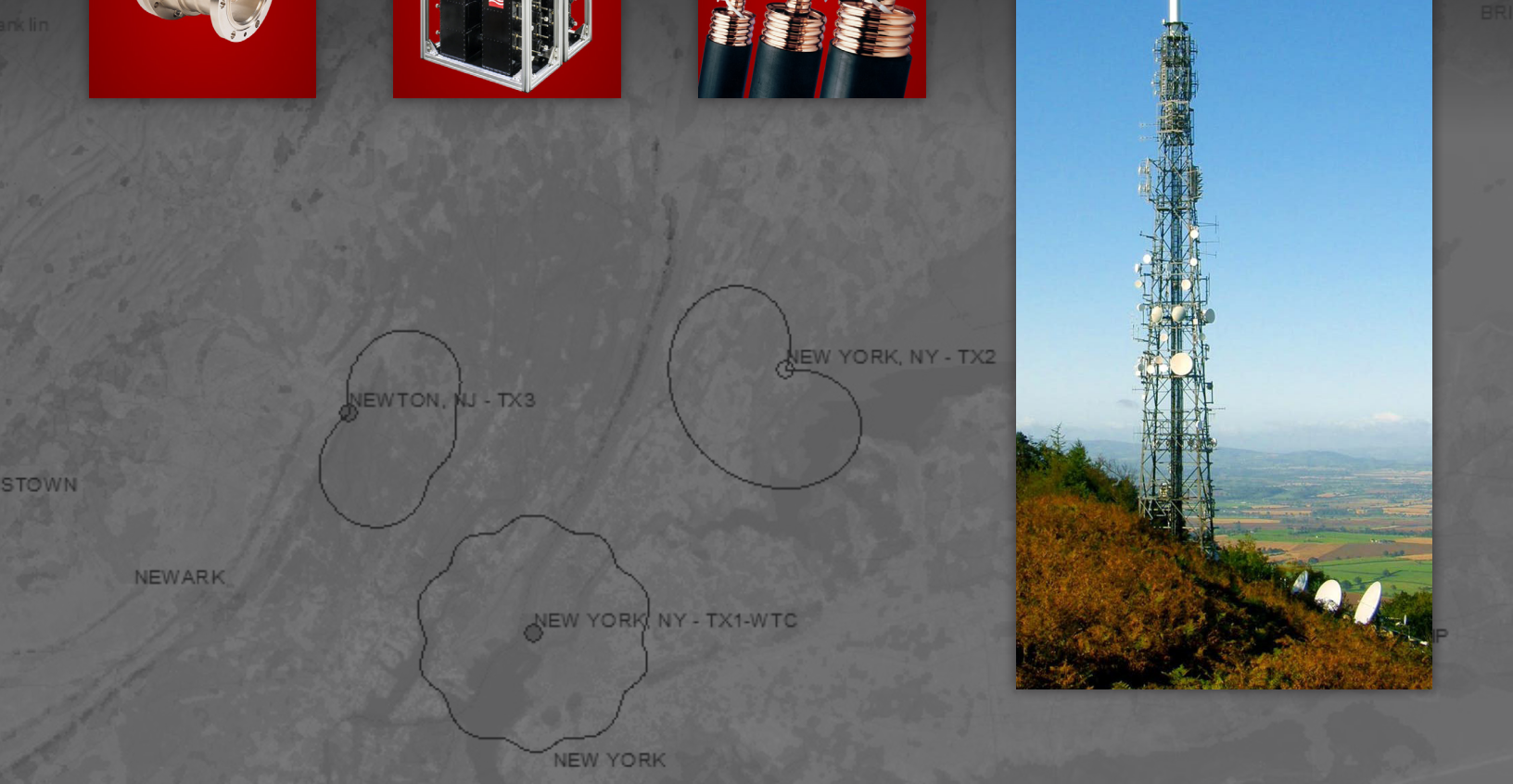




RADIO FREQUENCY SYSTEMS

NEXTGEN-TV PRODUCT GUIDE

Edition 1 Rev. B / 5.2020



NEXTGEN TV ANTENNAS

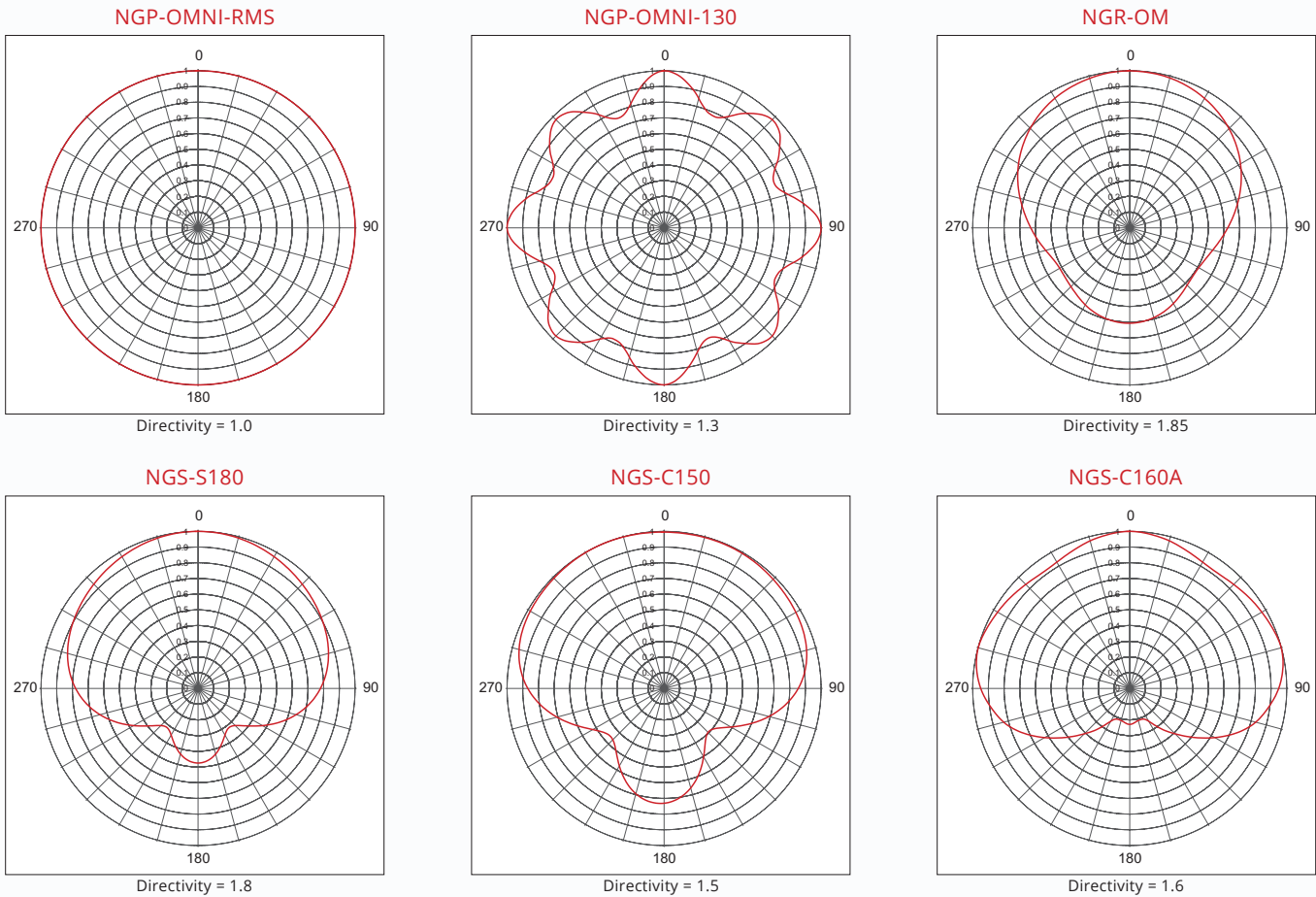
BROADBAND ANTENNAS FOR SINGLE FREQUENCY NETWORKS

NG Antenna Series

The NG series antennas are ideal for multi-channel Next Generation networks. These antennas are typically deployed at SFN sites that surround the main transmission site in a NextGen single frequency network (SFN). The high-power rating and broadband performance allow multiple channels to be transmitted from an SFN site, thus reducing capital costs and providing consistent coverage across channels. Elliptical or circular polarization is available for improved transmission to portable and indoor devices. The NG family of antennas provide both top mounted and side mounted solutions in a low wind load format. A wide range of radiation patterns are available in formats