



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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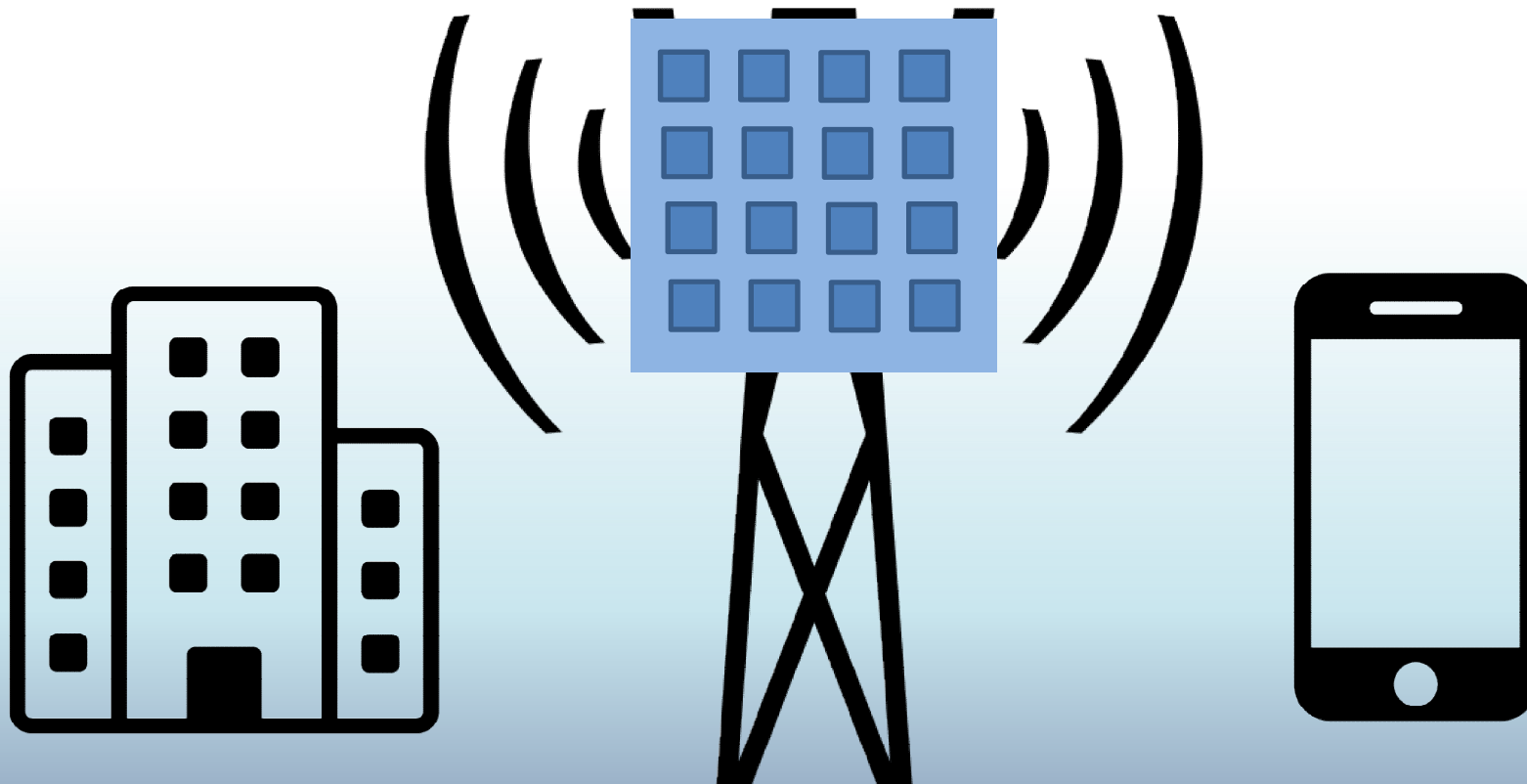
# 5G LS(Lightest and smallest) filter

# 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



## PRODUCT STRONG POINTS

01

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

02

3 times smaller size and 5 times lighter than cavity filter, and 2 times lighter than the ceramic waveguide filter.

