11 Action	PT
- depert	2	#0+28+29+20+25+68	BOLDENDPRASC40000			5	100%	36.0	14	0.000004	500.11 A08	PU=
14	3	🕎 TO: 10: TO: 10: FO: 55	1001:13:0F:A6:40:30	📑 00: 17: DF: A6: 40: 91		¢.	1004	26.0	.17	0.000003	308, 11 Action	FD,28+-026
Generation al	4	05:17:DF:R6:40:99	B00:12:E0:10:F0:55		1.0	5	1008	36.0	14	0.000013	502.11 Ack	FC
	4				100	100			1	120.120.1	ALC: NO.	LINE AND ADD A
											Postein 6	Duration: JHIH 01
Done												M9 Kora

- ADDBA 블록 승인 추가
- ADDBA Request(ADDBA 요청) 식별자, 블록 ACK 정책, 버퍼 크기 등을 포함합니다.
- ADDBA Response(ADDBA 응답) 정책 및 버퍼 크기를 변경할 수 있습니다.

• ADDBA 요청

• AP1250은 시간 초과가 없음을 나타내기 위해 0을 사용합니다.

🞾 OmniPeek - [AMPDUSetup.apc -	:ket #1]		_ D ×
📄 File Edit View Capture Send M	itor <u>T</u> ools	<u>W</u> indow <u>H</u> elp	_ 8 ×
🖸 • 📁 • 🗧 🗞 🗟 🗑 🗟 🔺	1 🎄 🖇	9720EE\$ *	1 0 6
- 🗢 🚉 🔤 号 👒 🕏	🧭 🕵		
Packet: 1 🚺 🕋 -			
a 802.11 MAC Header			
Version:			
Type:	00 Manag	ement	
	1101 <u>Man</u>	agement Action	
□ 👕 Frame Control Flags:	00000000		
· · · · · · · · · · · · · · · · ·	0	Non-strict order	
	. 0	Non-Protected Frame	
		No More Data	
🞯	0	Power Management - active m	lode
🞯	0	This is not a Re-Transmissi	ion 📀
🞯		Last or Unfragmented Frame	
🐨		0. Not an Exit from the Distri	ibution System
🞯		.0 Not to the Distribution Sys	stem 🗧
	0 Micros	econds	
Destination:	0:13:E8:11	D:F0:55	
Source:	0:17:DF:A	6:4C:90	
BSSID:	0:17:DF:A	6:4C:90	
Seq Number:	64		
🔄 🕤 Frag Number:			
BO2.11 Management - Acti			
Gategory Code:	Block A	ck	
G Action Code:	ADDBA R	equest	
Jialog Token:			
BlockAck Param Set:	000100000	0000010	
		Buffer Size:64	
a a a a a a a a a a a a a a a a a a a	•••••		and the plant lat
		A NEDU Not Downite	Mediate Block Ack
A PlackAck Timeout Valu	0 THe	A-MSDC: NOT PERMIT	:ea
	u ros	00001001010000	
a starting sequence	ACTO1: 300	Starting Seg Number	. 27
		0000 Frament Number: 0	
FCS - Frame Check Semier			
PCS:	x36E63FB9		-
0000: D0 00 28 00 00 13 E8 11	0 55 00 1	7 DF A6 4C 90 00 17 DF A6 4C	
0021: 90 40 3C 03 00 01 02 10	0 00 50 0	2 36 E6 3F B9	.@ <p.6.?.< th=""></p.6.?.<>
For Help, press F1			III) None

A-MPDU 설정

• ADDBA 응답

• 수신자는 블록 ACK 계약이 성공적으로 설정되었음을 표시해야 합니다.

