Patterson Group

Fire Systems Division

Bi-Directional Amplifier (BDA) System

Signal Boosting Solution designed to enhance in-building radio frequency (RF) Signal Coverage for Public Safety Radios

Submittal Data For:

Erwin Elementary School

BDA

301 S. 10th St.

Erwin, NC 28339

229 Carthage Street, Sanford, N.C. 27330 • (P)(919) 776-2403 • (F)(919) 718-6091

ERWIN ELEMENTARY SCHOOL

301 S 10th St
ERWIN, NC, US

TYPE: DISTRIBUTED ANTENNA SYSTEM DESIGN
DATE: 01/07/2021

NOTIFIER® by Honeywell

DESIGN CRITERIA

ASSUMPTIONS:

- -70 dBm OR BETTER SIGNAL AVAILABLE AT THE PROPOSED DONOR ANTENNA LOCATION
- 20 dB OR BETTER OF ISOLATION BETWEEN DONOR AND INDOOR ANTENNAS
- 32 CHANNELS FOR 700/800 MHz SYSTEM
- ALL PASSIVE DEVICES (DIRECTIONAL COUPLERS, SPLITTERS) ARE INSTALLED INSIDE JUNCTION BOXES WITH PROPER SPACING FOR CONNECTIONS.
- 24 HR BATTERY BACKUP SYSTEM IS INCLUDED
- ALL EQUIPMENT AND CABLING CAN BE INSTALLED AS DESIGNED
- FINAL ANTENNA LOCATION TO BE DETERMINED BY SYSTEM INTEGRATOR
- INSTALLER TO HAVE A VARIETY OF ATTENUATORS ON HAND TO BALANCE SYSTEM DURING COMMISSIONING STAGE

NOTES

COVERAGE AREA INCLUDES 1ST FLOOR, 2ND FLOOR
HONEYWELL NOTIFIER BDA: CLASS B, 0.5 WATTS COMPOSITE OUTPUT POWER
PASSIVE DAS OPERATIONAL RANGE 698-2700 MHZ
BDA LOCATED ON THE 2ND FLOOR
REMOTE ANNUNCIATOR TO BE INSTALLED AT FIRE CONTROL COMMAND ROOM AT LEVEL 1
DONOR ANTENNA AND ALL POWERED EQUIPMENT SHALL BE CONNECTED TO THE BUILDING GROUNDING SYSTEM.
DONOR ANTENNA SHALL BE CONNECTED TO LIGHTNING PROTECTION SYSTEM (IF EXISTING IN THE BUILDING).
PREDICTION HEATMAP OUTPUTS ARE BASED ON VARIABLE PATH LOSS

REVISIONS

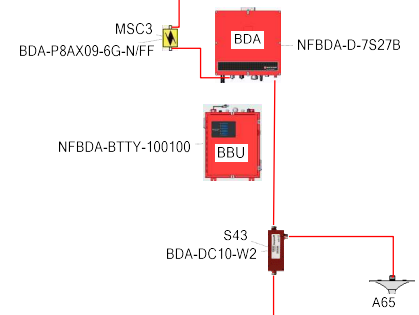
VERSION 1: ORIGINAL, DATE: 02/05/2021

NOTIFIER® by Honeywell
ERWIN ELEMENTARY SCHOOL
301 S 10th ST
ERWIN, NC, US

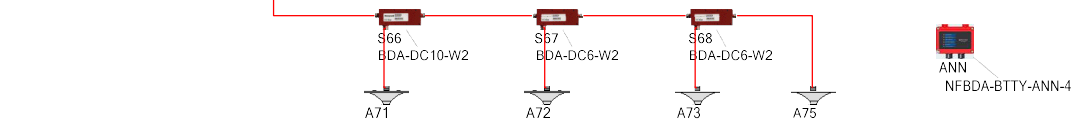
Legend

- Donor Antenna, Yagi Directional 763-869MHz, 14dBi — BDA-YDA763869-14-1
- Omni indoor 698-869MHz 3dBi, Low Profile — BDA-OIA-698869-3-1
- RF DIRECTIONAL COUPLER, 698-2690 MHz, 300W — BDA-DCx-W2
- POWER SPLITTER, 698-2700 MHz. Broadband power splitter, 2 way, 50W — BDA-PS2-W2
- Coaxial RF Surge Protector, DC - 6GHz, 90W, IP67, 60 V Max — BDA-P8AX09-6G-N/FF
- Coaxial Cable Jumper NM-NM 1/4" Superflex, Outdoor UV, 48" long — BDA-NM-RG8-13-NM
- 1/2in Plenum coax cable Rated/ Indoor/ Outdoor Usage/ Color Red — BDA-ICA12-JPLLR-1K
- Coaxial Cable Grounding Kit — BDA-GNDKIT1
- Weatherproofing Silicone Coldshrink for EOL Assembly, 9.8"L — BDA-WPK-ATBC40_01
- 700/800MHz BDA, class B, 0.5W, DC — NFBDA-D-7S27B
- Battery Backup (BBU) 100AH, 24VDC — NFBDA-BTTY-100100
- Remote annunciator without dry contacts (ANN1) — NFBDA-BTTY-ANN-4

ROOF



FLOOR 2



FLOOR 1

NOTIFIER by Honeywell

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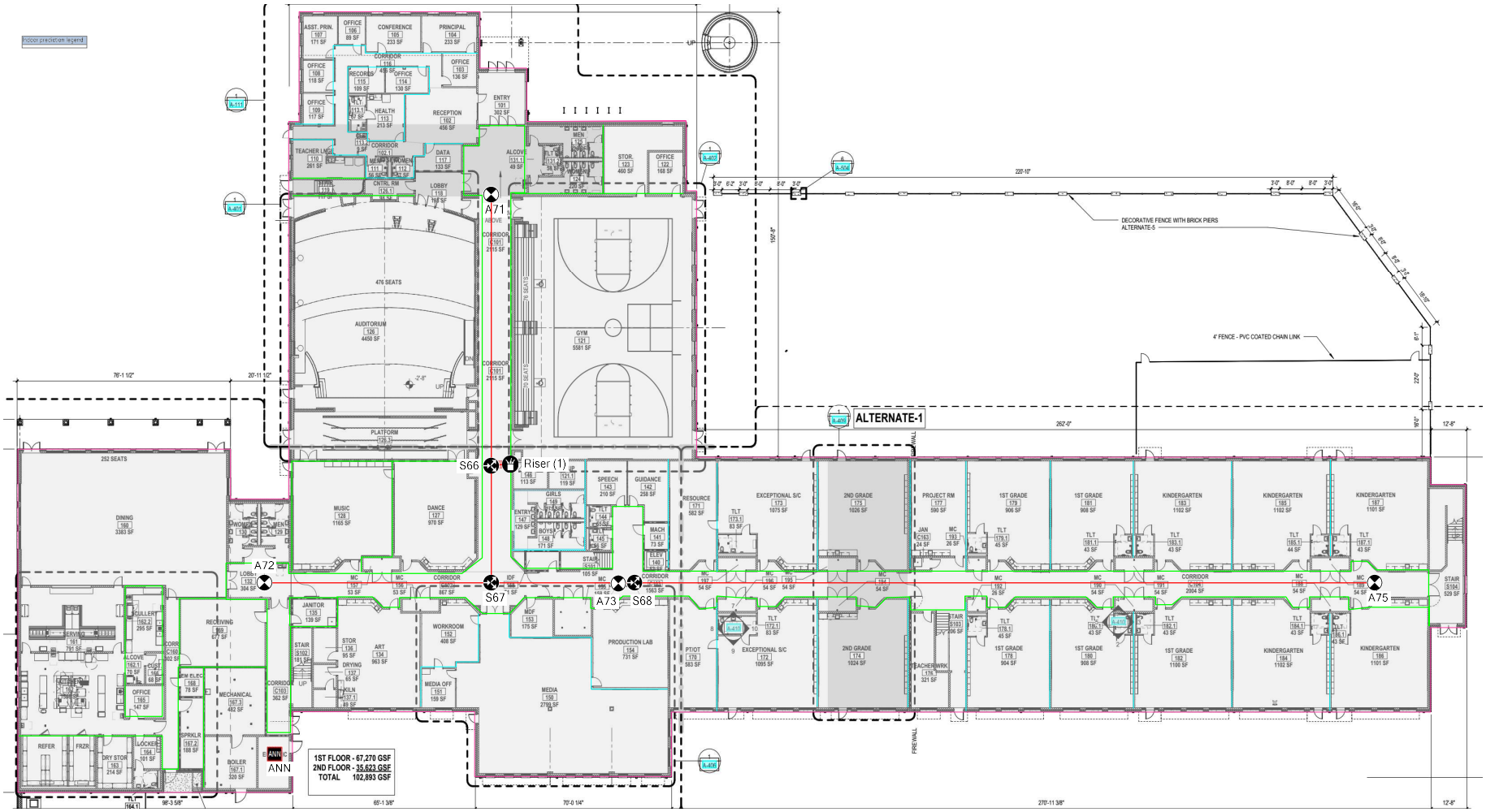
ERWIN, NC, US



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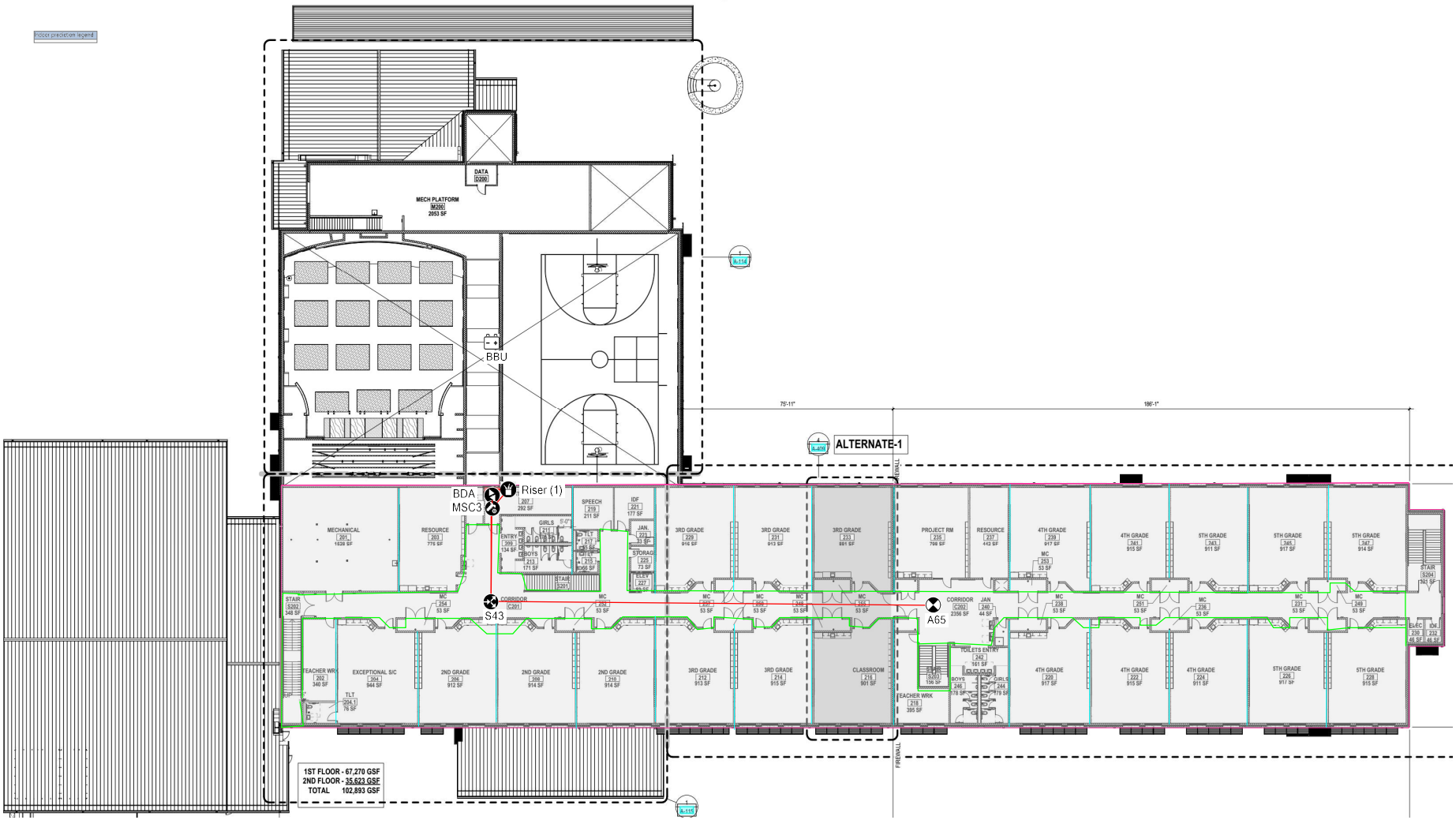

