QRC01001 Datasheet

900-MHz Compound-loop Antenna

Applications

- Smart Meters

Features

- Omnidirectional radiation pattern
- Standard low-cost FR4 material
- Superior efficiency across the 860–930 MHz band

Key Specifications

- Average total efficiency
  - 92+%[1] (860 – 930 MHz)
- Peak gain
  - 1.8 – 2.0 dBi[2] (860 – 930 MHz)

Overview

The QuantalRF QRC01001 is a high-efficiency 900-MHz PCB antenna for SM applications. This design is intended to deliver an omnidirectional radiation pattern with linear polarization, stable gain, and superior efficiency across the 860–930 MHz band. It is primarily designed for use as an external antenna; however, its versatile architecture also allows it to be adapted for embedded applications. The base design which is specified in this data sheet can be customized to specific use cases and applications to ensure that all customer demands are met.

[1] This value does not include cable loss which could be estimated in range of 5 to 10% depending on length and quality of cable.

[2] This value does not include cable loss which could be estimated in range of 0.3 to 0.5 dB depending on length and quality of cable & connector.

Contents

1 Antenna Specifications

1.1 Electrical Specifications

Table 1: General specifications

Parameter	Specification
Frequency range	860 – 930 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omnidirectional

Table 2: Detailed specifications

Parameter	860 – 930 MHz
Maximum VSWR	1.5
Minimum return loss (dB)	14.3
Average efficiency (%)	85 (with ~10% reduction to account for the cable loss)
Maximum peak gain (dBi)	1.5 (with ~0.5dB reduction to account for the cable loss)

1.2 Mechanical and Environmental Specifications

Parameter	Specification
Antenna dimensions	130 mm x 15 mm
Antenna type	Integrated on PCB
Material	FR4 ($\varepsilon r = 4.4$, $\tan\delta = 0.02$)
Operating temperature	-40C to +85C
Storage temperature	-40C to +85C

