



**RF MORECOM  
COREA**

# 5G High-end New Filter Solution

Technology Innovation of RF Microwave Industry



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(3GHz~5GHz)

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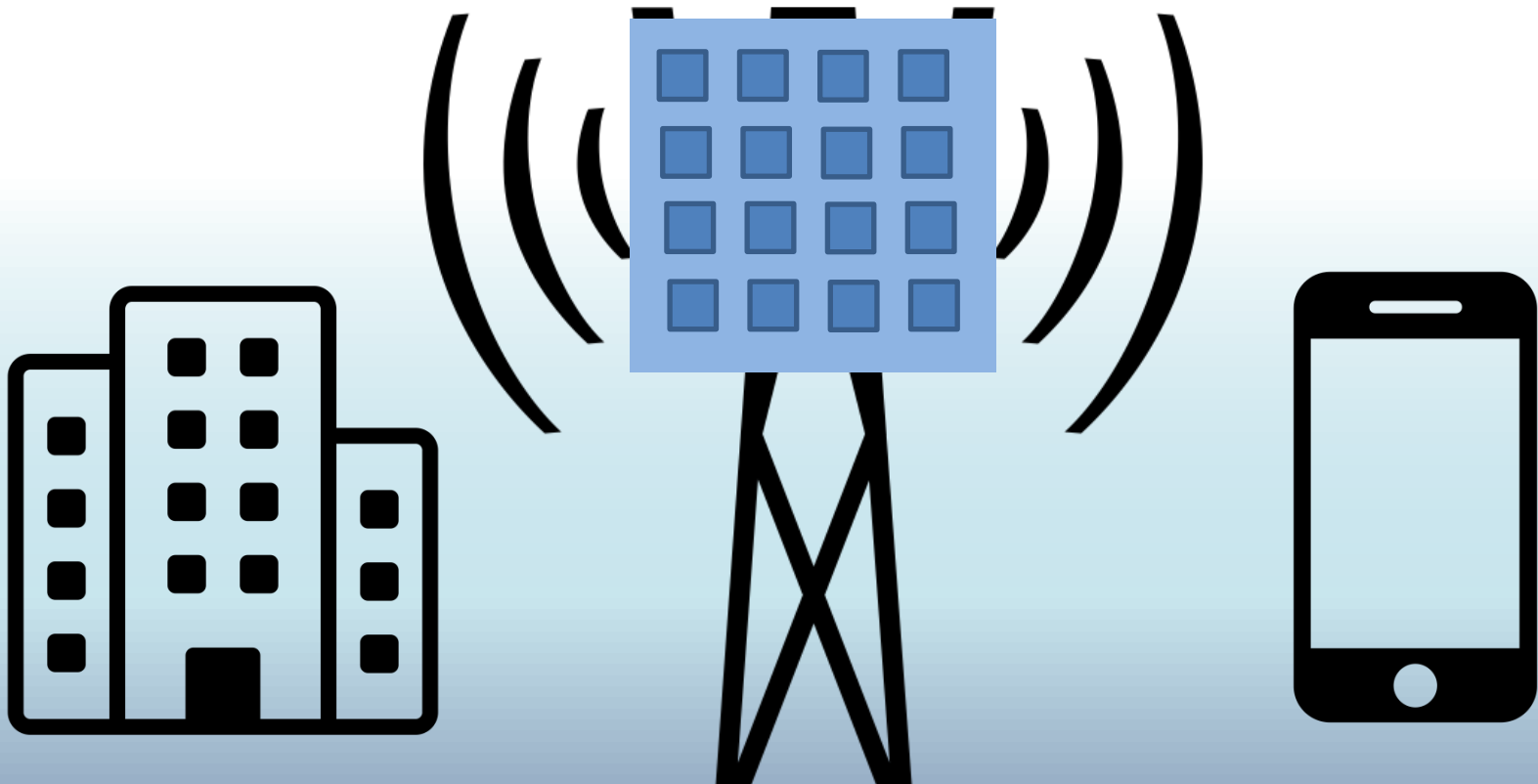
# 5G LS (Lightest and smallest) filter

# Products Application

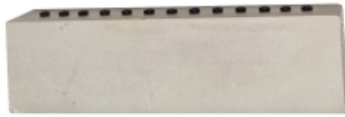
The LS filter can use the 5G New Radio(NR) Massive MIMO base station. The Massive MIMO consist with max 64 by 64 array antennas to dramatically improve wireless data speed and link reliability.

