MCC Series™ Application Note

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Passive Modular Carrier Combiner
MCC Series™
Application Note

The **MCC Series** is a Passive Modular Carrier Combiner that serves as a point-of-interface (POI) for neutral host Distributed - Radio Access Network (D-RAN) architectures and in-building or outdoor Distributed Antenna Systems (DAS). This solution helps service providers combine RAN remote heads or head-end services for RF distribution. Requirements commonly include the need to combine all commercial signals for all or some of the operators with cellular services extending from 4G/5G 617 MHz to LTE-LAA 6 GHz. Its modularity enables cost-effective scalability to only pay for what is needed, when its needed.

- **Passive modular carrier combiner point-of-interface**
  - 3,4, or 5 bands per filter combiner for superior flexibility
  - Frequency coverage from 617 to 5925 MHz for future-proof investment
  - Low insertion loss for maximum transmit effective isotropic radiated power (EIRP)
  - Low passive intermodulation (PIM) for maximum network throughput
  - Guaranteed system specifications for ultimate reliability
  - Modularity enables cost-effective scalability as requirements change
  - Configurability supports one- or two-sector SISO/MIMO applications
  - Rackmountable with passive cooling for easy installation

Multi-band combiners are offered in configurations to combine either 3, 4, or 5 licensed frequency bands. Frequency coverage spans 617 MHz to 5925 MHz. This enables the platform to address multiple combinations of frequency bands and operators per scenario.

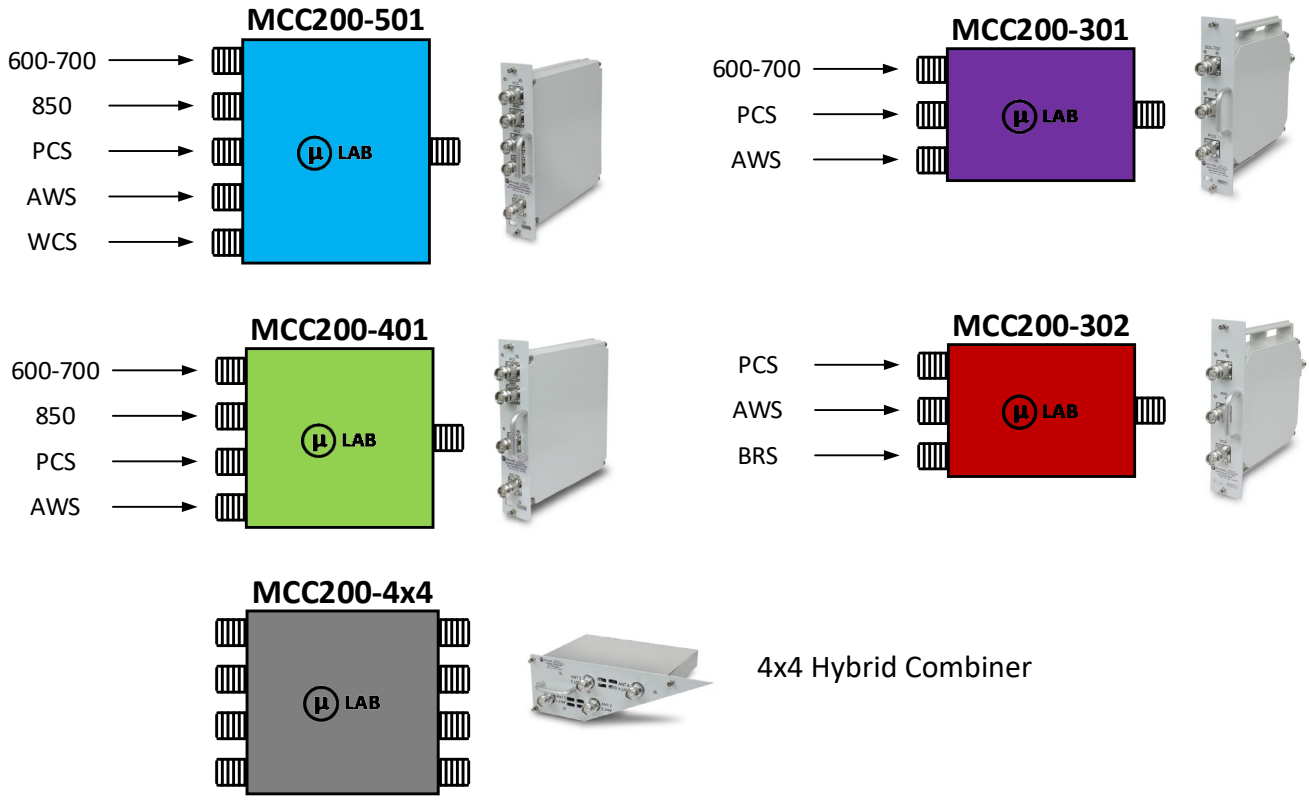
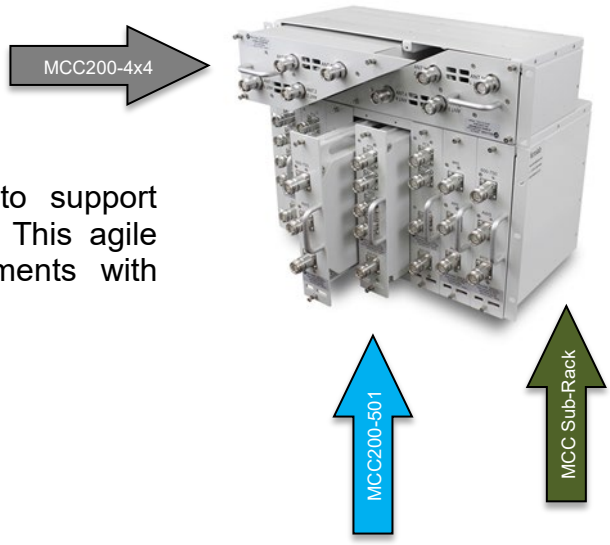