2 Antenna Performance

2.1 VSWR

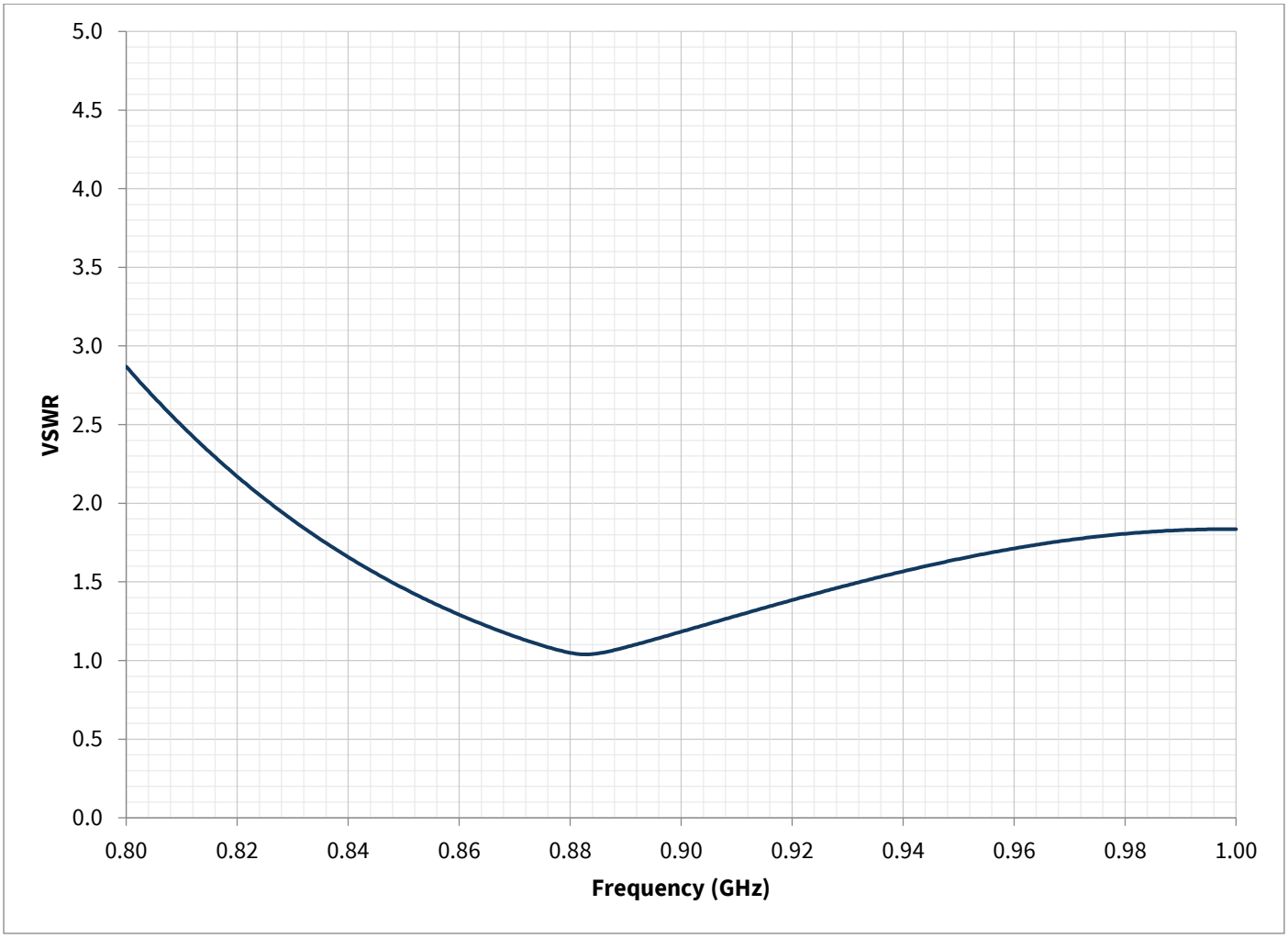


Table 3: 900 MHz VSWR

Frequency (MHz)	**860**	**865**	**870**	**875**	**880**
VSWR	1.4	1.3	1.2	1.2	1.1
Frequency (MHz)	**885**	**890**	**895**	**900**	**905**
VSWR	1.1	1.0	1.1	1.1	1.2
Frequency (MHz)	**910**	**915**	**920**	**925**	**930**
VSWR	1.2	1.3	1.3	1.4	1.4