suitable for direct import into most SFN coverage and planning tools. In addition, the RFS Antenna Selection Tool works alongside modern SFN planning tools to help you choose the right NextGen antenna for each SFN site.

- Broadband performance for multi-channel SFN networks allows SFN infrastructure sharing and reduces overall CAPEX
- Low wind-load reduces tower loads thus simplifying SFN site acquisition
- Large range of azimuth radiation patterns – simplifies the SFN planning process to provide optimum network coverage
- Broadband elliptical or circular polarization performance – improves signal penetration and network performance
- Radiation patterns with reduced back-radiation are available for SFN sites requiring interference mitigation
- AAST Software: [Download](#)

TYPICAL AZIMUTH RADIATION PATTERNS

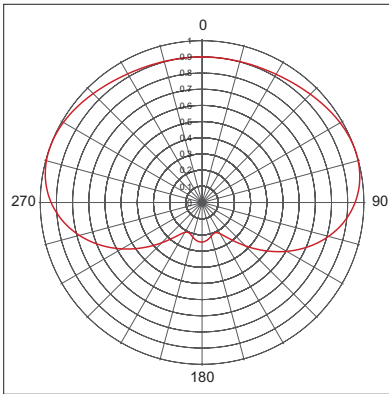


Note: Horizontal polarization component is shown on radiation patterns.