This technology is completely different from the traditional BTS architecture. Massive MIMO has hundreds of antenna elements and uses pre-coding technology to focus wireless energy on target mobile users to reduce radiant power. Focusing energy on certain users saves not only copy power, but also reduces interference with other users. This is particularly advantageous in the current cellular network, where interference is limited.

## Massive MIMO Base Station



## 5G LS filter



## STRONG POINTS

01

Same Electrical Performance as Cavity Filter technology and better Loss than ceramic waveguide filter performance

02

2 times smaller size than cavity filter, and same size as ceramic waveguide filter.

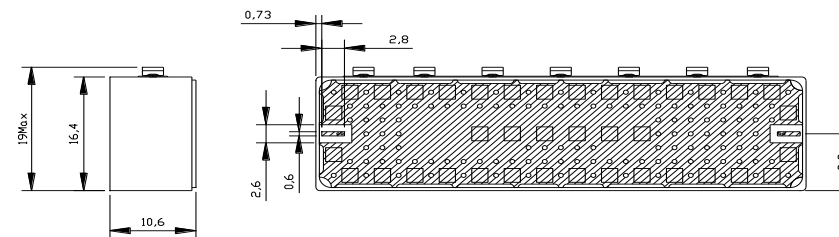
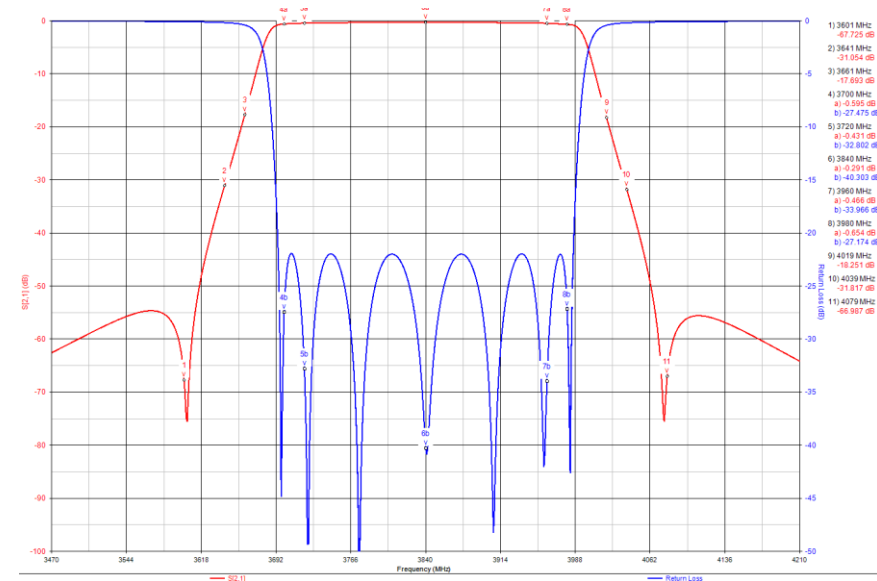
03


SMD Type, and lightest weight

# 1-1. LS filter (3.8GHz 280MHz BandWidth)

## 1. Electrical Specifications

Descriptions		Specification
Frequency		3700-3980 MHz
Band Width		280MHz
Insertion loss		<b>1.0 dB max(0.8dB typ)</b>
Return loss		18dB min
Attenuation	@3660, @4020 MHz	15 dB min
	@3640, @4040MHz	25 dB min
	@3600, @4080 MHz	50 dB min
Weight		<b>20g</b>
In and Out port		<b>SMD TYPE</b>
Dimension(mm)		62 X 19 X 12mm
Power handling		8watt
Temperature		-20 to +85 °C