2.2 Return loss

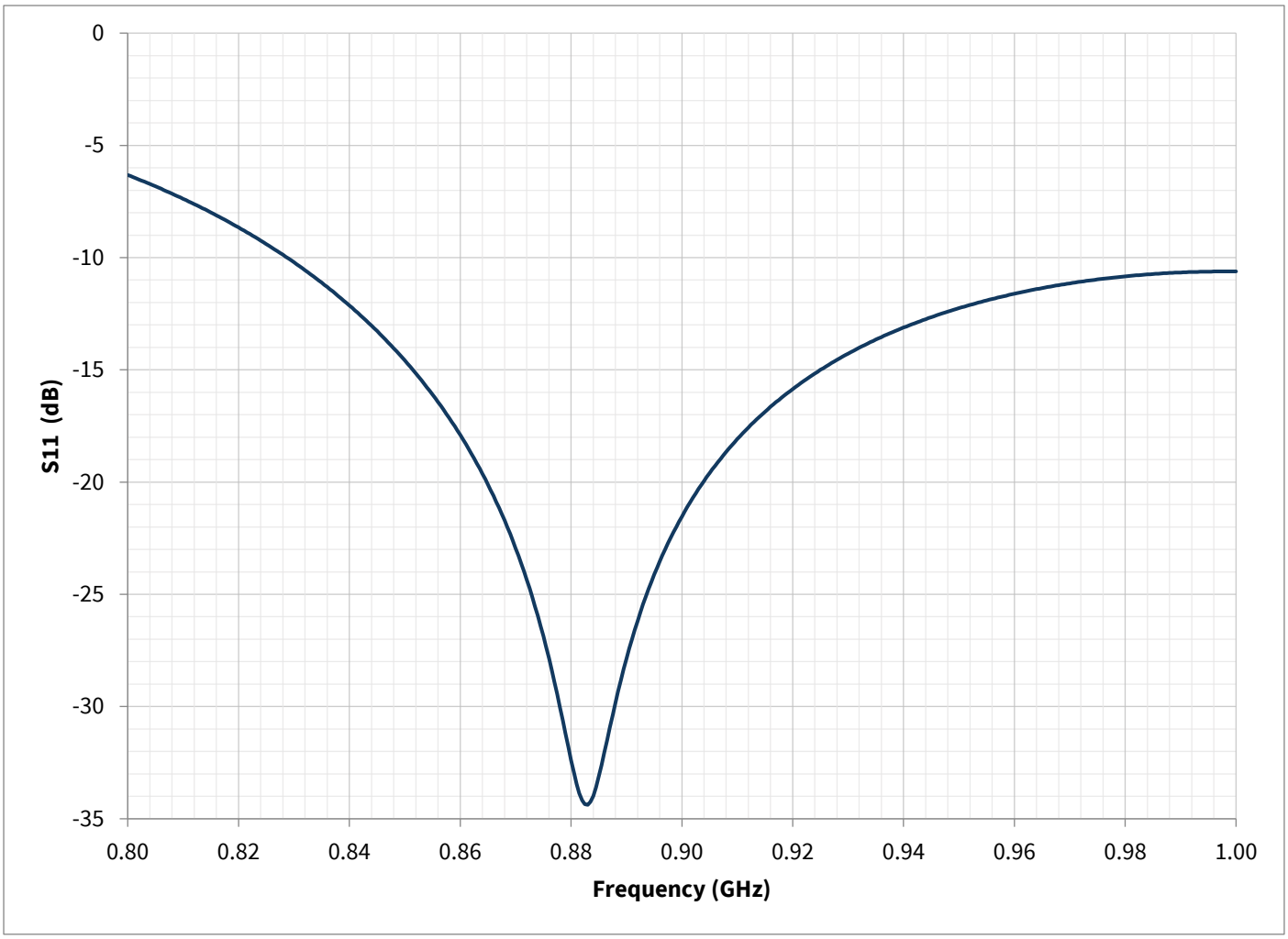


Table 4: 900 MHz Return loss (dB)

Frequency (MHz)	**860**	**865**	**870**	**875**	**880**
Return loss (dB)	15.6	17.3	19.4	22.0	25.5
Frequency (MHz)	**885**	**890**	**895**	**900**	**905**
Return loss (dB)	30.6	34.2	29.3	25.1	22.2
Frequency (MHz)	**910**	**915**	**920**	**925**	**930**
Return loss (dB)	20.1	18.5	17.2	16.1	15.2