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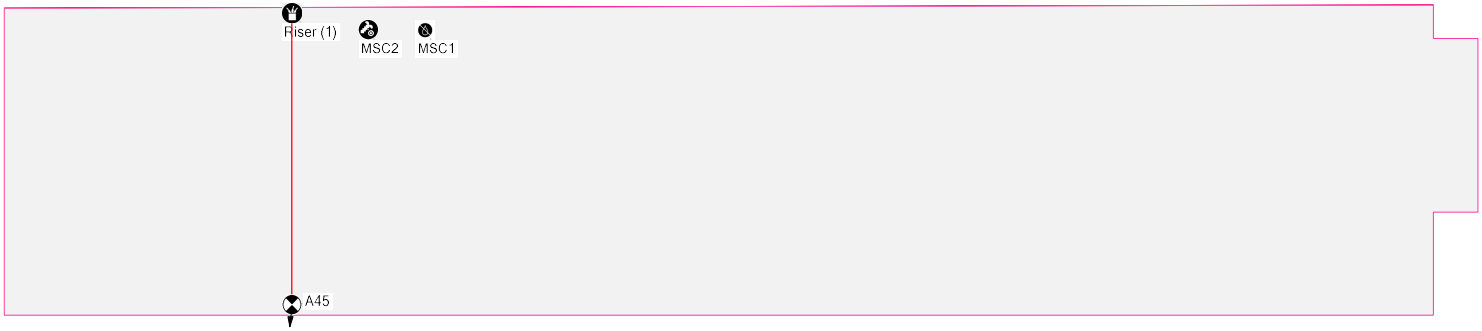

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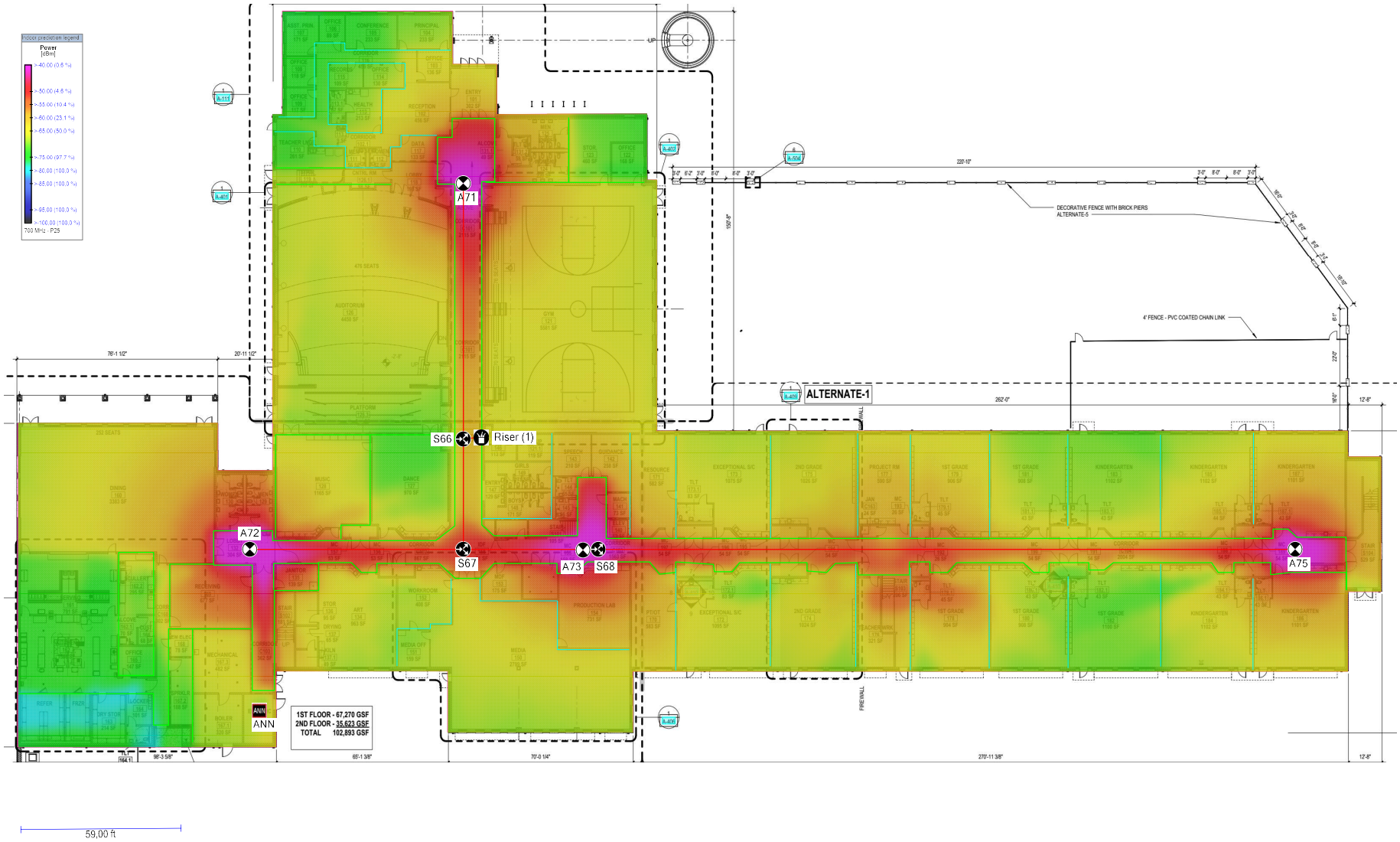

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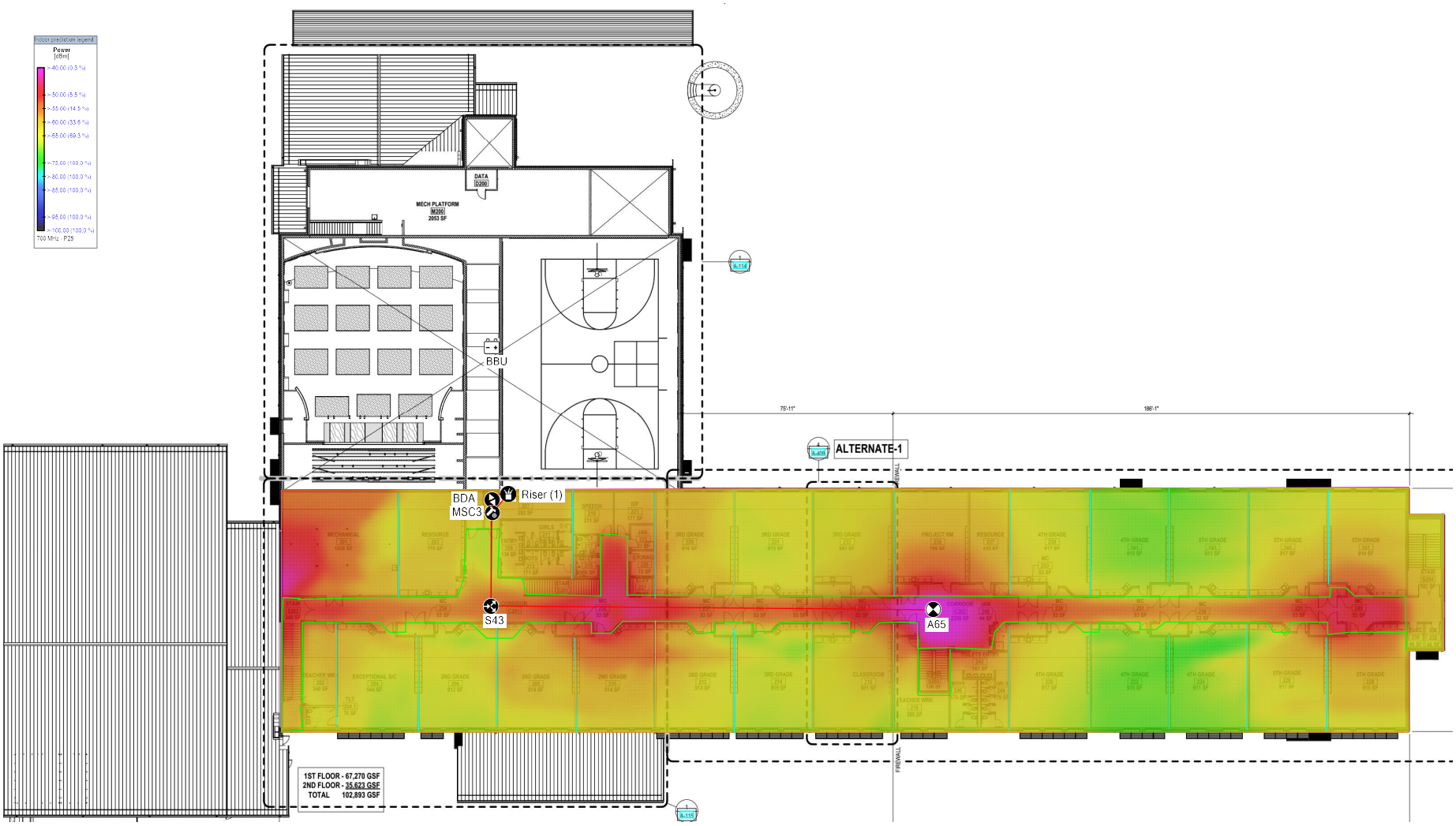

68.00 ft

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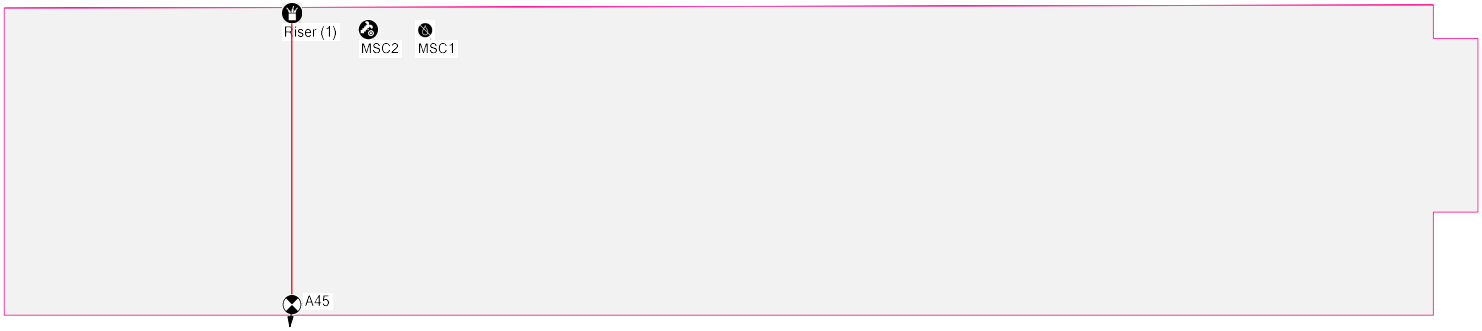