NEXTGEN TV ANTENNAS

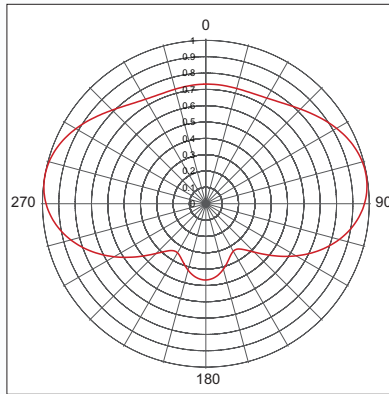
TYPICAL AZIMUTH RADIATION PATTERNS

NGS-C170



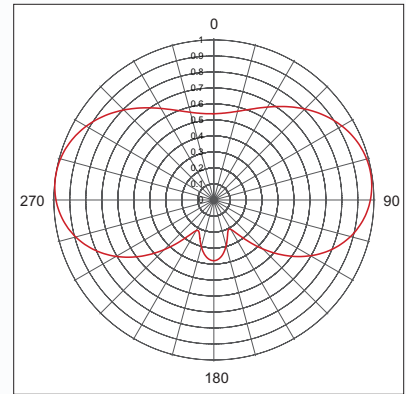
Directivity = 1.7

NGS-C185i



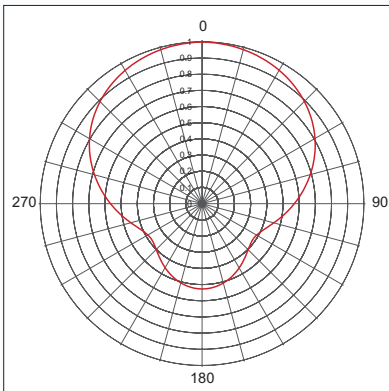
Directivity = 1.85

NGS-C200J



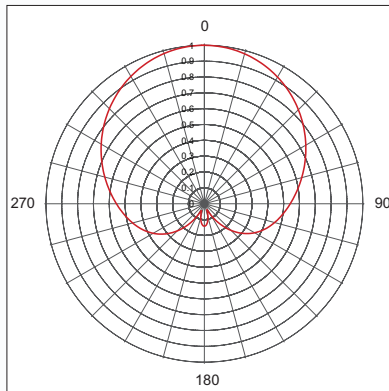
Directivity = 2.0

NGS-C210C



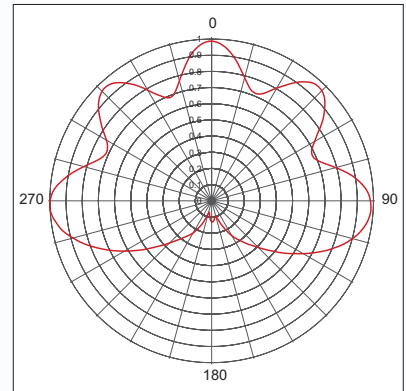
Directivity = 2.1

NGS-C260



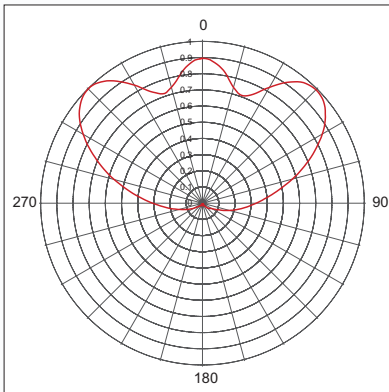
Directivity = 2.6

NGP-C190



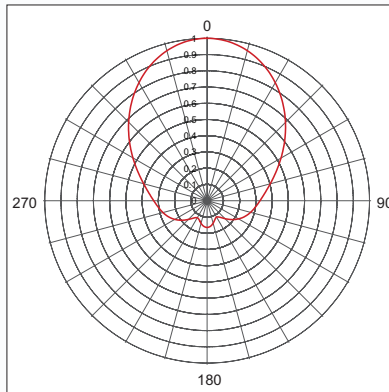
Directivity = 1.9

NGP-C315



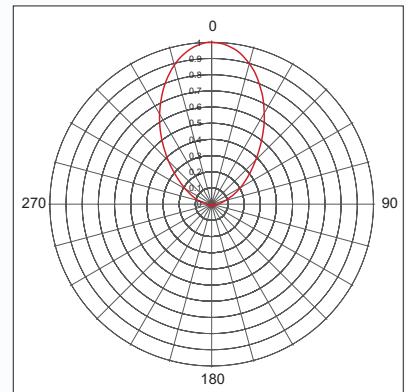
Directivity = 3.15

NGP-C360



Directivity = 3.6

NGP-C630



Directivity = 6.30

Note: Horizontal polarization component is shown on radiation patterns.

