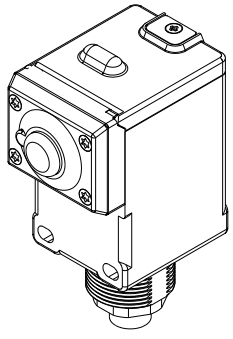
Q45RDL Wireless Remote Device with Light Node

Features

Sure Cross® Wireless Q45 Sensors combine the best of Banner's flexible sensor family with its reliable, field-proven, Sure Cross wireless architecture to solve new classes of applications limited only by the user's imagination. Containing a variety of sensor models, a radio, and an internal battery supply, this product line is truly plug-and-play.

The Q45RDL is a compact, industrial, battery-powered device that accepts remote two dry contacts or one NAMUR input and transmits those signals to a wireless controller to track, monitor, or sense a wide range of devices while also providing local LED indication. All configuration is done through internal DIP switches or the DX80 Performance Configuration Software.



Benefits

- Powerful device to deliver factory automation and IIoT solutions for many applications including but not limited to:
  - Retrofit an existing door position switch
  - Integrate specialty third-party discrete devices
  - Monitor the alignment of plastic mold pin position switches
  - Sense a ball or gate valve position using Namur inputs
  - Monitor security by verifying a door or gate position
- Easy-to-use rugged device that can be easily mounted to equipment
- Use with a DXM Wireless Controller to track position, count cycles, or times in different positions
- Local LED indication can be linked to any locally connected input or to other wireless inputs within the network
- Battery-powered for "peel and stick" functionality with a 2-year battery life capability
- **Eliminate control wires**—The Sure Cross wireless system is a radio frequency network with integrated I/O that removes the need for power and control wires
- **Reduce complexity**—Machine or process reconfiguration made easier; great for retrofit applications
- **Deploy easily**—Simplify installation on existing equipment enables deployment in remote and hard-to-access locations where implementing a wired solution would be difficult, impractical, or not cost-effective
- Selectable transmit power levels of 250 mW or 500 mW for 900 MHz models and 65 mW for 2.4 GHz models
- DIP switches for user configuration
- Frequency Hopping Spread Spectrum (FHSS) technology ensures reliable data delivery
- Transceivers provide bidirectional communication between the Gateway and Node, including fully acknowledged data transmission
- Diagnostics allow user-defined output settings in the unlikely event of a lost radio signal

Models

Model	Frequency	Inputs and Outputs
DX80N9Q45RDL-QD	900 MHz ISM Band	Inputs: Two remote discrete or one Namur Outputs: One four-color LED indicator light

IMPORTANT: Because these sensors run on very low battery power, the contact wetting voltage is 3.3 volts. High voltage contacts are not designed to reliably switch these low voltages. Use a contact rated for operation at 3.3 volts.

The following models are no longer available for order, but are still covered by the information in this document.

Model	Frequency	Inputs and Outputs
DX80N2Q45RDL-QD	2.4 GHz ISM Band	Inputs: Two remote discrete or one Namur Outputs: One four-color LED indicator light

Storage Mode

While in **storage mode**, the device's radio does not operate to conserve the battery. To put any device into storage mode, press and hold the binding button for five seconds. The device is in storage mode when the LEDs stop blinking. To wake the device, press and hold the binding button (inside the housing on the radio board) for five seconds.

Original Instructions
04-Feb-25

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204703
p/n: 204703 Rev. H

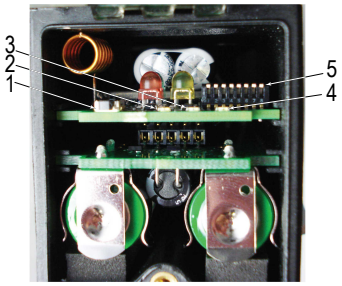
ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Configuration Instructions

Buttons and LEDs

1. Binding button
2. Red LED (flashing) indicates a radio link error with the Gateway.
3. Green LED (flashing) indicates a good radio link with the Gateway.
4. Amber LED indicates when input 1 is active.
5. DIP switches

Inside the Q45



DIP Switches

After making any changes to any DIP switch position, reboot the Wireless Q45 Sensor by triple-clicking the button, waiting a second, then double-clicking the button. By default, the DIP switches are in the OFF position. To turn a DIP switch on, push the switch toward the battery pack. DIP switches are numbered from left to right.