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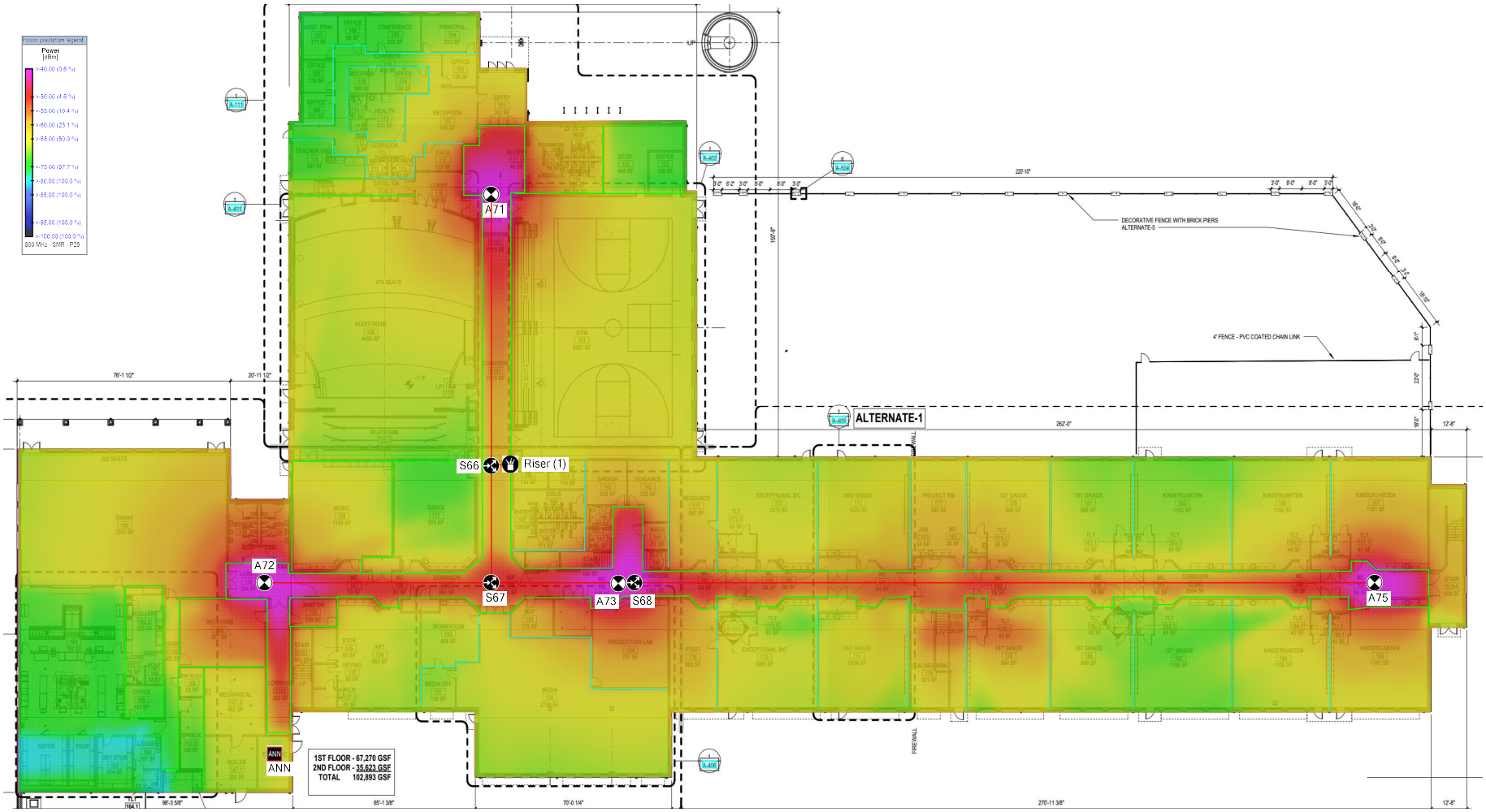

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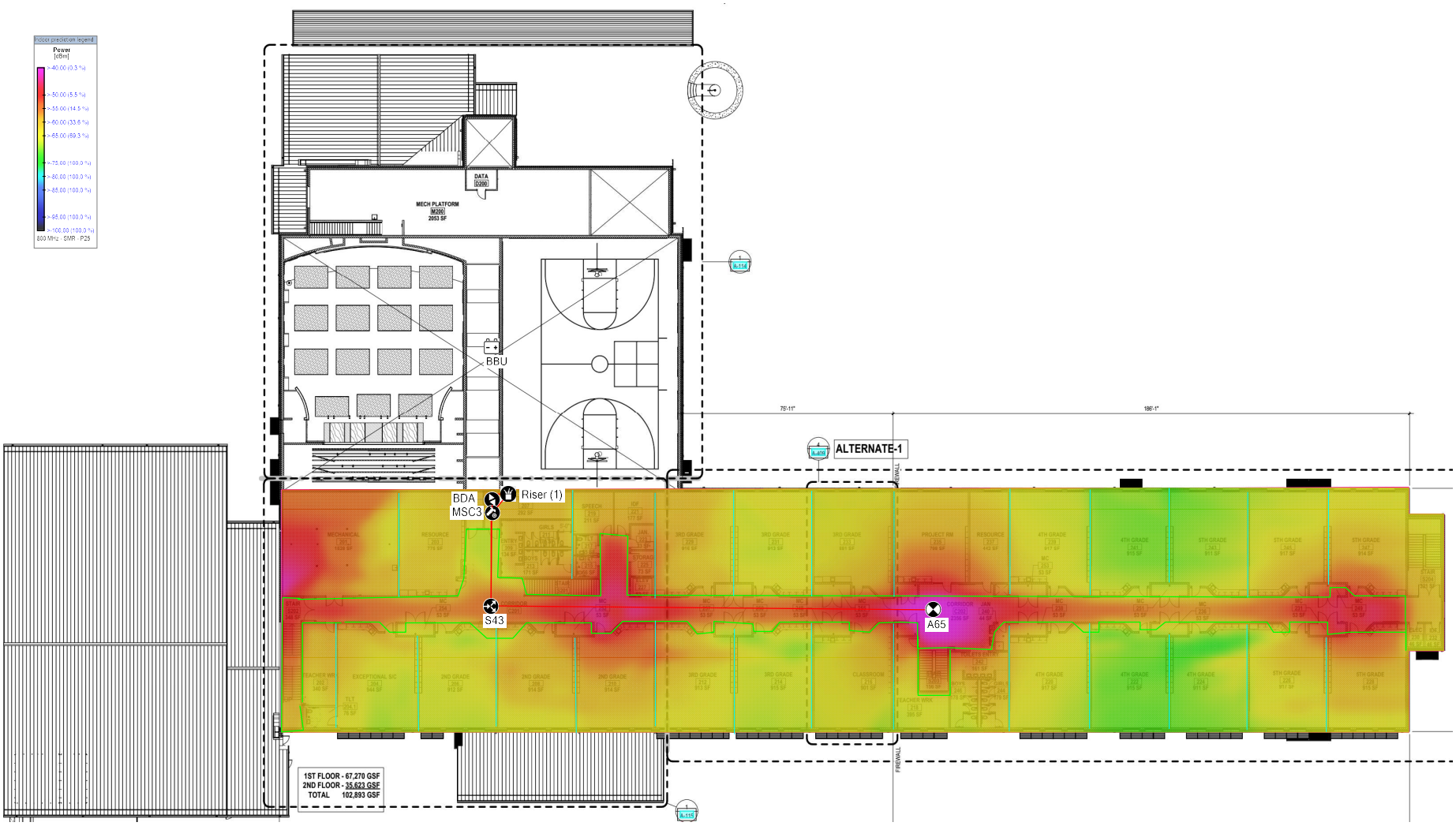

68.00 ft

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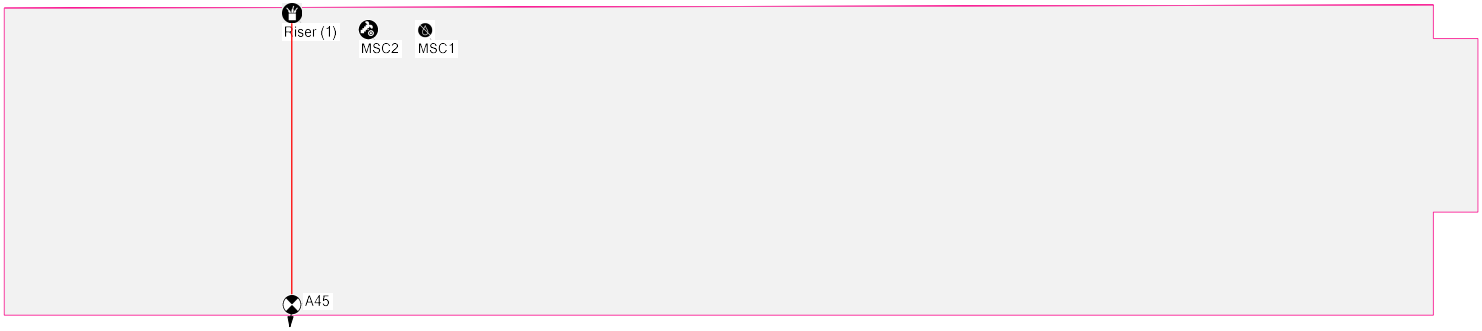

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NOTIFIER by Honeywell

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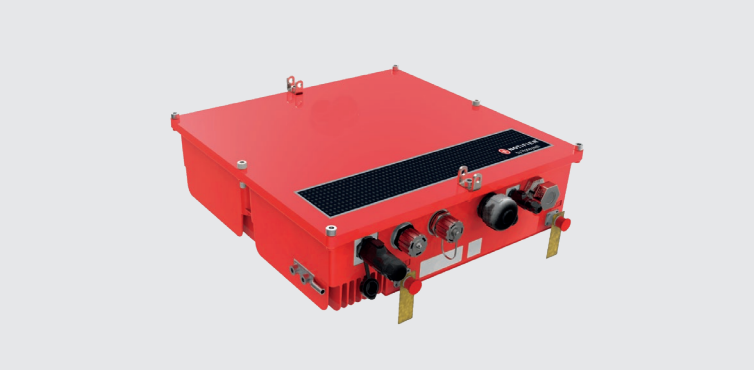
PS 700 + PS 800
DIGITAL SIGNAL BOOSTERS

NFBDA-A
NFBDA-D



Product Features

- Supports Public Safety 700 & 800 MHz in single or dual band versions
- FirstNet Band 14 available
- Channel Selective, software programmable or adjustable bandwidths
- Fully digital signal boosters, FPGA based
- US and Canada 700MHz band compatible, software adjustable
- Auto diagnostic
- Uplink and downlink squelch, per channel and per time slot on channel selective mode
- User adjustable gain control, UL and DL independent, per band, per channel and per time slot on channel selective mode
- Automatic gain control per band, per channel, per time slot
- Oscillation detection with alarm and auto-shutdown
- Antenna Isolation measurement feature
- Antenna Isolation alarm
- Built-in input and output spectrum analyzer
- Weatherproof enclosure, IP67/NEMA4X
- NFPA compliant with dry contact alarms
- PS700 and PS800 High capacity versions (64 channels)
- Country of Origin: USA
- 3-year warranty
- IFC & NFPA compliance; UL2524 2nd Edition Listing

Applications

- For P25 Phase I & Phase II, DMR, NXDN and Conventional systems.
- Indoor coverage: buildings, schools, hospitals, casinos, tunnels, metro stations.
- Outdoor coverage: oil rigs, stadiums, dense urban areas, rural areas.

Specification	Value
Type	Single and Dual Band Digital Signal Boosters
Frequency range	758-775 / 788-805 MHz or 764-776 / 794-806 MHz (software adjustable) & 806-824 / 851-869MHz
Passband BW. min	Channel Selective (150KHz, 100Khz, 75KHz, 62.5KHz, 50KHz, 37.5KHz, 25KHz and 12.5KHz) or 100KHz to full band (depends of configuration)
Number of Passband	PS700 + FirstNet Class B: 1 FirstNet + 1 BWA PS700 + FirstNet Class A: 32 channel filters + 1 FirstNet + 1 BWA PS700 + FirstNet High Capacity: 64 filters + 1 FirstNet PS800 Class B: 2 BWA PS800 Class A: 32 channel filters + 2 BWA PS800 + High Capacity: 64 filters PS700 + FirstNet + PS800: Class B: 2 BWA per band PS700 + FirstNet + PS800: Class A: 32 channel filters + 2 BWA per band
Channel Filter Options	150KHz, 100Khz, 75KHz, 62.5KHz, 50KHz, 37.5KHz, 25KHz and 12.5KHz
BWA Filters	Adjustable from 100KHz to fullband in step in steps of 50KHz
Gain, maximum	85 dB
Passband ripple	+/- 2.0 dB
Gain, manual control	30dB range, digitally controlled in 1dB steps, per link, per band

DOC DN-62053.11 • 01052021 • MDG

NOTIFIER® by Honeywell

PS 700 + PS 800
DIGITAL SIGNAL BOOSTERS

NFBDA-A
NFBDA-D

Antenna isolation	Max Gain + 20dB
Composite output power, DL	+33dBm or +27dBm (depending on configuration) per band
Composite output power, UL	+27dBm
IMD	< -13dBm
Noise figure	9.0dB max
Group delay	Channel Selective 150KHz, 11.5µS Channel Selective 100KHz, 13.5µS Channel Selective 75KHz, 16.0µS Channel Selective 62.5KHz, 18.0µS Channel Selective 50KHz, 21.0µS Channel Selective 37.5KHz, 25.5µS Channel Selective 25KHz, 35.0µS Channel Selective 12.5KHz, 61.5µS or Band Selective: 3.5 to 6.5µS, depending on BWA
Maximum input power, no damage	+5dBm (UL) +5dBm (DL)
Maximum input power, normal operation	0dBm (UL) 0dBm (DL)
Connectors	N(f) as standard
RF Input/Output impedance	50Ω
Uplink squelch function	Yes, user selectable, to avoid UL noise when no carriers present, per band, per time slot and per channel (on channel selective mode)
Self diagnostic platform	Microprocessor based
Alarms	Yes, amplifiers status, power amplifiers status, power supply failure, temperature, AGC, RF overload, donor antenna failure, VSWR Indoor.
Local management and supervising	Local access via USB
RoHS compliance	Yes
Power Supply	AC 110 VAC, 50/60 Hz or DC +24VDC & -48VDC (depending on configuration)
Power consumption	80W in dual band, 62W in single band
Housing	IP67 / NEMA4X
Temperature range	-13° to 131° F • -25° to +55° C
Cooling	Natural convection
Weight	52.9 lbs • 24 kg
Dimension	17.7 x 17.3 x 5.1 in • 450 x 440 x 130 mm
Mounting	Wall or pole mounting (Rack mounting option available)
MTBF	250000 hours

