Planeacion Espectro

De: [redacted]
Enviado el: miércoles, 2 de septiembre de 2020 12:01 p. m.
Para: Planeacion Espectro
Asunto: Consulta Pública Banda de 2.4 GHz
Datos adjuntos: consulta pública banda 2.4 GHz.; ECB350FICHATECNICA.pdf; ENGENIUS 2.4 GHZ.pdf; RocketM_DS.pdf; WBSn_2400_2450_Serie_ver2.0.pdf

Se presenta a su consideración nuestra propuesta para la Consulta de la Banda de 2.4 GHz.

Agradezco sus atenciones y quedo en espera de sus comentarios.

Saludos
Ing. Salvador Moreno Rosas
[redacted]

Planeacion Espectro

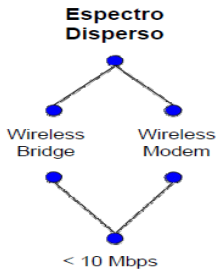
Para: Planeacion Espectro
Asunto: consulta pública banda 2.4 GHz.

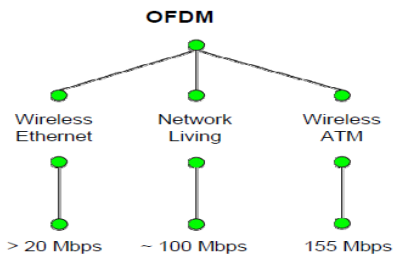
1.- El Instituto debe regular servicios, no tecnologías, esto para evitar que pueda dejar fuera del marco regulatorio, a tecnologías con las cuales se pudiese hacer un mejor uso y aprovechamiento del Espectro Radioeléctrico.

2.- Se debe considerar la cancelación o abrogación de la Disposición Técnica IFT-008-2015: Sistemas de radiocomunicación que emplean la técnica de espectro disperso-Equipos de radiocomunicación por salto de frecuencia y por modulación digital a operar en las bandas 902-928 MHz, 2400-2483.5 MHz y 5725-5850 MHz-Especificaciones, límites y métodos de prueba, debido a que no refleja lo comentado en el punto 1, y que ha venido prorrogando sus vigencia desde el año de 1994,2003, 2010 y 2015, año en el que se cambió de NOM a DT, permaneciendo en las revisiones para la prorroga de vigencia el mismo titulo que ostenta para la consulta que nos ocupa.

3.- Se comenta que desde los años 2005, 2006, la tecnología de Espectro Disperso cayo en deshuso, por no cumplir con las expectativas del mercado mundial, el cual demandaba mas capacidad en la transmisión de datos de las redes inalámbricas, Una de las tecnologías emergentes y con mayor aceptación es la de Multiplexaje por División de Frecuencia Ortogonal (OFDM). El comportamiento de
esta tecnología esta avalada por el Estandar 802.11 que a excepción del inciso “b”, a, g y ac, proporcionan a las redes una mayor capacidad de datos > 20 Mbps.

Plataformas Tecnológicas Interface Aire.





4.- Se anexa a nuestra propuesta catálogos de equipos homologados, con registro vigente, que operan en las bandas de 900, 2400-2483.5 y 5150-5850 MHz., contenidas en la DT-IFT-008-2015, los cuales manejan las capacidades de datos demandantes en las redes de telecomunicaciones y ninguno utiliza la técnica de Espectro Disperso.
5.- La DT-IFT-008-2015, manifiesta que Modulación Digital (Secuencia Directa) es una forma de OFDM, lo cual es inexacto, por lo tanto se solicita la elaboración de una nueva disposición técnica que nos remita al Servicio de Acceso Inalámbrico de Banda Ancha Fijo en las bandas aquí mencionadas, que nos sitúe en la actualidad tecnológica.

6.- Se hace eco a los objetivos que se pretende alcanzar en esta consulta:
I. Establecer nuevas condiciones técnicas de operación para el uso de la banda de 2.4 GHz, con el fin de propiciar el despliegue de mas sistemas de radicomunicación en nuestro país, en beneficio del usuario final.
ii. Impulsar condiciones para que el público en general tenga acceso a nuevas tecnologías de información y comunicación y servicios de telecomunicaciones mediante el uso de esta banda.
iii. Promover el uso eficiente del Espectro Radioeléctrico, al establecer el uso intensivo de las frecuencias o canales en la banda.

iv. Acrecentar la armonización en el uso del espectro, considerando las mejores practicas internacionales y los avances tecnológicos que existen.
v. Incentivar la innovación tecnológica en el país, al habilitar el acceso al espectro radioeléctrico para pruebas y experimentación de nuevos equipos y tecnologías para la banda de 2.4 GHz, sin necesidad de contar con una concesión para estos fines; y
vi. Fomentar la competencia en el mercado de las telecomunicaciones en esta banda, con el objeto de lograr un mayor desarrollo en el sector.