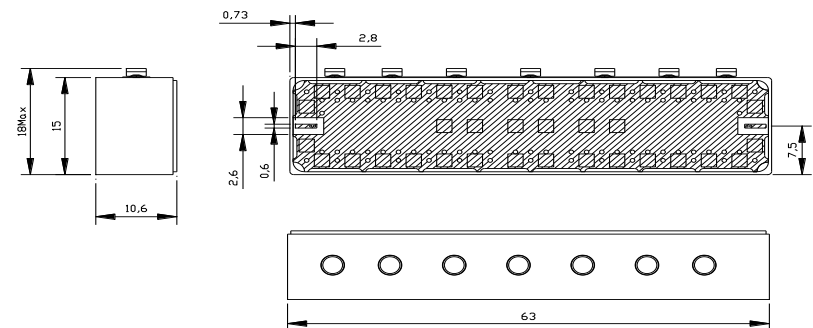
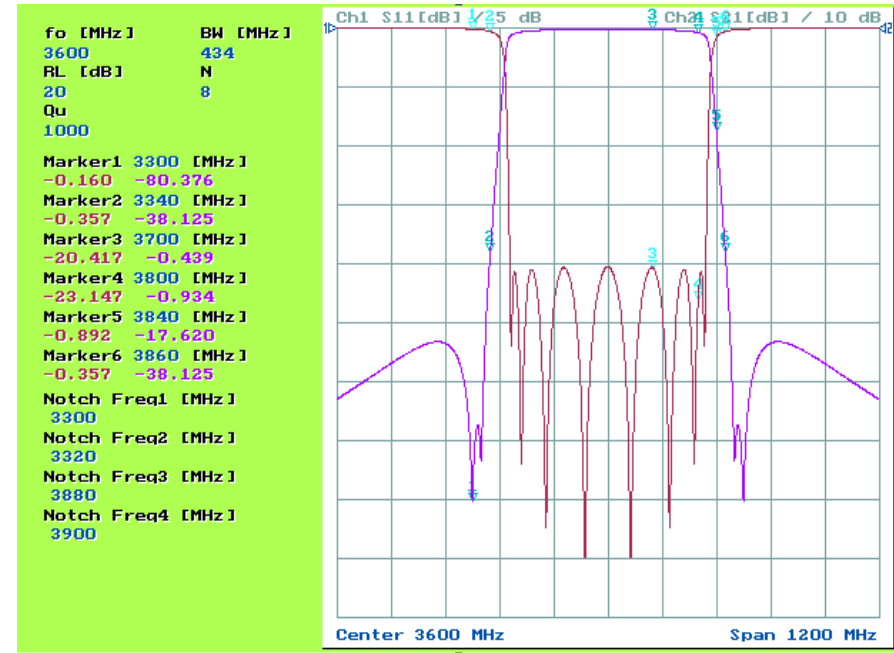


 METALLIZATION  
 SOLDER RESIST

# 1-2. LS filter (3.6GHz 400MHz BandWidth)

## 1. Electrical Specifications

Descriptions		Specification
Frequency		3400-3800 MHz
Band Width		400MHz
Insertion loss		<b>1.2 dB max(1.0dB typ)</b>
Return loss		17dB min
Attenuation	DC & 3300 MHz	50 dB min
	3300 & 3340 MHz	30 dB min
	3340 & 3360 MHz	15 dB min
	3400 & 3800 MHz	Passband
	3840 & 3860 MHz	15 dB min
	3860 & 3900 MHz	30 dB min
	3900 & 4400 MHz	50 dB min
	4400 & 5000 MHz	60 dB min
	5000 & 8000 MHz	30 dB min
8000 & 12750 MHz		10 dB min
Weight		<b>20g</b>
In and Out port		<b>SMD TYPE</b>
Dimension(mm)		63 X 18 X 11mm
Power handling		6 watt
Temperature		-40 to +85 °C