💯 OmniPeek - [AMPDUSetup.apc -	Packet #3]	- D ×
📄 <u>File E</u> dit <u>V</u> iew <u>C</u> apture Sen <u>d</u> <u>N</u>	<u>1</u> onitor <u>T</u> ools <u>W</u> indow <u>H</u> elp	_ 8 ×
🖸 - 📁 - 🗦 🛸 🖻 🖻 🛋	1 🙆 🚳 🕸 T 2 🗢 🖬 💱 🗢 🔝 🖓 🔂	
🗢 🔿 🖹 🛛 🖂 🔍 🗇 🍮 🕯	🗟  🔗 🛸	
Packet: 3 🚺 🕋 -		
- 50 990 11 MAC Monday		
- Version:	0	~
Type:	\$00 Management	
Subtype:	\$1101 Management Action	
Frame Control Flags:	*0000000	
	0 Non-strict order	
	.0 Non-Protected Frame	
	0 No More Data	
	0 Power Management - active mode	
	0 This is not a Re-Transmission	
(g)	0 Last or Unfragmented Frame	
	0. Not an Exit from the Distribution System	ja.
	0 Not to the Distribution System	
	40 Microseconds	
Destination:	00:17:DF:A6:4C:90	
Source:	00:13:E8:1D:F0:55	
BSSID:	00:17:DF:A6:4C:90	
💮 Seg Number:	876	
🕤 Frag Number:	0	
🚊 🚏 802.11 Management - Acti	ion	
	3 Block Ack	
Action Code:	1 ADDBA Response	
	1	
	0 Successful	
BlockAck Param Set:	\$00010000000010	
🞯	Buffer Size:64	
🞯	0000 TID: 0	
	1. BlockAck Policy: Immediate Block A	ck
(9	0 A-MSDU: Not Permitted	
BlockAck Timeout Valu	e:5000 TUs	
ECS - Frame Check Seguer	<u>uce</u>	
E 🕤 ECS:	0x3DD891AF	•
0000: D0 00 28 00 00 17 DF A6	6 4C 90 00 13 E8 1D F0 55 00 17 DF A6 4C(	JL
0021: 90 C0 36 03 01 01 00 00	0 02 10 88 13 3D D8 91 AF6	
For Help, press F1	III) None	11.

### A-MPDU 데이터 전송

- Block Ack에는 수신된 MPDU를 나타내는 압축된 비트맵이 포함되어 있습니다.
- 블록 ACK 전송에 대한 자세한 내용은 IEEE 802.11n 섹션 9.10.7 "HT-immediate Block Ack Extensions"를 참조하십시오.

🔀 OmniPesk - (AMP	OUD-staAndBinckAck.epc										_ [0] X
😩 Eile Edit Mew	Depluse Send Monitor Look Window	Hep									
🔄 - 😃 - 🖬 🌫	🖻 🖹 🗟 🛋 🚳 🏷 😕 🖓	* 🕹 🛆 🖬 🕅 🕸 🖞	1 0 1								
÷ 💎 -											
Capture 🔺	() 🔿 🗄 🔜 🖬 🕥 🔍 ヤ	<b>***</b>									
<ul> <li>Packets</li> </ul>	Padat Samo	East nation	85310	Hegs	Channel	Signal	Data Rate	Spe	Ralative Time	Protocol	
C Exect	1 50 00:13:E8:36:19:77	00:14:5E:07:7E:A1	00:16:01:6F:03:5E	1	1	100%	130.0	78	0.000000	TCP	
Hearth	2 📰 00: 13: K6: 36: 19: 77	14:5K:57:70:A1	100:16:01:5F:03:5E	*	1	100%	130.0	75	0.000003	TEP	
Bu	3 🐠 00:13:E8:36:19:77	BD 0D:14:5E:67:7E:A1	00:16:01:6F:03:5E	à.	1	100%	130.0	78	0.000008	TCP	
Application	4 📑 00:13:K6:36:19:72	00:14:5K:67:70:A1	B) 00: 16: 01: 5F: 03: 5E	Α	1	100%	130.0	75	0.000011	TOP	
La Visuals	5 🜉 00:13:E8:36:19:77	BD0:14:5E:67:7E:A1	B00:16:01:6F:03:5E	λ	1	100%	130.0	78	0.000014	TCP	
Base Map	6 📲 00:13:50:36:19:72	■00:14:5K:07:7E:A1	B) 00:16:01:0F:00:5E	A	1	100%	130.0	70	0.000017	TOP	
Granita	7 📑 00:13:E8:96:19:77	BD 0D: 14: 5E: 87: 7E: A1	BD 00:16:01:6F:03:5E	à.	1	100%	130.0	78	0.000020	TCP	
E Statistics	0 🕎 00:16:01:07:03:55	B00:13:E0:36:19:77		1 C	1	100%	20.0	33	0.000023	002.11 08	
Birther T											
· ·	×								A. A. A. A. A.	A	0 C F
									Packetz 8	Duration 0	00.00
Done										Bý None	
Bone	*								Packets 8	Duration 0	.00.00