NEXTGEN TV ANTENNAS

ANTENNAS WITH REDUCED BACK RADIATION

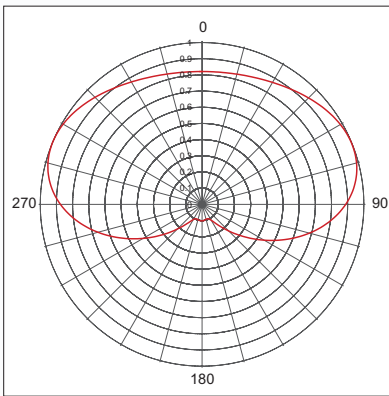
NG-RBL & NG-SBL Series Antennas

These antennas are designed to reduce radiation in the rear direction. For difficult site locations or difficult network planning scenarios, these antenna patterns will enable the network designer to meet the FCC requirements without resorting to large reductions in radiated power. Standard radiation patterns are shown below. Custom radiation patterns are also available. RFS can design a radiation pattern to your requirements using sophisticated design tools to provide the best match to the site planning specification. These patterns are in file formats suitable for direct import into most SFN coverage and planning tools.

- Simplifies network planning for difficult sites
- Can reduce interference without resorting to large reductions in ERP
- Custom radiation patterns can be designed to provide the best match to the site planning specification

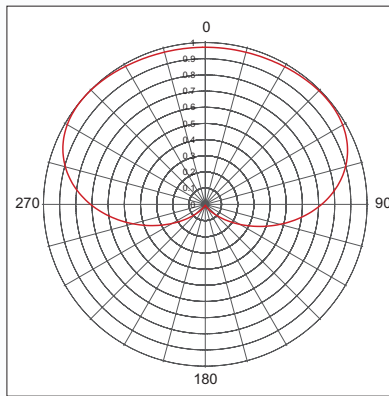
TYPICAL AZIMUTH RADIATION PATTERNS

NGS-C170-RBL



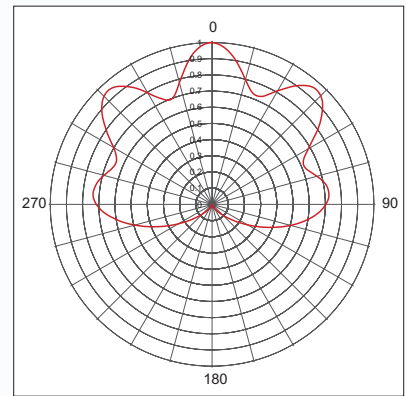
Directivity = 2.0
Reduced Back Lobe

NGS-C170-SBL



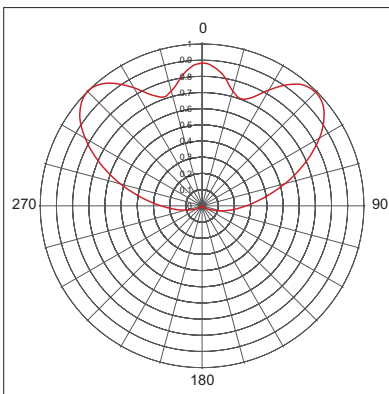
Directivity = 2.0
Suppressed Back Lobe

NGP-C190-SBL



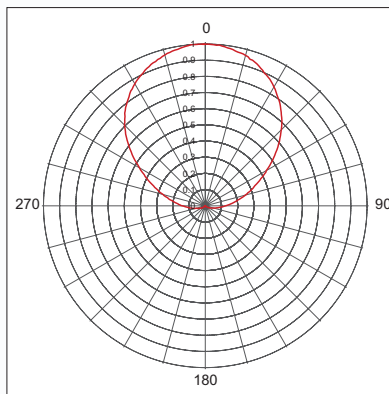
Directivity = 2.7
Suppressed Back Lobe

NGP-C315-SBL



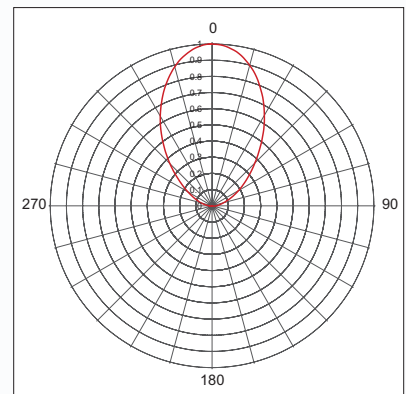
Directivity = 3.27
Suppressed Back Lobe

NGP-C390-SBL



Directivity = 4.09
Suppressed Back Lobe

NGP-C630-SBL



Directivity = 6.34
Suppressed Back Lobe

Note: Horizontal polarization component is shown on radiation patterns.