 METALLIZATION  
 SOLDER RESIST

## 1-3. Filter Comparison advantage per the filter types

Descriptions		LS Filter	Ceramic waveguide filter	Cavity filter
Weight		20g	40g	500g
Electrical Performance	Insertion loss	0.8dB	1.5dB	0.8dB
	Rejection	15dB min (at 40MHz away from pass band) 25dB min (at 60MHz away from passband) 50dB min (at 100MHz away from passband)	15dB min (at 40MHz away from pass band) 25dB min (at 60MHz away from passband) 50dB min (at 100MHz away from passband)	Same as LS Filter
	Harmonic	50dB at 10GHz	No possible	Same as LS Filter
	Power	10W	10W	10W
	In/Out Port	SMD type	SMD type	Connector type
Dimension(mm)		35 x 19 x 16mm max.	32 x20 x7.5mm	100 x50 x30mm



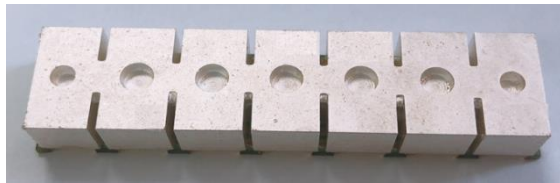
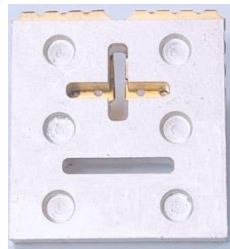
# 1-3. Filter Comparison advantage per the filter types

Descriptions		LS Filter	Ceramic waveguide filter(China)	K&T New filter
Weight		20g	40g	34g
Electrical Performance	Insertion loss	1.0dB max	2.0 dB max	1.2dB max
	Rejection	15dB min (at 40MHz away from pass band) 25dB min (at 60MHz away from passband) 50dB min (at 100MHz away from passband)	15dB min (at 40MHz away from pass band) 25dB min (at 60MHz away from passband) 50dB min (at 100MHz away from passband)	Same as LS Filter
	Harmonic	50dB at 10GHz	No possible	Same as LS Filter
	Power	10W	10W	10W
	In/Out Port	SMD type	SMD type	Connector type
Dimension(mm)		35 x 19 x 16mm max.	32 x20 x7.5mm	60 x25 x12mm

# Ceramic waveguide filter

## 3.5GHz, 3.7GHz

# PRODUCT STRONG POINTS



**<Ceramic Wave Filter>**

01

Same Performance as  
Cavity Connectorized Filter

02

Ultra Compact Size

03

Sharp Rejection and lowest  
Insertion loss

04

Surface Mounted Type

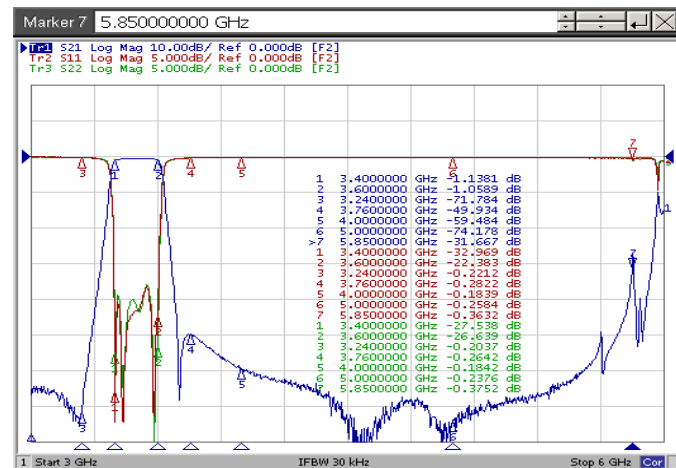
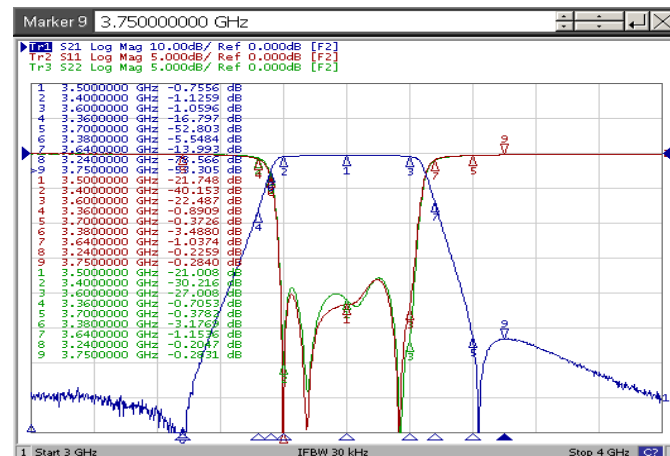
05