Agradeciendo sus atenciones, quedamos en espera de sus amables comentarios,

Atentamente.
Ing. Salvador Moreno Rosas
[redacted]

ECB350

THE LEADER IN LONG RANGE BUSINESS CLASS WIRELESS DATA

Business Class Gigabit Wired Indoor Long Range Wireless-N Access Point/Client Bridge

The EnGenius ECB350 is an ideal solution for expanding an existing network and increasing bandwidth to support additional users. This 2.4GHz Wireless-N Indoor Access Point/Client Bridge that features up to 29 dBm RF Tx (transmit) power for long range coverage, wireless speeds up to 300Mbps and a Gigabit Ethernet port for connecting to a switch or router.

The ECB350's robust transmit power, enhanced receive sensitivity and its MIMO (Multiple In/Multiple Out) antenna array extends wireless coverage and enhances connectivity to client devices even in areas where connections have been previously challenging or nonexistent.

This capability also helps to reduce the number of Access Points needed to deploy over large properties and helps to eliminate the need for roaming clients to constantly re-associate to different APs in the building or throughout the property.

This powerful and versatile, multi-functional 802.11n wireless device features eight different operation modes (Access Point/Client Bridge/Universal Repeater/WDS Bridge/WDS AP/WDS Station/AP Router/Client Router) to meet the changing needs of evolving business environments. The ECB350 is designed for extending networks within large or multi-story buildings or expansive, client-intensive facilities like hotels, resorts, hospitals, office buildings, universities or other multibuilding campus facilities that need to offer employees, guests, staff or students access to network resources likeprinters, content or the Internet.

The ECB350 includes EnGenius Zone Controller Access Point Management software that provides a robust suite of tools for IT managers, installers and network administrators who deploy, manage and maintain wireless networks. With Zone Controller, EnGenius Wireless Indoor and Outdoor Access Points and Client Bridges can be configured, controlled and monitored from one central location.

Key Differentiators

HIGH-POWER, LONG-RANGE WI-FI

- Up to 29dBm RF Tx (transmit) power provides more than twice greater Wi-Fi coverage over mainstream competitors

WIRELESS-N WITH MULTIPLE OPERATION MODES

- Offers multiple operation modes for different network topologies. 8 operation modes: Access Point/Client Bridge/Universal Repeater/WDS Bridge/WDS AP/WDS Station/AP Router/Client Router

WIRELESS-N 6X SPEED OVER 802.11G NETWORKS

- MIMO delivers up to 300Mpbs speed rate

GIGABIT ETHERNET PORT

- Up to 10X faster data transfer than Fast Ethernet. Ideal for streaming videos, VOIP, music, and multimedia applications

SSID TO VLAN MAPPING

- Supports 802.1q mapping of SSIDs and up to 4 VLANs

802.3af POE COMPATIBLE

- Supports Power over Ethernet (IEEE 802.3af) and allows deployment in areas where power outlets are not available

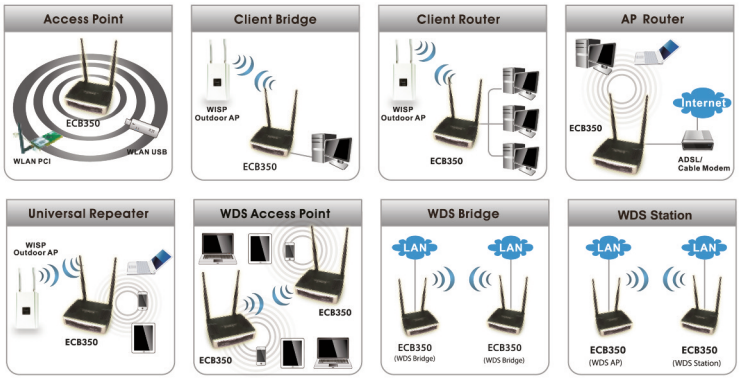
DUAL HIGH GAIN DETACHABLE ANTENNA DESIGN

- 2x 5dBi upgradable antennas with optimized configuration and RF performance for increase wi-fi coverage and receive sensitivity

AP MANAGEMENT SOFTWARE

- Includes EnGenius Zone Controller for configuring, managing and monitoring multiple APs from one central location

Ideal For:



EnGenius®

ECB350 – Technical Specifications

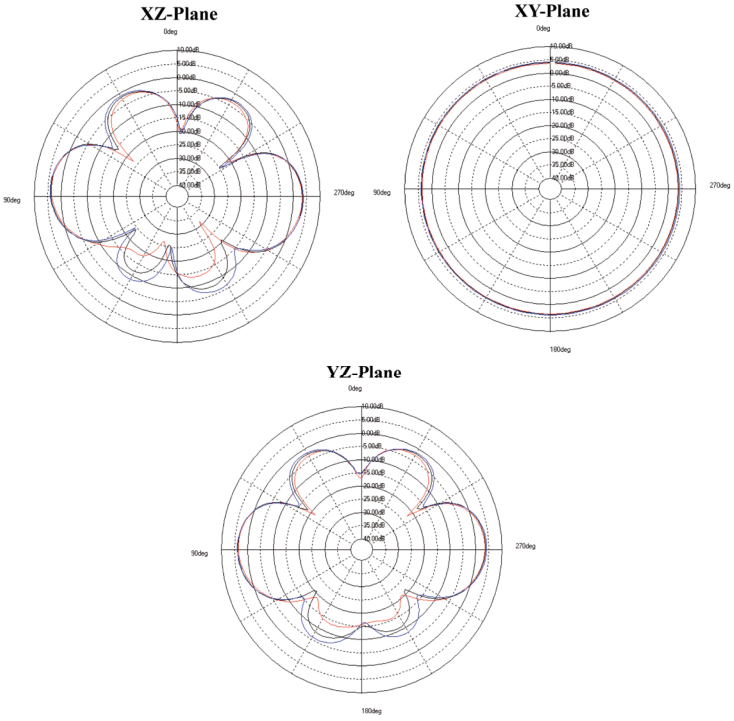
Specifications may change without notice.