DOC DN-62053.11 • 01052021 • MDG

NOTIFIER® by Honeywell

PS 700 + PS 800
DIGITAL SIGNAL BOOSTERS

NFBDA-A
NFBDA-D

Configurations	CLASS A			
Bands	**+33 dBm AC**	**+33 dBm DC**	**+27 dBm AC**	**+27 dBm DC**
700 + FirstNet	NFBDA-A-733A	NFBDA-D-733A	NFBDA-A-727A	NFBDA-D-727A
800 MHz	NFBDA-A-S33A	NFBDA-D-S33A	NFBDA-A-S27A	NFBDA-D-S27A
800 + 700 + FirstNet	NFBDA-A-7S33A	NFBDA-D-7S33A	NFBDA-A-7S27A	NFBDA-D-7S27A
700MHz High Capacity	NFBDA-A-733AH	NFBDA-D-733AH	NFBDA-A-727AH	NFBDA-D-727AH
800MHz High Capacity	NFBDA-A-S33AH	NFBDA-D-S33AH	NFBDA-A-S27AH	NFBDA-D-S27AH

Configurations	CLASS B			
Bands	**+33 dBm AC**	**+33 dBm DC**	**+27 dBm AC**	**+27 dBm DC**
700 + FirstNet	NFBDA-A-733B	NFBDA-D-733B	–	–
800 MHz	NFBDA-A-S33B	NFBDA-D-S33B	–	–
800 + 700 + FirstNet	NFBDA-A-7S33B	NFBDA-D-7S33B	NFBDA-A-7S27B	NFBDA-D-7S27B

Upgrade License PN	DESCRIPTION
BDA-LIC-S33B-S33A	Digital 700/800 BDA Upgrade License - Single Band 2W Class B to Single Band 2W Class A
BDA-LIC-D33B-D33A	Digital 700/800 BDA Upgrade License - Dual Band 2W Class B to Dual Band 2W Class A
BDA-LIC-S33B-D33B	Digital 700/800 BDA Upgrade License - Single Band 2W Class B to Dual Band 2W Class B
BDA-LIC-S33A-D33A	Digital 700/800 BDA Upgrade License - Single Band 2W Class A to Dual Band 2W Class A
BDA-LIC-S33B-D33A	Digital 700/800 BDA Upgrade License - Single Band 2W Class B to Dual Band 2W Class A
BDA-LIC-S27A-S33A	Digital 700/800 BDA Upgrade License - Single Band 0.5W Class A to Single Band 2W Class A
BDA-LIC-D27A-D33A	Digital 700/800 BDA Upgrade License - Dual Band 0.5W Class A to Dual Band 2W Class A
BDA-LIC-S27A-D27A	Digital 700/800 BDA Upgrade License - Single Band 0.5W Class A to Dual Band 0.5W Class A
BDA-LIC-S27A-D33A	Digital 700/800 BDA Upgrade License - Single Band 0.5W Class A to Dual Band 2W Class A
BDA-LIC-D27B-D33B	Digital 700/800 BDA Upgrade License - Dual Band 0.5W Class B to Dual Band 2W Class B
BDA-LIC-D27B-D27A	Digital 700/800 BDA Upgrade License - Dual Band 0.5W Class B to Dual Band 0.5W Class A
BDA-LIC-D27B-D33A	Digital 700/800 BDA Upgrade License - Dual Band 0.5W Class B to Dual Band 2W Class A

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WARNING: This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENCE or express consent of an FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

NOTIFIER
12 Clintonville Road
Northford, CT 06472
203.484.7161
www.notifier.com

DN-62053.11 • 01052021

NOTIFIER® by Honeywell

BATTERY BACKUP SYSTEMS

NFBDA-BTTY-100xxx

Product Features

- NFPA Compliant
- Up to 24 hour version
- AC Input, 24 Volt DC Output
- NEMA-4 Rated BBU Enclosure
- Up to 4 Annunciators may be connected to one BBU
- Tamper Proof with Lock and Key Accessibility
- Flush Wall Mounted Annunciators
- IFC & NFPA compliance; UL2524 2nd Edition
- Country of Origin: USA
- 3-year warranty (excluding batteries)
- Common Battery Backup Systems to support BDA, Fiber DAS Master/Remote
- Integrated NOTIFIER Addressable Monitor Module XP10-M in order to connect to NOTIFIER's SLC loop for monitoring of the BDA status at the fire alarm control panel.

Specification	Value
Type	Battery Backup Unit
Input	120 VAC 50/60 Hz
Size	24 x 20 x 10 in

Specifications	**BTTY-100050**
Storage capacity	100W / 12hs
Annunciator	AC Power Normal AC Power Failure Battery Capacity <30% Battery Charger Fail Donor Antenna Disconnection Donor Antenna Malfunction RF Emitter Fail System Component Fail
Max Load	270 W (contact Honeywell for battery duration at different loads)
Batteries	Included
BDA Annunciator	Built in, port for additional external annunciators
Weight (batteries included)	150lbs

Specifications	**BTTY-100100**
Storage capacity	100 W / 24 hs or 200 W / 12 hs
Annunciator	AC Power Normal AC Power Failure Battery Capacity <30% Battery Charger Fail Donor Antenna Disconnection Donor Antenna Malfunction RF Emitter Fail System Component Fail

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NOTIFIER® by Honeywell

Max Load	270 W (contact Honeywell for battery duration at different loads)
Batteries	Included
BDA Annunciator	Built in, port for additional external annunciators
Weight (batteries included)	210lbs

Specifications	**BTTY-100050N**
Storage capacity	100W / 12hs
Annunciator	AC Power Normal AC Power Failure Battery Capacity <30% Battery Charger Fail Donor Antenna Disconnection Donor Antenna Malfunction RF Emitter Fail System Component Fail
Max Load	270 W (contact Honeywell for battery duration at different loads)
Batteries	Not Included
BDA Annunciator	Built in, port for additional external annunciators
Weight	30lbs

Specifications	**BTTY-100100N**
Storage capacity	100 W / 24 hs or 200 W / 12 hs
Annunciator	AC Power Normal AC Power Failure Battery Capacity <30% Battery Charger Fail Donor Antenna Disconnection Donor Antenna Malfunction RF Emitter Fail System Component Fail
Max Load	270 W (contact Honeywell for battery duration at different loads)
Batteries	Not Included
BDA Annunciator	Built in, port for additional external annunciators
Weight	72lbs

Battery Models	Description
BDA-BTTY-12-1	Replacement Battery for 55AH BBU, single unit (2 batteries required)
BDA-BTTY-24-1	Replacement Battery for 100AH BBU, single unit (2 batteries required)

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NOTIFIER® by Honeywell

EXTERNAL ANNUNCIATOR

NFBDA-BTTY-ANN-3

Product Features

- NFPA Compliant
- NEMA 4 Enclosure
- LED alarm indicators
- Form C alarm relays
- Works with BBU models
- Quick connection with BBUs
- IFC & NFPA compliance; UL2524 2nd Edition (Listing Pending)
- Country of Origin: USA
- 3-year warranty

Specification	Value
Type	External Annunciator for BBU
Alarm Display	8 LED's
Alarms Displayed	AC Power Normal
	AC Fail - Batt Active
	Battery Capacity < 30%
	Battery Charger Fail
	Donor Antenna Disconnect
	Donor Antenna Malfunction
	RF Emitter Fail
	System Component Fail
Audible Alarm	Yes
Mute button for Audible Alarm	Yes
Maximum number of Annunciator	4
Relays	Form C Dry Contacts
Quantity of Relays	8
BBU interconnection	CAT 5/6
Conduit connector	Yes
Enclosure Rating	NEMA 4
Color	Red
Temperature Range	0 to 50 C
Dimensions	340 x 265 x105 mm • 13.3 x 10.4 x 4.1 in
Weight	3 kg • 6.6 lbs

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www.notifier.com

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NOTIFIER® by Honeywell

Patterson Group
Fire Systems Division

Battery Calculations

Notifier by Honeywell Models: NF-BDA150-1B, NF-BDA400-1B, NF-BDA400-2B, NF-BDA700-1B, NF-BDA800-1B, NF-BDA7800-2B

Rated DC Supply Voltage:	24V
Maximum Battery Current Draw*:	2.5A
Rated Battery Run Time:	24Hrs
Power Consumption over 24Hr:	2.5A x 24Hrs = 60Ah
Rated Battery Capacity:	75Ah (2 x 12V / 75Ah Batteries)
Battery Derating Factor:	20%
Derated Battery Capacity:	60Ah
Capacity Required for 24-Hr Operation:	60Ah

- Tested under full load on all UL and DL amplifiers*

UL-2524 listed for 24-hour battery operation with two 75Ah SLA batteries. UL File UTMH.S36080

229 Carthage Street, Sanford, N.C. 27330 • (P) (919) 776-2403 • (F) (919) 718-6091

INDOOR CEILING MOUNT ANTENNA
134-173 MHz

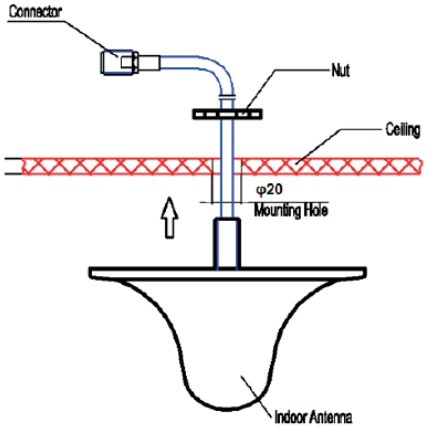
BDA-OIA-136174-2-1

Features

- Broad Band, Low VSWR
- Small Size, Low Profile, Good Appearance
- Ceiling Mount

Electrical Specifications	Value
Freq.Range	134-173 MHz
Bandwidth	3 MHz
Gain	2 dBi
VSWR	≤2.5
Impedance	Ω 50
Polarization	Vertical
Max.Power	50 W
Connector	N Female or Customized
Dimensions	φ180×92 mm
Weight	320 g
Mounting	Fix with Nut

Installation Sketch



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715 Peachtree Street NE
Atlanta, GA 30308
www.honeywell.com

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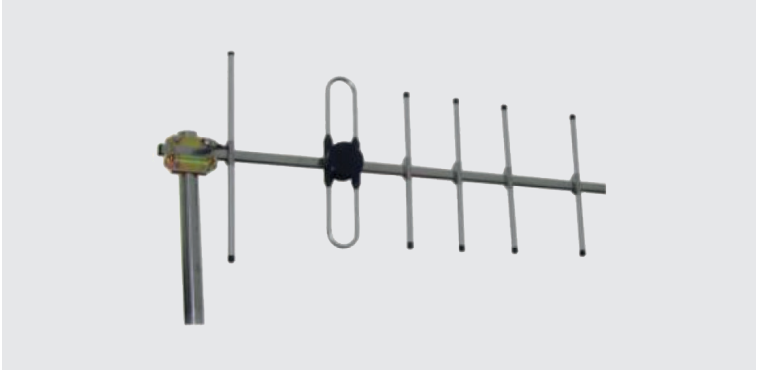
YAGI DIRECTIONAL ANTENNA
450 - 512 MHz

BDA-YDAxxxxxx-9-1

Product Features
- High Selectivity
- Max Power 100W
- Tempered aluminum tubes



Electric Specifications	BDA-YDA450512-9-1	BDA-YDA470490-9-1	BDA-YDA490512-9-1
Frequency Range	450 - 470 MHz	470 - 490 MHz	490 - 512 MHz
Elements	6	6	6
Gain	10.0 dBi	10.0 dBi	10.0 dBi
VSWR	≤2.0	≤2.0	≤2.0
Polarization	Vertical or Horizontal	Vertical or Horizontal	Vertical or Horizontal
Horizontal Beamwidth	48°	48°	48°
Vertical Beamwidth	44°	44°	44°
F/B Ratio	15 dB	15 dB	15 dB
Input Impedance	50 Ω	50 Ω	50 Ω
Max. Input Power	100 W	100 W	100 W
Lightning Protection	DC Ground	DC Ground	DC Ground

Mechanical Specifications	Value
Connector	N Female
Dimensions	900x230x45mm
Weight	0.80kg
Rated Wind Velocity	60 m/s
Reflector Material	Aluminum
Operating Temperature	-40°C to +65°C
Installation	Pole mounting

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RADIO FREQUENCY SYSTEMS
The Clear Choice®

1/2" ClearFill®Line Aluminum Plenum-Rated Air-Dielectric Coaxial Cable for In-Building Applications

ClearFill®Line 1/2" low-loss air dielectric cable, Plenum-rated, CMP

FEATURES / BENEFITS

- **Supports Multiple RF Signals**
- **Complete Shielding**
  The solid outer conductor of the ClearFill®Line coaxial cable creates a continuous RFI/EMI shield that minimizes system interference.
- **Outstanding Intermodulation Performance**
  RFS coaxial cable's solid inner and outer conductors virtually eliminate intermods. Intermodulation performance is also confirmed with state-of-the-art equipment at the RFS factory.
- **Wide Range of Applications**
  Typical areas of application are feedlines for plenum-space installations within occupied buildings or structures but also suitable for outdoor use due to jacket UV rating.