Lower cost than Cavity filter

# 2-1. 3.5GHz 200MHz BandWidth

## 1. Electrical Specifications

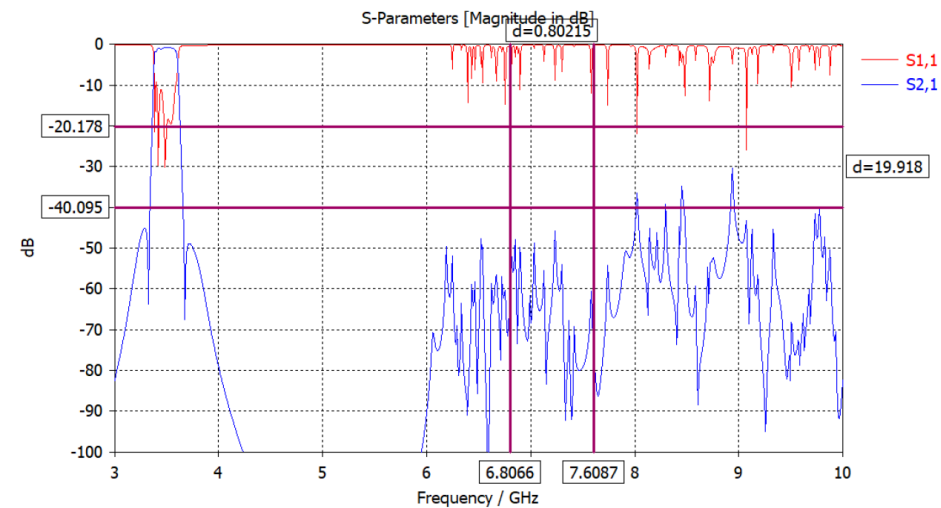
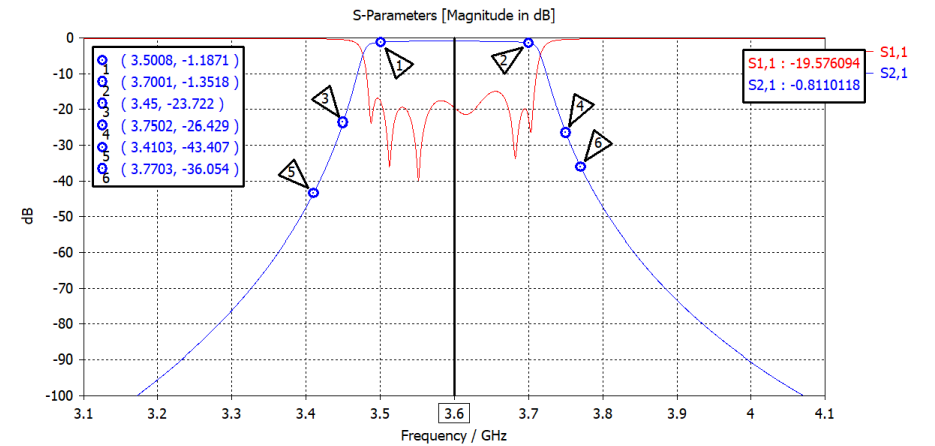
Descriptions		Specification
Frequency		3400-3600 MHz
Band Width		200MHz
Insertion loss		≤ 1.1 dB
Passband Ripple		≤ 0.5 dB
Return loss		≥ 15dB
Attenuation	DC - 2500 MHz	≥ 60 dB
	2500 - 2600 MHz	≥ 50 dB
	2600 - 3300 MHz	≥ 30 dB
	3340 - 3360 MHz	≥ 12 dB
	3640 - 3660 MHz	≥ 12 dB
	3660 - 3700 MHz	≥ 20 dB
	3700 - 4000 MHz	≥ 50 dB
	4000 - 5000 MHz	≥ 50 dB
5000 - 5850 MHz		≥ 25 dB
Dimension(mm)		<b>30 x 30 x 8 or 65 x 15 x 8</b>
Power handling		20 watt
Temperature		-40 ~ 85 °C