HARDWARE SPECIFICATIONS

MCU/RF	AR7242 + AR9283
Memory	32 MB
Flash	8 MB
Physical Interface	LAN: 1 x 10/100/1000 Gigabit Ethernet (RJ-45) port Reset Button Power Jack
LEDs Status	Power/Status LAN (10/100/1000Mpbs) WLAN (Wireless connection)
Power requirement	Power Supply: 90 to 240 VDC ± 10%, 50/60 Hz (Depends on different countries) Active Ethernet (Power over Ethernet, IEEE802.3af) 48 VDC/0.375A Device: 12V/1A

RF SPECIFICATIONS

Wireless standard	IEEE802.11 b/g/n		
Frequency	2.400 ~ 2.484GHz (b/g/n)		
Modulation Technology	OFDM: BPSK, QPSK, 16-QAM, 64-QAM DBPSK, DQPSK, CCK		
Operating Channels	11 channels		
Transmit Power	**802.11b(2.412 ~ 2.472 GHz)** 29 dBm @ 1Mbps 29 dBm @ 2Mbps 29 dBm @ 5.5Mbps 29 dBm @ 11Mbps	**802.11g(2.412 ~ 2.472 GHz)** 29 dBm @ 6Mbps 29 dBm @ 9Mbps 28 dBm @ 12Mbps 28 dBm @ 18Mbps 24 dBm @ 24Mbps 24 dBm @ 36Mbps 23 dBm @ 48Mbps 23 dBm @ 54Mbps	**802.11n(2.412 ~ 2.472 GHz)** 26 dBm @ MCS0/MCS8 26 dBm @ MCS1/MCS9 25 dBm @ MCS2/MCS10 25 dBm @ MCS3/MCS11 24 dBm @ MCS4/MCS12 24 dBm @ MCS5/MCS13 23 dBm @ MCS6/MCS14 23 dBm @ MCS7/MCS15
Receiver Sensitivity	802.11b (2.412 ~ 2.472 GHz) best ≤ -98 dBm 802.11g (2.412 ~ 2.472 GHz) best ≤ -93 dBm 802.11n (2.412 ~ 2.472 GHz) best ≤ -93 dBm		
Antenna	2x external 5dBi SMA antennas (Diversity support)		



SOFTWARE SPECIFICATIONS

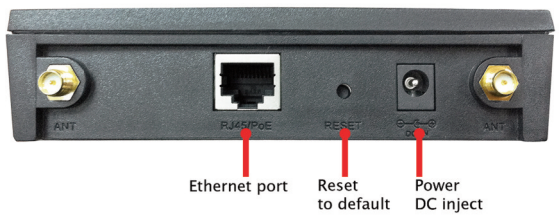
Topology	Infrastructure/Ad-Hoc
Operation Mode	Access Point/Client Bridge/Universal Repeater/WDS Bridge/WDS AP/WDS Station/AP Router/Client Router
Multiple BSSID	Supports up to 4 BSSIDs
LAN	IP (check validity and DHCP server IP range)
DHCP Server	DHCP range, lease time, client list
VLANs	Supports 802.1q (up to 4 VLANs) SSID to VLAN mapping
Spanning Tree	Supports 802.1d Spanning Tree Protocol
Wireless	Wireless mode: 11b/11g/11n Channel selection (setting varies by country) Channel bandwidth (Auto, 20MHz, 40MHz) Transmission rate: 11n only, 11b/g/n mix, 11b only, 11b/g, 11g only
VPN	VPN pass-through (PPTP, L2TP, IPSEC)
QoS	WMM
WPS	Software only
Security	WEP Encryption - 64/128 bit WPA Personal (WPA-PSK using TKIP or AES) WPA Enterprise (WPA-EAP using TKIP) 802.1x Authenticator SSID broadcast enable/disable WLAN MAC Address Filter WLAN L2 isolation (AP mode) Wireless STA (Client) connected list (Idle/Connection Time, Pkt statistics)

MANAGEMENT

Tx Power Control	Adjust transmit power by dBm
Configuration	Web-based configuration (HTTP)/Telnet
Telnet Server	CLI
Firmware Upgrade	Upgrade firmware via web browser
Administrator Setting	Administrator Username & Password change
Reset Setting	Reboot (press 1 second). Reset to Factory Default (press 10 second)
System Monitoring	Status Statistic and Event log
SNMP	V1 , V2c
MIB	MIB I , MIB II(RFC1213) and Private MIB
Traffic Measurement	Per interface
Auto-channel Selection	Automatically selecting least congested channel
Bandwidth Measurement	IP range and bandwidth management
Backup & Restore	Save & restore settings through Web interface
Diagnosis	IP pinging statistics
AP Detection	Scanning for available EnGenius APs