2.3 Efficiency

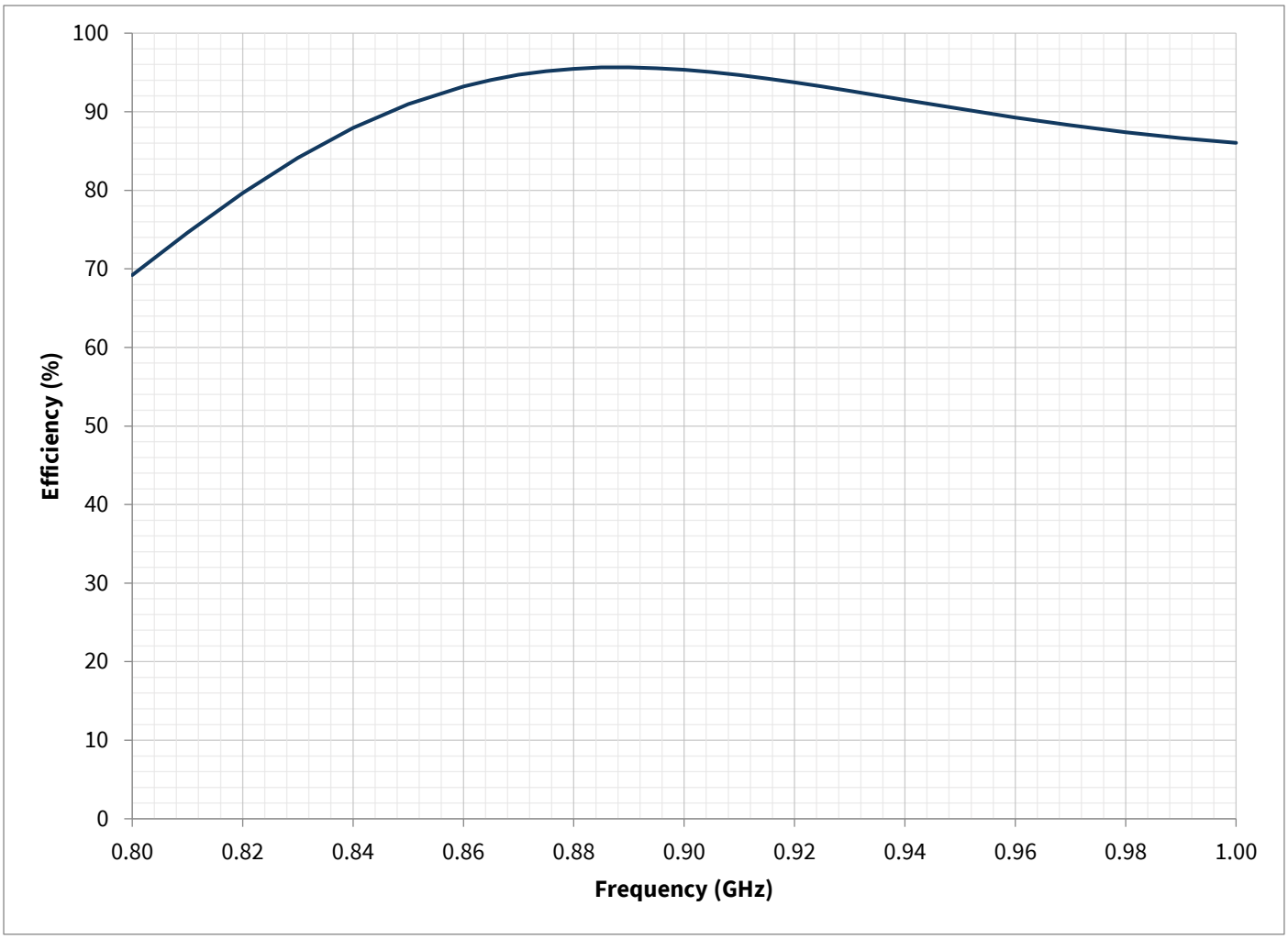


Table 5: 900 MHz Efficiency (%)

Frequency (MHz)	**860**	**865**	**870**	**875**	**880**
Efficiency (%)	93.2	94.0	94.7	95.2	95.5
Frequency (MHz)	**885**	**890**	**895**	**900**	**905**
Efficiency (%)	95.6	95.6	95.5	95.3	95.0
Frequency (MHz)	**910**	**915**	**920**	**925**	**930**
Efficiency (%)	94.7	94.2	93.7	93.2	92.7

2.4 Peak gain

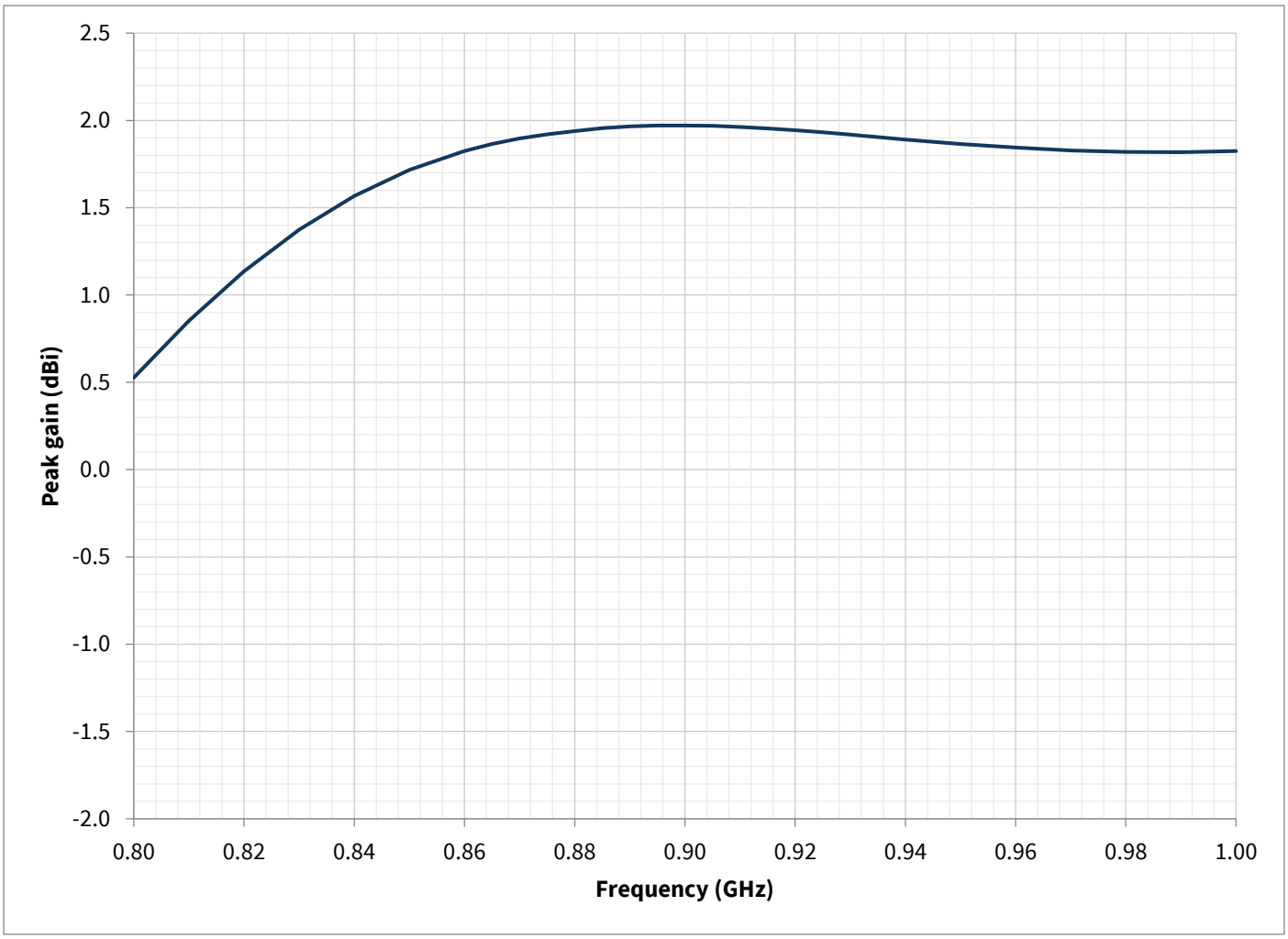
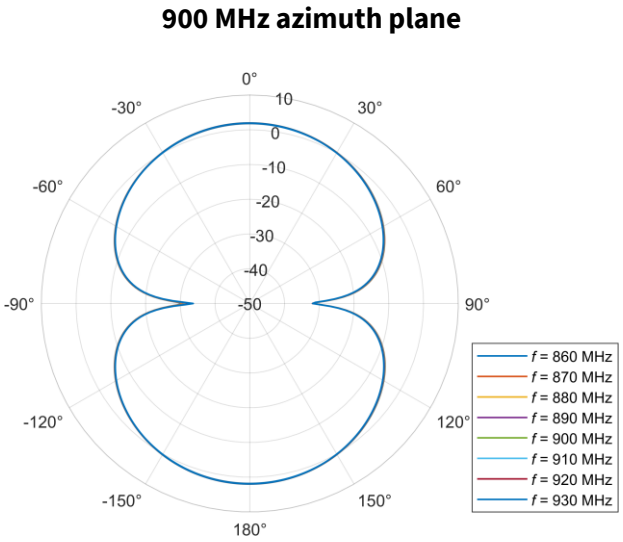