# 2-2. 3.6GHz 200MHz BandWidth

## 1. Electrical Specifications

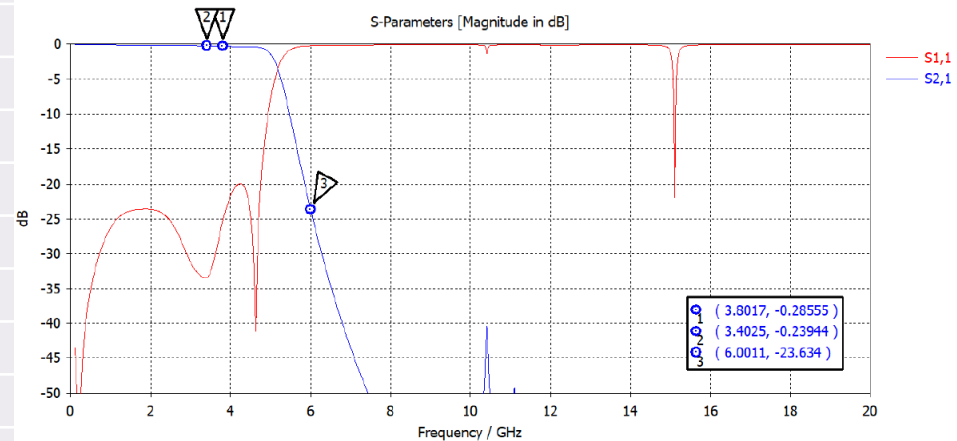
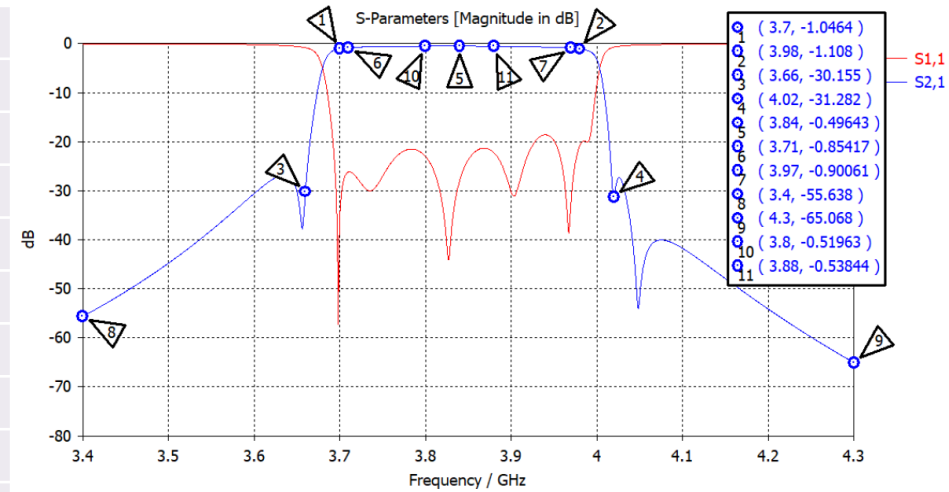
Descriptions		Specification
Center Frequency		3500-3700MHz
Band Width		200MHz
Insertion loss		≤ 1.35 dB
Passband Ripple		≤ 1.5 dB
Return loss		≥ 17 dB
Attenuation	DC - 1915.7 MHz	≥ 60 dB
	1915.7 - 3300 MHz	≥ 53 dB
	3300 - 3410 MHz	≥ 40 dB
	3410 - 3450 MHz	≥ 20 dB
	3750 - 3770 MHz	≥ 20 dB
	3770 - 4400 MHz	≥ 35 dB
	4400 - 5000 MHz	≥ 50 dB
	5000 - 7400 MHz	≥ 35 dB
	7400 - 11000 MHz	≥ 15 dB
	11000 - 18500 MHz	≥ 5 dB
Dimension(mm)		45 x 12 x 7
Power handling		Avg 10 Watt
Temperature		-40 ~ 105 °C