# <u>신호에서 광고되는 기능</u>

🚏 HT Capability Info	
	45 HT Capability Info
🍘 Length:	26
😑 👕 HT Capability Info:	%0001100001101110
🞯	0 L-SIG TXOP Protection Support: Not Supported
🗊	.0 AP allows use of 40MHz Transmissions In Neighboring BSSs
🜍	0 Device/BSS does Not Support use of PSMP
🞯	1 BSS does Allow use of DSSS/CCK Rates 040MHz
🐨	1 Maximal A-MSDU size: 7935 bytes
· · · · 😚	0 Does Not Support HT-Delayed BlockAck Operation
🞯	00 No Rx STBC Support
🞯	0 Transmitter does Not Support Tx STBC
··· 🚱	
🗊	
🞯	
🗊	
🕲	1. Both 20MHz and 40MHz Operation is Supported
1 🗊	
T A-MPDU Parameters:	\$00011011
🕥	xxx Reserved
🚱	110 Minimum MPDU Start Spacing: 8 usec
i 🕥	11 Maximum Rx A-MPDU Size: 64K
Supported MCS Set	
One Spatial Stream	m: %1111111
MCS Index 0 Su	pported - BPSK. Coding Rate: 1/2
	pported - QPSK. Coding Rate: 1/2
	pported - QPSK. Coding Rate: 3/4
MCS Index 3 Su	pported - 16 QAM. Coding Rate: 1/2
	pported - 16 QAM. Coding Rate: 3/4
	pported - 64 QAM. Coding Rate: 2/3
MCS Index 6 Suj	pported - 64 QAM. Coding Kate: 3/4
MCS Index 7 Su	pported - 64 QAM. Coding Kate: 5/6
- I TWO Spatial Stream	ns: «Ullill
MCS Index 8 Su	pported - Brsk. Coding Rate: 1/2
MCS Index 9 Su	pportea - grsk. Coding Rate: 1/2
MCS Index 10 S	upported - QPSK. Coding Rate: 374
MUS Index II S	apported - 16 QAM. Coding Rate: 1/2
MCS Index 12 S	upported - 16 QAM. Coding Rate: 3/4
MCS Index 13 S	upported - 64 QAM. Coding Zate: 2/3
MCS Index 14 S	apported - 64 0MM Coding Rate: 5(6
By Bitmack hif he	se supported - of the courty sate: 5/5
By Ditmak bld ba	1. 10000000
Dy Ritmak b24-b3	1: \$0000000
Dr Bitmark h40 h4	2. \$0000000
The Distance batters	F: \$0000000
W EX BITMASK D48-D5	2: 40000000

## 비컨에서 광고되는 기능:

	0	Rx Bitnask b64-b76:	\$00000000000
	۲	Reserved:	\$000
	0	Highest Supported Rate	9:0 Maps
	ē	Reserved:	\$00000
	ã	Tx Supported MCS Set:	30 Not Defined
	ě	Tx and Rx MCS Set:	40 Kmma3
	ě	Tx Naximum Number Snat	tial Streams Summerted: 500 / Smatial Stream
	ž	Tx Unermal Modulation	*10 Note Sumperiod
	ž	Reserved:	\$0000000000000000000000000000000000000
-	HT.	Extended Canabilities	
1		incomen caparities	Tree Beerved
	ž		0 Deserve Direction Recorder: Supported
	ž		AFT Sumart. Superior
	ž		00 W'C Zackazak STI Doca Mat Dearride M'S Zackazak
-	2		The first man had been been and the been had been been been been been been been bee
	2		An Transition Time We Transition
	2		A Transmitter Suprember 200 Departed
		Bern Resident Couchd Id.	
	18	Beam Forming Capabili	
			xxx Keserved
			Charge Estration Capability: 1 Space like Stream
	9		CS1 Max Number of Kows: 2 Row of CS1
	9		0 0
	0		O 0 CSI Number of BF Antennes: 1 TX Antenne Sounding
	0		No Grouping)
	۹		Compressed BF Feedback Katrix: Not Supported
	۲		Uncompressed BF Feedback Matrix: Not Supported
	0		IXBF CSI Feedback: Not Supported
	۲		
	۹		Uncompressed BF Feedback Matrix: Not Supported
	۲		Explicit CSI TxBF Capable: Not Supported
	۲		Galibration: Not Supported
	۹		Implicit TxBF Capable: Not Supported
	۲		Tx NDP Capable: Not Supported
	۲		Not Supported
	۲		
	۲		
÷	۲		O Implicit TxBF Receiving Capable: Not Supported
T	λn	tenna Selection Capabi	lity (RSEL): \$0000000
	۲		x Reserved
	۲		.0 Tx Sounding PPDUs Capable: Not Supported
	۲		Rx ASEL Capable: Not Supported
	۲		0 Antenna Indices Feedback Capable: Not Supported
	۲		0 Explicit CSI Feedback: Tx AS Capable: Not Supported
	۲		0 Antenna Indices Feedback Based Tx ASEL Capable: Not Supported
	۲		0. Re-Explicit CSI Feedback Tx ASEL Capable: Not Supported
	-		a feature distribution devices with community

