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**Electronics & Communications** 

# **ABOUT US**

Since 2002, SUNGSAN Electronics & Communications is growing as an RF leader providing **expertise and customized solutions** to client projects in the fields of Military & Defence, Aerospace, Telecommunications, Test & Measurements, and Research.

# Our goal is to support the successful completion of clients' projects.



# **HISTORY**

2022	· Signed LIG Nev1 Partner
LULL	Completed R&D in X-band image radar transmit & receive module (TRM) for scientific satellites
2021	<ul> <li>Completed R&amp;D in 325MHz, 8kW SSPA for heavy ion accelerator, and deliveried 69set</li> </ul>
2020	• Mass production of 3.5GHz Band Reject Filter for 5G
2018	Completed R&D in 6-18GHz, 16W Amplifier     Awarded as an alobal small business corporation
2017	Awarded Innovative Industry and Energy in 12th Electronic Awards from Ministry of Trade in the Republic of Korea (CEO ST Kim)     Completed R&D in SSPA for EMC Testing
2016	<ul> <li>Completed R&amp;D in SSPA for 81.25MHz 20-80KW heavy ion accelerator</li> <li>Acquired Innovation Small Business (INNO-BIZ) Certification</li> </ul>
2015	<ul> <li>Completed R&amp;D in 30W PCS, AWS, UMTS of LPA communications, and exported to Europe</li> </ul>
2014	• Acquired ISO 9001 / ISO 14001 Certifications
2013	<ul> <li>Completed R&amp;D in WCDMA, GSM, LTE HPA 30W and exported to Europe</li> </ul>
2012	· Completed R&D in X-Band and S-Band radar SSPA
2011	<ul> <li>Awarded as an export-promising small business corporation</li> <li>Exported high efficiency 8W 16W 30W WCDMAs</li> </ul>
	and HPAs to Europe
2009	<ul> <li>Completed R&amp;D in high efficiency 16W, 30W, USPCS, HPA</li> </ul>
2008	· Completed R&D in Military Communication Systems
2006	<ul> <li>Completed R&amp;D in Low Power Broadband Amplifier for the defence industry, exported to the U.S</li> </ul>
2003	• Exported Broadband Power Amplifiers to the U.S.
2002	· Established

# MARKET

# SUNGSAN provides customized RF solutions of active and passive modules for various applications.



# AEROSPACE & DEFENCE

**CONT** SUNGSAN produces HPA generated with GaN devices of a high frequency band reaching to more than octave, high efficiency and compact size, and has a competitive LDMOS-based lineup.

Providing the expertise and customized solutions for active and passive modules, it can operate at optimal performance in aerospace and defense industries of broadband mobile jamming, radar, satellite communication, unmanned aerial vehicles, and drones business.



SATCOM (Satellite Comunications) · Drone · Interception & Jamming UAV (Unmanned Aerial Vehicle) · Radar



# **SCIENTIFIC**

SUNGSAN's special purpose high-power amplifier maintains a wide range of lineups, including SSPA for Pulse, Energy, EMC Testing SSPA and Accelerator SSPA, guaranteed excellent linearity, long-term stability, user-friendly UI, and competitive pricing.

As a primary partner, SUNGSAN participate South Korea-government project of Heavy-ion Accelerator, "RAON", and a variety of government-led projects to provide solutions. We produce EMC SSPA complied with the Radiated Test requirements of the IEC 61000-4-3 EMC Test system. We provide customized, user-friendly solutions for testing measurement for basic research company.



 Test & Measurement
 · EMC (Electromagnetic Compatibility) Testing

 Fundamental Research
 · Accelerator



# COMMUNICATION

•••••• SUNGSAN produces linear amplifiers of traditional back-off linear HPA and digital pre-distortion HPA that performs high linearity and low distortion.

By utilizing analog pre-distortion method, We produce HPA with compensation technology that adapted for the first time in Korea, providing it to excellent repeater companies in Korea and Europe.

Upon customer requests, we develop a variety of solutions and technologies to provide superior linearity for the communication of base stations, repeaters, and DAS.



