

4x4 MIMO Outdoor Panel Antenna

by WAVEFORM

SKU: ANT660-NF-PANEL-4X4-OD

Main Features:

- Wideband 4x4 Cross-Polarized MIMO Panel Antenna
- 50 Ω
- 3.5-8.5 dBi
- 600-6000 MHz



Specifications:

Electrical:

Frequency Range	600-698 MHz	698-960 MHz	1710-2700 MHz	3300-6000 MHz
Gain (Peak)	4.0 dBi \pm 0.5 dB	5.5 dBi \pm 0.5 dB	8.0 dBi \pm 0.5 dB	6.5 dBi \pm 0.5 dB
Horizontal Beamwidth	94 \pm 14 deg	107.5 \pm 22.5 deg	76.5 \pm 18.5 deg	58.5 \pm 28 deg
Vertical Beamwidth	86.5 \pm 11.5 deg	93 \pm 15 deg	64 \pm 19 deg	67.5 \pm 44 deg
Front-to-Back Ratio	> 6 dB	> 7 dB	> 13 dB	> 10 dB
VSWR	\leq 2.5	\leq 2.0	\leq 2.0	\leq 2.0
Input Impedance	50 Ω			
Polarization	4x4 Cross-Polarized, \pm 45 deg			
Power Rating (Peak)	50 W			

Mechanical:

Type	Directional
Radome Color	White
Radome Material	ABS (UV Stabilized)
Dimensions	385 x 315 x 68 mm (15.2 x 12.4 x 2.7 inch)
Connector Type	N-Female
Cable Type	RG58
Cable Length	30 cm (12 inch)
Net Weight	1.5 kg (3.3 lbs)
Mounting Type	Pole
Mounting Material	Steel

Environmental:

Protection Class	IP65
Rated Wind Velocity	210 km/h
Operating Temperature	-40 to +65 deg C
Lightning Protection	DC Ground



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4x4 MIMO Outdoor Panel Antenna

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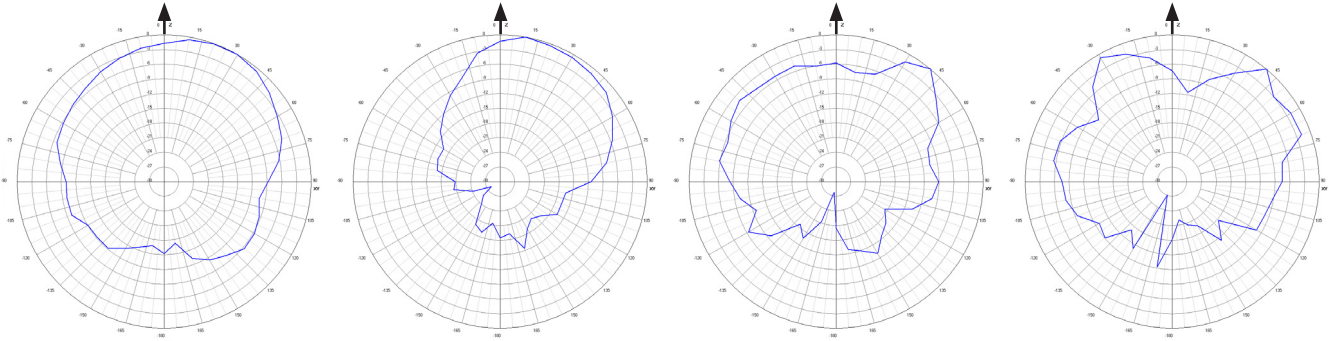
650 MHz