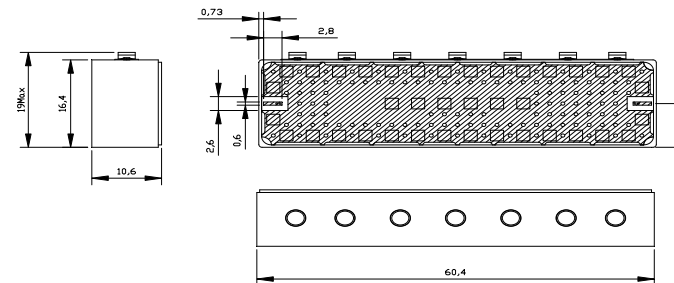
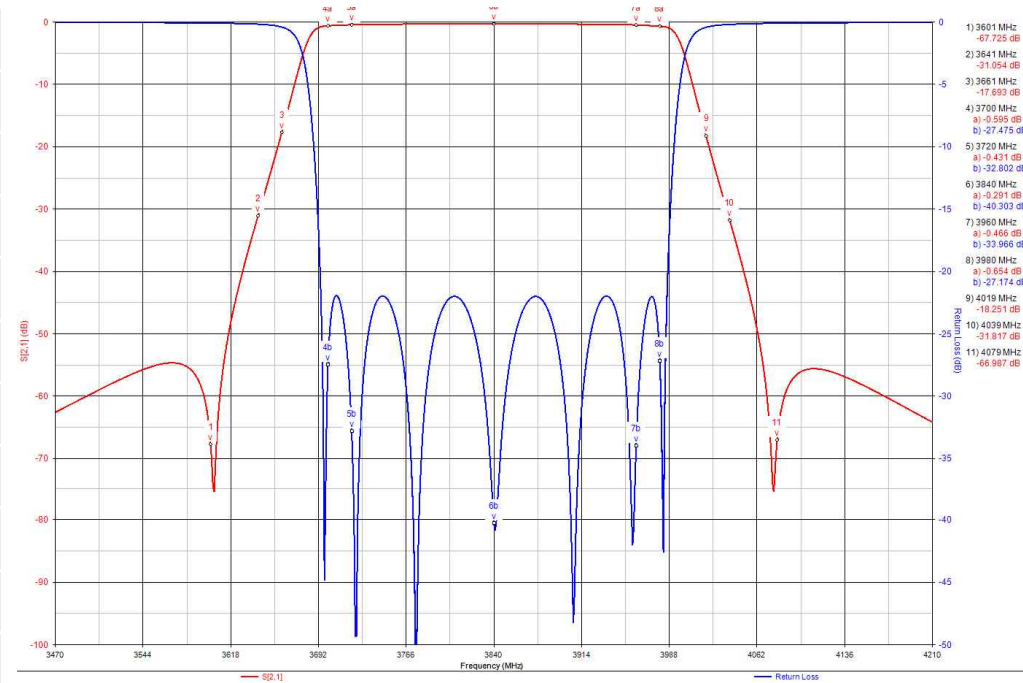
03



SMD Type

# 1. LS filter(3.8GHz 280MHz Bandwidth)

## 1. Electrical Specifications

| Descriptions    |                   | Specification   |
|-----------------|-------------------|-----------------|
| Frequency       |                   | 3700-3980 MHz   |
| Band Width      |                   | 280MHz          |
| Insertion loss  |                   | <b>0.8 dB</b>   |
| Return loss     |                   | 18dB min        |
| Attenuation     | 3660MHz & 4020MHz | 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  |                   | 10 watt         |
| Temperature     |                   | -20 to +85 °C   |



 METALLIZATION  
 SOLDER RESIST

## 1-2. 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<br>(at 40MHz away from pass band)<br>25dB min<br>(at 60MHz away from passband)<br>50dB min<br>(at 100MHz away from passband) | 15dB min<br>(at 40MHz away from pass band)<br>25dB min<br>(at 60MHz away from passband)<br>50dB min<br>(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)          |                | 62 x 19 x 12mm max.   | 32 x20 x7.5mm   | 100 x50 x30mm     |