ENVIRONMENT & PHYSICAL

Temperature Range	Operating: 0 to 50° C (32° to 122° F) Storage: -20 to 60° C (-4° to 140° F)
Humidity (non-condensing)	Operating: 90% or less Storage: 90% of less
Dimensions	L: 5.32"(135mm), W: 4.14"(105mm), H: 1.18"(30mm)
Weight	0.77 lb. (280g)
Certifications	FCC, CE, IC



EnGenius®

EnGenius

Datasheet

The Neutron Series

Distributed Network Management Solution

Flexible, Scalable, Enterprise-Class Management for Networks Both Large and Small

Today's networks must be flexible, robust and as effective as the organizations they serve. Often comprised of different sizes, infrastructures and locations, these distributed networks can place an enormous burden on in-house IT personnel or managed service providers looking to manage, monitor and upgrade a potentially vast number of Access Points and Switches.

Fortunately, EnGenius has the answer: the **Neutron Series Distributed Network Management Solution**.

This highly flexible, scalable, fully integrated solution offers simplified configuration and management with enterprise-class performance, feature-rich Managed Access Points, WLAN Controller Switches and ezMaster™ Centralized Network Management, at an incredible price point – **with NO AP licensing, subscription or tech support fees**.

The Neutron Series is ideal for deploying into:

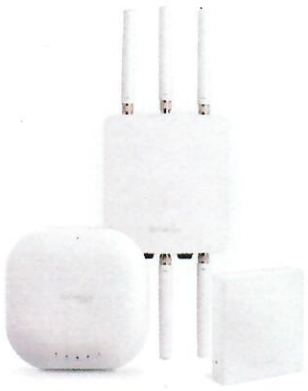
- Managed Service Providers (MSPs)
- The Public Sector
- School Districts
- Large, Geographically Diverse Organizations
- Healthcare Facilities
- Hotels & Resorts

Features and Benefits

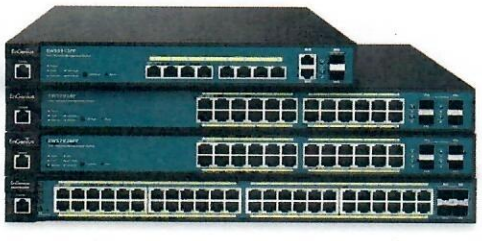
- Complete Scalability
  - Manage 1 – 1,000+ APs & Switches
  - 10,000+ Concurrent Users
  - Unlimited Number of Distributed Networks
- Unlimited Flexibility
  - Operate Neutron APs Standalone or Managed
  - Locally Manage up to 50 APs per Switch
  - Manage Unlimited APs & Switches with ezMaster™
  - Deploy ezMaster via Cloud-Based* Service, on a Remote or Local Server
- Greater Affordability
  - NO AP Licensing, NO Annual Subscriptions, NO Technical Support Fees
  - Affordable Hardware
  - Save Time & Resources
  - Lower TCO per Deployment
- Neutron Series Distributed Network Management
  - Centralized Management with ezMaster
  - Full Featured WLAN Controller Switches
  - Versatile Access Point Portfolio
- Optimize Wireless Performance
- Create Secure, Branded Captive Portals
- Simplified Deployment & Provisioning
- Comprehensive Network Protection
- Rich Reporting & Analytics
- Enterprise-Class Performance
- Comprehensive Pre/Post Sales & Customer Support

*Feature available 2016

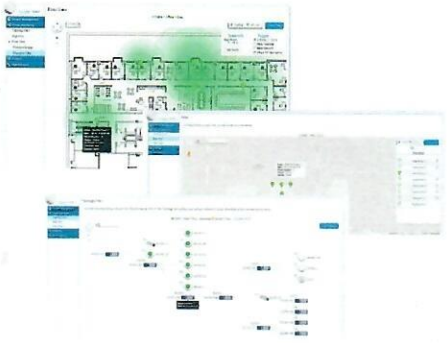
The EnGenius® Neutron™ Series Distributed Network Management Solution includes:



Neutron Managed Access Points



Neutron WLAN Controller Switches



ezMaster™ Network Management Software

EnGenius Neutron Series Indoor Managed Access Points

	CEILING MOUNT					WALL PLATE	
Models	EWS360AP	EWS350AP	EWS320AP	EWS310AP	EWS300AP	EWS510AP	EWS500AP
Standards	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n	802.11a/b/g/n	802.11b/g/n	802.11a/b/g/n	802.11b/g/n
Frequency	2.4 & 5 GHz	2.4 & 5 GHz	2.4 & 5 GHz	2.4 & 5 GHz	2.4 GHz	2.4 & 5 GHz	2.4 GHz
2.4 GHz Max. Data Rate	450 Mbps	300 Mbps	450 Mbps	300 Mbps	300 Mbps	300 Mbps	300 Mbps
5 GHz Max. Data Rate	1,300 Mbps	867 Mbps	450 Mbps	300 Mbps	N/A	300 Mbps	300 Mbps
Radio Chains/Streams	3 x 3:3	2 x 2:2	3 x 3:3	2 x 2:2	2 x 2:2	2 x 2:2	2 x 2:2
RF Output Power (2.4 GHz)	28 dBm	26 dBm	28 dBm	29 dBm	29 dBm	20 dBm	20 dBm
RF Output Power (5 GHz)	28 dBm	26 dBm	28 dBm	26 dBm	N/A	20 dBm	N/A
Ethernet Ports	1 x Gig Port (PoE+)	1 x Gig Port (PoE+)	1 x Gig Port (PoE+)	1 x Gig Port (PoE+)	1 x Gig Port (PoE+)	- 1 x 10/100 Mbps Access Port (PoE+) - 3 x 10/100 Mbps Access Ports - 1 x Gig Uplink Port (PoE) - 1 x RJ45 Pass Through Ports	- 1 x 10/100 Mbps Access Port (PoE+) - 3 x 10/100 Mbps Access Ports - 1 x Gig Uplink Port (PoE) - 2 x RJ45 Pass Through Ports
110 Punch Down Block	-	-	-	-	-	1	1
Power-over-Ethernet	802.3at	802.3at	802.3at	802.3af/at	802.3af	802.3af/at	802.3af/at
Power Consumption (Peak)	22.8W	18W	18.2W	15.6W	9.6W	10.8W	7.5W
Integrated Antenna	6 x 5 dBi	4 x 5 dBi	6 x 5 dBi	4 x 5 dBi	2 x 5 dBi	2 x 4 dBi (2.4 GHz) 2 x 5 dBi (5 GHz)	2 x 4 dBi

Key Features

- Sectorized 3D Antenna (selected models)
- Dynamic Channel Optimization
- Dual-Band (selected models)
- Band Steering (Dual-Band models)
- Seamless Roaming, Fast Handover
- Supports Connectivity of 100+ Users
- 16 SSIDs (8 SSIDS per frequency band)
- Wireless Traffic Shaping
- QoS
- SSID-to-VLAN Mapping
- Email Alert
- Wi-Fi Scheduler
- Auto-Reboot
- AP Detection

Neutron Series Managed Access Points

Versatile Portfolio of Managed Access Points

EnGenius offers one of the broadest Access Point portfolios available. The Neutron Series' versatile line of high-performance, managed indoor and outdoor APs range from **affordable, Single-Band 11n models** to **high-capacity 3x3 Dual-Band 11ac versions**, all with Power-over-Ethernet **(PoE) convenience**.

Neutron Access Points include sleek, low profile **Indoor Ceiling-Mount APs** and **Wall Plate AP/ Switches** that provide an all-in-one communications hub for hotel guest rooms, and multi-tenant dwellings to powerful, slim line, **IP-rated Outdoor** and **industrial, ruggedized APs** that extend the network beyond. Neutron Managed APs are sure to meet a variety of application needs for both large and small networks alike.

For added versatility, **deploy as a standalone Access Point** or **part of a scalable Neutron Solution** managed via a Neutron Controller Switch or centrally managed with ezMaster software.

DATASHEET

rocket M

Powerful 2x2 MIMO airMAX® BaseStation

Models: M5, M3, M365, M2, M900

Advanced Software Technology to Maximize Performance

Plug and Play Integration with airMAX Antennas

Frequency and Channel Flexibility

Overview

Featuring mix-and-match industrial design, the Rocket® is a Ubiquiti Networks® airMAX® BaseStation that supports speeds of up to 150+ Mbps real TCP/IP throughput. It is ideal for deployment in Point-to-Point (PtP) bridging or Point-to-MultiPoint (PtMP) airMAX applications.

Flexibility

The Rocket is available in several frequency models: 900 MHz, 2.4 GHz, 3/3.65 GHz, and 5 GHz, to support your specific application. You have the freedom to locate, deploy, and operate the Rocket in these unlicensed bands (subject to local country regulations).

The Rocket allows for a high degree of flexibility in configuring channel bandwidths: 2, 3, 5, 8, 10, 20, 25, 30, and/or 40 MHz, depending on the specific product model and local country regulations.

Plug and Play Integration

Rocket radios and airMAX antennas have been designed to seamlessly work together. Every airMAX Sector, RocketDish™, Omni, or Yagi antenna has a built-in Rocket mount, so installation requires no special tools. Snap the Rocket securely into place and mount the antenna; then you have the optimal combination of Rocket radio and airMAX antenna for your PtP or PtMP application.

airMAX Technology Included

Unlike standard Wi-Fi protocol, Ubiquiti's Time Division Multiple Access (TDMA) airMAX protocol allows each client to send and receive data using pre-designated time slots scheduled by an intelligent AP controller.