Base Station · DAS (Distributed Antenna Systems)

# BENEFIT

# QUALITY

Maintain ISO 9001 and ISO 14001 certifications from 2014



# R&D

- · Average annual R&D investment of 12% compared to sales (4-year average)
- · Maintained 25% of the researcher rate
- · Expertise in designing experience about 800 amplifier models (HPA, SSPA etc) and about 200 passive models (Filter, Coupler, Combiner & Divider etc)
- · Robust information protection with DLP (data loss prevention) systems

# PRODUCTION

- · Mass amount production system (Manufacture capacity of Minimum 200 units produced per week.)
- · Having minimum stock on standby for mass production
- · Thorough Follow-up Management

### CERTIFICATIONS

· QMS (QUALITY MANAGEMENT SYSTEM) ISO 9001:2015 / KS Q ISO 9001:2015

> · EMS (ENVIRONMENT MANAGEMENT SYSTEM) ISO 14001:2015 / KS I ISO 14001:2015

PATENT · No. 10-2073475, Filter having

Jin Chul choi

- a Combined Structure of a Resonator and a Feeder with Improved Capacitance
- No. 10-2131873, EIA Connector with Coupler
- No. 10-1860930, Bias Circuit of a Power Amplifier using a Gallium Nitride (GaN) Transistor
- · No. 10-1860931, SSPA Power Amplifier Switching Delay Adjustment Circuit
- No. 10-1694470, a Gate Voltage Control Circuit for an Amplification Element of a Negative Voltage-Based Driving
- ·No. 10-2186801, a Power Synthesizer Capable of Changing the Number of Ports used

# PARTNER

The best partner for RF Solution.





# GLOBAL



# **TRADING COUNTRY**

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THE UNITED STATES, THE UNITED KINGDOM, GERMANY, FRANCE, TAIWAN, SINGAPORE, RUSSIA, ROMANIA, LITHUANIA, UNITED ARAB EMIRATES, ISRAEL, ITALY, INDIA, JAPAN, CANADA, CROATIA, CYPRUS, TURKEY, PAKISTAN, VIETNAM, KOREA



**TRADING COMPANY** 



**EXPORTS AMOUNT (LAST 2 YEARS)** 

# LINE UP



SUNGSAN has more than 1,000 development experiences. It is for supporting the successful completion of clients' projects.



### **1. BROADBAND AMPLIFIER**

- · 20MHz to 18GHz
- · Less Current Consumption High Output Power
- · Low Harmonics
- · Long-term Reliability
- · Superior Gain Flatness
- · Excellent Linearity
- · Up to 1,000Watts CW & Pulsed
- · Compact Size

SYSTEM

· Class AB Amplifier

(20MHz to 18GHz)

Superior Gain Flatness
19" Rack Mounted

LAN (Ethernet), RS-232

· Auto Gain Control Mode

· Low Harmonics

### 2. LINEAR AMPLIFIER

- · Doherty Configuration
- Feed Forward & APD
- (Analog Pre-Distortion)
- High Linearity & Efficiency
- Low IMD & Distortion and EVM

· Instrantaneous Ultra Broadband

· Remote Control : GPIB (IEEE-488),

· High Reliability and Rugged Design

3. SSPA (SOLID STATE POWER AMPLIFIER)

· Up to 4000 Watts CW and Pulsed Output Power

# 4. SSPA FOR EMC TESTING

- $\cdot$  20MHz to 6GHz
- $\cdot$  Up to 50V/m
- (50V/m w/80% AM per IEC 61000-4-3)
- Low Harmonics
- Long-term Reliability
- Superior Gain Flatness
- Excellent Linearity

### 5. SSPA FOR ACCELERATOR

- · Up to 150k Watts
- $\cdot$  81.25MHz to 500MHz
- · High Output Power Stability
- High Efficiency
- Water Cooling Systems

### 6. CAVITY FILTER

- $\cdot$  Low Insertion Loss
- · High Power Handling
- $\cdot$  High Isolation and Low IMD
- $\cdot$  High Experienced MTBF

### 7. DIRECTIONAL COUPLER

- · 20MHz to 20GHz
- · Compact Size
- · High Power Handling
- Coupling & Directivity