Figure 1. 3, 4, or 5 bands per filter combiner for superior flexibility

The MCC allows many configurations to support neutral-host MIMO or SISO applications. This agile design can solve a variety of requirements with expansion capability for future integration.



The block diagram below demonstrates four unique filter modules being combined for a multiple-band neutral-host distribution (Figure 2).

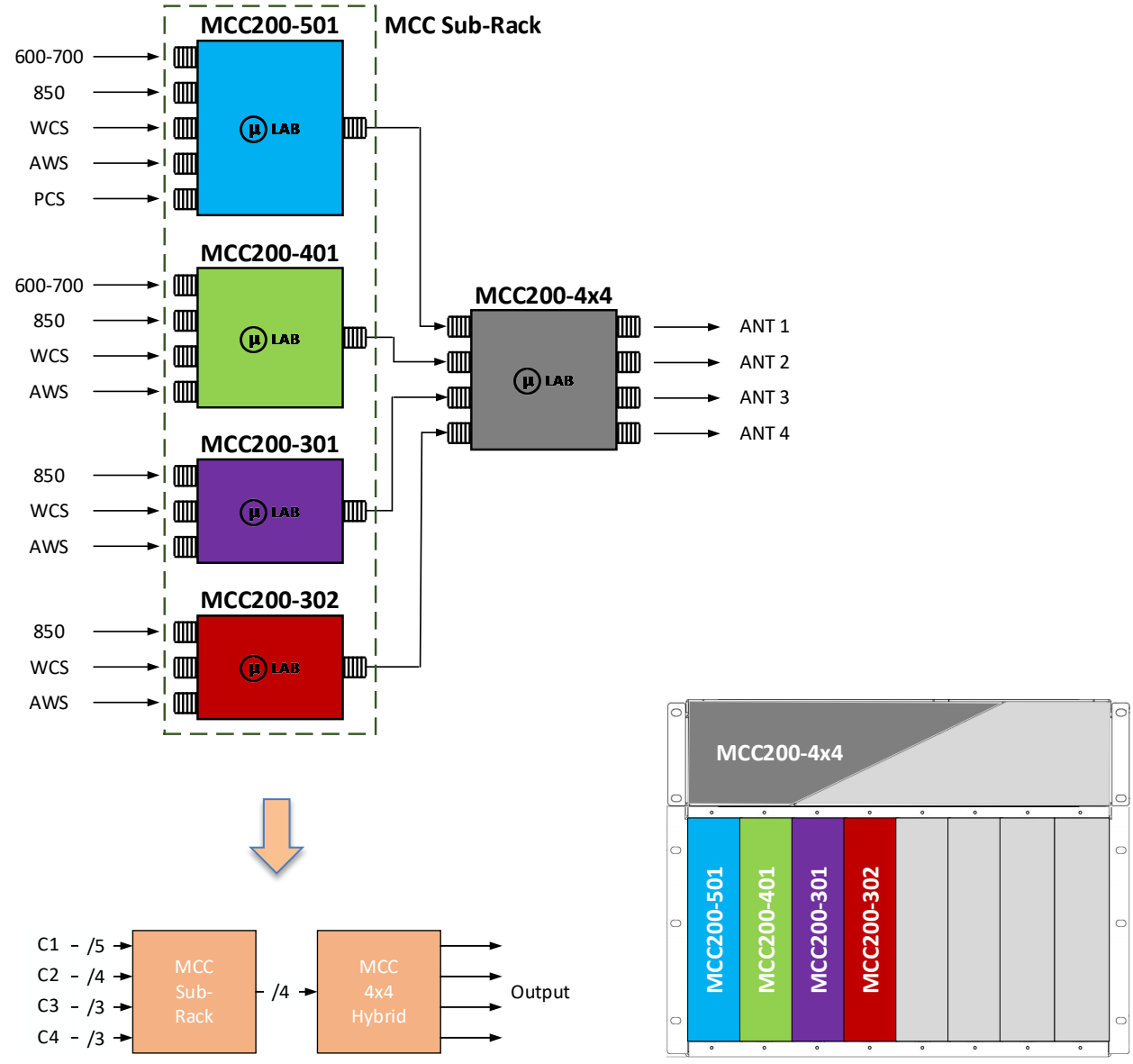


Figure 2. 4-Carrier SISO solution. Modularity enables cost-effective scalability.

As the point of interface, the MCC is tested as a system capitalizing on superior specifications that guarantee