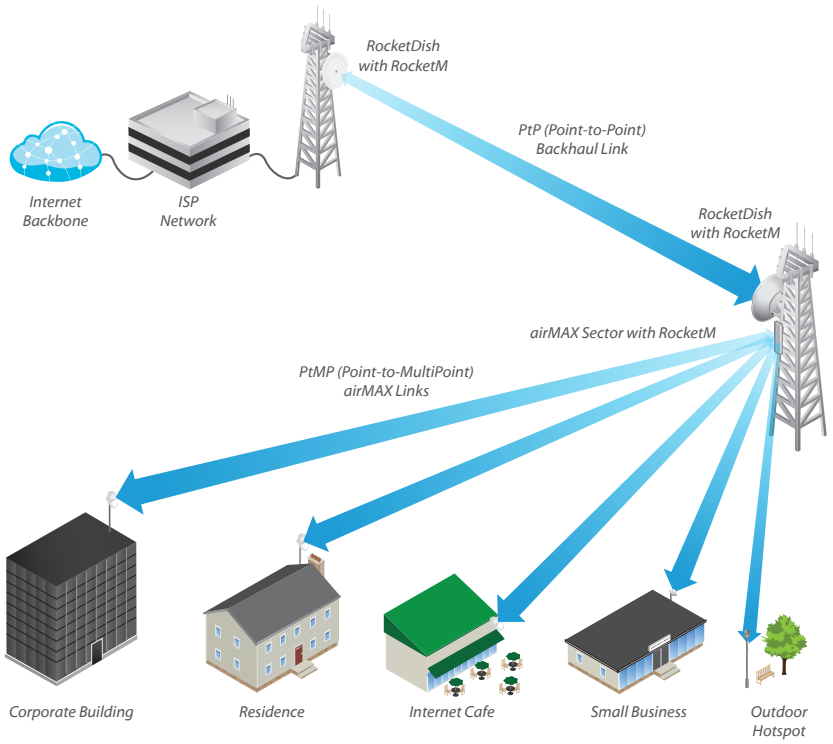
This time slot method eliminates hidden node collisions and maximizes airtime efficiency. It provides many magnitudes of performance improvements in latency, throughput, and scalability compared to all other outdoor systems in its class.

Intelligent QoS Priority is given to voice/video for seamless streaming.

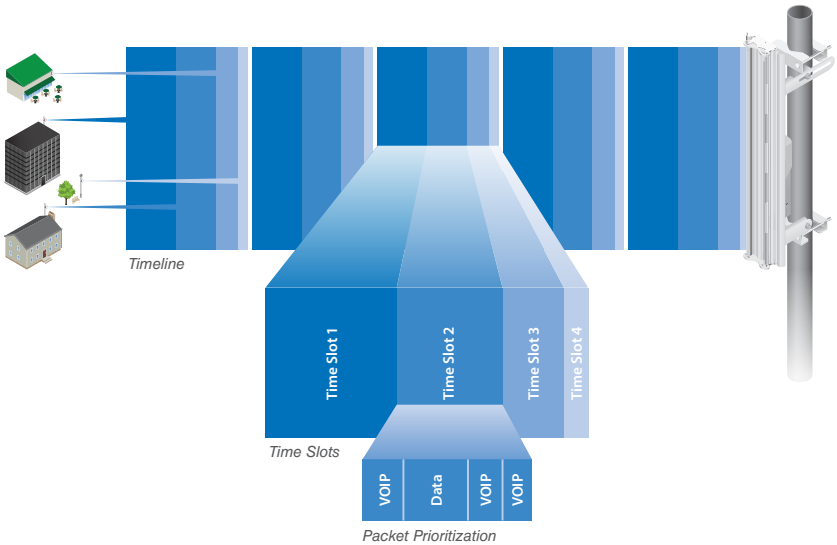
Scalability High capacity and scalability.

Long Distance Capable of high-speed, carrier-class links.

Application Example



airMAX TDMA Technology



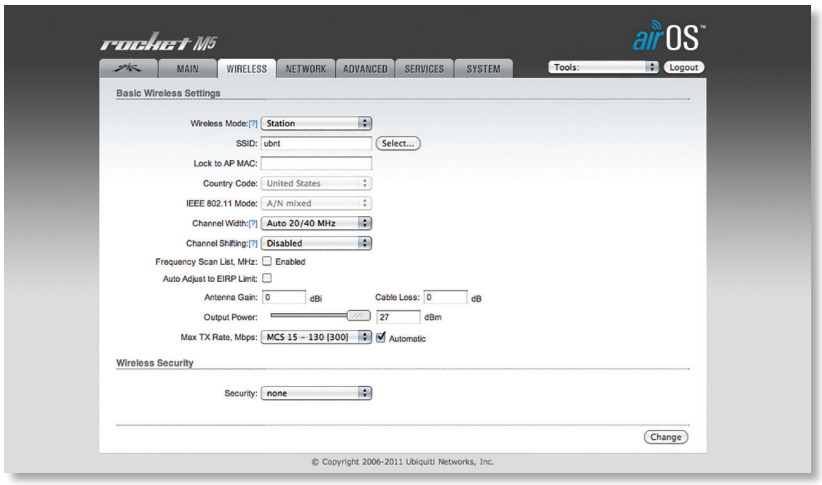
Up to 100 airMAX stations can be connected to an airMAX Sector; four airMAX stations are shown to illustrate the general concept.