# BROADBAND AMPLIFIER



## **MAIN FEATURE**

- · 20 MHz to 18 GHz
- Less Current Consumption
- High Output Power
- $\cdot$  Low Harmonics
- · Long-term Reliability
- Superior Gain Flatness
   Excellent Linearity
- Up to 1000Watts
  - CW & Pulsed
- · Compact Size

# **APPLICATION**

- Military and Defense
   SATCOM
- (Satellite Comunications) • UAV
- (Unmanned Aerial Vehicle) • Drone
- · Radar
  - Interception & Jamming
     EMC Testing

A Broadband Amplifier is a device that amplify signals over a wide frequency range and operate in a variety of frequency bands.

SUNGSAN's Broadband Amplifiers are designed by adapting GaN, LDMOS, and GaAs, that demonstrates excellent performances in terms of high efficiency, high reliability, and robustness.

Our products are to facilitate with the environment and requriments in aerospace, military and defense of jamming and radar, generating low current consumption power for long-term reliable communication.

# SPECIFICATIONS

Model	Start Frequency (MHz)	Stop Frequency (MHz)	Power (W)	Gain (dB)	Power Supply (V)	Current (A)
PA1074	20	520	60	46	28	9
PA1018	20	520	100	50	28	12.5
PA1008	20	1,000	5	42	32	2
PA1072	20	1,000	25	46	30	6
PA1014	20	1,000	80	49	30	9.5
PA1013	20	1,000	100	50	32	10
PA1069	500	2,000	200	55	28	25
PA1045	500	2,500	25	44	28	3.3
PA1075	500	2,500	50	46	28	6.5
PA1070	500	2,500	100	50	28	12
PA1093	500	2,700	25	44	30	3.3
PA1092	500	2,700	50	46	30	6.5
PA1091	500	2,700	100	50	28	14
PA1030	500	3,500	10	42	28	3
PA1011	700	2,200	100	49	28	13
PA1044	700	3,800	15	42	28	3
PA1057	800	3,000	50	47	28	6.3
PA1006	1,000	2,000	50	50	32	6.5
PA1081	1,000	2,000	150	48	28	14
PA1038	1,000	2,700	100	54	32	13
PA1019	1,000	3,000	50	47	28	6.3
PA1050	1,000	3,000	50	47	28	7
PA1051	1,000	3,000	100	7	28	12
PA1055	1,000	6,000	0.1	20	36	0.2
PA1100	1,000	6,000	7	45	50	2
PA1056	1,000	6,000	40	40	36	20
PA1012	2,000	6,000	35	55	32	10
PA1098	2,000	6,000	60	49	28	17
PA1026	2,500	6,000	2	30	28	2
PA1047	2,500	6,000	10	40	28	2
PA1017	2,500	6,000	35	46	28	10
PA1053	2,500	6,000	35	46	30	10
PA1033	3,000	6,000	2	20	15	6.3
PA1089	6,000	8,000	30	44	28	8
PA1046	6,000	18,000	16	42	22	10
PA1094	6,000	18,000	25	44	22	15

# <sup>•</sup> LINEAR AMPLIFIER



# **MAIN FEATURE**

### **APPLICATION**

Doherty Configuration
Feed Forward & APD (Analog Pre-Distortion)
High Linearity & Efficiency
Low IMD & Distortion and EVM GSM, WCDMA, LTE, 5G
 DAS
 (Distributed Antenna Systems)
 Digital Television

A Linear Amplifier is a device that amplifies an input signal with no deformation, and is used in Systems processing voice, data, and various plane wave signals. Its application for the customer requires undistorted amplification and accurate delivery of signals.

Our linear amplifiers prove high linearity, and low distortion performance for 5G, LTE, CDMA, WCDMA, GSM, PCS, and UMTS systems.

These linear amplifiers of Sungsan are ideal for RF repeaters, DAS, and wireless communication users who require signal amplification without distortion and accurate transmission.

