

# Co-location Interference Protection Filters

## Application

Interferences are likely to exist when RF base stations are co-located. That may cause receiver desensitization, overload and/or intermodulation product (IMP) interference, thereby degrading their system performances and increasing dropped calls.

Co-location filters are used to prevent wideband noise and spurious signals to interfere from one system transmitter band into another system receiver band.

Some examples of applications of the co-location filters are:

- GSM900 is co-located with 800 MHz cellular equipment
- PCS is co-located with GSM 1800 MHz equipment
- UMTS is co-located with PCS equipment, etc

## Features & Benefits

- Suppression of out-of-band noise and spurious emission signals of a transmitter.
- Protection of the receiver from overload.
- Protection of the receiver sensitivity.
- Reduction of dropped calls.
- Maintain an appropriate isolation between the co-located base stations.



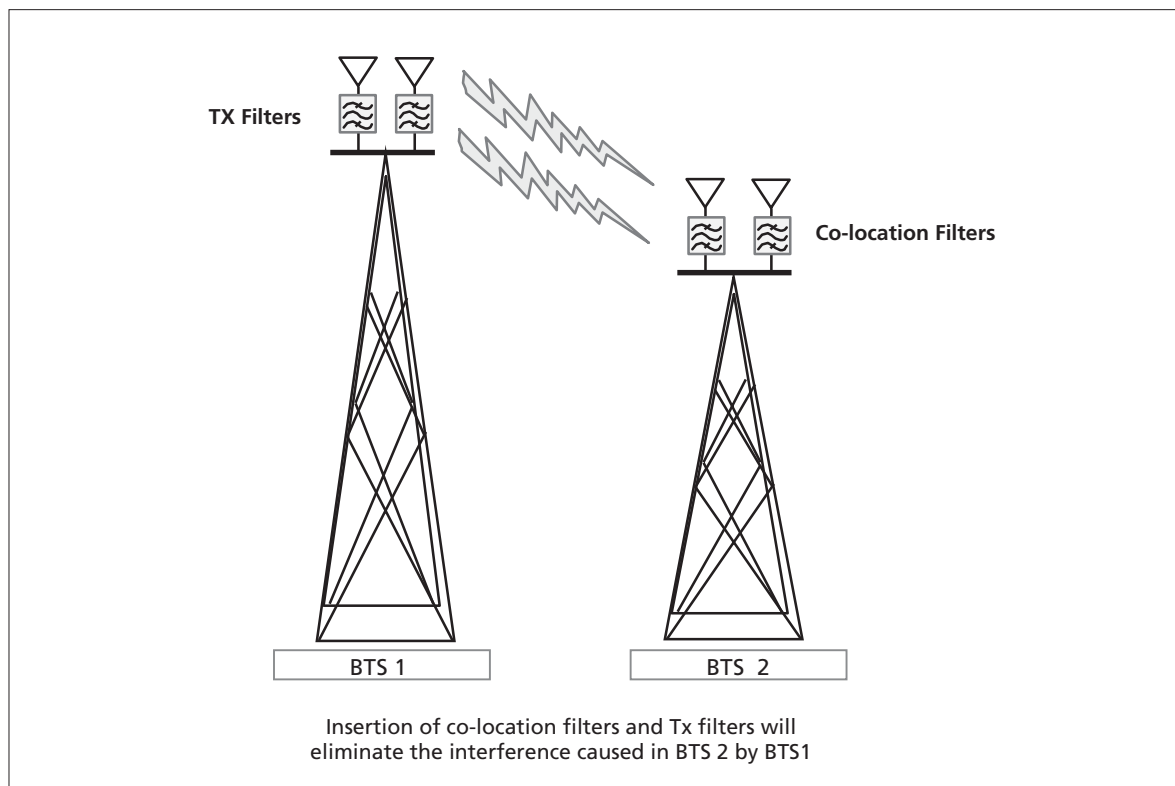
5044-4 Series Cellular Band Transmit Filter



MF08-61X-2 Bandpass Filter



FB907-9605008 GSM 900MHz Co-location Filter



## Co-location Interference Protection Filters

### Cellular 800MHz Receive Filters

The 5478 and 5198 series of filters provide passbands for Cellular 800 MHz A and B bands. They protect the respective receiver band from interference from mobiles and portables in other bands.