# 2-3. 3.84GHz 280MHz BandWidth

## 1. Electrical Specifications

Descriptions		Specification
Center Frequency		3700-3980MHz
Band Width		280MHz
Insertion loss		≤ 1.5 dB
Passband Ripple		≤ 1.0 dB
Return loss		≥ 14 dB
Attenuation	1 - 2690 MHz	≥ 67 dB
	2690 - 3400 MHz	≥ 40 dB
	3400 - 3660 MHz	≥ 25 dB
	4020 - 4400 MHz	≥ 25 dB
	4400 - 4550 MHz	≥ 42 dB
	4550 - 4865 MHz	≥ 37 dB
	4865 - 5000 MHz	≥ 60 dB
	5000 - 5380 MHz	≥ 35 dB
	5380 - 7400 MHz	≥ 28 dB
	7400 - 15965 MHz	≥ 25 dB
15965 - 18500 MHz	≥ 5 dB	
7400 - 19900 MHz	≥ 20 dB	
Dimension(mm)		42 x 18 x 7
Power handling		Avg 10 Watt
Temperature		-20 ~ 95 °C

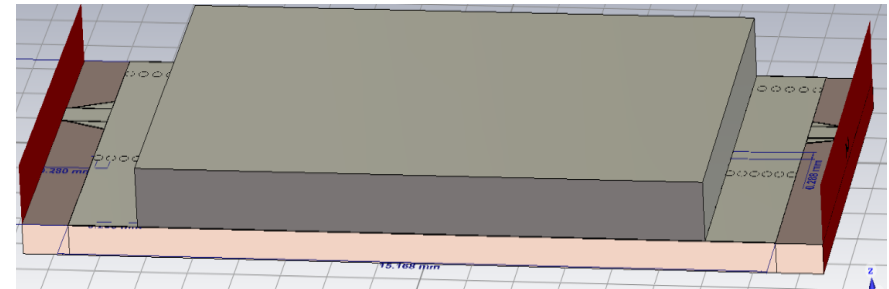


# 28GHz Substrate Integrated Waveguide filter

# 3. RMS500B2800 SIW filter

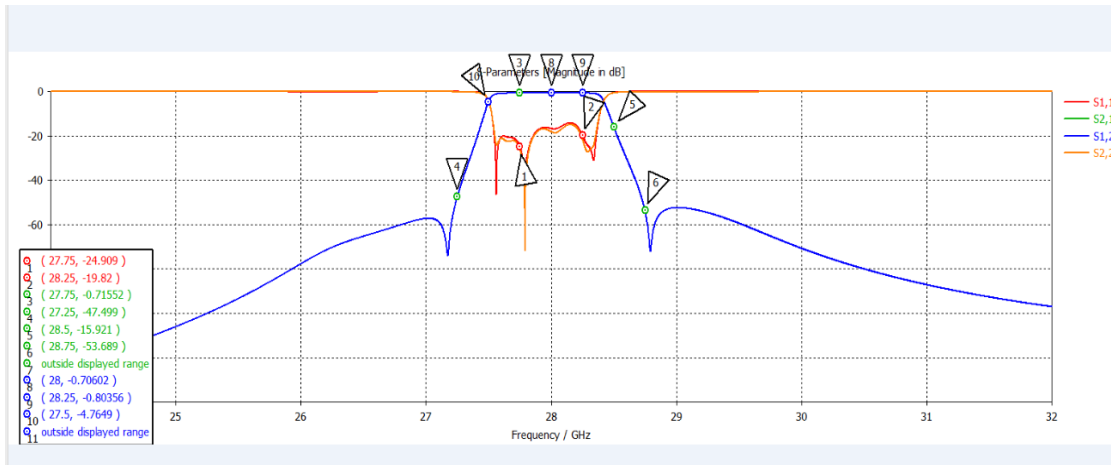
## 1. Electrical Specifications

Parameter	Specification
Frequency Range	27.75GHz~28.25GHz
Return Loss	15dB Min.