SPECIFICATIONS											
Model	Start Frequency (MHz)	Stop Frequency (MHz)	Power (W)	Gain (dB)	Power Supply (V)	Current (A)					
PA3202	462.5	467.5	100	53	32	12					
PA 3163	728	758	30	45	28	4					
PA3180	729	821	200	45	50	12					
PA3001	758	788	250	58	28	37.6					
PA3164	758	803	30	45	28	4					

Model	Start Frequency (MHz)	Stop Frequency (MHz)	Power (W)	Gain (dB)	Power Supply (V)	Current (A)
PA3196	758	803	100	45	28	4
PA3002	824	849	250	58	28	37.6
PA 3153	859	894	30	45	28	4
PA3186	859	894	100	53	32	12
PA3179	859	960	200	45	50	12
PA3092	869	894	60	50	28	8.5
PA3197	869	894	100	53	32	12
PA3003	869	894	250	58	28	37.6
PA3097	869	960	30	50	28	5.3
PA3099	869	960	60	50	28	35.7
PA3004	880	915	250	58	28	37.6
PA3154	918	960	16	42	28	2
PA3192	925	960	100	53	32	12
PA3005	925	960	250	58	28	37.6
PA3172	1,710	1,785	30	45	32	4
PA3006	1,710	1, 785	250	58	28	37.6
PA3171	1,805	1,880	30	45	32	4
PA3100	1,805	1,880	60	50	28	8.5
PA3193	1,805	1,880	100	53	32	12
PA3007	1,805	1,880	250	58	28	37.6
PA3100	1,805	1,995	200	45	50	12
PA31/4	1,920	1,980	30	40	32	4
PA3008	1,720	1,900	60	50	20	85
PA 3166	1,730	1,770	30	45	20	4.3
PA3091	1,930	1,775	60	50	28	8.5
PA3182	1.930	1.995	100	53	32	12
PA3089	2,100	2,170	60	49	28	8.5
PA3087	2,110	2,170	8	45	27	4
PA3173	2,110	2,170	30	44.3	32	4
PA3194	2,110	2,170	100	53	32	12
PA3011	2,110	2,170	250	54	30	12
PA3187	2,110	2,200	100	53	32	11.1
PA3189	2,110	2,200	200	45	50	12
PA3085	2,300	2,400	16	42	28	2.75
PA3198	2,300	2,400	100	53	32	12
PA3183	2,496	2,690	100	53	32	12
PA3190	2,496	2,690	200	45	50	12
PA3098	2,570	2,620	30	44	28	4.8
PA3191	2,570	2,620	100	53	21	12
PA3195	2,620	2,690	100	53	32	12
PA3010	2,620	2,690	250	58	28	37.6
PA3200	3,300	3,800	100	53	32	12
PA3201	3,300	4,200	100	53	32	12
PA3199	3,600	3,800	100	53	32	12

# **SSPA\* SYSTEM**

\*Solid State Power Amplifier



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# **MAIN FEATURE**

Class AB Amplifier
 Instrantaneous Ultra

- Broadband (20MHz to 18GHz) • Up to 4,000Watts CW and
- Pulsed output Power • Low Harmonics
- Superior Gain Flatness
- · 19" Rack Mounted
- · Remote Control : GPIB (IEEE-
- 488), LAN (Ethernet), RS-232
- $\cdot$  Auto Gain Control Mode

**SPECIFICATIONS** 

 High Reliability and Rugged Design

## ••••••• SUNGSAN's SSPA Systems are solid-state, self-air-cooled, or water-cooled broadband amplifiers designed for application if instantaneous bandwidth, high gain, and linearity are required.

It provides a minimum of 20 to 4,000W for both CW and pulse output power in the frequency band of 20MHz to 18GHz if used with sweep generators.