Description	DIP Switches			
	1	2	3	4
Transmit power: 500 mW (default)	OFF			
Transmit power: 250 mW (compatible with 150 mW radios)	ON			
Light mode: flashing (default)		OFF		
Light mode: solid		ON		
Reserved (default)			OFF	OFF

DIP Switches for Dry Contact Input Mode (DIP Switch 5 OFF)

Description	DIP Switches			
	5	6	7	8
Dry contact input mode (default)	OFF			
3.3 V contact wetting voltage (default)		OFF		
5.5 V contact wetting voltage		ON		
Two dry contact inputs (default)			OFF	
One dry contact input			ON	
62.5 millisecond sample rate (default)				OFF
250 millisecond sample rate				ON

To extend the battery's life:

- Select one dry contact input when only one is being used.
- Use the slower sample rate of 250 ms when a high-speed response is not required.

DIP Switches for Namur Input Mode (DIP Switch 5 ON)

Description	DIP Switches			
	5	6	7	8
Namur input mode	ON			
5.5 V sensor voltage (default)		OFF		
8.2 V sensor voltage		ON		
2 millisecond warmup time, 62.5 ms sample rate (default)			OFF	OFF
2 millisecond warmup time, 250 ms sample rate			OFF	ON
5 millisecond warmup time, 125 ms sample rate			ON	OFF
5 millisecond warmup time, 500 ms sample rate			ON	ON

To extend battery life, select the slower sample rates when a high-speed response is not required.

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To use with Turck's Bi2-M12-Y1X-H1141, Bi5-M18-Y1X-H1141 Namur proximity sensor, set DIP switch 5 to ON and DIP switches 6 through 8 to OFF.

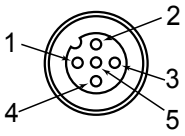
To use with Turck's Bi10-M30-Y1X-H1141 Namur proximity sensor, set DIP switch 5 and 7 to ON and DIP switches 6 and 8 to OFF.

Use cable MQDEC-406SS (male to female cable) to connect the Namur sensors to the Wireless Q45 Sensor - Remote Device model's interface.

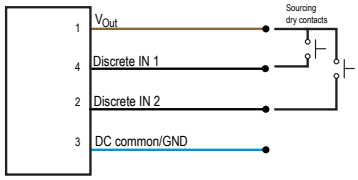
Transmit Power Levels

The 900 MHz radios have a high output option that will transmit at 500 mW (27 dBm). The low output option transmits at 250 mW (24 dBm). The 250 mW mode reduces the radio's range but improves the battery life in short-range applications. For 2.4 GHz models, this DIP switch is disabled. The transmit power for 2.4 GHz is fixed at about 65 mW EIRP (18 dBm).

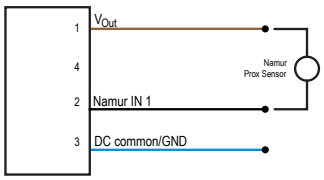
Wiring

5-pin M12 Female Connection	Pin	Wire Color	Description
	1	Brown	V_{Out}
	2	White	Discrete IN 2 or Namur IN 1
	3	Blue	DC common (GND)
	4	Black	Discrete IN 1
	5	Gray	-

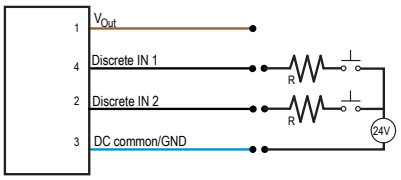
Wiring for dry contact mode



Wiring for NAMUR mode



Wiring for externally-powered sourcing sensors



Voltage at the discrete IN:

- 0 V to 1 V = OFF
- 2 V to 5 V = ON
- More than 6 V will damage the Q45 sensor's input

Internal resistance is 800 Ohms. To connect the Wireless Q45 Sensor to a 24 V sourcing output, add a 3.0 KOhm to 5.6 KOhm external resistor in series to reduce the voltage applied to the Q45 Sensor's discrete input to less than 6 V.

R = 3.0 to 5.6 KOhm at 24 V

Apply Power to the Q45 AA-Cell Models

Follow these instructions to install or replace the lithium "AA" cell batteries.

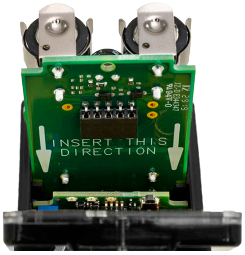
CAUTION:

- **As with all batteries, these are fire, explosion, and severe burn hazards. There is a risk of explosion if the battery is replaced incorrectly.**
- Do not burn or expose them to high temperatures. Do not recharge, crush, disassemble, or expose the contents to water.
- Verify the battery's positive and negative terminals align to the positive and negative terminals of the battery holder mounted within the case.
- Properly dispose of used batteries according to local regulations by taking them to a hazardous waste collection site, an e-waste disposal center, or another facility qualified to accept lithium batteries.