NEXTGEN TV ANTENNAS

NGS & NGR SERIES ANTENNAS

Model Number	NGR-Om	NGS-S180	NGS-C150	NGS-C160A	NGS-C170	NGS-C170-RBL
Pattern type	Omnioid	Skull	Skull increased rear	Cardioid type A	Cardioid type C170	Cardioid reduced rear
Frequency Range (MHz)	470-608					
Bandwidth (MHz)	36	138 (Full Band)	138 (Full Band)	138 (Full Band)	138 (Full Band)	138 (Full Band)
VSWR	1.15 (1.1 on channel)					
Polarization	Elliptical					
Polarization ratio (Vpol ERP/Hpol ERP)	30% standard – contact RFS for other ratios					
Azimuth pattern directivity (numerical)	1.8	1.8	1.5	1.6	1.7	2.0
Mounting Type:	8 Bay	Side or Top	Side or Top	Side or Top	Side or Top	Side or Top
	16 Bay	Side	Side	Side	Side	Side
	24 Bay	Side	Side	Side	Side	Side
Elevation Gain at 539MHz	8 Bay	8.1				
	16 Bay	14.8				
	24 Bay	20.0				
Standard input power rating (higher power versions available) (kW) *	8 Bay	35				
	16 Bay	40				
	24 Bay	40				
Height (ft) *	8 Bay	14.1				
	16 Bay	28.5				
	24 Bay	43				
Weight (lb)*	8 Bay	525				
	16 Bay	1370				
	24 Bay	2315				
Effective area CaAc(ft ²)*	8 Bay	15.5	10.8			
	16 Bay	31.7	21.6			
	24 Bay	46.65	32.4			

Model Number	NGS-C170-SBL	NGS-C185i	NGS-C200J	NGS-C210C	NGS-C260	NGS-C360
Pattern type	Cardioid suppressed	Cardioid type I	Cardioid type J	Cardioid type C	Cardioid/wide sector	Wide Sector
Frequency Range (MHz)	470-608					
Bandwidth (MHz)	138					
VSWR	1.15 (1.1 on channel)					
Polarization	Elliptical					
Polarization ratio (Vpol ERP/Hpol ERP)	30% standard – contact RFS for other ratios					
Azimuth pattern directivity (numerical)	2.0	1.85	2.0	2.1	2.6	3.6
Mounting Type:	8 Bay	Side or Top	Side or Top	Side or Top	Side or Top	Side or Top
	16 Bay	Side	Side	Side	Side	Side
	24 Bay	Side	Side	Side	Side	Side
Elevation Gain at 539MHz	8 Bay	8.1				
	16 Bay	14.8				
	24 Bay	20.0				
Standard input power rating (higher power versions available) (kW) *	8 Bay	35				
	16 Bay	40				
	24 Bay	40				
Height (ft) *	8 Bay	14.1				
	16 Bay	28.5				
	24 Bay	43				
Weight (lb)*	8 Bay	525				
	16 Bay	1370				
	24 Bay	2315				
Effective area CaAc(ft ²)*	8 Bay	10.8				
	16 Bay	21.6				
	24 Bay	32.4				

* Side Mount Antenna



NEXTGEN TV ANTENNAS

NGP SERIES ANTENNAS

Model Number		NGP-Omni -RMS	NGP-Omni-130	NGP-C190	NGP-C190-SBL	NGP-C315
Pattern type		Omni	Omni filed as directional	Broad Cardioid	Cardioid suppressed rear	Narrow Cardioid
Frequency Range (MHz)		470-608				
Bandwidth (MHz)		138 (Full Band)				
VSWR		1.1				
Polarization		Elliptical or Circular				
Polarization ratio (Vpol ERP/Hpol ERP)		Any ratio can be specified at time of order				
Azimuth pattern directivity (numerical)		1	1.3	1.9	2.7	3.15
Mounting Type:	8 Bay	Side or Top	Side or Top	Side or Top	Side or Top	Side or Top
	16 Bay	Side or Top	Side or Top	Side or Top	Side or Top	Side or Top
	24 Bay	Side or Top	Side or Top	Side or Top	Side or Top	Side or Top
Elevation Gain at 539MHz	8 Bay	8.1				
	16 Bay	15.3				
	24 Bay	22.7				
Standard Input power rating (higher power versions available) (kW)	8 Bay	40				
	16 Bay	40				
	24 Bay	40				
Height (ft) *	8 Bay	17.5				
	16 Bay	32.6				
	24 Bay	47.7				
Weight (lb)*	8 Bay	1332				
	16 Bay	2686				
	24 Bay	4020				
Effective area CaAc(ft^2)*	8 Bay	32.7				
	16 Bay	46.1				
	24 Bay	85.5				

Model Number		NGP -C315-SBL	NGP-C390	NGP-C390-SBL	NGP-C630	NGP-C630-SBL
Pattern type		Narrow Cardioid suppressed rear	Wide Sector	Wide Sector suppressed rear	Narrow Sector	Narrow Sector suppressed rear
Frequency Range (MHz)		470-608				
Bandwidth (MHz)		138 (Full Band)				
VSWR		1.1				
Polarization		Elliptical or Circular				
Polarization ratio (Vpol ERP/Hpol ERP)		Any ratio can be specified at time of order				
Azimuth pattern directivity (numerical)		3.4	3.9	4.1	6.3	6.3
Mounting Type:	8 Bay	Side or Top	Side or Top	Side or Top	Side or Top	Side or Top
	16 Bay	Side	Side	Side	Side	Side
	24 Bay	Side	Side	Side	Side	Side
Elevation Gain at 539MHz	8 Bay	8.1				
	16 Bay	15.3				
	24 Bay	22.7				
Standard Input power rating (higher power versions available) (kW)	8 Bay	40				
	16 Bay	40				
	24 Bay	40				
Height (ft) *	8 Bay	17.5				
	16 Bay	32.6				
	24 Bay	47.7				
Weight (lb)*	8 Bay	1332				
	16 Bay	2686				
	24 Bay	4020				
Effective area CaAc(ft^2)*	8 Bay	32.7				
	16 Bay	46.1				
	24 Bay	85.5				