1950 MHz

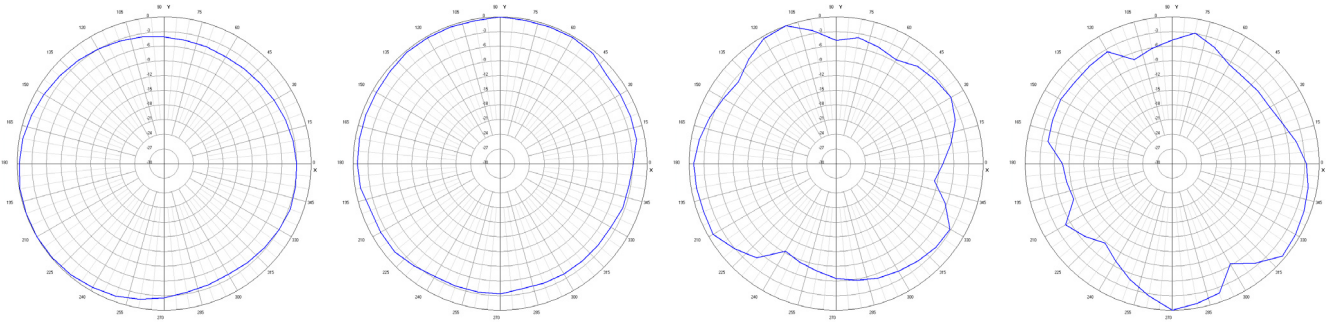
3800 MHz

5400 MHz

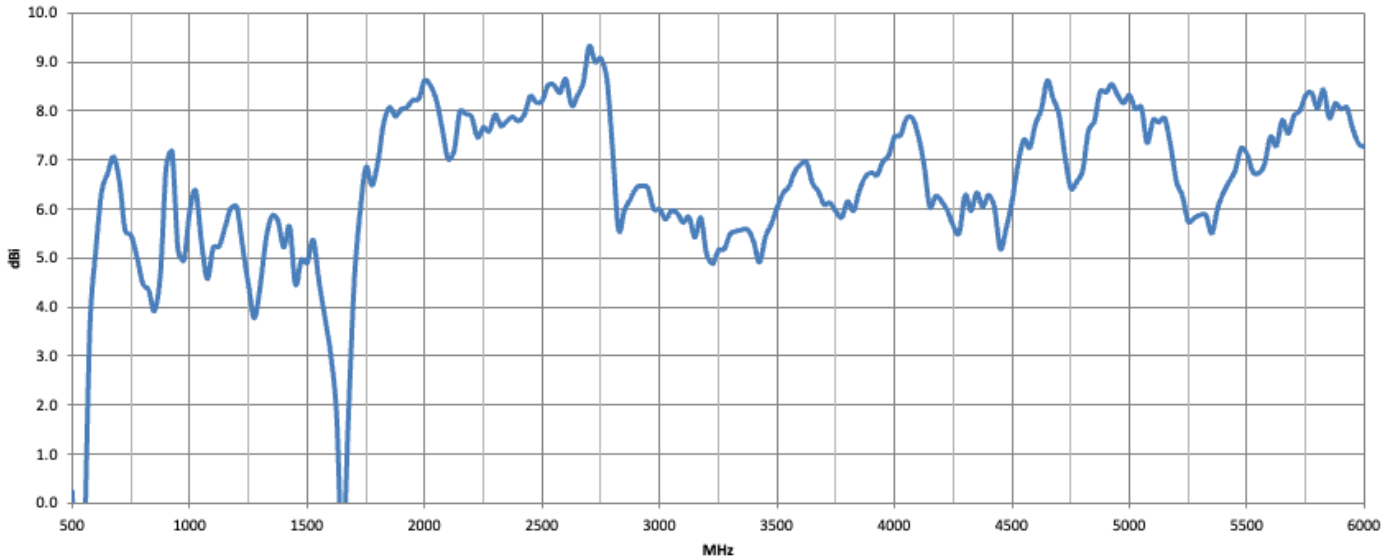
Vertical Plane
"Top-down view"



Horizontal Plane
"Head-on view"



Antenna Broadside Gain (dBi) by Frequency (Mhz)