Software

airOS®

Built upon an intuitive user interface foundation, airOS® 5 is an advanced operating system for Ubiquiti airMAX M Series products.

- airMAX Protocol Support
- Long-Range PtP Link Mode
- Transmit Power Control: Automatic/Manual
- Automatic Distance Selection (ACK Timing)
- Device Statistics
- Diagnostic Tools



airView®

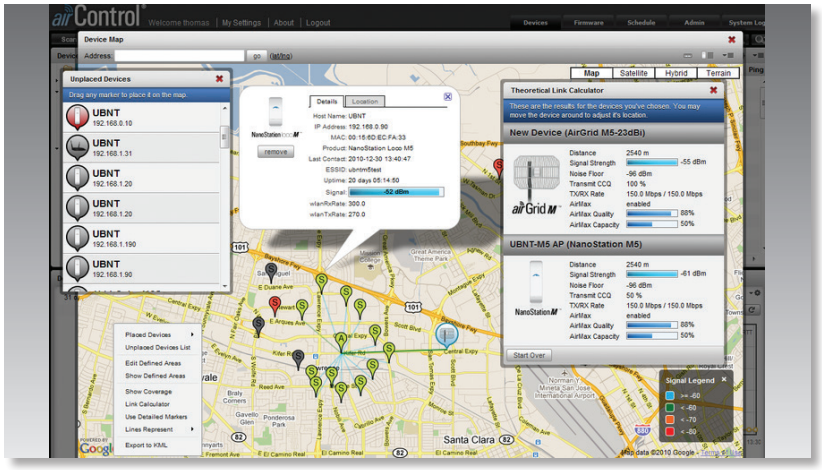
Integrated on all Ubiquiti M products, airView® provides advanced spectrum analyzer functionality: waterfall, waveform, and real-time spectral views allow operators to identify noise signatures and plan their networks to minimize noise interference.

- **Waterfall** Aggregate energy over time for each frequency.
- **Waveform** Aggregate energy collected.
- **Real-time** Energy is shown in real time as a function of frequency.
- **Recording** Automate airView to record and report results.

airControl®

airControl® is a powerful and intuitive, web-based server network management application, which allows operators to centrally manage entire networks of Ubiquiti devices.

- Network Map
- Monitor Device Status
- Mass Firmware Upgrade
- Web UI Access
- Manage Groups of Devices
- Task Scheduling



Models

The Rocket enclosure is built to survive harsh environments and fits the Rocket mount built into every airMAX antenna. Pair the Rocket with the appropriate antenna for your PtP link or PtMP network.

rocket M5

The 5 GHz frequency band is free to use, worldwide, offers plentiful spectrum, and works well for long-distance links. However, 5 GHz signals have more difficulty passing through obstacles than lower-frequency signals.

rocket M3 / M365

The 3.65 GHz frequency band is noise-free in most areas; however, its use requires a license. There may be additional restrictions on its use depending on local country regulations.

rocket M2

The 2.4 GHz frequency band is free to use, worldwide; however, it is crowded due to interference from other wireless devices. Also, there are only three non-overlapping, 20 MHz channels available for use.

rocket M9

The 900 MHz frequency band has a higher tolerance for obstacles that may obstruct line of sight; however, noise levels are typically higher. Also, its use may require a license in some parts of the world.

Antenna Compatibility

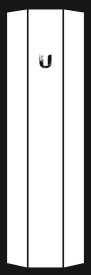
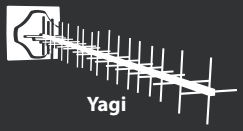
RocketM9

RocketM2

RocketM3
RocketM365

RocketM5

Frequency Band

	900 MHz	2.4 GHz	3/3.65 GHz	5 GHz
 Sector	AM-9M13	AM-V2G-Ti AM-2G15-120 AM-2G16-90	AM-3G18-120	AM-V5G-Ti AM-M-V5G-Ti AM-5G16-120 AM-5G17-90 AM-5G19-120 AM-5G20-90 AM-5AC21-60 AM-5AC22-45
 Rocket Dish		RD-2G24	RD-3G26	RD-5G31-AC RD-5G30-LW RD-5G30 RD-5G34
 Omni		AMO-2G10 AMO-2G13	AMO-3G12	AMO-5G10 AMO-5G13
 Yagi	AMY-9M16			

Specifications

rocket M5

M5	
Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")
Weight	500 g (1.1 lb)
Power Supply	24V, 1A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
Max. Power Consumption	8W
Processor	MIPS 74Kc
Memory	128 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof)
LEDs	Power, Ethernet, (4) Signal Strength
Enclosure Characteristics	Outdoor UV Stabilized Plastic
ESD/EMP Protection	± 24KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4
Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes
Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CL
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/8/10/20/30/40 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

M5 Operating Frequency (MHz)				
Worldwide	5150 - 5875			
USA	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	5150 - 5250*	5250 - 5350*	5470 - 5725*	5725 - 5850*
IC	5470 - 5600, 5650 - 5725, 5725 - 5850			