* Side Mount Antenna

NEXTGEN TV COMBINERS

STARPOINT COMBINERS

CS Series

RFS CS series starpoint combiners offer an economical solution for combining non adjacent channels at multi-channel SFN sites. The compact footprint and air-cooled design simplifies site acquisition and reduces site infrastructure costs. These combiners include mask filtering that is optimized for ATSC3 operation. They are available in 2, 3 and 4 channel configurations. Additional channels can be added in the field up to a maximum of 4 channels.

- Optimized for ATSC3 SFN applications
- Economical solution for non-adjacent channel combining
- Includes ATSC3 mask Filtering
- Compact footprint
- Add channels or change frequencies in the field using RFS BCAT™ tuning software**
- BCAT™ software removes the requirement to return each unit to the factory for reconfiguration or retuning
- Uses the field proven RFS PeakPower+™ filter technology that provides the utmost power handling capability and reliability



Model Number	CS8PPXX110E	CS8PPXX160E	CS8PPXX200E, Natural CS8PPXX202E, Fan	CS8PPXXW
Model Description	2, 3 or 4 Channel Combiner			
Product Type	UHF TV Starpoint Combiner			
Frequency range, MHz	476-608 MHz			
Channel Spacing	Non-Adjacent			
Narrowband Input Power (maximum) kW	1.0	2.6	6 Natural convection / 9.0 Forced air cooling (water cooling option)	12
Output Power (maximum) kW	4.0	10.4	36	44
Impedance (unbalanced) Ohms	50			
Number of Poles	8			
Filter Type	Cross Coupling Retuneable			Wave Guide Non-Retuneable
Number of Cross Couplings	2			
Passband, MHz	6 MHz, ATSC3.0			
Input Connector Size *	DIN 7-16	1-5/8" EIA	3-1/8" EIA	3-1/8" EIA
Output Connector Size *	1-5/8" EIA	3-1/8" EIA	6-1/8" EIA	6-1/8" EIA
Weight (lbs)	260	331	846	750
Dimensions H x W x D (in)	32.16 x 25.35 x 35.04 (4 channel unit)	36.38 x 33.43 x 30.55 (4 channel unit)	29.06 x 97.17 x 97.17 (4 channel unit)	84.17 x 51.18 x 51.18 (4 channel unit)

* Others available on request

** Except for model CS8PPXXW

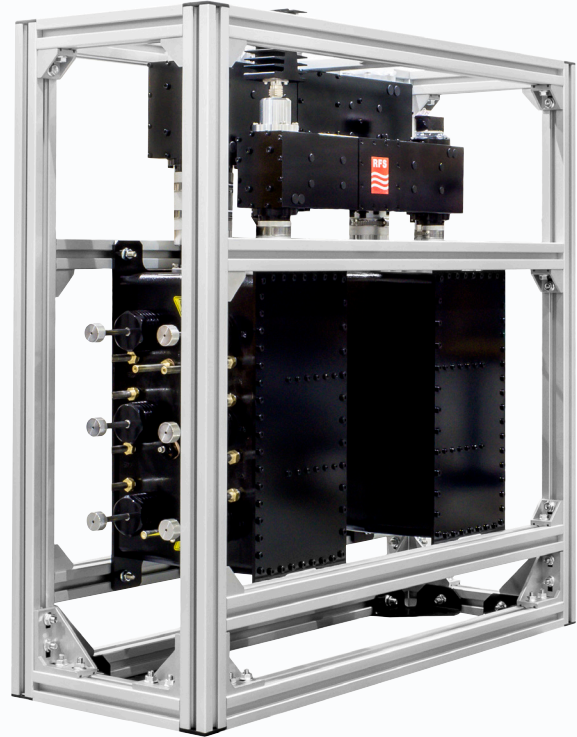
NEXTGEN TV COMBINERS

BALANCED COMBINERS

CA Series

RFS CA series constant impedance balanced combiners offer a high performance solution for combining both adjacent and non-adjacent channels at multi-channel SFN sites. The compact footprint and air-cooled design simplifies site acquisition and reduces site infrastructure costs. These combiners include mask filtering that is optimized for ATSC3 operation. The modular design incorporates multi stage hybrids that allow additional channels to be added in the field without the need for tuning or adjustment.