Table 6: 900 MHz Peak gain (dBi)

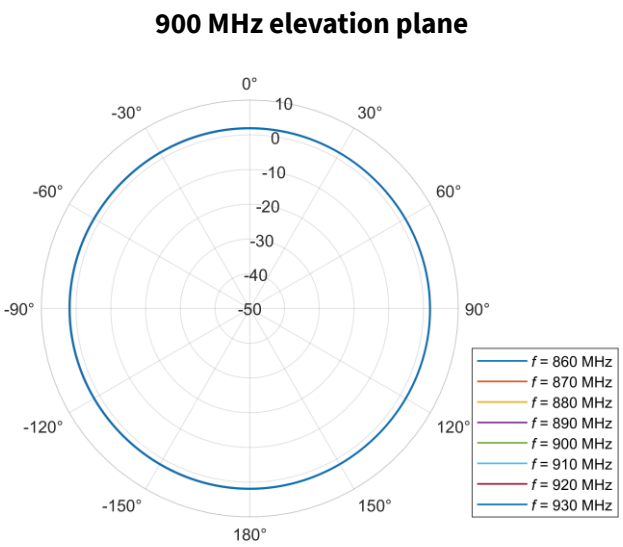
Frequency (MHz)	**860**	**865**	**870**	**875**	**880**
Peak gain (dBi)	1.8	1.9	1.9	1.9	1.9
Frequency (MHz)	**885**	**890**	**895**	**900**	**905**
Peak gain (dBi)	2.0	2.0	2.0	2.0	2.0
Frequency (MHz)	**910**	**915**	**920**	**925**	**930**
Peak gain (dBi)	2.0	2.0	1.9	1.9	1.9

2.5 2D Radiation patterns

2.5.1 Azimuth plane



2.5.2 Elevation plane



RoHS Compliance

The part is compliant with the 2011/65/EU RoHS directive, as amended by Directive 2015/863/EU.

Contact Information

For the latest specifications, additional product information and support:

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Learn more at **quantalrf.com**

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