Technical Features

APPLICATIONS		
Applications		Suitable for plenum in-building/public safety or outdoor usage
STRUCTURE		
Cable Type		Air-Dielectric, Corrugated
Size		1/2"
Inner Conductor	mm (in)	4.8 (0.19) Copper-Clad Aluminum Wire
Dielectric	mm (in)	11.8 (0.464) Extruded Polyethylene
Outer Conductor	mm (in)	13.8 (0.54) Corrugated Aluminum
Jacket	mm (in)	15.93 (0.627) Plenum Rated / Color Red UV rated to ASTM G155
ELECTRICAL SPECIFICATIONS		
Impedance	Ω	50 +/- 1
Maximum Frequency	GHz	6.0
Velocity	%	91.0
Capacitance	pF/m (pF/ft)	75 (22.86)
Inductance	µH/m (µH/ft)	0.19 (0.058)
Peak Power Rating	kW	40.0
RF Peak Voltage	Volts	2000.0
Jacket Spark	Volt RMS	8000.0
Inner Conductor dc Resistance	Ω/1000 m (Ω/1000 ft)	1.48 (0.45)
Outer Conductor dc Resistance	Ω/1000 m (Ω/1000 ft)	2.29 (0.7)
Return Loss (VSWR) Performance		19 (1.25) @ 450-960 MHz 19 (1.25) @ 1395-1432 MHz 19 (1.25) @ 1700-2155 MHz 19 (1.25) @ 2300-2500 MHz
Temperature & Power		High Power Rating
MECHANICAL SPECIFICATIONS		
Cable Weight, Nominal	kg/m (lb/ft)	0.19 (0.13)
Minimum Bending Radius, Single Bend	mm (in)	76 (3)
Minimum Bending Radius, Repeated Bends	mm (in)	127 (5)
Bending Moment	Nm (lb*ft)	5.4
Tensile Strength	N (lb)	549 (150)
Recommended / Maximum Clamp Spacing	m (ft)	0.5 / 0.9 (1.8 / 3)
Crush Strength	kg/mm (lb/ln)	0.893 (50)

RADIO FREQUENCY SYSTEMS
The Clear Choice®

1/2" ClearFill®Line Aluminum Plenum-Rated Air-Dielectric Coaxial Cable for In-Building Applications

ATTENUATION AND POWER RATING

Frequency MHz	Attenuation dB/100m	Attenuation dB/100ft	Power kW
0.5	0.16	0.05	40.00
1	0.23	0.071	32.80
1.5	0.28	0.087	26.80
2	0.33	0.101	23.20
10	0.74	0.226	10.30
20	1.06	0.322	7.22
30	1.30	0.395	5.89
50	1.68	0.514	4.55
88	2.25	0.687	3.40
100	2.41	0.734	3.18
108	2.51	0.764	3.05
150	2.98	0.907	2.57
174	3.22	0.98	2.38
200	3.46	1.05	2.21
300	4.29	1.31	1.79
400	5.00	1.52	1.53
450	5.32	1.62	1.44
500	5.63	1.72	1.36
512	5.71	1.74	1.34
600	6.22	1.90	1.23
700	6.76	2.06	1.14
750	7.02	2.14	1.09
800	7.28	2.22	1.06
824	7.40	2.25	1.04
894	7.74	2.36	0.993
900	7.76	2.37	0.99
925	7.88	2.40	0.976
960	8.05	2.45	0.955
1000	8.23	2.51	0.934
1250	9.32	2.84	0.826
1400	9.93	3.03	0.776
1500	10.30	3.15	0.749
1700	11.10	3.38	0.695
1800	11.50	3.49	0.671
2000	12.20	3.71	0.634
2100	12.50	3.81	0.619
2200	12.80	3.92	0.605
2300	13.20	4.02	0.587
2400	13.50	4.12	0.574
2500	13.80	4.22	0.562
2600	14.20	4.31	0.546
2700	14.50	4.41	0.535
3000	15.40	4.69	0.505
3500	16.90	5.14	0.461
3600	17.10	5.22	0.456
4000	18.30	5.56	0.427
4500	19.60	5.97	0.399
5000	20.90	6.36	0.376
5500	22.10	6.74	0.356
6000	23.30	7.11	0.339

Attenuation at 20°C (68°F) cable temperature; tolerance +/- 5% max.; Mean power rating at 40°C (104°F) ambient temperature

TESTING AND ENVIRONMENTAL

Fire Performance	Flame Retardant, Plenum-rated, CMP
Regulatory Compliance	NEC Article 800 Communication Circuits ETL Listed to UL444 Canadian CSA C.22.2/FT6
Installation Temperature	-20 to 60 (-4 to 140) °C(°F)
Storage Temperature	-40 to 85 (-40 to 185) °C(°F)
Operation Temperature	-40 to 85 (-40 to 185) °C(°F)

External Document Links

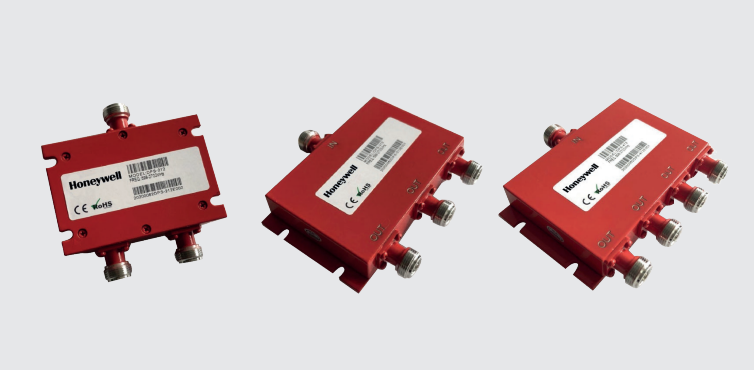
Notes

BROADBAND POWER SPLITTERS
698 - 2700 MHz

BDA-PSx-W2

Product Features

- Passive devices designed in a multistage Wilkinson configuration
- Low insertion loss
- Low VSWR ripple
- Two, three and four output ports models available as standard,
others available upon request
- Power input is 50W as splitter, and 1W as combiner, other values
are available upon request



Specification	BDA-PS2-W2	BDA-PS3-W2	BDA-PS4-W2
Type	Broadband power splitters	Broadband power splitters	Broadband power splitters
Frequency range	698 – 2700 MHz	698 – 2700 MHz	698 – 2700 MHz
Number of ways	2	3	4
Split Loss	3 dB	4.8 dB	6 dB
Insertion loss	< 0.5 dB	< 0.7 dB	< 0.7 dB
Power Raiting	50 W Average per port	50 W Average per port	50 W Average per port
VSWR	<=1.25 : 1	<=1.3 : 1	<=1.3 : 1
Isolation between output ports	20 dB min	18 dB min	18dB min
Connectors	N(f)	N(f)	N(f)
Temperature range, storage	-40º to 158º F	-40º to 158º F	-40º to 158º F
	-40º to +70º C	-40º to +70º C	-40º to +70º C
Temperature range, operation	-22º to 149º F	-22º to 149º F	-22º to 149º F
	-30º to +65º C	-30º to +65º C	-30º to +65º C
Environmental	IP60	IP60	IP60
Dimension	2.4 x 3.4 x 0.8 inches	2.7 x 4.8 x 0.88 inches	2.7 x 4.8 x 0.88 inches
	62 x 88 x 22 mm	122 x 71 x 22 mm	71 x 122 x 22 mm
Weight	0.5 lbs • 0.24 kg	0.7 lbs • 0.34 kg	0.79 lbs • 0.36 kg

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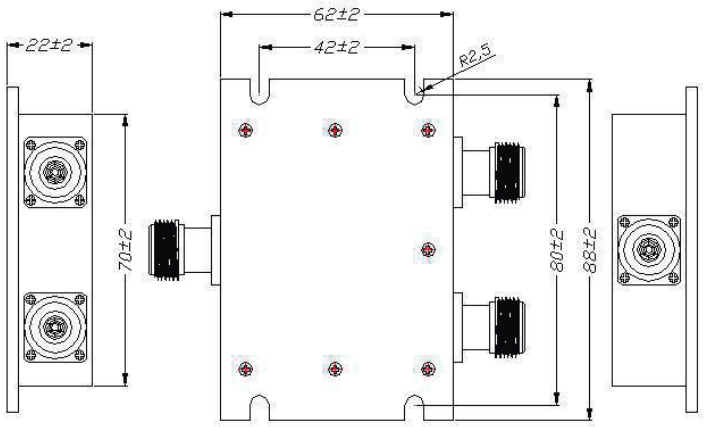
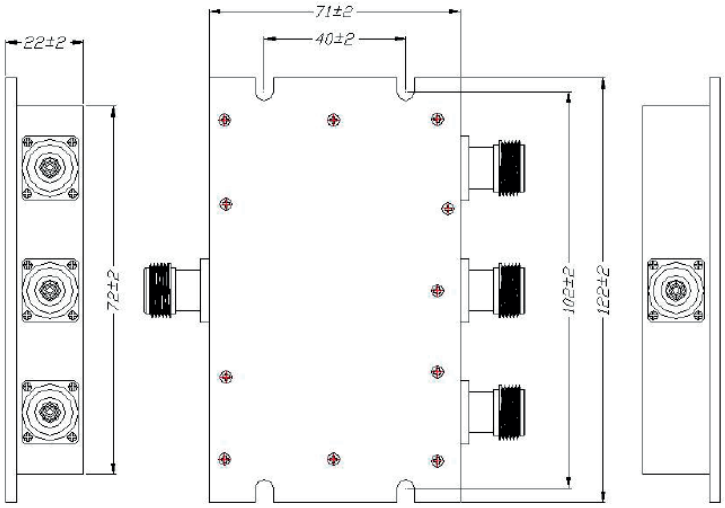
BROADBAND POWER SPLITTERS
698 - 2700 MHz

BDA-PSx-W2

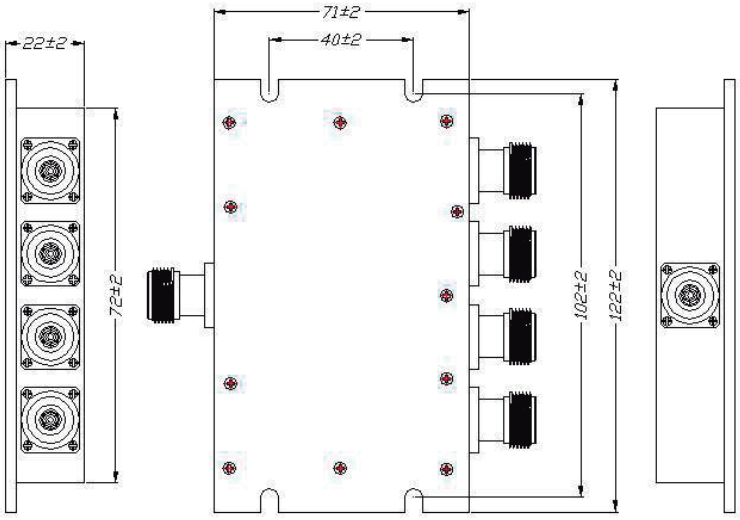
BDA-PS2-W2



BDA-PS3-W2



BDA-PS4-W2



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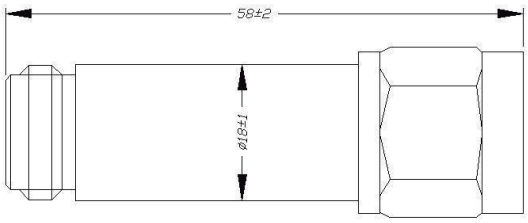
RF COAXIAL FIXED ATTENUATORS
DC - 3000 MHz