- Optimized for ATSC3 SFN applications
- High performance solution for both adjacent and non-adjacent channel combining
- Includes ATSC3 mask filtering
- Compact footprint
- Plug and Play – Add channels in the field without the need for tuning or adjustment
- Uses the field-proven RFS Peak+™ filter technology that provides the utmost power handling capability and reliability



Model Number	CA6PPXX110E	CA8PXX160E	CA8PPXX200E
Product Type	UHF Balanced Combiner		
Frequency range, MHz	470-608		
Channel Spacing	Adjacent		
Narrowband Input Power Rating @ fc, kW (≤40° rise), fc = 539 MHz	3.3	5.5	16.5
Combined Output Rating with 1-5/8" Coupler, kW	5.6	N/A	N/A
Combined Output Rating with 3-1/8" Coupler, kW	13.2	18	18
Combined Output Rating with 6-1/8" Coupler, kW	N/A	40	40
Impedance (unbalanced) Ohms	50		
Number of Poles	6	8	8
Filter Type	Cross Coupling		
Number of Cross Couplings	2		
Passband, MHz	6MHz, ATSC 3.0		
Input Connector	1-5/8" EIA	1-5/8" EIA or 3-1/8" EIA	3-1/8" EIA
Output Connector	1-5/8" EIA OR 3-1/8" EIA	3-1/8" EIA OR 6-1/8" EIA	3-1/8" EIA OR 6-1/8" EIA
Weight (lbs)	152.12	392.7	478.4
Dimensions H x W x D (in)	34.06 x 17.72 x 35.04 (Single Module)	56.9 x 19.69 x 39.9 (Single Module)	60.87 x 19.69 x 39.92 (Single Module)

RF CABLES

HELIFLEX® AIR-DIELECTRIC COAXIAL CABLE

HCA Series

RFS HELIFLEX® transmission lines are ideally suited to the requirements of multi-channel SFN sites. The inherently broadband nature of these continuous length cables eliminates the problem of “flange VSWR build-up” and banned channels that are often associated with rigid line systems. Furthermore, there is no need for complex spring hanging systems or multiple interconnections, resulting in simplified installation and increased reliability. The relatively short SFN tower heights (measured in hundreds of feet rather than thousands of feet) make these cables an obvious choice for SFN sites.

RFS HELIFLEX® transmission lines are made from premium materials and offer low attenuation and high-power rating to ensure superior performance of your transmission system. RFS’s leadership in the industry has never been in contention. The product has undergone continuous improvement since we first introduced the continuous weld corrugated coaxial cable in the 1950’s.



- Highest power and lowest loss for products of equivalent size from any competitor
- Each cable run is tested. The jacket shows sequential marking for length, product code and production tracer code.
- Superior performing connectors
- Custom lengths and interfaces
- Full range of accessories

Model Number	HCA158-50J	HCA214-50J	HCA300-50J	HCA400-50J	HCA495-50J	HCA550-50J	HCA618-50J	HCA800-50J
Size	1-5/8"	2-1/4"	3"	4"	5"	5-1/2"	6-1/8"	8"
Jacket Option	Black							
Inner Conductor Material	Corrugated Copper Tube							
Dielectric Material	Helical Polyethylene Spacer							
Outer Conductor Material	Corrugated Copper							
Jacket Material	Polyethylene, PE							
Recommended / Maximum Clamp Spacing, m (ft)	0.8/1.2 (2.75/4.0)	0.8/1.0 (2.75/3.25)	0.8/1.2 (2.75/4.0)		1.0/2.0 (3.3/6.6)	1.0 / 2.0 (3.3 / 6.6)		
Impedance, Ohm	50 +/- 0.5							
Maximum Frequency, GHz	3	2.3	1.63	1.66	1	0.86		0.65
Velocity, percent	95		96		97	96	97	
Peak Power Rating, kW	270	425	640	940	1560	2250	2890	4000
RF Peak Voltage, Volts	5200	6500	8000	9700	12500	15000	17000	20000
Jacket Spark, Volt RMS	8000							
Install. Temperature, °C(°F)	-40.0 to 60.0 (-40.0 to 140.0)							
Storage Temperature, °C (°F)	-70.0 to 85.0 (-94.0 to 185.0)							
Operation Temperature, °C(°F)	-50.0 to 85.0 (-58.0 to 185.0)							
Phase Stabilized	Phase stabilized and phase matched cables and assemblies are available upon request.							
Flame Retardant Jacket Specs	Meets the requirements according to: IEC60754-1, IEC60754-2							
Attenuation (dB/100 ft) @ 473 MHz	0.430	0.387	0.295	0.253	0.195	0.152	0.132	0.106
Attenuation (dB/100 ft) @ 605 MHz	0.490	0.443	0.340	0.289	0.222	0.174	0.151	0.122
Maximum Average Power (kW) @ 473 MHz	8.6	10.0	17.3	24.4	37.3	58.7	76.7	124.4
Maximum Average Power (kW) @ 605 MHz	7.6	8.8	15.1	21.5	32.9	51.6	67.3	109.3
Applications	UHF, VHF, Broadcast; intended for outdoor usage		TV, Broadcast					