an optimal engine for combining and distribution. The filter characteristics are optimized with low insertion losses to provide maximum transmit EIRP at the antennas. Additionally, filter combiners and the hybrid combiner have low-PIM performance to ensure maximum network throughput.

Additional Example Configurations

By duplicating the filters and hybrid combiner seen in Figure 2, a user can either deploy this solution as a 2-sector, 4-carrier SISO or a 1-sector, 4-carrier 2x2 MIMO solution. (Figure 3)

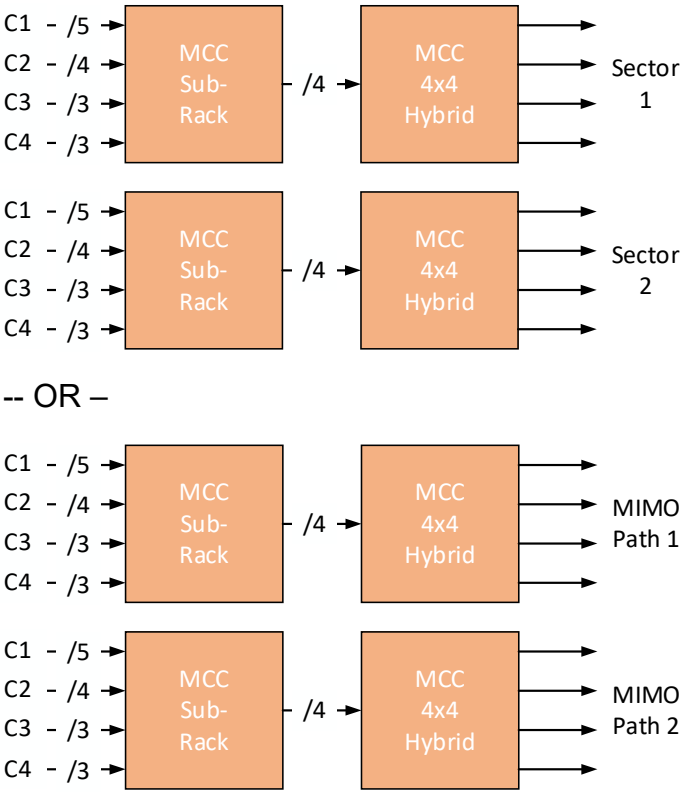
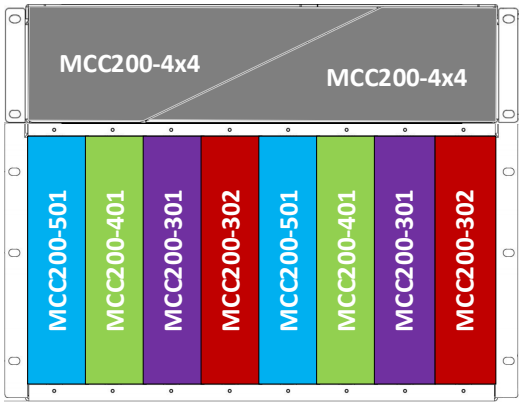
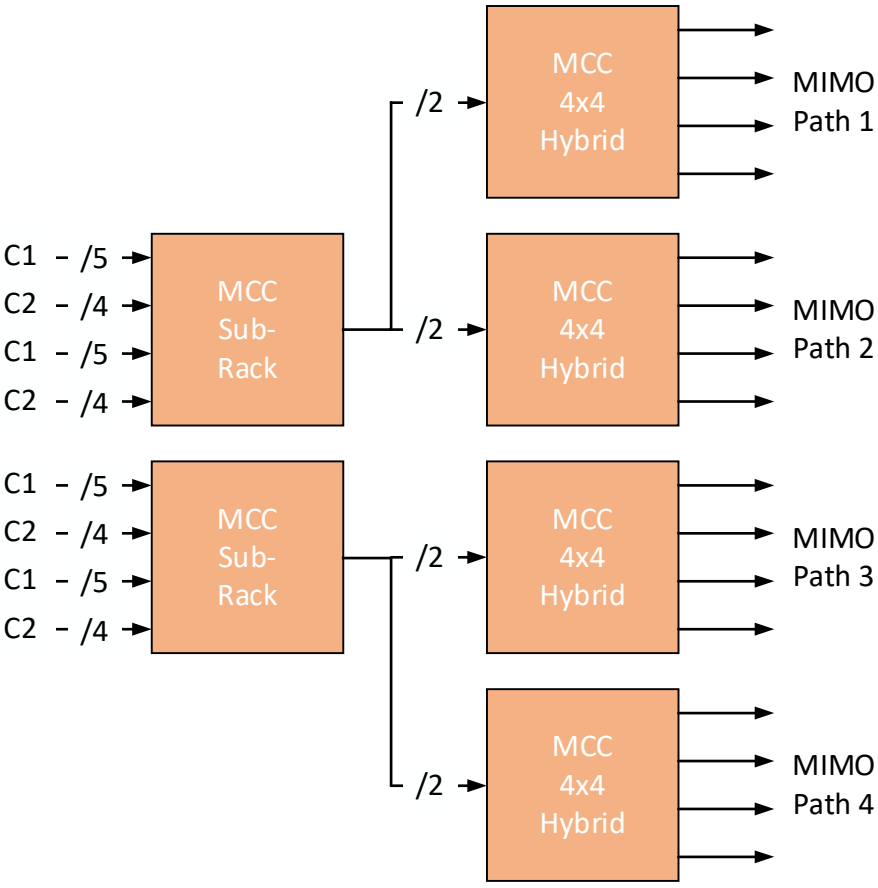