비컨에서 광고되는 기능:

```
Blenent ID:
                    61 Additional HT Information
 🕤 Length:
                    22
 Primary Channel:
                    6
😗 PSNP STAs Only:
                    30 Association Requests are Accepted Regardless of PSMP Capability
 . 🗑 RIFS Mode:
                    31 Use of RIFS Permitted
 🗑 STA Channel Width:
                    %1 Use Any Channel Width Enabled Under Supported Channel Width Set
 2nd Channel Offset: 401 Above the Primary Channel
. 🗑
                      XXXXXXXX XXX.... Reserved
   - 🙃
                       .
                       .....0... Transmit Burst Limit: No Limit
  -- 🕲
                       .....1.. Mon-Greenfield STAs: One or more HT STAs are Not Greenfield Capable
   . 🐨
                       HT Info Element 3:
                    ... 📦
                       xxxx.... Reserved
                       ....0.... PCO Phase: Switch To/Continue Use 200Hz Phase
  --- 🗑
                       .....0.. ....... PCO Active: Not Active in the BSS
   - 🗑
  --- 🗑
                       .....0. ...... L-SIG THOP Protection: Not Full Support
  -- 😥
                       .....0 ...... Secondary Beacon: Primary Beacon
                       ..... 0..... Duel CTS Protection: Not Required
   . 🕤
                       0
   . 📦
                       - Basic MCS Set
 🗄 🍞 One Spatial Stream: 🛛 30000000
    ... 🜒 MCS Index 0 Not Supported - BPSK. Coding Rate: 1/2
    -- 😙 MCS Index 1 Not Supported - QPSK. Coding Rate: 1/2
    ... 📵 MCS Index 2 Not Supported - QPSK. Coding Rate: 3/4
     ... 🕲 MCS Index 3 Not Supported - 16 QAM. Coding Rate: 1/2
     📵 MCS Index 4 Not Supported - 16 QAM. Coding Rate: 3/4
     🌒 MCS Index 5 Not Supported - 64 QAM. Coding Rate: 2/3
     MCS Index 6 Not Supported - 64 QAM. Coding Rate: 3/4
    -- 🕲 MCS Index 7 Not Supported - 64 QAM. Coding Rate: 5/6
 📩 🍞 Two Spatial Streams: 300000000
    -- 🎯 MCS Index 8 Not Supported - BPSK. Coding Rate: 1/2
     ... 🕤 MCS Index 9 Not Supported - QPSK. Coding Rate: 1/2
     ... MCS Index 10 Not Supported - QPSK. Coding Rate: 3/4
     ... 🕲 MCS Index 11 Not Supported - 16 QAM. Coding Rate: 1/2
     - 😚 MCS Index 13 Not Supported - 64 QAM. Coding Rate: 2/3
    ... 📵 MCS Index 14 Not Supported - 64 QAM. Coding Rate: 3/4
    -- 🕲 MCS Index 15 Not Supported - 64 GAM. Coding Rate: 5/6
   🞯 Rx Bitnask b16-b23: 🛛 %00000000
   🕲 Rx Bitnask b24-b31: 👘 \00000000
   🝘 Rx Bitnask b32-b39:
                       $00000000
   Rx Bitnask b40-b47: \00000000
```

A-MPDU에 대한 블록 ACK 설정 추가와 유사한 연결:

194	B) 00:13:E8:1D:F0:55	B00:17:DF:A6:4C:90	802.11 Ack			100%	6.0	14
195	EE 00:17:DF:A6:4C:90	Elethernet Broadcast	802.11 Beacon	m 00:17:DF:A6:4C:90	*	100%	6.0	204
196	EP 00:13:28:10:F0:55	🕎 Ethernet Broadcast	802.11 Probe Reg	Ethernet Broadcast	×	100%	1.0	81
197	FP 00:17:DF:A6:4C:90	P2 00:13:E8:1D:F0:55	802.11 Probe Rsp	mp 00:17:DF:A6:4C:90	*+	100%	6.0	204
198	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Ack		#	100%	6.0	14
199	III 00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast		100%	1.0	87
200	00:13:E8:36:19:77	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	81
201	B0:17:DF:A6:4C:90	00:13:E8:36:19:77	802.11 Probe Rsp	B00:17:DF:A6:4C:90	*+	100%	6.0	204
202	Image: 00:13:E8:36:19:77	B00:17:DF:A6:4C:90	802.11 Ack		9	100%	6.0	14
203	00:13:E8:36:19:77	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	74
204	D0:13:E8:36:19:77	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	81
205	B0:17:DF:A6:4C:90	00:13:E8:36:19:77	802.11 Probe Rsp	ID: 17: DF: A6: 4C: 90	*+	100%	6.0	204
206	00:13:E8:36:19:77	B00:17:DF:A6:4C:90	802.11 Ack		#	100%	6.0	14
207	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast		52%	1.0	55
208	BO:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	97\$	1.0	55
209	B) 00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	87
210	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Reg	Ethernet Broadcast		100%	1.0	55
211	00:17:DF:A6:4C:90	Ethernet Broadcast	802.11 Beacon	00:17:DF:A6:4C:90	*	100%	6.0	204
212	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	×	95%	1.0	55
213	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast		100%	1.0	87
214	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	55
215	EP 00:13:E8:10:F0:55	R 00:17:DF:A6:4C:90	802.11 Auth	1 00:17:DF:A6:4C:90	*	100%	36.0	34
216	FP 00:17:DF:A6:4C:90	R. 00:13:E8:1D:F0:55	802.11 Ack		ÿ	100%	36.0	14
217	E 00:17:DF:A6:4C:90	E 00:13:E8:1D:F0:55	802.11 Auth	E 00:17:DF:A6:4C:90	×	100%	36.0	34
218	FP 00:13:E8:1D:F0:55	F 00:17:DF:A6:4C:90	802.11 Ack		ÿ	100%	36.0	14
219	FP 00:13:E8:1D:F0:55	100:17:DF:A6:4C:90	802.11 Assoc Reg	E 00:17:DF:A6:4C:90	*	100%	36.0	134
220	E 00:17:DF:A6:4C:90	FR 00:13:E8:1D:F0:55	802.11 Ack		¥	100%	36.0	14
221	FF 00:17:DF:A6:4C:90	F 00:13:E8:1D:F0:55	802.11 Assoc Rsp	00:17:DF:A6:4C:90		100%	130.0	180
222	00:13:E8:1D:F0:55	B00:17:DF:A6:4C:90	802.11 Åck		#	100%	36.0	14
223	3 192.168.170.89	3224.0.0.1	IGMP	B) 00:17:DF:A6:4C:90		100%	130.0	84
224	🕎 00:13:E8:1D:F0:55	BO:17:DF:A6:4C:90	802.11 Ack		¥	100%	36.0	14
225	3 192.168.170.89	3224.0.0.1	IGMP	B) 00:17:DF:A6:4C:90	+	100%	130.0	84
226	III 00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Ack			100%	36.0	14
227	B) 00:17:DF:A6:4C:90	B 00:13:E8:1D:F0:55	WLCCP	B) 00:17:DF:A6:4C:90		100%	130.0	92
228	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Ack		¥.	100%	36.0	14
229	FP 00:17:DF:A6:4C:90	F2 00:13:E8:1D:F0:55	802.11 Action	E 00:17:DF:A6:4C:90	*	100%	130.0	37
230	00:13:E8:1D:F0:55	B00:17:DF:A6:4C:90	802.11 Ack		¥	100%	36.0	14
231	FP 00:13:E8:1D:F0:55	FR.00:17:DF:A6:4C:90	802.11 Action	E 00:17:DF:A6:4C:90	*	100%	36.0	37
232	00:17:DF:A6:4C:90	BO:13:E8:1D:F0:55	802.11 Ack		¥	100%	36.0	14

# Verifying A-MPDU is enabled on the controller

in the second second second		
a st capaciticy into	A DE ANNO 1997 AND AND AND	
Element ID:	as an capability hare [01]	
- W Length:	26 [04]	
T HT Capability Info:	4000110000110110 (05-06)	
- 9	0 E-SIG TADP Protection Support: Not Supported	
	.0 30 allows use of 4090s Transmissions In Heighboring SDSs	
	Device/855 does Not Support use of 2502	
	8 Does Not Support MT-Delayed BlockAck Operation	
	A Transmitter does Not Support Ty SIDC	
	1. Both 1000s and 4000s Constitut is Constant	
	A 150° ordine cambilities for formertad	
The second burners are	And the second s	A-MPDU enabled and seen in the
a s anno racasters	November (07)	+ baacon
	KER Beserver [07 Hark Octo]	Deacon
T Supported BCS Set.		