RF CONNECTORS

HELIFLEX® CONNECTOR SERIES

HCA Series

RFS' line of high performance HELIFLEX coaxial cable connectors are characterized by excellent gas tightness and extremely low losses. HELIFLEX connectors can be installed with basic hand tools, but the use of dedicated installation tools further facilitates ease of assembly and improves performance. RFS connectors are fully tested for mechanical and electrical compliance specifications. HELIFLEX premium connectors have excellent electrical values and provide outstanding performance for the most demanding applications. The RFS connector design provides maximum sealing integrity and gas tightness.

- Quick-fit connector series -019KT simplifies installation by removing the need for sealing compound
- Excellent gas tightness – overpressure for increased voltage handling is maintained throughout the system
- Robust mechanical design, superior and consistent performance guarantees outstanding system characteristics
- Extremely low reflection factor, outstanding low reflection factor improves overall system performance and margin and reduces mismatch losses
- Totally waterproof according to IP 66 / 68 assuring safe, long term operation in the harshest of environments

Model Number	78EIA-HCA78-019KT	158EIA-HCA158-019KT
Flange Type	7/8"EIA	1-5/8"EIA
Gender	Male	
Cable Type	HCA78	HCA158
Impedance (ohms)	50	
VSWR	0 - 1GHz 1.02 1 - 2.3GHz 1.03 2.3 - 3.0GHz 1.06	0 - 1GHz 1.02 1 - 2.7GHz 1.06
Average Power (kW) @ 605MHz *	2.5	5.9
Working Voltage @ sea level (kV) *	2.5	4.7
Sealing Method	O-Ring Sealing	O-Ring Sealing

Model Number	318EIA-HCA300-019KT	318EIA-HCA400-019KT
Flange Type	3-1/8"EIA	3-1/8"EIA
Gender	Male	
Cable Type	HCA300	HCA400
Impedance (ohms)	50	
VSWR	0 - 860MHz 1.02 860-1500MHz 1.05	
Average Power (kW) @ 605MHz *	15.2	19.5
Working Voltage @ sea level (kV) *	8.0	9.5
Sealing Method	O-Ring Sealing	O-Ring Sealing

Model Number	412IEC-HCA495-009KT	618EIA-HCA550-009KT	618EIA-HCA618-009KT
Flange Type	4-1/2"IEC	6-1/8"EIA	6-1/8"EIA
Gender	Male		
Cable Type	HCA495	HCA550	HCA618
Impedance (ohms)	50		
VSWR	0 - 860MHz 1.02 860-1000MHz 1.04	0 - 860MHz 1.02	0 - 860MHz 1.02
Average Power (kW) @ 605MHz *	33.1	52	68
Working Voltage @ sea level (kV) *	12.6	15	17
Sealing Method	Sealing Compound	Sealing Compound	Sealing Compound

* Power and voltage ratings are determined by both the connector and cable to be attached to.
Please Note:KT series connectors come with inner coupling, O-ring and flange hardware.



WORLDWIDE **BROADCAST SUPPORT**

RFS is committed to developing cutting-edge, cost-effective broadcast solutions designed to outlast other systems while never compromising on performance. We anticipate the evolving technology needs of our partners creating greater connectivity within the markets we serve and representing one simple force – the design, manufacture and deployment of RF technology, systems and services.



RFS has advanced RF simulation and modeling to the point where antennas can be fully built using design simulation software so that the manufactured product will not require any additional tuning.



Pioneering significant advancements for RF broadcast antennas, filters and combiners has greatly reduced lead time, increasing the factory's capacity to produce more antennas in a shorter time.



RFS' USA-based state-of-the-art manufacturing facility with more than 350,000 sq. ft. is located in Meriden, CT. It contains near and far field test ranges and abundant covered storage areas.



From design to manufacture, ISO 9001 and ISO 14001 certification standards and LEAN manufacturing methods encompass all aspects of RFS' business worldwide.

THE ONLY END-TO-END BROADCAST SYSTEM PROVIDER

RFS is the only provider with a truly holistic, end-to-end approach. Our focus is on your future needs, so innovation in adaptability of infrastructure play a vital role. We utilize retunable filters at all power levels and provide the broadest bandwidth antennas across FM, VHF and UHF bands. Our polarization designs are market leading and our software tools allow for tuning to customer needs.

A LIFETIME OF SUPERIOR ELECTRICAL PERFORMANCE

Meticulous end-to-end system design means that each broadcast system is fine tuned to deliver premium performance year after year.

BUILT TOUGH TO SURVIVE EXTREME CONDITIONS

Our rugged construction and corrosion resistance measures ensure that each system works reliably in the harshest of environments, under the most demanding of operating conditions.





RADIO FREQUENCY SYSTEMS

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