dB value over Frequency (27.25~28.75GHz)	40dB Min.@27.25GHz
	2.5dB Max.@27.5GHz
	1.5dB Max. @27.75GHz
	1.5dB Max.@28.25GHz
	2dB Max.@28.5GHz
	30dB Min.@28.75GHz



Size:29X13X6mm

## 2. Simulation data



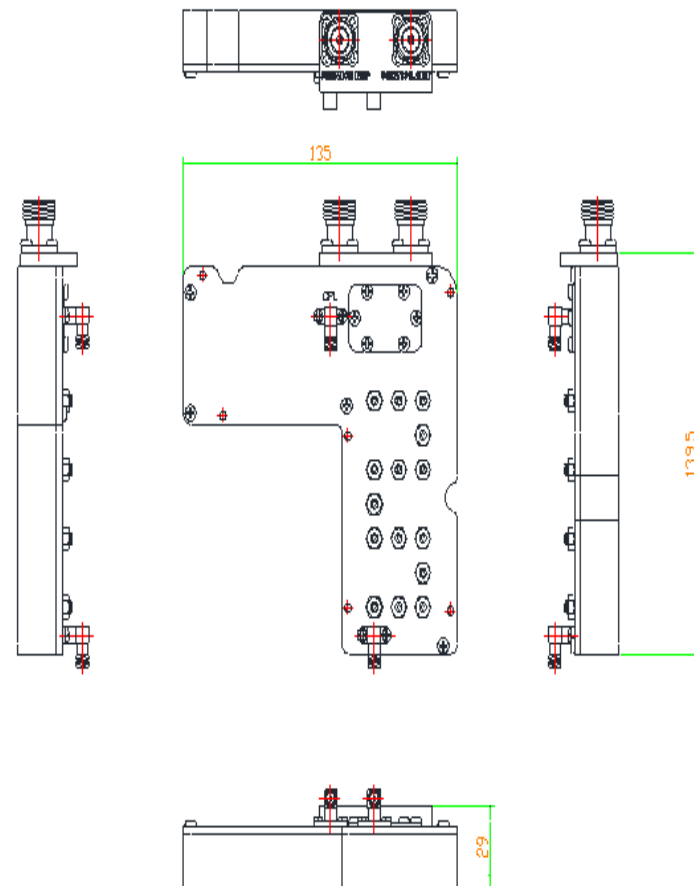


# 3.5GHz combined Cavity Filter

# 4. 3.5GHz combined Diplexer

## 1. Electrical Specifications

Descriptions	Specification	
Frequency Range	3600~ 3800MHz	800~2700MHz
Insertion Loss	1dB	1dB
Ripple	0.8dB	1dB
Return Loss	18 dB	18 dB
Coupling	30dB ±1.5dB	
Directivity	10dBc	
Attenuation	3400MHz ~ 5000MHz	≥30 dB
	100MHz ~ 3500MHz	-
	3500MHz ~ 3550MHz	-
	3850MHz ~ 6000MHz	-
	3577MHz	5dB(Room)
	3823MHz	5dB(Room)
	6500MHz ~ 8000MHz	-
Absolute Delay	20nsec	20nsec
Input Power	AVG 5W	AVG 1W
In/Out Impedance	50Ω	
Temp. / Humidity.	- 30°C ~ 70°C(0% ~ 90%)	
Vibration	1G 10 ~ 150Hz, 0.1 OCTAVES / MIN	
RoHS	RoHS apply	
Size	135 x 139.5 x 29 mm	



## 2. Block Diagram