Figure 3.
2-sector, 4-carrier SISO solution



1-sector, 4-carrier 2x2 MIMO

In cases where there are only two operators, a single MCC sub-rack can house all filter combiners for an entire 4x4 MIMO application. (Figure 4)



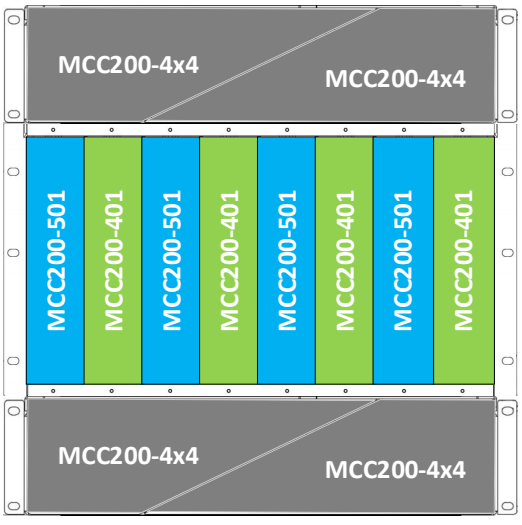


Figure 4. 1-sector, 2-carrier 4x4

Note: The same configuration for two operators, can be utilized for two sector 2x2 MIMO.

In the event that a four operator 4x4 MIMO configuration is needed; an additional fully populated Subrack can be added to support this arrangement (Figure 5).