Above is a beacon frame from an SSID enabled for n rates

#### 

- interface Dot11Radio1
- Radio AIR-RM1252A, Base Address 00119ea6.8520, BBlock version 0.00, Software version 2.10.20
- Serial number: FOC1212405A
- Number of supported simultaneous BSSID on Dot11Radio1: 16
- Carrier Set: Americas (OFDM) (US) (-A)
- Uniform Spreading Required: Yes
- Configured Frequency: 5180 MHz Channel 36 40MHz, extended above
- Compared Prequency: 5159 MHz Channel 36 40MHz, extended above Allowed Frequencies: 5180(36) 5200(40) 5220(44) 5240(48) \*5260(52) \*5280(56) \*5300(60) \*5320(64) \*5500(100) \*5520(104) \*5540(108) \*5560(112) \*5590(116) \*5660(132) \*5680(136) \*5700(140) 5745(148) 5765(153) 5785(157) 5805(161) 5825(165) \* = May only be selected by Dynamic Frequency Selection (DFS) Listen Frequencies: 5180(36) 5200(40) 5220(44) 5240(48) 5260(52) 5280(56) 5300(60) 5320(64) 5500(100) 5520(104) 5540(108) 5560 (112) 5580(116) 5660(132) 5680(136) 5700(140) 5745(149) 5765(153) 5785(157) 5805(161) 5825(165) Beacon Flags: 0, Interface Flags 20105; Beacons are enabled; Probes are enabled Compared Brance Methods Methods and the second Brance Methods and Brance Methods Methods

- Configured Power: 14 dBm (level 1)
- Active power levels by rate
- 6.0 to 54.0 , 14 dBm
- 6.0-bf to 54.0-b, 8 dBm, changed due to regulatory maximum m0. to m15.-4, 11 dBm, changed due to regulatory maximum
- OffChnl Power: 14, Rate 6.0
- Allowed Power Levels: -1 2 5 8 11 14 --More--
- --More--Allowed Client Power Levels: 2 5 8 11 14
- Receive Antennas : right-a left-b middle-c
- Transmit Antennas : right-a left-b, ofdm single
- Antenna: external, Gain: Allowed 11, Reported 0, Configured 0, In Use 11
- Active Rates: basic-6.0 9.0 basic-12.0 18.0 basic-24.0 36.0 48.0 54.0
- Current Rates: basic-6.0 9.0 basic-12.0 18.0 basic-24.0 36.0 48.0 54.0
- Allowed Rates: 6.0 9.0 12.0 18.0 24.0 36.0 48.0 54.0
- All Rates: 6.0 9.0 12.0 18.0 24.0 36.0 48.0 54.0 m0. m1. m2. m3. m4. m5. m6. m7. m8. m9. m10. m11. m12. m13. m14. m15.
- Default Rates: basic-6.0 9.0 basic-12.0 18.0 basic-24.0 36.0 48.0 54.0 m0. m1. m2. m3. m4. m5. m6. m7. m8. m9. m10. m11. m12. m13. m14. m15.
- Best Range Rates: basic-6.0 9.0 12.0 18.0 24.0 36.0 48.0 54.0 m0. m1. m2. m3. m4. m5. m6. m7. m8. m9. m10. m11. m12. m13. m14. m15.
- Best Throughput Rates: basic-6.0 basic-9.0 basic-12.0 basic-18.0 basic-24.0 basic-36.0 basic-48.0 basic-54.0 m0. m1. m2. m3. m4. m5. m6. m7. m8. m9. m10. m11. m12. m13. m14. m15.