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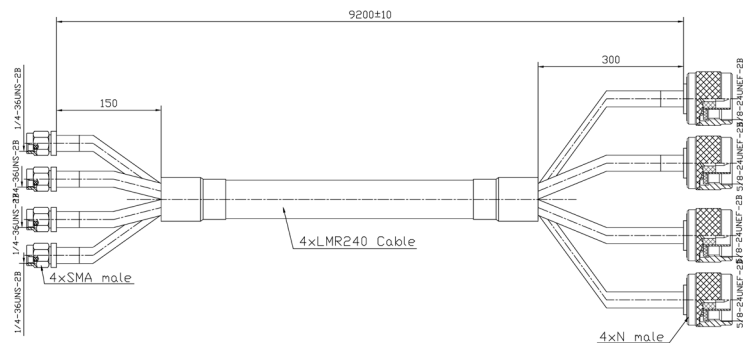
Quad-RS240 N-Male to SMA-Male Coaxial Cable (30ft)

by WAVEFORM

SKU: RS240-QUAD-NM-SMAM-30

Main Features:

- N-Male to SMA-Male connectors
- 0-6000 MHz
- 50 Ω
- 17.8 mm (0.7 inch) diameter cable



Section Description	Material	Plating
N Body	Brass	Nickel
SMA Body	Brass	Gold
Inner Conductor	Aluminum	Copper
Dielectric	FPE	
Outer Conductor	Bonded Aluminum Foil	
Overall Braid	Aluminum-Magnesium Wire	
Jacket (Indiv.)	PVC	
Inter-Cable Fill	PP-Polyester	
Jacket (Group)	PVC	

Specifications:

Electrical:

Input Impedance	50 Ω
Frequency Range	0 - 6000 MHz
VSWR	≤ 1.25
Capacitance	79.4 pF/m
Velocity	84 %
Shielding	> 90 dB
Power Rating (Peak)	5.6 kW
Voltage	1500 V max (Working) 2500 V rms (Withstand)
Contact Resist. (N)	≤ 1 m Ω (Center) ≤ 1 m Ω (Outer)
Contact Resist. (SMA)	≤ 3 m Ω (Center) ≤ 2 m Ω (Outer)
Insulation Resist.	≥ 5000 M Ω

RF Attenuation (per 30 ft):

600 MHz	1.8 dB
900 MHz	2.3 dB
1800 MHz	3.3 dB
2100 MHz	3.5 dB
2500 MHz	3.9 dB
3000 MHz	4.3 dB
4000 MHz	4.9 dB
5000 MHz	5.6 dB
6000 MHz	6.2 dB

Environmental:

Burial Rated?	No
UV Rated?	Yes
Operating Temp.	-55 to +155 deg C

Mechanical:

Jacket Color	Black
Cable Type	RS240 (LMR240)
Cable Diameter (Group)	17.8 mm (0.7 in)
Cable Diameter (Indiv.)	6.1 mm (0.24 in)
Cable Length	9.2 m (30 ft)
Bending Radius	30 mm (1.2 in.)
Connector A Type	N-Male
Connector A Diameter	20.3 mm (0.9 in.)
Connector B Type	SMA-Male
Connector B Diameter	7.9 mm (0.3 in.)
Net Weight	1.82 kg (4.0 lbs)



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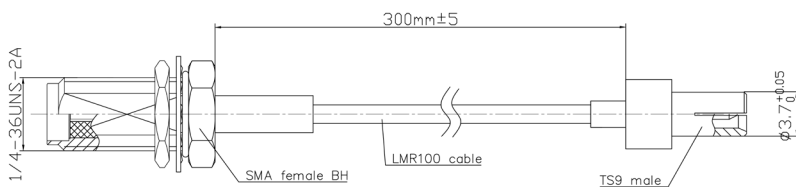
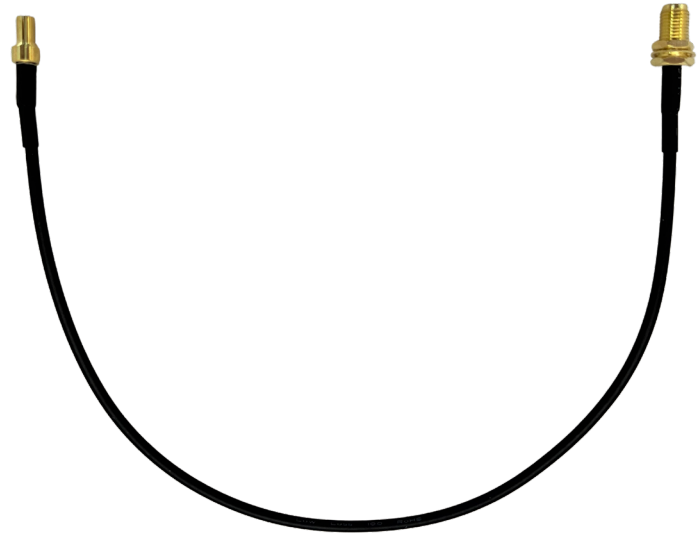
SMA-Female to TS9-Male Pigtail Adapter