	5478	5198	5198-6
Frequency Range, MHz	824-835; 845-846,5	835-849	835-849
Insertion Loss, dB	1.9 (typ)	1.6 (max)	1.6 (max)
Rejection, dB @ F, MHz	35 (min) @ 821 35 (min) @ 837 35 (min) @ 844.2 35 (min) @ 847.3	35 (min) > 851	35 (min) > 851
Indoor/Outdoor	Indoor	Indoor	Indoor
Special Features	Dual Window Filter	N/A	Six 5198 filters in a 19" tray

### GSM 900MHz Receive Filters

Featuring low insertion loss and compact size they improve system performance by rejecting all interference signals outside the GSM 900 Rx band, like CDMA transmitter frequencies.

	FLG851045	FLG078040-1	FLG078040-2
Frequency Range, MHz	885-910	907-915	907-915
Insertion Loss, dB	1.5 (max)	1.3 (max)	1.3 (max)
Rejection, dB @ F, MHz	45 (min) @ <880 and > 915	40 (min) @ 850 - 894 60 (min) @ 935 - 2750	40 (min) @ 850 - 894 60 (min) @ 935 - 2750
Indoor/Outdoor	Indoor	Indoor	Outdoor

### UHF Transmit Filters

The 5044-4 filter provide band pass characteristics for both transmitter and receiver applications in the UHF frequency band.

	5044-4-1	5044-4-2
Frequency Range, MHz	406-512	406-512
BandWidth, MHz	2	4
Insertion Loss, dB	1.5 (max)	1.0 (max)
Rejection, dB @ F, MHz	60 (min) @ $f_c \pm 3$	60 (min) @ $f_c \pm 6$
Indoor/Outdoor	Indoor	Indoor
Average Continuous Power, W	250	250

### Cellular Band Transmit Filters

	5044-8-1	5044-8-2	5044-8-4	5044-8-5
Frequency Range, MHz	806-880	880-960	880-960	806-960
BandWidth, MHz	5	5	10	20
Insertion Loss, dB	1.5 (max)	1.5 (max)	1.2 (max)	0.8 (max)
Rejection, dB @ F, MHz	30 (min) @ $f_c \pm 8$	30 (min) @ $f_c \pm 8$	30 (min) @ $f_c \pm 15$	30 (min) @ $f_c \pm 30$
Indoor/Outdoor	Indoor	Indoor	Indoor	Indoor
Average Continuous Power, W	400	400	600	600
	5605			
Frequency Range, MHz	869-880			
BandWidth, MHz	11			
Insertion Loss, dB	1.0 (max)			
Rejection, dB @ F, MHz	60 (min) @ 890-915			
Indoor/Outdoor	Indoor and Outdoor			
Average Continuous Power, W	100			

## Co-location Interference Protection Filters

### GSM 900MHz Co-location Filters

Designed for use in GSM 900MHz applications, these compact filters have very low insertion loss and high rejection of unwanted signals.

	FLG908045/1V-0	FLG928840/1V-0	FLG969430S-3	FLG989430D-3
Frequency Range, MHz	890 - 960	892 - 960	896-960	898.5 - 960
Insertion Loss, dB	1.0 (max)	1.0 (max)	1.5 (max)	1.1 (max)
Rejection, dB @ F, MHz	45 (min) @ 850-880	40 (min) @ 850-888	30 (min) @ 824-894	30 (min) @ 850-894
Indoor/Outdoor	Indoor	Indoor	Indoor	Outdoor
Average Continuous Power, W	240	240	240	240
Special Features	Double Filter for 19" Rack	Double Filter for 19" Rack	Single Filter	Double Filter for Outdoor Installation
	FLG989450D-3	FLG029450/1V-0	FLG059430/1V-0	FB907-9605008
Frequency Range, MHz	898.5 - 960	902 - 960	905 - 960	907-960
Insertion Loss, dB	1.1 (max)	0.8 (max)	1.0 (max)	0.5 (max)
Rejection, dB @ F, MHz	50 (min) @ 850-894	50 (min) @ 850-894	30 (min) @ 850-894	50 (min) @ 850-894
Indoor/Outdoor	Outdoor	Indoor	Indoor	Outdoor
Average Continuous Power, W	240	240	240	250
Special Features	Double Filter for Outdoor Installation	Double Filter for 19" Rack	Double Filter for 19" Rack	Single Filter

### Bandpass Filters – High Rejection

The MF series of filters provide a range of passbands and selectivities in the 800-1000, 1700-1880 and 1920-2170 MHz bands. They feature symmetrical or asymmetrical transmission zeros to provide enhanced selectivity.