# MCS Rates on 802.11n beacon

Contract and a second to be able
· · · · · · · · · · · · · · · · · · ·
in A. a state of a support of the su
Example and a second se
The second second second second second second second second
a T Dependent Mill Set
in T the Spation Phonese Taxanana (11)
- Will Dates 4 Papersted - ANNL Contrar Beter L/D
- · Wit links I happened - phil. Collar links Art
- Bit Dates / Departed - USE, Colleg Beles Ave
- · · · · · · · · · · · · · · · · · · ·
- The second state of the
- Still Dollar i Dagastited - 66 (200, Colling Rate: 2/7
. · · · · · · · · · · · · · · · · · · ·
a T he lasted House Allocation (11)
- · · · · · · · · · · · · · · · · · · ·
- · · · · · · · · · · · · · · · · · · ·
• With Dasher 2.4 Regenerated + QMML Conting Refer Arts
- The second second and the second se
- · · · · · · · · · · · · · · · · · · ·
- · · · · · · · · · · · · · · · · · · ·
Still Dates 10 Augustind - 68 108. Colling Jahrs 1/4
- Bo BUILDING BUILDING TO
- B Re Billeanh 200-612: 40000000 1111
- P By By handle hit have a subsection (12).
- Br Billeash 148-141: ADDIMIDD [11]
Bar Burlagah 168 brits - KOODDOOD (14)
- * Ba Britandi 154-141. 10000000 [11]
Be Billerich 144-1/10 Househouseman (200-17 Baum California)
- • Branz mit: • • • • • • • • • • • • • • • • • • •
- Bighter Supported Baters How (19-33 Back Collect)
- • Brant vid. • • • • • • • • • • • • • • • • • • •
- The Suggestion MIS Sets the form during spin them subi-
- The and the MCD Bells - No Expert 1100 Back -to-M11
. In Process Party Institute Concess Connected Add. J. Section (1998) Role (1999)

# Supported MCS rates

_		
	OmniPeek _ =	ж
6 B	Idt Verw Capture Send Monitor Tools Window Help Wild Packada Capture Send Monitor Tools Window Help	ek.
-	Rat Page 002.11a.pkt 000.130,4094.pkt 000.11a.pkt - Packet #57 000.11m_40994.pkt - Packet #100 ×	х.
-		
8.7	SSD Bird Afen State SSD-Vi	-
* 7	andrean 19-1: Satasa Lemand Rate-5.0 Maps Rate-5.0 Maps Rate-52.0 Maps Rate-10.0 Maps Rate-54.0 Maps Rate-54.0 Maps Rate-56.0 Maps	г
* T	The DeS Tit: Least FTH Counted FTH Fertude; Sting Control+1000000 Part Virt Bag-0000	
13	Constry Dev Country Level & Country Country Country Country (Developed and Section Country Cou	٩.
14	With Brill (Diff Level Muttin Grant & Changel Millington (0) 1 Prola Menories Capacity (2007	h
11	Convert Di 40 27 Canability 2ndo 1821	
	• Length: 26 (04)	
1.4		
	- 1 * 1. 2000 Parameters-100012011	
	T Supported MIS Set	
	G The Spatial Stream + 1111111 (***)	
	We cannot a supported - state. Contry where 1/2	
	Ref Dates 2 Supporter - 0027, Colling Barty 3/4	
	Will Index 3 Supported - 16 GMM, Coding Rate: 1/1	
	- Will Index 4 Supported - 14 GMK, Coding Reter 1/4	
	- 🗣 MCF Index 6 Supported - 66 QBM. Coding Ante: 2/9	
	- • MCF Index 6 Supported - 46 QMK, Coding Actor 3/4	
	La ACE Jonda 7 Supported - 42 QMA, Coding Arter 5/4	
	We special intervent transmission (17)	
	REL Dates 9 Supported - OVE, Collar Late L/I	
	WET Index 10 Supported - OFER, Colling Rate: 3/4	
	- 🖉 MCF Index 12 Supported - 14 GAM. Collar Aste: 1/2	
	With Index 12 Supported - 14 GAM. Coding Bates 3/4	
	- REF Index 13 Deported - 64 UAR. Colling Jates 2/7	
	<ul> <li>We assure as appointed = or gave concept parts of a</li></ul>	
	Bit Bitmark bit should be separate to be a second bit	۳
	- R Bitmack b19-0101 V00000000 [11]	
	- Bx Eltrank b17-b19 40000000 2103	
	- 9 Rx 811yuark 548 5431 90000000 (103	
	- Sx Eltman b48 0151 V000000 (14)	
	- The Billmank bill bill 19 00000000 (2013)	
	- • • • • • • • • • • • • • • • • • • •	
	• Nuclear Transition Robert Rose (201701)	
	9 Reserved) 940000 (17 Ball 0217)	
	The Supported MCS Set: VB. Dot Decision 2100 Basis (2001)	*