# 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

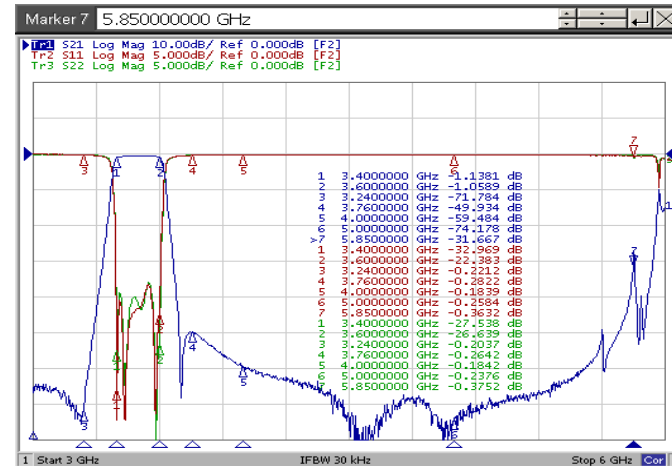
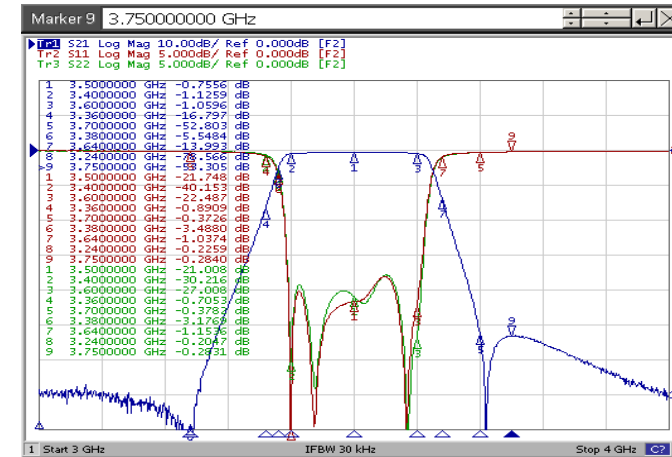
05

Lower cost than Cavity filter

# 2-1. 3.5GHz 200MHz BandWidth

## 1. Electrical Specifications

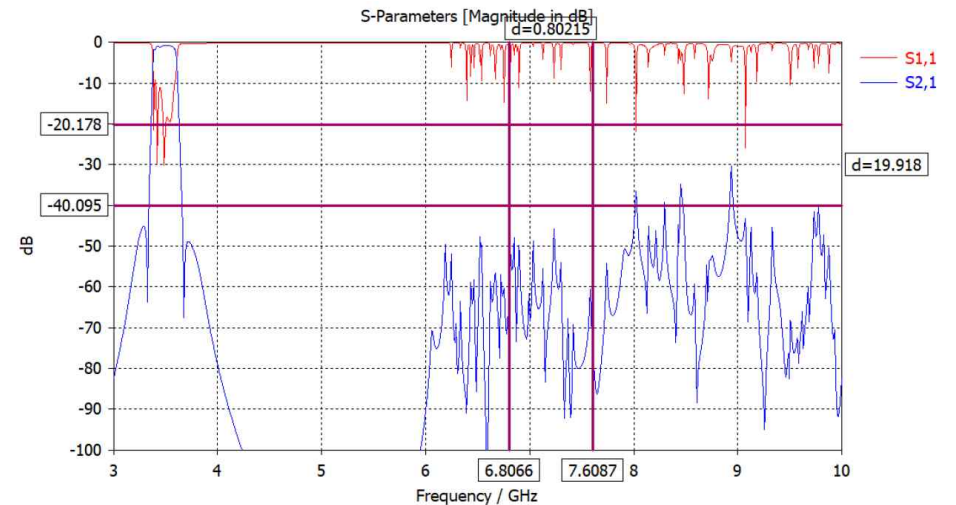
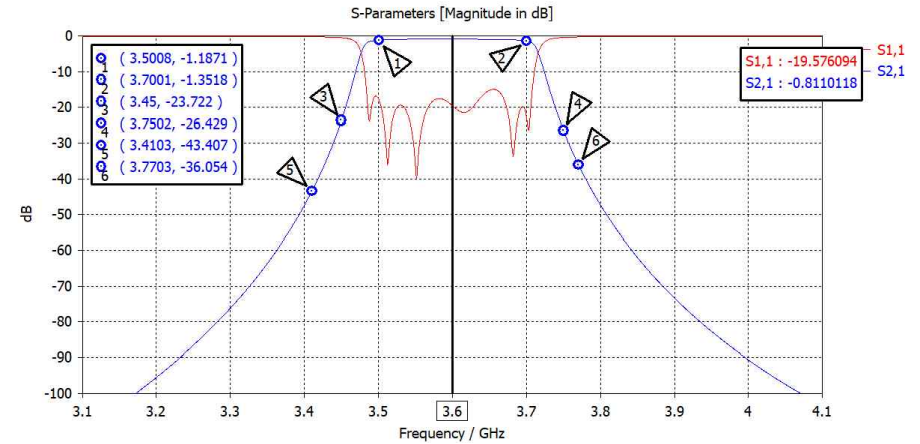
| Descriptions           |                 | Specification                     |
|------------------------|-----------------|-----------------------------------|
| Frequency              |                 | 3400-3600 MHz                     |
| Band Width             |                 | 200MHz                            |
| 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) SMD type |                 | <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