BDA-NATTEN-05xx

Product Features

- Passive devices designed in a coaxial configuration
- Nominal impedance is 50 ohms
- Power level 5W
- N male type connectors as standard, other types available upon request

Specification	0503	0505	0510	0515	0520	0530
Attenuation value	3	5	10	15	20	30
Frequency band	DC - 3000 MHz					
Input power	5W					
Coolant	Natural convection					
Type	In-line, coaxial					
Impedance	50 Ω					
VSWR	1.20:1 min					
Connector	N(m)					
Tempearture range	-22º to 149º F -35º to +65º C					
MTBF	>1,000,000 hours					
Weight	0.22 lbs • 0.10 kg					
Environmental	IP60					
Operating position	Any					



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MULTIBAND COMBINER
VHF + UHF + 700/800 MHz

BDA-MBC-312

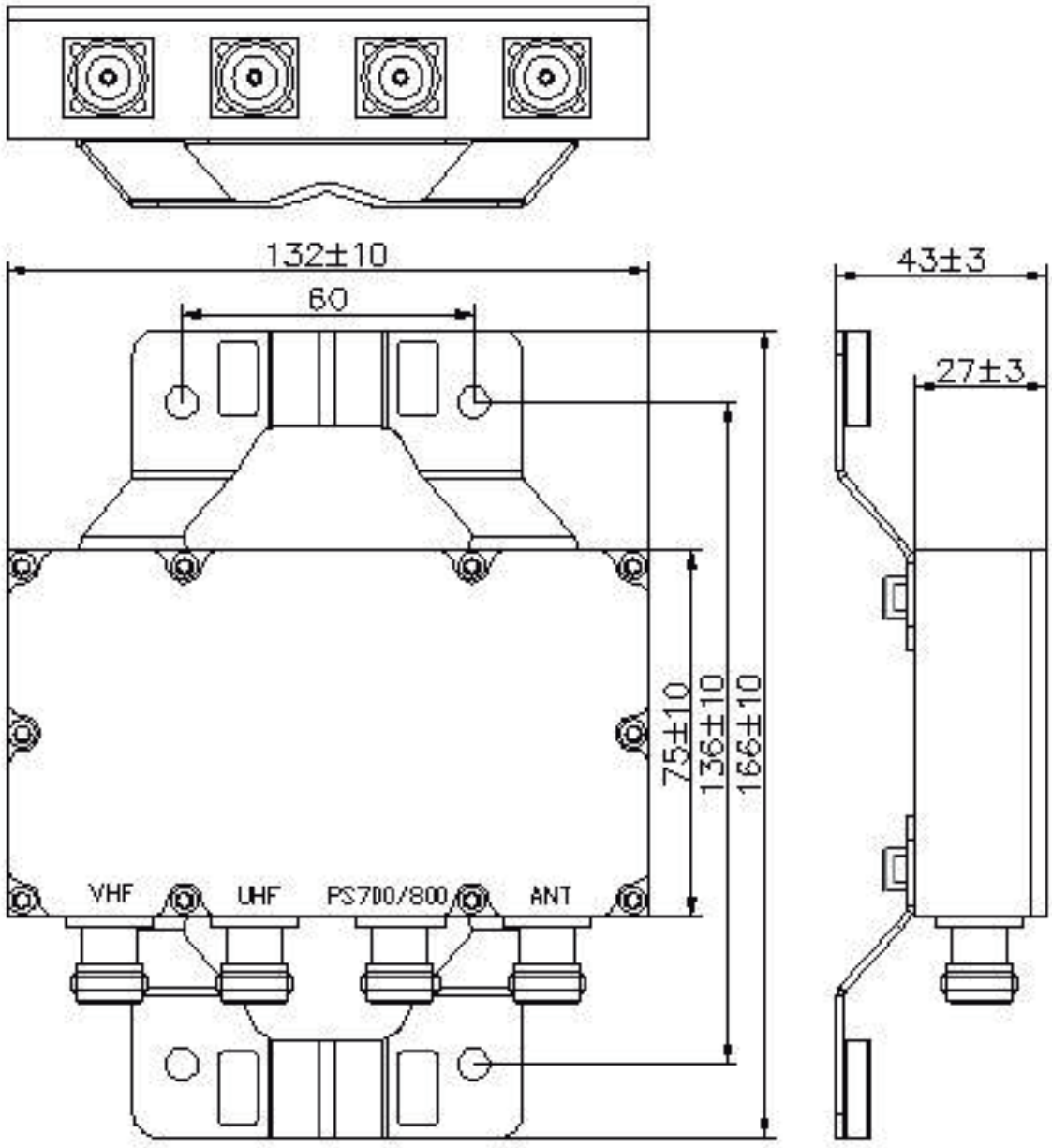
Specification	Value
Type	Multiband Combiner
Input Bands	88 - 174 MHz 380 - 510 MHz 760 - 870 MHz
Number of inputs per band	1
Number of multiband outputs	1
Insertion loss	< = 0.5 @ 88 - 174 MHz < = 0.6 @ 380 - 510 MHz < = 0.6 @ 760 - 870 MHz
Between bands isolation	>50 dB
Return loss	18 dB min
Impedance	50 ohms
Power input	50W average per port
Connectors	N (f)
Temperature range	-40º to +85º C
Humidity	95% non condensing
Dimension	5.19 x 2.9 x 1.0 in • 132 x 75 x 27 mm (without brackets)
Housing	IP67, Outdoor Use
Mounting	Wall mount / Pipe mount
MTBF	>1,000,000 hours

DOC HON-62070.01 • 10202020 • DMC

Honeywell

MULTIBAND COMBINER
VHF + UHF + 700/800 MHz

BDA-MBC-312



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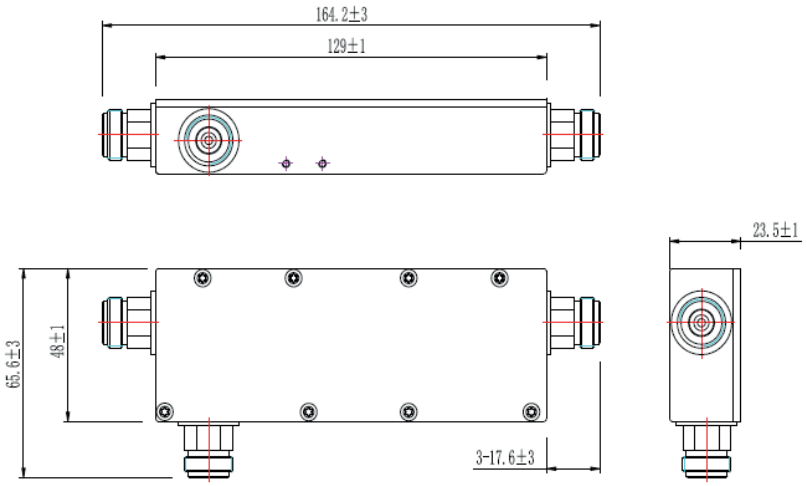
HIGH POWER DIRECTIONAL COUPLER
698 - 2690 MHz

BDA-DCxx-W2

Product Applications

Fiplex RSA Series of RF Directional Couplers are passive devices designed to provide unequal power distribution to the output ports.
Due to the internal configuration, this devices have a low VSWR value in all ports (less than 1.3:1, based on 50 ohms characteristic impedance) and low incidental insertion loss. Standard coupling values are 6dB, 10dB, 15dB, 20dB and 30dB, other power ratios available upon request.

Specification	Value				
Product Number	DC6-W2	DC10-W2	DC15-W2	DC20-W2	DC30-W2
Coupling(dB)	6	10	15	20	30
Accuracy(dB)	±0.8	±1.0	±1.2	±1.2	±1.5
Insertion Loss(dB)	≤1.75	≤0.80	≤0.50	≤0.40	≤0.40
Isolation	≥26	≥28	≥32	≥35	≥45
Freq	698 - 2690 MHz				
VSWR	≤1.25				
Power Rating	300W (average Per Port)				
Impedance	50 ohm				
Connector	N-female				
Color	Red-plated				
Operating Temperature	-25°C to +75°C				
Weight	0.38 kg				



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HON-62073 • 10202020

THE FUTURE IS WHAT WE MAKE IT

Honeywell

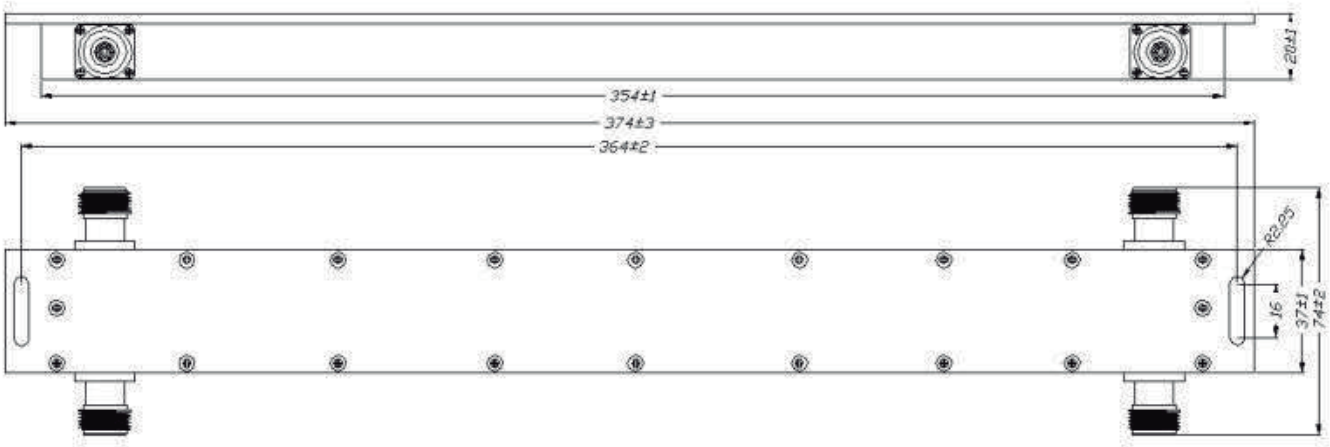
3dB HYBRID COUPLER
136 - 870 MHz

BDA-HC3-L2

Product Applications

- Low Frequency Band Covering VHF, UHF and Tetra Band
- Low VSWR
- High Directivity
- Indoor Using IP60
- Available with Type N, 7/16DIN or 4.3/10 male Connectors

Specification	Value
Coupling(dB)	3
Accuracy(dB)	±1.3
Isolation	> = 18
Freq	136-870MHz
VSWR	≤1.30
Power Rating(W)	200W (average Per Port)
Impedance	50 Ω
Connector	N-female
Color	Red-plated
Operating Temperature	-25°C to +75°C
Weight	1.05 kg
Dimensions(mm)	See drawing



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BROADBAND 3dB HYBRID
700 - 2700 MHz

BDA-HC3-W2

Product Features

- Guaranteed PIM Compliance
- Wide Frequency Band Covering 700-2700MHz
- Low Insertion Loss
- Low VSWR
- High Isolation
- Indoor/ Outdoor Using IP65
- Available with Type N, 7/16DIN or 4.3/10 Connectors

Specification	Value
Coupling	3 dB
Insertion Loss	≤0.65
Isolation	>=23
Freq	700-2700MHz
VSWR	≤1.25
PIM Rating	-153dBc@2x43dBm
Power Rating	300W (average Per Port)
Impedance	50 ohm
Connector	N-female
Color	Red
Operating Temperature	-25°C to +75°C
Weight	0.60 kg

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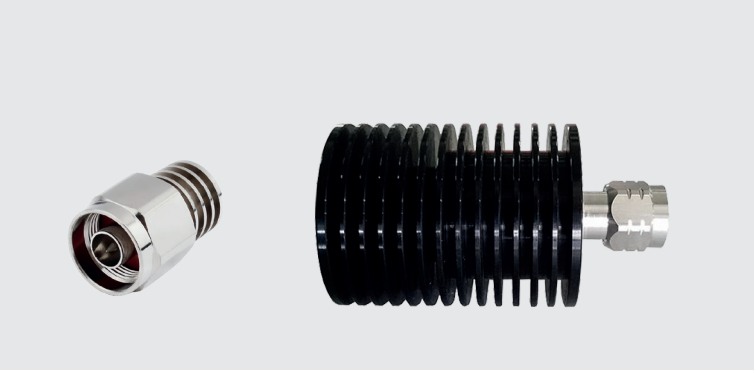
RF LOADS / TERMINATIONS
DC - 3000 MHz