	MF08-1C	MF08-52X-1	MF08-61X-1	MF08-61X-2
Pass Band, MHz	886-905	820-841	890-915	935-960
Insertion Loss, dB	2.5	0.5	0.5	0.5
Rejection, dB @ F, MHz	30 @ 870	75 @ 864	70 @ 935	70 @ 915
Indoor/Outdoor	Indoor	Indoor	Indoor	Indoor
Peak Power, W	N/A	N/A	N/A	500
	MF08-72X-1	MF08-92X-2	MF08-92X-3	
Pass Band, MHz	880-887.5	890-915	865-886	
Insertion Loss, dB	1.5	1.5	1.0	
Rejection, dB @ F, MHz	60 @ 890	50 @ 886	60 @ 892	
Indoor/Outdoor	Indoor	Indoor	Indoor	
Peak Power, W	500	N/A	500	
	MF18-41X-1	MF18-31X-1	MF18-5-1	MF18-72X-1
Tuning Range, MHz	1750-1850	1750-1880	1720-1875	N/A
Pass Band, MHz	63	75	10	1805-1880
Insertion Loss, dB	1.2	0.7	1.6	1.5
Rejection, dB @ F, MHz	50 @ f> (fc +130)	30 @ f> (fc +120)	30 @ fc +/-15	66 @ 1785
Indoor/Outdoor	Indoor	Indoor	Indoor	Indoor
Peak Power, W	N/A	N/A	N/A	500
	MF18-72X-2	MF18-92X-1	MF18-4-1	
Tuning Range, MHz	N/A	N/A	1810-1875	
Pass Band, MHz	1710-1785	1805-1880	20	
Insertion Loss, dB	0.7	1.3	0.5	
Rejection, dB @ F, MHz	63 @ 1805	70 @ 1780, 1905	20 @ fc +/-40	
Indoor/Outdoor	Indoor	Indoor	Indoor	
Peak Power, W	N/A	1000	500	
	MF19-3-1	MF19-72X-3	MF21-4-1	MF21-51X-1
Tuning Range, MHz	1880-1980	N/A	2115-2165	N/A
Pass Band, MHz	15	1920-1980	15	2110-2170
Insertion Loss, dB	0.5	1.0	0.7	1.0
Rejection, dB @ F, MHz	20 @ fc +/-35	70 @ 1880, 2040	20 @ fc +/-25	80 @ 2000
Indoor/Outdoor	Indoor	Indoor	Indoor	Indoor
Peak Power, W	500	N/A	250	1000

## Tower Mount Amplifiers

### Application

A high BTS sensitivity is the key parameter to a better transmission quality. The BTS up-link sensitivity is significantly improved when using Tower Mounted Amplifiers (TMA) with low noise figure. The large improvements of the BTS sensitivity lead also to a better voice quality and improved dropped call rate.

TMA's are used to optimize the balance between the uplink and downlink RF paths, compensating for the feeder losses from antenna to the base station. Up- and down-link balancing is a key factor for better and sharper cell hand-over.

In the case of 3G, the extra amplification of the up-link signals will ensure a better bit rate coverage for data transmission, hence a significant improvement of the network quality.

Cell enlargement can also be achieved using TMA. This gives the operators the benefit of serving more subscribers from the same BTS site. This leads to less base stations needed, faster roll-out time and more BTS revenue.

RFS offers TMA's developed for SMR, cellular 850, GSM 900 and 1800, PCS 1900 and UMTS. Monitoring of the TMA system can be performed in two different ways, either by measuring the current level at the BTS level or by having an intelligent interface like the AISG protocol.

### Features & Benefits

- Compact design and low weight
- Current alarm monitoring or AISG interface
- Low noise figure
- Low downlink insertion loss
- Easy access for RET option
- Optimization of the cell capacity and of the coverage
- Ability of serving more subscribers from the same site
- Reduction of drop call rate and better transmission call quality
- More BTS revenue
- Re-balancing the up- and downlink signals



1900 TMA with current alarm detection



AISG in-line UMTS TMA