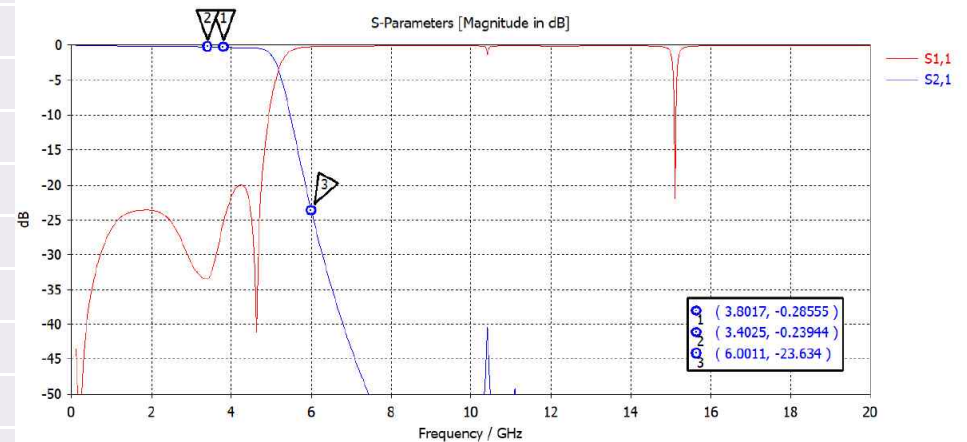
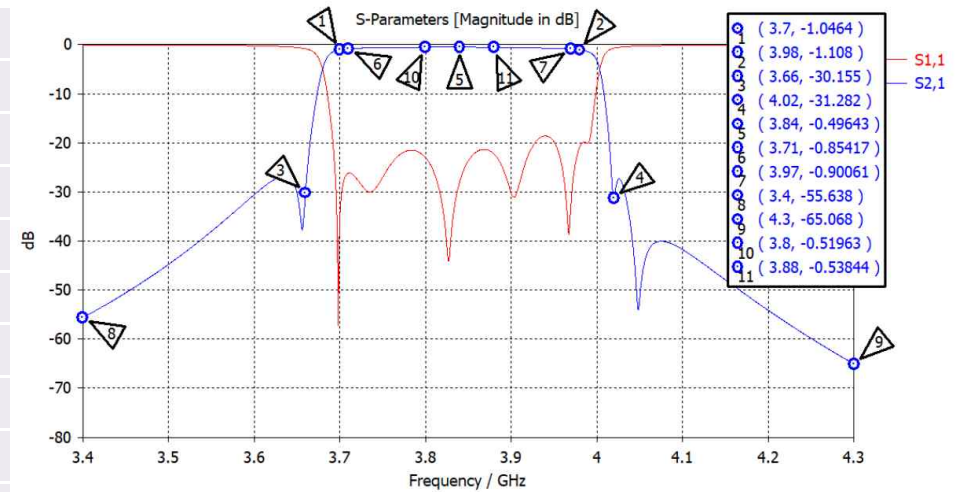
| Descriptions      |                   | Specification |
|-------------------|-------------------|---------------|
| Center Frequency  |                   | 3500-3700MHz  |
| Band Width        |                   | 200MHz        |
| Insertion loss    |                   | ≤ 1.35 dB     |
| Passband 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   |