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1. Loosen the clamp plate with a small Phillips screwdriver and lift the cover.
2. Slide the battery board out of the Q45 housing.
3. If applicable, remove the discharged batteries.
4. Install the new batteries.
   Use Banner's **BWA-BATT-006** replacement batteries or equivalent 3.6 V AA lithium batteries, such as Xeno's XL-60F.
5. Verify the battery's positive and negative terminals align to the positive and negative terminals of the battery holder mounted within the case.
6. Slide the board containing the new batteries back into the Q45 housing.
7. Close the cover and gently tighten the clamp plate with the small Phillips screwdriver.

Q45 battery board



Bind to the Gateway and Assign the Node Address

Before beginning the binding procedure, apply power to all the devices. Separate the devices by two meters when running the binding procedure. Put only one Gateway into binding at a time to prevent binding to the wrong Gateway.

1. On the Gateway: Enter binding mode.
   - For housed DX80 Gateways, triple-click button 2 on the Gateway. Both LEDs flash red.
   - For Gateway board modules, triple-click the button. The green and red LED flashes.
2. Assign the Q45 a Node address using the Gateway's rotary dials. Use the left rotary dial for the left digit and the right rotary dial for the right digit. For example, to assign your Q45 to Node 10, set the Gateway's left dial to 1 and the right dial to 0. Valid Node addresses are 01 through 47.
3. On the Q45: Loosen the clamp plate on the top of the Q45 and lift the cover.
4. Enter binding mode on the Q45 by triple-clicking the Q45's button.
   The red and green LEDs flash alternately and the sensor searches for a Gateway in binding mode. After the Q45 is bound, the LEDs stay solid momentarily, then they flash together four times. The Q45 exits binding mode.
5. Label the sensor with the Q45's Node address number for future reference.
6. Repeat steps 2 through 5 for as many Q45s as are needed for your network.
7. On the Gateway: After binding all Q45s, exit binding mode.
   - For housed DX80 Gateways, double-click button 2.
   - For board-level DX80 Gateways, double-click the button.

For Gateways with single-line LCDs: After binding your Q45 to the Gateway, make note of the binding code displayed under the Gateway's *DVCFG menu, XADR submenu on the LCD. Knowing the binding code prevents having to re-bind all Q45s if your Gateway is ever replaced.

Bind to a DXM and Assign the Node Address

Before beginning the binding procedure, apply power to all the devices. Separate the radios by two meters when running the binding procedure. Put only one DXM into binding mode at a time to prevent the Q45 from binding to the wrong Gateway.

1. On the DXM: Use the arrow keys to select the **ISM Radio** menu on the LCD and click **ENTER**.
2. Highlight the **Binding** menu and click **ENTER**.
3. Use the arrow keys to select the Node address to bind the Q45 to.
4. On the Q45: Loosen the top clamp plate and lift the cover.
5. Enter binding mode by triple-clicking the binding button.
   The red and green LEDs flash alternately and the sensor searches for a Gateway in binding mode. After the Node binds, the LEDs stay solid momentarily, then they flash together four times. The Node exits binding mode.
6. Label the sensor with the Node address number for future reference.
7. On the DXM: Click **BACK** to exit binding for that specific Node address.
8. Repeat steps 3 through 7 and change the Node address for as many Q45s as are needed for your network.
9. On the DXM: After you have finished forming your network, click **BACK** until you reach the main menu.

Modbus Registers

I/O #	Modbus Holding Register		I/O Type	I/O Range		Holding Register Representation	
	Gateway	Any Node		Min. Value	Max. Value	Min. (Dec.)	Max. (Dec.)
1	1	1 + (Node# × 16)	Discrete IN 1 OR Namur IN 1	0	1	0	1
2	2	2 + (Node# × 16)	Discrete IN 2	0	1	0	1
		...					
7	7	7 + (Node# × 16)	Reserved				
8	8	8 + (Node# × 16)	Device Message				

Continued on page 5

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Continued from page 4

I/O #	Modbus Holding Register		I/O Type	I/O Range		Holding Register Representation	
	Gateway	Any Node		Min. Value	Max. Value	Min. (Dec.)	Max. (Dec.)
9	9	9 + (Node# × 16)	Discrete OUT 1 (red light)	0	1	0	1
10	10	10 + (Node# × 16)	Discrete OUT 2 (yellow light)	0	1	0	1
11	11	11 + (Node# × 16)	Discrete OUT 3 (green light)	0	1	0	1
12	12	12 + (Node# × 16)	Discrete OUT 4 (blue light)	0	1	0	1
13	13	...					
15	15	15 + (Node# × 16)	Control Message				
16	16	16 + (Node# × 16)	Reserved				