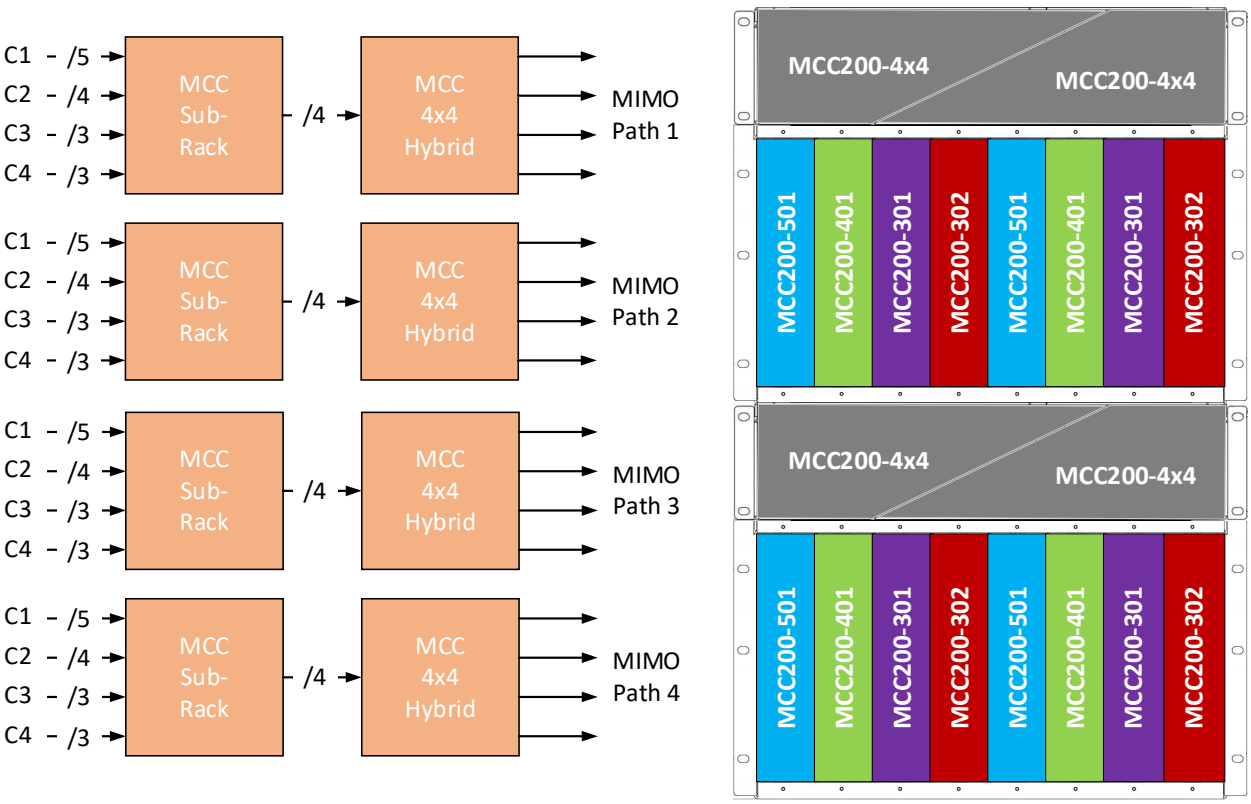


Figure 5. 1-sector, 4-carrier 4x4

Table 1 summarizes the key technical and commercial advantages of the MCC Series platform versus using individual discrete components.

	Discrete Components	MCC Series
Modular Design and Platform	No	**Yes**
Passives Performance	Guaranteed by part – Not System	**100% Guaranteed as a system**
Form-factor / Footprint	Variable	**Fixed**
Ease of Deployment	No	**Yes**
Capability to Upgrade after deployment	No	**Yes**
Labor & Installation Cost	High	**Low**

Table 1. Summary of MCC Series Advantages

Modular Filters

MCC200-501

- Integrates 600-700/850/PCS/AWS/WCS
- 40dB Input Isolation
- 40 W/port Avg. Power
- Guaranteed Low PIM
- RoHS Compliant
- 4.3-10 Connectors
- Minimar RF Insertion Loss

MCC200-301

- Integrates 600-700/PCS/AWS
- 40dB Input Isolation
- 40 W/port Avg. Power
- Guaranteed Low PIM
- RoHS Compliant
- 4.3-10 Connectors
- Minimar RF Insertion Loss

MCC200-401

- Integrates 600-700/850/PCS/AWS
- 40dB Input Isolation
- 40 W/port Avg. Power
- Guaranteed Low PIM
- RoHS Compliant
- 4.3-10 Connectors
- Minimar RF Insertion Loss

MCC200-302

- Integrates PCS/AWS/BRS
- 40dB Input Isolation
- 40 W/port Avg. Power
- Guaranteed Low PIM
- RoHS Compliant
- 4.3-10 Connectors
- Minimar RF Insertion Loss

Modular Combiners

MCC200-4x4A

- Supports 617-2700 MHz
- High Isolation
- Guaranteed Low PIM
- 500 W/port Avg. Power
- Low VSWR
- Convenient Connector Spacing

Subrack

MCC200

MCC200H