* Some frequencies may require activation; visit: **https://www.ubnt.com/fcclabelrequest**

M5 Output Power: 27 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11a	6 - 24 Mbps	27 dBm	± 2 dB	**802.11a**	6 - 24 Mbps	-94 dBm Min.	± 2 dB
	36 Mbps	25 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	23 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	22 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	27 dBm	± 2 dB	**802.11n/airMAX**	MCS0	-96 dBm	± 2 dB
	MCS1	27 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	27 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	27 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	26 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	24 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	22 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	21 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	27 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	27 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	27 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	27 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	26 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	24 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	22 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
	MCS15	21 dBm	± 2 dB		MCS15	-75 dBm	± 2 dB

Specifications

rocket M3 / M365

M3/M365		
Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")	
Weight	500 g (1.1 lb)	
Power Supply	24V, 1A PoE Adapter	
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)	
Max. Power Consumption	6.5W	
Operating Frequency	M3	M365
	3400 - 3730 MHz*	3650 - 3675 MHz
Processor	MIPS 24Kc	
Memory	64 MB SDRAM, 8 MB Flash	
Networking Interface	(1) 10/100 Mbps	
RF Connections	(2) RP-SMA (Waterproof)	
LEDs	Power, Ethernet, (4) Signal Strength	
Enclosure Characteristics	Outdoor UV Stabilized Plastic	
ESD/EMP Protection	± 24KV Air / Contact	
Operating Temperature	-30 to 75° C (-22 to 167° F)	
Operating Humidity	5 to 95% Noncondensing	
Shock and Vibration	ETSI300-019-1.4	
Wireless Approvals	M3	M365
	FCC, IC, CE	FCC Part 90Y
RoHS Compliance	Yes	
Modes	Access Point, Station	
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing	
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test	
Distance Adjustment	Dynamic Ack and Ackless Mode	
Power Adjustment	Software Adjustable UI or CL	
Security	WPA2 AES Only	
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low	
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate	
Other	M3	M365
	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/8/10/20/25/40 MHz Channel Width Support	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/10/20/25 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode	

* RocketM3 not supported in the USA

M3/M365 Output Power: 25 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX	MCS0	25 dBm	± 2 dB	airMAX	MCS0	-94 dBm Min.	± 2 dB
	MCS1	25 dBm	± 2 dB		MCS1	-93 dBm	± 2 dB
	MCS2	25 dBm	± 2 dB		MCS2	-90 dBm	± 2 dB
	MCS3	25 dBm	± 2 dB		MCS3	-89 dBm	± 2 dB
	MCS4	24 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	23 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	22 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	20 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	25 dBm	± 2 dB		MCS8	-93 dBm	± 2 dB
	MCS9	25 dBm	± 2 dB		MCS9	-91 dBm	± 2 dB
	MCS10	25 dBm	± 2 dB		MCS10	-89 dBm	± 2 dB
	MCS11	25 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	24 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	23 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	22 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
	MCS15	20 dBm	± 2 dB		MCS15	-75 dBm	± 2 dB

3 GHz | 3.65 GHz | 25 dBm | 10/100

Specifications

rocket M2

	M2
Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")
Weight	500 g (1.1 lb)
Power Supply	24V, 1A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
Max. Power Consumption	6.5W
Operating Frequency	2402 - 2462 MHz
Processor	MIPS 24Kc
Memory	128 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof)
LEDs	Power, Ethernet, (4) Signal Strength
Enclosure Characteristics	Outdoor UV Stabilized Plastic
ESD/EMP Protection	± 24KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4
Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes
Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CL
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/8/10/20/30/40 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

M2 Output Power: 28 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11g	6 - 24 Mbps	28 dBm	± 2 dB	**802.11g**	6 - 24 Mbps	-97 dBm Min.	± 2 dB
	36 Mbps	26 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	25 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	24 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	28 dBm	± 2 dB	**802.11n/airMAX**	MCS0	-96 dBm	± 2 dB
	MCS1	28 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	28 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	28 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	27 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	25 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	23 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	22 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	28 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	28 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	28 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	28 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	27 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	25 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	23 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
	MCS15	22 dBm	± 2 dB		MCS15	-75 dBm	± 2 dB

Specifications

rocket M9

M900	
Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")
Weight	500 g (1.1 lb)
Power Supply	24V, 1A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
Max. Power Consumption	6.5W
Operating Frequency	902 - 928 MHz
Processor	MIPS 24Kc
Memory	64 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof)
LEDs	Power, Ethernet, (4) Signal Strength
Enclosure Characteristics	Outdoor UV Stabilized Plastic
ESD/EMP Protection	± 24KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4
Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes
Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CL
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 3/5/8/10/20 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

M900 Output Power: 28 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX	MCS0	28 dBm	± 2 dB	airMAX	MCS0	-96 dBm	± 2 dB
	MCS1	28 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	28 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	28 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	28 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	24 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	22 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	21 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	28 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	28 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	28 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	28 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	28 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	24 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	22 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
	MCS15	21 dBm	± 2 dB		MCS15	-75 dBm	± 2 dB

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