# APPLICATION

SATCOM (Satellite Comunications)
Radar
Interception & Jamming
EMC Testing
Accelerator

Model	Start Frequency (MHz)	Stop Frequency (MHz)	Power (W)	Gain (dB)	Power Supply(V)	Current (A)	Dimension (mm)
SA1022	20	500	500	57	220	3,000	482.6 x 600 x 310.5 (19" 7U)
SA1003	20	520	100	50	220	400	300 x 400 x 133.5 (handheld type)
SA1079	20	1,000	30	45	220	500	482.6 x 600 x 132.5 (19" 3U)
SA1002	20	1,000	50	47	220	700	300 x 400 x 133.5 (handheld type)

Model	Start Frequency (MHz)	Stop Frequency (MHz)	Power (W)	Gain (dB)	Power Supply(V)	Current (A)	Dimension (mm)
SA1042	20	1,000	300	55	220	1,600	441 x 600 x 221.5 (19" 5U)
SA1063	20	6,000	300	58, 54	220	2,000	600 x 1025 x 1,340 (19" Rack)
SA1035	20	6,000	1,000	63, 54, 52	220	7,600	600 x 985 x 1,900 (19" Rack)
SA1054	30	4,000	50	40	220	2,000	482.6 x 568 x 265.9 (19" 6U)
SA1060	80	1,000	100	52	220	650	479.6 x 600 x 133.5 (19" 3U)
SA1027	80	1,000	150	56	220	1,000	441 x 600 x 133.5 (19" 3U)
SA1028	80	1,000	250	55	220	1,200	441 x 600 x 222.5 (19" 5U)
SA1023	80	1,000	500	60	220	3,500	441 x 600 x 310.5 (19" 7U)
SA1055	80	1,000	1,000	63	380	7,000	600 x 985 x 1,100 (19" Rack)
SA1064	80	6,000	500	60, 54	220	3,000	600 x 1025 x 1,340 (19" Rack)
SA1080	100	500	500	57	220	3,000	482.6 x 600 x 310.3 (19" 7U)
SA1070	100	10,000	40	40	220	500	482.6 x 600 x 177 (19" 4U)
SA1040	300	6,000	25	47, 43	220	500	482.6 x 601.5 x 133.5 (19" 3U)
SA1049	500	2,000	2,000	63	220	7,500	482.6 x 600 x 222.5 (19" 5U)
SA1050	500	2,700	100	50	220	500	482.6 x 600 x 132.5 (19" 3U)
SA1001	700	2,700	100	50	220	1,500	441 x 602.5 x 177 (19″ 4U)
SA2018	800	1,000	500	57	28	3,000	482.6 x 595 x 221.5 (19" 5U)
SA2004	800	1,000	1,000	63	27	3,000	482.6 x 595 x 221.5 (19" 5U)
SA1032	800	6,000	750	62	220	6,000	600 x 985 x 1,900 (19" Rack)
SA1066	1,000	2,000	150	51.7	110, 220	1,000	482.6 x 600 x 132.5 (19" 3U)
SA1030	1,000	3,000	60	48	220	400	441 x 600 x 133.5 (19" 3U)
SA1041	1,000	3,000	250	57	220	2,000	482.6 x 602.5 x 221.4 (19" 5U)
SA1068	1,000	3,000	350	56	220	3,000	482.6 x 600 x 221.4 (19" 5U)
SA1081	1,000	6,000	50	47	220	1,000	482.8 x 450 x 132.5 (19" 3U)
SA1043	1,000	6,000	55	48	220	1,000	482.6 x 600 x 221.4 (19" 5U)
SA1059	1,000	6,000	250	54	220	4,000	600 x 1000 x 1,500 (19" Rack)
SA1062	1,000	18,000	10	40	220	500	482.6 x 600 x 132.5 (19" 3U)
SA2019	1,800	2,200	500	45	28	3,000	482.6 x 595 x 221.5 (19" 5U)
SA2005	1,800	2,200	1,000	63	27	3,000	482.6 x 595 x 221.5 (19" 5U)
SA1051	2,000	3,800	300	55	220	2,500	482.6 x 600 x 222.5 (19" 5U)
SA1071	2,000	6,000	100	53	220	2,000	482.6 x 600 x 221.4 (19" 5U)
SA1056	2,000	6,000	120	51	220	1,600	482.6 x 600 x 222.5 (19" 5U)
SA2020	2,500	2,700	500	67	28	3,000	482.6 x 595 x 221.5 (19" 5U)
SA1025	2,500	6,000	35	46	220	500	482.6 x 600 x 133.5 (19" 3U)
SA1008	2,500	6,000	100	50	220	1,500	482.6 x 600 x 222.5 (19" 5U)
SA1031	3,000	6,000	60	52	220	1,000	482.6 x 600 x 133.5 (19" 3U)
SA1026	3,000	6,000	125	52	220	1,600	482.6 x 600 x 222.5 (19" 5U)
SA1069	3,000	6,000	350	60	220	3,500	600 x 985 x 1,100 (19" Rack )
SA2051	3,300	4,100	350	56	220	3,200	482.6 x 600 x 221.4 (19" 5U)