BDA-LD-xx

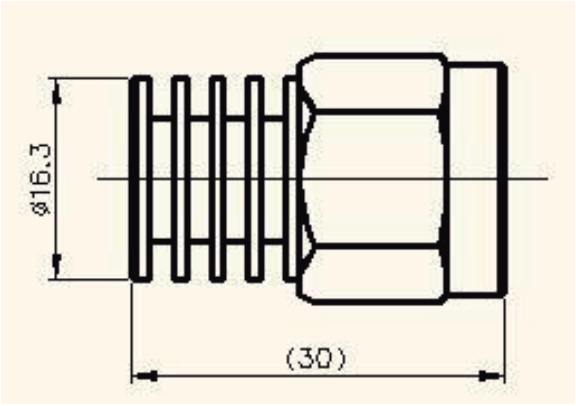
Product Features

- Passive devices designed in a coaxial configuration
- Nominal impedance is 50 ohms
- Power levels 5W and 50W
- N male type connectors as standard, other types available upon request

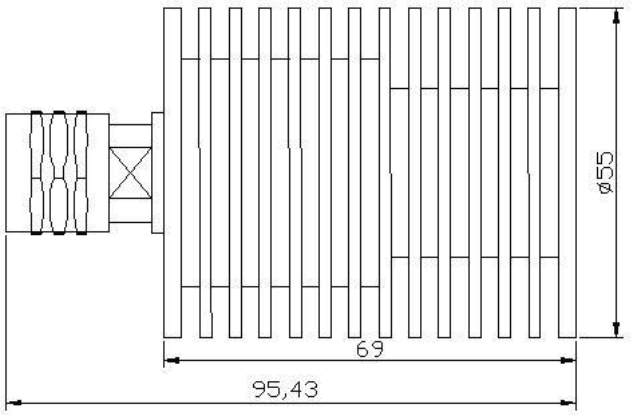


Specification	BDA-LD-05	BDA-LD-50
Frequency band	DC-3GHz	DC-3GHz
Input power	5W, CW	50W, CW
Coolant	Natural convection	Natural convection
Type	In-line, coaxial	In-line, coaxial
Impedance	50 Ω	50 Ω
VSWR	1.2:1 min	1.2:1 min
Connector	N(m)	N(m)
Tempearture range	-22º to 149º F -30º to +65º C	-22º to 149º F -30º to +65º C
MTBF	>1,000,000 hours	>500,000 hours
Weight	0.17 lbs • 0.08 kg	1.1 lbs • 0.5 kg
Operating position	Any	Any

BDA-LD-05



BDA-LD-50



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GROUNDING KIT
FOR 1/2" COAXIAL CABLE, 500mm

BDA-GNDKIT1

Product Features

- For 1/2" RF Cable
- Copper cable
- PVC Jacket

Product Structure Grounding Kit	Value
Cable Kit	Copper, for 1/2"
Rivet	Copper
Locking Bail Material	Stainless steel
Grounding Cable	16 mm2 Copper wire & PVC, Black
Cable Lug	Tin-Plated Copper(1 hole M8)

Product Structure Hardware	Value
Hexagon Screw	A2 Stainless Steel, M8X25mm
Nut	A2 Stainless Steel, M8
Spring Washer	A2 Stainless Steel, M8
Washer	A2 Stainless Steel, M8

General Specifications	Value
Cable Type	Corrugated
Cable Size	1/2" & 1/2" Low Loss
Lug Type	One-hole lug
Lug Attachment	Factory attached

Cable Specifications	Value
Bonding Conductor Length	500mm
Bonding Conductor Material	Copper
Bonding Conductor Wire Size	16 mm2
Bonding Conductor Jacketing Material	PVC

Electrical Specifications	Value
Current Handling	Tested to withstand 100,000 amps peak current surge
Current Handling Test Method	MIL-STD-1757
Grounding, Bonding and Shielding Test Method	MIL-STD-188-124A
Lightning Protection Test Method	IEC 1024-1

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GROUNDING KIT
FOR 1/2" COAXIAL CABLE, 500mm

BDA-GNDKIT1

Environment Specifications	Value
Operating Temperature	-40°C to +85°C
Storage Temperature	-40°C to +80°C
Immersion Depth	1 m
Immersion Test Mating	Mated
Immersion Test Method	IEC 60529:2001, IP68
Blowing Rain Test Method	MIL-STD-810, Method 506
Corrosion Test Method	MIL-STD-1344, Method 1001
Freezing Rain/Icing Test Method	MIL-STD-810, Method 521
Humidity Test Method	MIL-STD-1344, Method 1002
UV Resistance Test Method	MIL-STD-810, Method 505
Vibration Test Method	IEC 60068-2-6:2007

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N MALE TO N FEMALE ADAPTER
0 - 6GHz

BDA-NMRA-NFRA

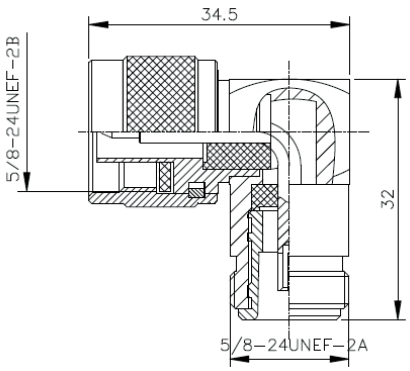
Product Features

- N female to N male adapter
- Right Angle 90º

Electrical Specifications	Value	
Impedance	50Ω	
Frequency range	0～6GHz	
Withstand Voltage	500V rms	
VSWR	Rigth Angle	≤ 1.25
Contact resistance	center contact	≤ 1mΩ
	outer contact	≤ 1mΩ
Insulation resistance	≥5000MΩ	

Mechanical Specifications	Value
Temperature range	-65°C～+165°C
Durability(matings)	＞500

Material Specifications	Value
Body	Brass Nickel Plated
Center conductor	Brass Gold plated
Crimping suite	Copper alloy Nickel plated
O-ring sealing	6146 silastic
Insulator	PTFE



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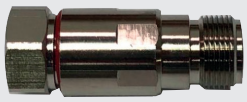
N(f) CONNECTOR
0 - 3GHz

NF-ICA12-50JPLLR

Product Features

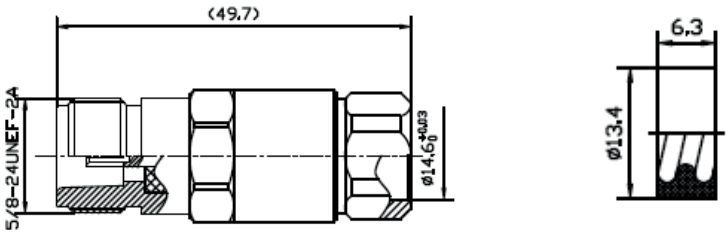
- N female connector
- For 1/2 " cable



Electrical Specifications	Value	
Impedance	50Ω	
Frequency range	0～3GHz	
Withstand Voltage	500V rms	
VSWR	Straight	≤ 1.15
	Rigth Angle	≤ 1.25
Contact resistance	center contact	≤ 1mΩ
	outer contact	≤ 1mΩ
Insulation resistance	≥5000MΩ	

Mechanical Specifications	Value
Temperature range	-65°C～+165°C
Durability(matings)	＞500

Material Specifications	Value
Body	Brass Nickel Plated
Center conductor	Brass Gold or silver plated
Crimping suite	Copper alloy Nickel plated
O-ring sealing	6146 silastic
Insulator	PTFE



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N (m) CONNECTOR
0 - 3GHz

NM-ICA12-50JPLLR

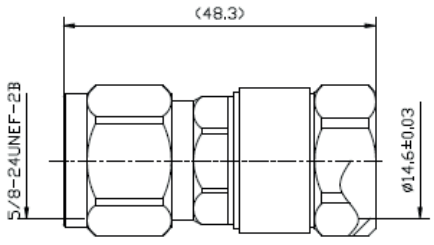
Product Features

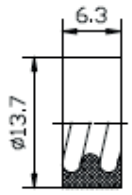
- N male connector
- For 1/2 " cable

Electrical Specifications	Value	
Impedance	50Ω	
Frequency range	0～3GHz	
Working Voltage	1500V max	
Withstand Voltage	2500V rms	
VSWR	Straight	≤ 1.2
	Rigth Angle	≤ 1.3
Contact resistance	center contact	≤ 1mΩ
	outer contact	≤ 1mΩ
Insulation resistance	≥5000MΩ	

Mechanical Specifications	Value
Temperature range	-35°C～+155°C
Durability(matings)	＞500

Material Specifications	Value
Body	Brass Tri-Metal or nickel
Center conductor	Phosphor Bronze Gold or silver plated
Coupling nut	Brass Nickel
Gasket	Silicone Rubber
Insulator	PTFE





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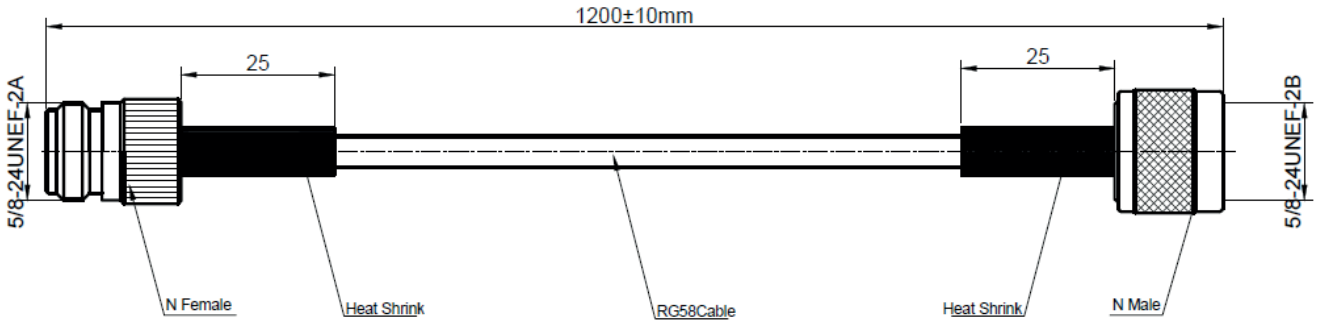
JUMPER RG58 CABLE
N female and N male

BDA-NM-RG58-12-NF

Product Features

- Low VSWR
- Low Insertion Loss
- Robust Design

Specification	Value
Connector	N Male - N Female
Type of Cable	RG58
Length of cable	48 Inch
Center conductor material	Phosphore bronze - Gold plating & Brass - Gold plating
Insulator material	PTFE
Body connector material	Brass - Nickel Plating
Impedance	50 Ohms
Frequency range	0 - 6 GHz
VSWR	1.15 (0-3GHZ)



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JUMPER RN-400 CABLE
N female and N male

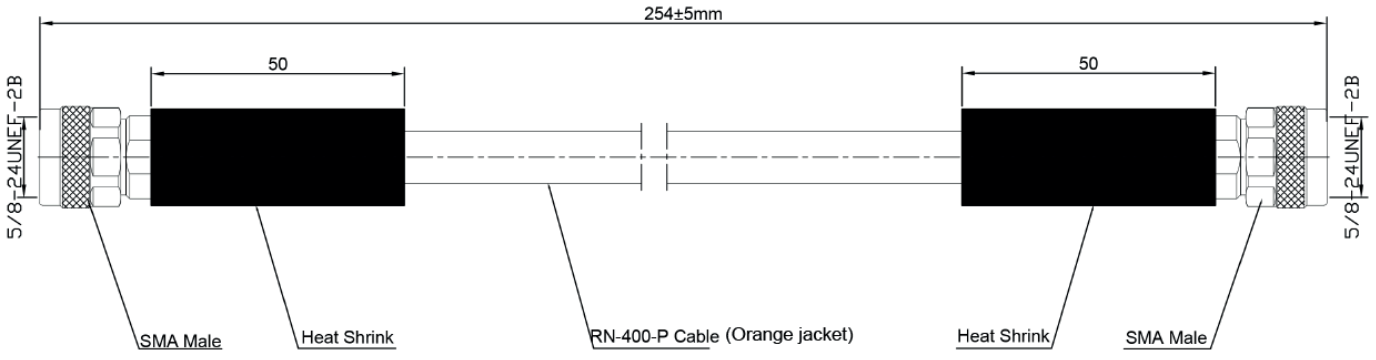
BDA-NM-RN4P-03-NM
BDA-NM-RN4P-05-NM
BDA-NM-RN4P-10-NM