Specifications

Radio Specifications for Performance Internal Antenna

Radio Transmit Power (900 MHz, 500 mW radios)

Conducted: 27 dBm (500 mW)

EIRP with the supplied antenna: < 36 dBm

Radio Transmit Power (2.4 GHz radios)

Conducted: < 18 dBm (65 mW)

EIRP with the supplied antenna: < 20 dBm (100 mW)

Antenna Minimum Separation Distance

900 MHz radios transmitting at ≥ 500 mW: 4.57 m (15 ft) with the supplied antenna

2.4 GHz radios transmitting at 65 mW: 0.3 m (1 ft) with the supplied antenna

Radio Range

A 2 dB antenna ships with this device.

Transmit power and range are subject to many factors, including antenna gain, installation methods, characteristics of the application, and environmental conditions.

Please refer to the following documents for installation instructions and high-gain antenna options.

Installing Your Sure Cross® Radios (151514)
Conducting a Site Survey (133602)
Sure Cross® Antenna Basics (132113)

Link Timeout (Performance)

Gateway: Configurable via User Configuration Software

Node: Defined by Gateway

Spread Spectrum Technology

FHSS (Frequency Hopping Spread Spectrum)

900 MHz Compliance (SX7023EXT Radio Module)

Radio module is indicated by the product label marking

Contains FCC ID: UE3SX7023EXT

Contains IC: 7044A-SX7023EXT

2.4 GHz Compliance (SX243 Radio Module)

Radio module is indicated by the product label marking

Contains FCC ID: UE3SX243

Radio Equipment Directive (RED) 2014/53/EU

Contains IC: 7044A-SX243

FCC Part 15 Class A for Intentional Radiators

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Industry Canada Statement for Intentional Radiators

This device contains licence-exempt transmitters(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil contient des émetteurs/récepteurs exemptés de licence conformes à la norme Innovation, Sciences, et Développement économique Canada. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage.
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Q45RDL Specifications

Externally Powered Sourcing Sensors

ON Condition: 2 V to 5 V

OFF Condition: Less than 1 V

Construction

Molded reinforced thermoplastic polyester housing, oring-sealed transparent Lexan® cover, molded acrylic lenses, and stainless steel hardware. Designed to withstand 1200 psi washdown.

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Indicators
Red and green LEDs (radio function); amber LED indicates when input 1 is active

Default Sample Rate
62.5 milliseconds (dry contact) or 125 milliseconds (Namur)

Report Rate
On Change of State

Typical Battery Life for One Dry Contact Input
Up to 3 years at a 62.5 ms sample rate or 250 ms sample rate.

Assumes an average of 20 seconds between changes of state and a Gateway heartbeat setting of 30 seconds.

Typical Battery Life for Bi2 and Bi5 Namur Inputs
Up to 2 years at a 2 ms warmup time and 62.5 ms sample rate; 4 years at a 2 ms warmup time and 250 ms sample rate.

Assumes an average of 20 seconds between changes of state and a Gateway heartbeat setting of 30 seconds.

Typical Battery Life for Bi10 Namur Inputs
Up to 2 years at a 5 ms warmup time and 125 ms sample rate; 4 years at a 5 ms warmup time and 500 ms sample rate.

Assumes an average of 20 seconds between changes of state and a Gateway heartbeat setting of 30 seconds.

Certifications
CE/UKCA approval only applies to 2.4 GHz models

Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
1831 Diegem, BELGIUM

Turck Banner LTD Blenheim House
Blenheim Court
Wickford, Essex SS11 8YT
GREAT BRITAIN

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03737-22-04042

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Environmental Specifications for the Q45

Operating Conditions
–40 °C to +70 °C (–40 °F to +158 °F); 90% at +50 °C maximum relative humidity (non-condensing)

Radiated Immunity: 10 V/m (EN 61000-4-3)

Environmental Rating
NEMA 6P

IP67

Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.