# <sup>•</sup> SSPA FOR EMC TESTING



# **MAIN FEATURE**

- · 20MHz to 6GHz
- · Up to 50V/m
- (50V/m w/80% AM per
- IEC 61000-4-3)
- $\cdot$  Low Harmonics
- · Long-term Reliability
- Superior Gain Flatness
- $\cdot$  Excellent Linearity

**SUNGSAN** develops SSPA for EMC testing is used to ensure if applications are performed reliably compatible with electromagnetic compatibility.

Our SSPA desgined for EMC testing applications complies with the Radiated Test requirements of the IEC 61000-4-3 EMC Test system. it ensures of reliable performances in developing products or systems in testing electromagnetic wave integrity and reliability.

# SYSTEM LIST

Model	SA5100 SA5101		SA5102	SA5103	SA5104				
Frequency Range	80MHz - 6GHz								
CW Field Strength	<b>5 V/m</b> (3 V/m w/ 80% AM)	<b>18 V/m</b> (10 V/m w/ 80% AM)	<b>18 V/m</b> (10 V/m w/ 80% AM)	<b>50 V/m</b> (30 V/m w/ 80% AM)	<b>50 V/m</b> (30 V/m w/ 80% AM)				
Test Distance	Up to 3meters	Up to 2meters	Up to 3meters	Up to 2meters	Up to 3meters				
UFA		1.5 x	1.5 meters per IEC 61000	-4-3					
Amplifier	SA5200 (80-1,000MHz 50W) SA5210 (1,000~6,000MHz 20W)	SA5200 (80-1,000MHz 50W) SA5211 (1,000~6,000MHz 30W)	SA5201 (80-1,000MHz 200W) SA5212 (1,000~6,000MHz 60W)	SA5202 (80-1,000MHz 500W) SA5213 (1,000~6,000MHz 100W)	SA5202 (80-1,000MHz 500W) SA5214 (1,000~6,000MHz 200W)				
Antenna	Gain 6 ~ 8dBi / 600W min								
RF Output Cable	Lower loss cable, 2sets (one for each amp /antenna) consisting of 2 and 5 meter lengths								





### **EQUIPMENT LIST**

System Rack	Amplifier	Band selector	Controller	Option
1EA (600 x 900 x 1,500mm)	Lower band 1EA High band 1EA	1EA	1EA	Signal Generator Power Meter



# SYSTEM BLOCK DIAGRAM

# • SSPA FOR ACCELERATOR



# **MAIN FEATURE**

- $\cdot$  Up to 150k Watts
- $\cdot$  81.25 MHz to 500 MHz
- $\cdot$  High Output Power Stability
- High Efficiency
- Water Cooling Systems

# SPECIFICATIONS

Model	Start Frequency (MHz)	Stop Frequency (MHz)	Power (W)	Gain (dB)	Power Supply (V)	Power Consumption(W)	Dimension (mm)
SA4056	80	350	500	57	220	3,000	482.6 x 600 x 310.3 (7U)
SA4040	80.25	82.25	5,000	67	220	60	600 x 900 x 1900
SA4028	80.25	82.25	20,000	73	220	60	600 x 2,600 x 1,900
SA4027	80.25	82.25	80,000	79	220	50	600 x 2,600 x 2,805
SA4054	324	326	8,000	69	380	45	600 x 1,500 x 2,000
SA2047	490	510	40	46	220	800	482.6 x 600 x 132.5 (19" 3U)

protons to uranium.

its localization of excellent quality.