by WAVEFORM

SKU: PTA-SMAF-TS9M

Main Features:

- SMA-Female to TS9-Male connector
- 0-6000 MHz
- 50 Ω
- 2.79 mm diam. cabling



Section Description	Material	Plating
SMA Body	Brass	Gold
TS9 Body	Brass	Gold
Crimping Suite	Brass	Nickel
Inner Conductor	Phosphor Bronze	Gold
Jacket	PE	
Gasket	Silicone Rubber	
Dielectric	PTFE	

Specifications:

Electrical:

Input Impedance	50 Ω
Frequency Range	0 - 6000 MHz
VSWR	≤ 1.25
Capacitance	101.1 pF/m
Velocity	66 %
Shielding	> 90 dB
Power Rating (Peak)	0.6 kW
Insertion Loss (Typical)	< 0.4 dB @ 6000 MHz

Mechanical:

Jacket Color	Black
Cable Type	LMR100
Cable Diameter	2.79 mm
Cable Length	30 cm
Bending Radius	6.35 mm
Connector A Type	SMA-Female
Connector A Diameter	7.9 mm
Connector B Type	TS9-Male
Connector B Diameter	3.8 mm
Net Weight	30 g

Environmental:

Burial Rated?	No
UV Rated?	No
Operating Temperature	-40 to +85 deg C



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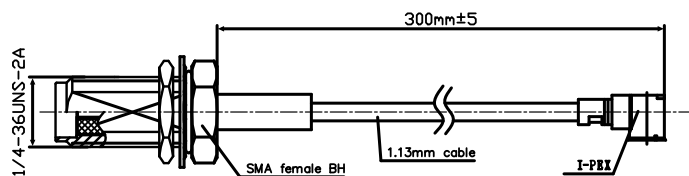
SMA-Female to U.FL Pigtail Adapter

by WAVEFORM

SKU: PTA-SMAF-UFL-V2

Main Features:

- SMA-Female to U.FL-Female connector
- 0-6000 MHz
- 50 Ω
- 1.13 mm diam. cabling



Section Description	Material	Plating
SMA Body	Brass	Gold
I-PEX UFL Body	Brass	Gold
Inner Conductor	Steel	Silver & Copper
Dielectric	PTFE	N/A
Outer Conductor	Copper Braid	Silver
Jacket	FEP	Nickel

Specifications:

Electrical:

Input Impedance	50 Ω
Frequency Range	0 - 6000 MHz
VSWR	≤ 1.15 (Straight) ≤ 1.25 (Right Angle)
Capacitance	95.6 pF/m
Velocity	70 %
Voltage	335 V max (Working) 1000 V rms (Withstand)
Insertion Loss	< 0.7 dB @ 6000 MHz
Contact Resistance	≤ 3 m Ω (Center) ≤ 2 m Ω (Outer)
Insulation Resistance	≥ 5000 M Ω

Mechanical:

Jacket Color	Black
Cable Type	1.13mm
Cable Diameter	1.13 mm (0.05 in.)
Cable Length	30 cm (12 in.)
Bending Radius	4 mm (0.15 in.)
Connector A Type	SMA-Female Bulk-head
Connector A Angle	Straight
Connector A Diameter	7.0 mm (0.27 in.)
Connector B Type	U.FL-Female
Connector B Angle	Right-Angle
Connector B Diameter	2.0 mm (0.8 in.)
Net Weight	15 g (0.5 oz)

Environmental:

Burial Rated?	No
UV Rated?	No
Operating Temp.	-40 to +85 deg C



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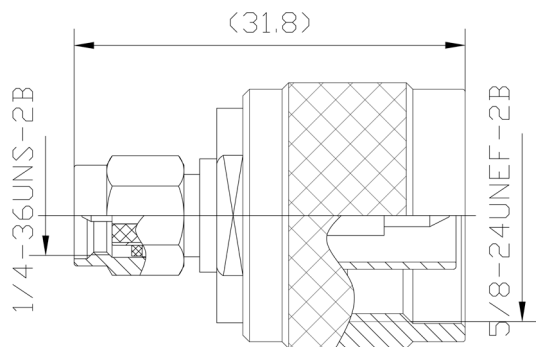
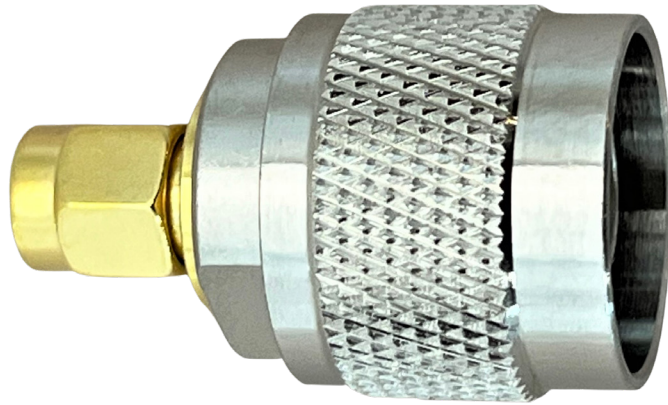
N-Male to SMA-Male Adapter

by WAVEFORM

SKU: ADT-NM-SMAM

Main Features:

- N-Male to SMA-Male connector
- 0-6000 MHz
- 50 Ω



Section Description	Material	Plating
N Body	Brass	Nickel
SMA Body	Brass	Gold/Nickel
Inner Conductor	Phosphor Bronze	Gold/Silver
Gasket	Silicone Rubber	
Dielectric	PTFE	

Specifications:

Electrical:

Input Impedance	50 Ω
Frequency Range	0 - 6000 MHz
VSWR	≤ 1.3
Insertion Loss (Typical)	.15 dB @ 6000 MHz

Mechanical:

Connector Length	31.8 mm
Connector A Type	N-Male
Connector A Diameter	20.3 mm
Connector B Type	SMA-Male
Connector B Diameter	7.9 mm
Net Weight	45 g

Environmental:

Burial Rated?	No
UV Rated?	Yes
Operating Temperature	-55 to +150 deg C



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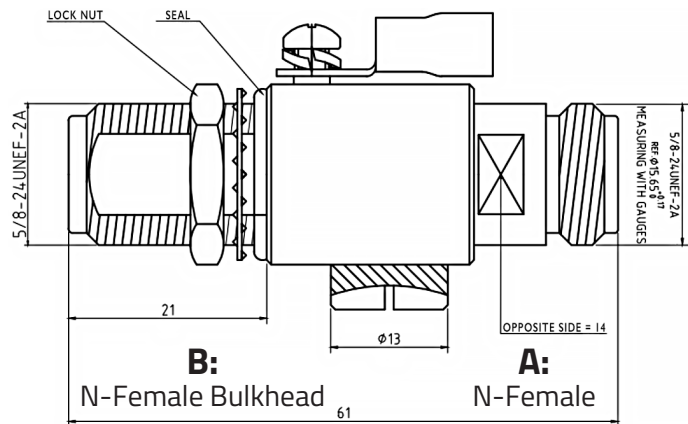
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50 Ohm Lightning Surge Protector Kit

by WAVEFORM

SKU: WF-LSP-50-KIT



Main Features:

- N-Female to N-Female Bulkhead Surge Protector
- 0-6000 MHz Frequency Support
- 50 Ω Impedance
- 5 ft 10 AWG Grounding Wire
- 5 ft RS240 N-Male to N-Male Jumper Cable

Surge Protector Specifications:

Electrical:

Frequency Range	0 - 6000 MHz
VSWR (DC)	≤ 1.25
Insertion Loss	≤ 0.25 dB
Input Impedance	50 Ω
Insulation Resistance	≥ 5000 M Ω
Transmission Power	200 W
Gas Tube Breakdown Voltage (DC)	90 V
Withstanding Voltage (50 Hz, at sea level)	≥ 2500 V RMS
Working Voltage (50 Hz, at sea level)	≤ 1000 V RMS
Maximum Impulse Discharge Current (8/20 μ s)	20 KA 2000 J
Contact Resistance (Center Contact)	≤ 0.4 m Ω
Contact Resistance (Outer Contact)	≤ 0.2 m Ω

Mechanical:

Dimensions	22.7 mm \varnothing x 61.0 mm
Connector A Type	N-Female
Connector B Type	N-Female Bulkhead
Connector Body	Nickel Plated Brass
Body	Nickel Plated Brass
Pin Material	Gold Plated Brass
O-Ring Material	Rubber
Ground Connection	By Feedthrough or Screw Terminal
Net Weight	0.13 kg
NFPA Rated?	No
ROHS Compliant?	Yes

Environmental:

Protection Class	IP67
Operating Temperature	-55 to +155 deg C



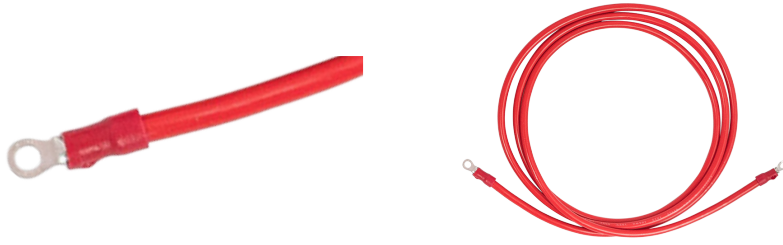
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50 Ohm Lightning Surge Protector Kit

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Grounding Cable Specifications:

Electrical:		Mechanical:		Environmental:	
Voltage Rating (AC)	600 V	Jacket Color	Red	UV Rated?	No
		Cable Type	Copper	Operating Temperature	-55 to +155 deg C
		Cable Diameter	6 mm		
		AWG	10 AWG		
		Cable Length	1.5 m (5 ft)		
		Connector Type	Ring Terminal		
		Connector Hole Diameter	4 mm		
		Net Weight	0.07 kg		
		NFPA Rated?	No		



Jumper Cable Specifications:

Electrical:		Mechanical:		Cable Layers:			
Input Impedance	50 Ω	Jacket Color	Black	#	Description	Material	Diam.
Frequency Range	0 - 6000 MHz	Cable Type	RS240	1	Jacket	PVC	6.10 mm
VSWR	≤ 1.0:1	Cable Diameter	6.10 mm	2	Outer Shield	Copper Braid	4.12 mm
Capacitance	< 79 pF/m	Cable Length	1.5 m (5 ft)	3	Inner Shield	Aluminum Foil	3.94 mm
Velocity	> 84 %	Bending Radius	19.1 mm	4	Dielectric	PE	3.81 mm
Shielding	> 90 dB	Connector Type	N-Male	5	Inner Conductor	Copper	1.42 mm
Power Rating (Peak)	5.6 kW	Connector Diameter	20.3 mm				
		Net Weight	0.15 kg				
		NFPA Rated?	No				
		ROHS Compliant?	Yes				
				Environmental:			
				Protection Class	IP67		
				UV Rated?	Yes		
				Operating Temperature	-40 to +85 deg C		



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