Accessories

Replacement Batteries (AA Cells)

BWA-BATT-006
- 3.6 V Lithium AA cell
- Two batteries



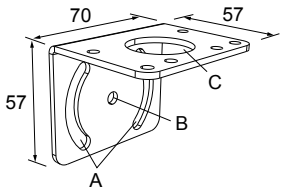
Q45RLD Mounting Brackets

- Q45 Wireless sensors can be mounted with double-sided tape or with bracket options below
- -NH models are supplied with two (2) mounting screws and nuts

Use with the -NH models:

SMB30MM
- 12-gauge stainless steel bracket with curved mounting slots for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor

Hole center spacing: A = 51, A to B = 25.4
Hole size: A = 42.6 × 7, B = ø 6.4, C = ø 30.1

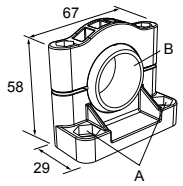


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SMB30SC

- Swivel bracket with 30 mm mounting hole for sensor
- Black reinforced thermoplastic polyester
- Stainless steel mounting and swivel locking hardware included

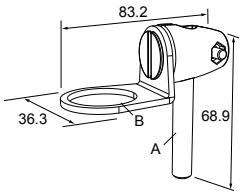
Hole center spacing: A=ø 50.8
Hole size: A=ø 7.0, B=ø 30.0



SMB30FA

- Swivel bracket with tilt and pan movement for precise adjustment
- Mounting hole for 30 mm sensor
- 12-gauge 304 stainless steel
- Easy sensor mounting to extrude rail T-slot
- Metric- and inch-size bolt available

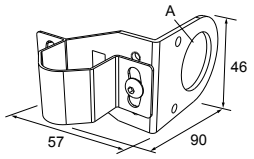
Bolt thread: SMB30FA, A= 3/8 - 16 × 2 in; SMB30FAM10, A= M10 - 1.5 × 50
Hole size: B= ø 30.1



SMB30RAVK

- V-clamp, right-angle bracket and fasteners for mounting sensors to pipe or extrusion
- Clamp accommodates 28 mm dia. tubing or 1 in. square extrusions
- 30 mm hole for mounting sensors

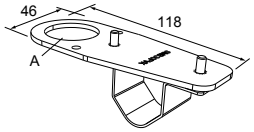
Hole size: A = ø 30.5



SMB30FVK

- V-clamp, flat bracket and fasteners for mounting to pipe or extensions
- Clamp accommodates 28 mm dia. tubing or 1 in. square extrusions
- 30 mm hole for mounting sensors

Hole size: A= ø 31



Warnings (Internal Antenna Models)

Exporting Sure Cross® Radios. It is our intent to fully comply with all national and regional regulations regarding radio frequency emissions. **Customers who want to re-export this product to a country other than that to which it was sold must ensure the device is approved in the destination country.** Consult with Banner Engineering Corp. if the destination country is not on this list.

IMPORTANT: Please download the complete Wireless Q45RDL Remove Device with Light technical documentation, available in multiple languages, from www.bannerengineering.com for details on the proper use, applications, Warnings, and installation instructions of this device.

IMPORTANT: Por favor descargue desde www.bannerengineering.com toda la documentación técnica de los Wireless Q45RDL Remove Device with Light, disponibles en múltiples idiomas, para detalles del uso adecuado, aplicaciones, advertencias, y las instrucciones de instalación de estos dispositivos.

IMPORTANT: Veuillez télécharger la documentation technique complète des Wireless Q45RDL Remove Device with Light sur notre site www.bannerengineering.com pour les détails sur leur utilisation correcte, les applications, les notes de sécurité et les instructions de montage.

WARNING:

- **Do not use this device for personnel protection**
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.

IMPORTANT:

- **Electrostatic discharge (ESD) sensitive device**
- ESD can damage the device. Damage from inappropriate handling is not covered by warranty.
- Use proper handling procedures to prevent ESD damage. Proper handling procedures include leaving devices in their anti-static packaging until ready for use; wearing anti-static wrist straps; and assembling units on a grounded, static-dissipative surface.

Banner Engineering Corp Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

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For patent information, see www.bannerengineering.com/patents.

Notas Adicionales

Información México: La operación de este equipo está sujeta a las siguientes dos condiciones: 1) es posible que este equipo o dispositivo no cause interferencia perjudicial y 2) este equipo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

Banner es una marca registrada de Banner Engineering Corp. y podrán ser utilizadas de manera indistinta para referirse al fabricante. "Este equipo ha sido diseñado para operar con las antenas tipo Omnidireccional para una ganancia máxima de antena de 6 dBd y Yagi para una ganancia máxima de antena 10 dBd que en seguida se enlistan. También se incluyen aquellas con aprobación ATEX tipo Omnidireccional siempre que no excedan una ganancia máxima de antena de 6dBd. El uso con este equipo de antenas no incluidas en esta lista o que tengan una ganancia mayor que 6 dBd en tipo omnidireccional y 10 dBd en tipo Yagi, quedan prohibidas. La impedancia requerida de la antena es de 50 ohms."

Mexican Importer

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