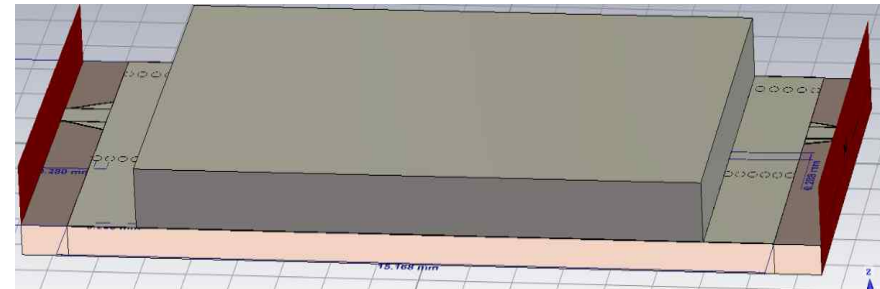


# 28GHz Substrate Integrated Waveguide filter

# 3-1. RMS500B2800 SIW filter

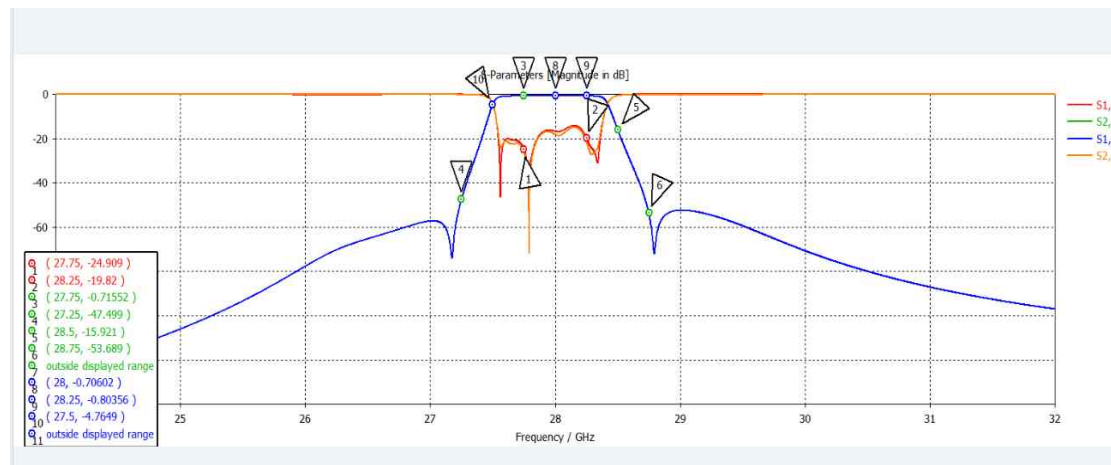
## 1. Electrical Specifications

| Parameter                                   | Specification        |
|---|----------------------|
| Frequency Range                             | 27.75Ghz~28.25Ghz    |
| Return Loss                                 | 15dB Min.            |
| dB value over Frequency<br>(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

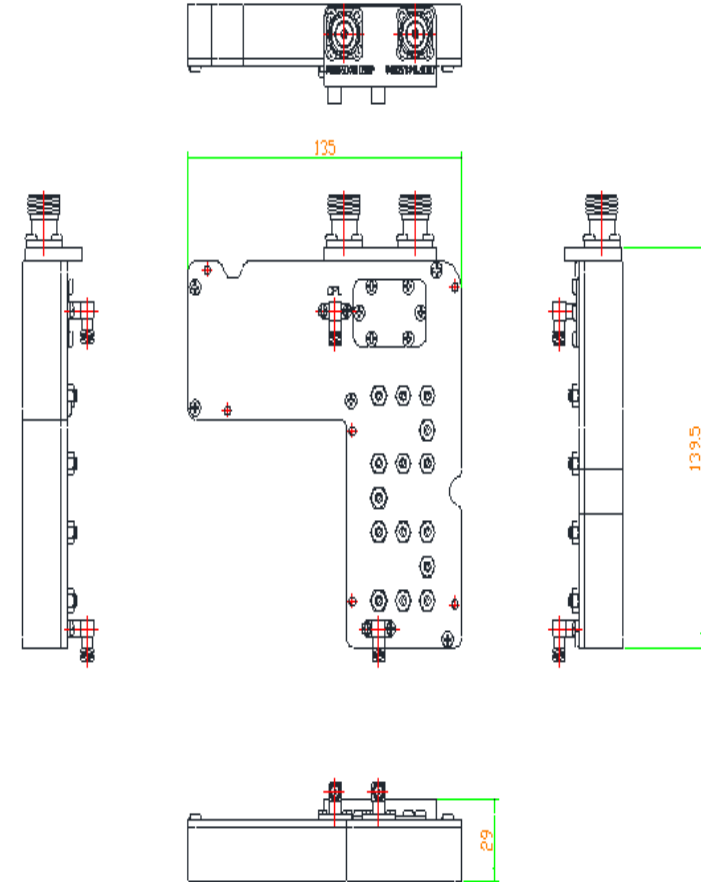


# 3.5GHz combined Cavity Filter

# 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 | ≥30 dB                           | -           |
| 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