•••••• The SSPA in accelerator is designed as RF

power suppliers of an accelerator to transmit RF power

to an accelerating tubes, which enables researchers to

generate atoms by accelerating all types of lons from

SUNGSAN completes commercializing in SSPA of

accelerator business in South Korea and contributes to

# **COMPONENT AND TECHNOLOGIES**



# **CIRCULATOR**<sup>1</sup>

even at high output power of several tens kW or more, it has been used as a core component for system protection circuit through stable direction control of RF signal by being applied to high power systems.

# **COMBINER**<sup>2</sup>

**Combiner** is the main component of High Power SSPA technology that combines the output of multiple amplifiers efficiently to produce high output power with low loss.

Especially, reliability that can be operated stably for a long time without characteristics changes or damaging components even at high output is a very important performance indicator.

# **COUPLER**<sup>3</sup>

Directional Coupler is to monitor operating status of a signal passing main transmission cable of system by sampling, which is used at high output power from several hundred Watt to several tens kW, and it is compatible with EIA connectors for high output power. In addition, since it has an exceptional directivity performance of 20dB or more, it provides a monitoring function with higher accuracy in the system.

# **COAXIAL LOAD-WATER COOLED<sup>4</sup>**

**Coaxial Load-Water Cooled is a high per**formance RF Termination that has been used in high output 50ohm Coaxial System of several tens kW or more. It would be a suitable solution since it has not only high performance by sophisticated matching design, but also compatibility and high reliability through efficient water-cooling design and high rugged design.

# <sup>©</sup> CAVITY FILTER

# DIRECTIONAL COUPLER





# **MAIN FEATURE**

### **APPLICATION**

Low Insertion Loss
High Power Handling
High Isolation and Low IMD
High Experienced MTBF

SATCOM
 (Satellite Comunications)
 Wireless Communication
 Radar

> SUNGSAN's Cavity Filter built a lineup of filters that can be used at frequencies ranging from 10MHz to 20 GHz and proves very high Q, low insertion loss, steep skirt selectivity, and narrow bandwidth than individual component filters.

### **MAIN FEATURE**

20 MHz to 20 GHz
Compact Size
High Power Handling
Coupling & Directivity

# **APPLICATION**

Military and Defense
 UAV
 (Unmanned Aerial Vehicle)
 Wireless Communication

• A Directional Coupler is a device for transmitting or measuring RF signals of other circuits. primarily used for signal measurements in communication systems, and it divides signal and control in communication networks.

SUNGSAN's Directional Coupler operates from 20MHz to 20GHz. It's fit for the customer in demand of easy access to assemble and high-performance. It is used in a variety of applications for projects in Aerospace, Military & Defense, and Wireless Communications.

### **SPECIFICATIONS**

Model	Туре	Start Frequency (MHz)	Stop Frequency (MHz)	Power (W)	Insertion Loss	Return Loss	Isolation/ Rejection
FIL0007	Low Pass Filter	DC	420	1	2	15	50
FIL0011	Triplexer	698	746	10	0.8	15	50
FIL0002	Triplexer	824	2,155	100	1	20	55
FIL0012	Band Pass Filter	890	930	10	0.8	15	50
FIL0016	Band Pass Filter	3,420	3,760	50	1	12	40
FIL0017	Band Pass Filter	4,000	5,500	10	0.6	12	40
FIL0018	Band Pass Filter	27,500	29,000	10	1.5	12	55
FIL0019	Band Pass Filter	27,700	28,300	10	0.8	15	30

## SPECIFICATIONS

Model	Start Frequency (MHz)	Stop Frequency (MHz)	Power (W)	Coupling (dB)	Directivity (dB)
DC1001	20	1,000	1,000	60	20
DC0009	300	6,000	50	40	13
DC0002	698	2,700	100	35	18
DC0005	1,000	3,000	1,000	40	15
DC0029	1,000	6,000	60	40	10
DC0008	1,800	2,700	2,000	50	10
DC0039	2,000	3,800	400	50	12
DC0033	3,300	3,900	600	40	20