# 802.11a with N rates Enabled

p OmniPeek	. * ×
F His Edit. View Cupture Send Monitor Tools Hindow Help	WildPachels OmniPeek
· 24 · 14 · 14 · 14 · 14 · 14 · 14 · 14	
File Fige 002.11a.jkt 002.124_00444.jkt. 002.11a.jktParket #17 002.11a.jkt-Parket #110 ×	
** N N N N N N N N N N N N N N N N N N	
Fachet Inde Fachet Raderräll Fingerörkönnnen (1997)	6 -7 Align Chairelds \$210 Mile
T (2-1) 48.11 KK: Node: Textion-0 Type-500 Anappend Subtype-51000 Joscon Parallan-0 Kicknessonic Parallan-FFIFFIFFIFFIFFIFFIFFIFFIFFIFFIFFIFFIFFI	E-ROARD BE WANTE-OOU LTINE ROAD
In a second seco	
- Brauss Internal ( MA (N-10)	
* T Capability Tain-1000000000000000000000000000000000000	
* T SID Det 1120 Land SID-N	
T Sales Del Inter Level Raised, 0 Kpc Ralest, 0 Kpc Rales21, 0 Kpc Rales24, 0 Kpc Rales24, 0 Kpc Rales34, 0 Kpc Rales34, 0 Kpc Rales34, 0 Kpc	
a T the B-3 DM Loss-4 BTH Forst-0 BTH Forst-0 Bitter Complexity - Proceeding For The They for the Section Complexity Complexity of Complexity Complexit	and these lines in the second s
2 Control with the stand of	The first the proper considering a proper-
T II Canadiaty Info	earon frame including
Compatible 45 AT Capability Date [80]	MODUL and MCS rates
- • Length: 86 (14)	WP DU and MGa rales
a T M (apphiling Tabe-600110000131100	pported
a T & STOR Terrent Converting - VOCUMENT The The State of the State	A DATE AND ADDRESS OF A DATE OF
THE Except Control of the State Stat	
The Beam Forming Capability (TallF)	
* T Astemas Selection Capability (BEE)-40000000	
- T his of Index Book Add of Index General Primary Channel-40	
T B-10 Let March 000000000	
a T the second set is the second with the second of the second set is a sec	
T Version Investigation In-Cold Version States (199-10-40-10 Version-1 OX Version-1	
a " Vender Spreiffe 20-021 Vender Specific Leard 600-00-06 Balar(2 Spins)	
w W wenter spectate ID-011 Ventor System (D-00-40-66 Deta-(1 bytes)	
T FIS - Frame Check Segment	
- CEI CEIDERE CLIMETER	

# 802.11A Beacon frame

He Edt. New Capture Send Monitor Tools Window Help MildPackets Ome	Peek
2-0-02 RERE 44 ST20001 * 2003	
1 Stat Rope 802.11a.pht 802.11a.4044.pht 802.11a.pht - Padet #57 x 802.11a4044.pht - Robet #110	-9
🗑 🍸 🛛 Recket Tailo – Packet Baber-57 Flags-Ind0000000 Status-Ind0000000 Status - Indox Length-150 Tlaestag-17/25/22. MM89000 N2/23/2000 Deta Sate-12 6 . 0 – Maye Chao-36 5100	Miz (
🛊 🎢 (0-23) 🔰 602.12 KK Keeler Version-O Type+000 Xatapaset Subtype+11000 Jeacon Duration-O Riccoreccols Destination-FD:FD:FD:FD:FD:FD:FD:FD:FD:KEE K KK KEELE-00:244	Pr BAc
G T HIZ 11 Nanagement - Beaces	
Timestamp: \$1548468 Kinvorecomds [24-11]	
- Descen Inferend: 100 [22-33]	
a 1 capacity inter-second	
a 1 Marco are accessioned balance and balance and balance and balance are appressively approximately and balance and balanc	
3. The set of the s	St and
T Con Built (String and Control Contro	
T D-10 Lead Vale-Subschrödenstro	
T um Ib-021 WW Leads 400-08-58-52 001 fgge-2 001 fabryes 1 Annual - Element Menimel	
a T Weeke Specific D-221 Venter Specific Least 00-40-46 Mater(3 Sytes)	
T Under Specific D-221 Vender Specific Lead 000-00-40-96 Vention-0 000 Vention-0	
※ Y tradec Specific ID-221 Worder Specific Leased 000-00-40-96 Outa-(2 bytes)	
a T Weake Specific De-Cli Vender Specific Least 000-00-40-96 Datas(2 bytes)	
FT 103 - Frame Clark Separate	
PEI DESI40002 Calculated	

# <u>관련 정보</u>

• <u>기술 지원 및 문서 - Cisco Systems</u>