Product Features

- Low VSWR
- Low Insertion Loss
- Robust Design

Specification	03-NM	05-NM	10-NM
Connector	N Male both ends	N Male both ends	N Male both ends
Type of Cable	RN-400-P	RN-400-P	RN-400-P
Length of cable	10 Inch	18 Inch	37 Inch
Center conductor material	Brass - Gold Plating	Brass - Gold Plating	Brass-Gold Plating
Insulator material	PTFE	PTFE	PTFE
Body connector material	Brass - Nickel Plating	Brass - Nickel Plating	Brass-Nickel Plat.
IMmpedance	50 Ohms	50 Ohms	50 Ohms
Frequency range	0 - 6 GHz	0 - 6 GHz	0 - 6 GHz
VSWR	1.15 (0-3GHZ)	1.15 (0-3GHZ)	1.15 (0-3GHZ)

NM-RN400P-03-NM



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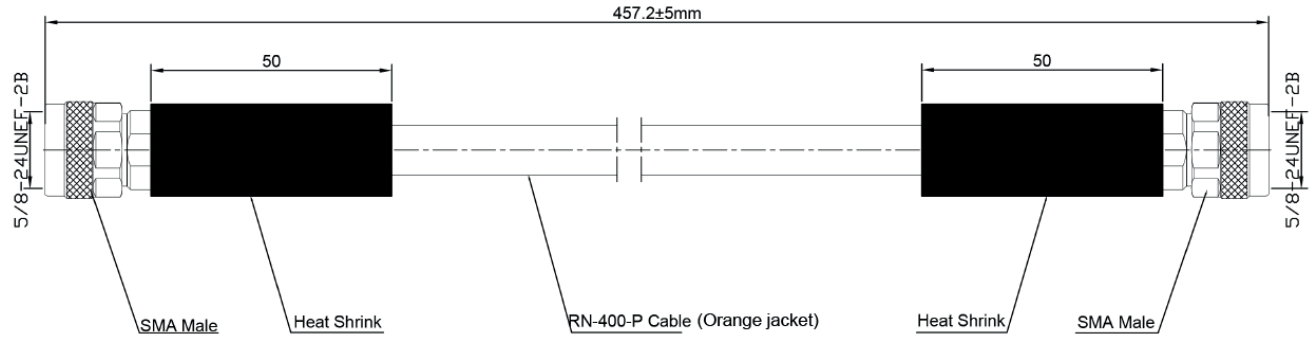
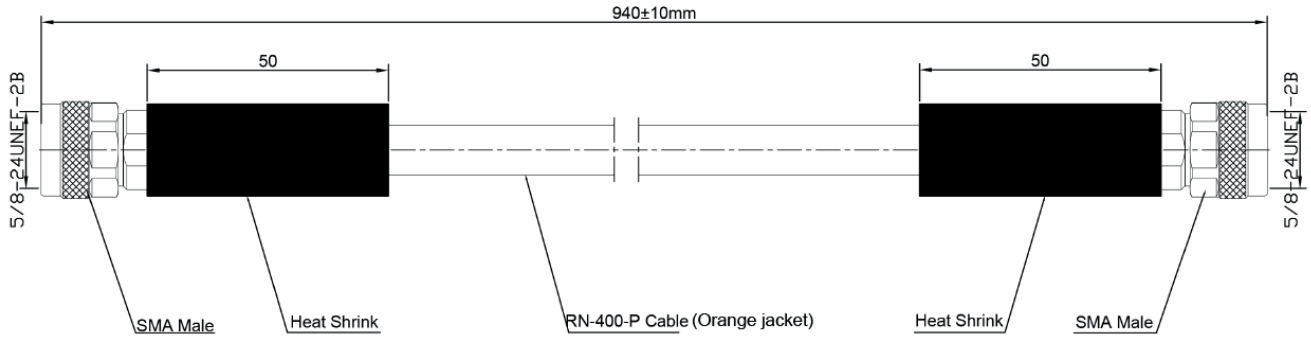
JUMPER RN-400 CABLE
N female and N male

BDA-NM-RN4P-03-NM
BDA-NM-RN4P-05-NM
BDA-NM-RN4P-10-NM

NM-RN400P-05-NM



NM-RN400P-10-NM



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JUMPER RG58
N male and N male

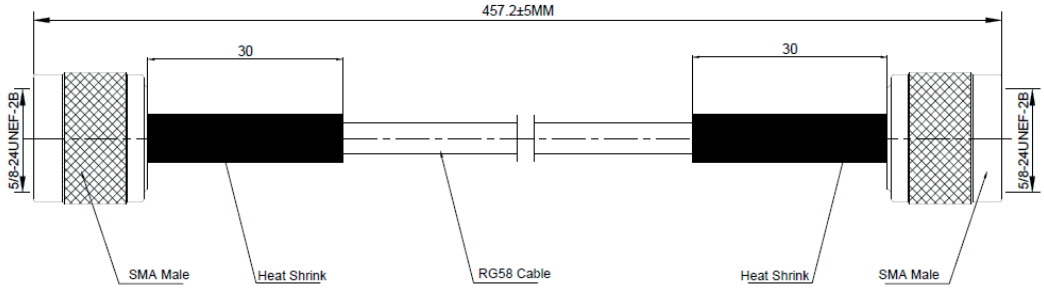
BDA-NM-RG58-05-NM
BDA-NM-RG58-10-NM

Product Features

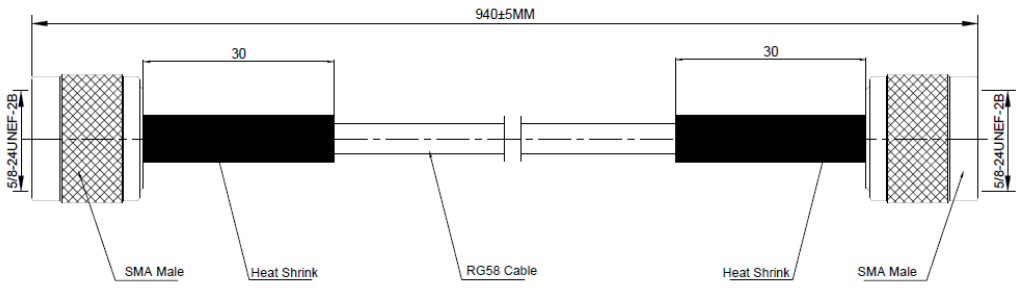
- Low VSWR
- Low Insertion Loss
- Robust Design

Specification	05-NM	10-NM
Connector	N Male both ends	N Male both ends
Type of Cable	RG58	RG58
Length of cable	18 Inch	37 Inch
Center conductor material	Brass - Gold Plating	Brass-Gold Plating
Insulator material	PTFE	PTFE
Body connector material	Brass - Nickel Plating	Brass-Nickel Plat.
IMmpedance	50 Ohms	50 Ohms
Frequency range	0 - 6 GHz	0 - 6 GHz
VSWR	1.15 (0-3GHZ)	1.15 (0-3GHZ)

NM-RG58-05-NM



NM-RG58-10-NM



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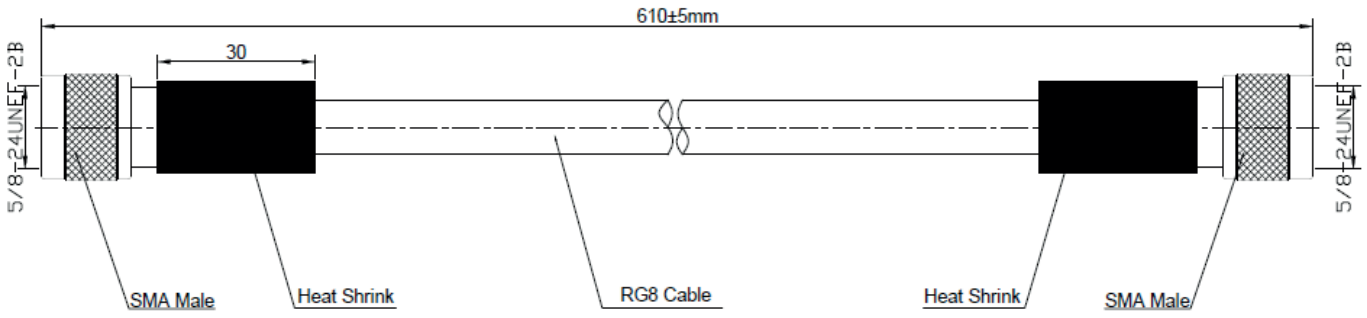
JUMPER RG8
N male and N male

BDA-NM-RG8-08-NM

Product Features

- Low VSWR
- Low Insertion Loss
- Robust Design

Specification	Value
Connector	N Male both ends
Type of Cable	RG8
Length of cable	24 Inch
Center conductor material	Brass - Gold Plating
Insulator material	PTFE
Body connector material	Brass - Nickel Plating
IMmpedance	50 Ohms
Frequency range	0 - 6 GHz
VSWR	1.15 (0-3GHZ)



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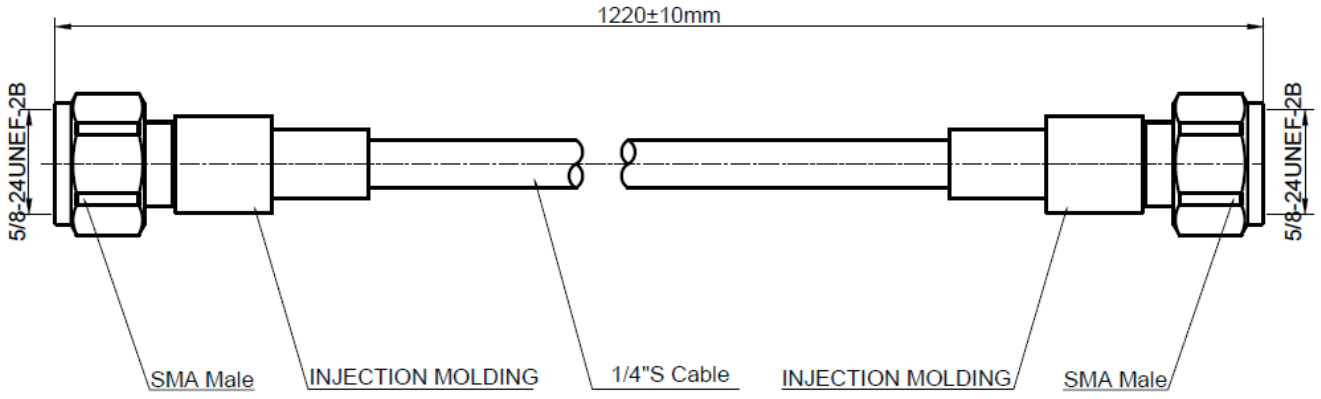
JUMPER 1/4" S
N male and N male

BDA-NM-RG8-13-NM

Product Features

- Low VSWR
- Low Insertion Loss
- Robust Design

Specification	Value
Connector	N Male both ends
Type of Cable	1/4" SUPERFLEX
Length of cable	48 Inch
Center conductor material	Brass - Silver Plating
Insulator material	PTFE
Body connector material	Brass - Ternary alloy plating
IMmpedance	50 Ohms
Frequency range	0 - 6 GHz
VSWR	1.2 (0-3.8GHZ)
PIM	<= -160DBC@1800MHZ



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NOTIFIER®
by Honeywell

NOTIFIER by Honeywell

Hereby Certifies That

Cole Patterson

Patterson Group Services, Inc

completed the course and is certified on

Installation, Testing and Service of In-Building ERCES,
NOTIFIER Class B Public Safety Signal Boosters / BDA

January 2020

24 Professional Development Hour(s) (PDH)

NOTIFIER by Honeywell
Radio Solutions, Inc (RSI)

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UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

General Radiotelephone Operator License

Licensee: This is your radio authorization in sizes suitable for your wallet and for framing. Carefully cut the documents along the lines as indicated.

The Commission suggests that the wallet size version be laminated (or another similar document protection process) after signing. The Commission has found, under certain circumstances, laser print is subject to displacement.

PATTERSON, GREGORY C
2124 SOUTHERN RD
SANFORD, NC 27330

FCC Registration Number (FRN): 0028971406

Special Conditions / Endorsements

NONE

Grant Date	Effective Date	Print Date	Expiration Date
02-18-2020	02-18-2020	02-19-2020	

File Number	Serial Number	Date of Birth
0008979843	PG00065596	04-05-1994

THIS LICENSE IS NOT TRANSFERABLE

(Licensee's Signature)

FCC 605-FRC - May 2007

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Serial Number	Grant Date	Expiration Date	File Number	Print Date	Effective Date
PG00065596	02-18-2020		0008979843	02-19-2020	02-18-2020

Date of Birth
04-05-1994

FCC Registration Number (FRN)
0028971406

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Special Conditions / Endorsements:
NONE

PATTERSON, GREGORY C
2124 SOUTHERN RD
SANFORD, NC 27330

General Radiotelephone Operator License

FCC 605-FRC - May 2007

(Licensee's Signature)
FEDERAL COMMUNICATIONS COMMISSION

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Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

Conditions:
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