Multiplexer/Hybrid Combiner Solutions

ACENTURY
RADIOCOMM

Dear valued customer,

Acentury has had over a decade of experience for interference issue of Cellular indoor/ outdoor systems. With more 5G bands added into Cellular spectrum, we've seen more and more passive intermodulation (PIM) related issues, which are usually caused by either internal components/ cables or external structures, magnetic materials, etc. We knew that the high PIM rejection solution could help a lot for such kind of issues. With the support of Acentury's innovative environment, Acentury Radiocomm developed -165dBc extra low PIM RF components and cables to help this industry known issue.

Our mission statement is to "Accelerate wireless communications innovation globally" and my vision for Acentury Radiocomm is creating a new standard to reduce the increasing PIM issues. I appreciate you taking the time to learn more about Acentury Radiocomm. We would love to hear from you if you have any questions.

Yours truly,
Fan Zhang
Vice President of Engineering
Acentury Radiocomm

Acentury Radiocomm – trusted globally

Radiocomm, the network components division of Acentury Inc., was launched in 2013 and developed a reputation for its superior technical performance, reliability, and customization services. We pride ourselves in creating a unique customer experience from product development to on-time product delivery. We help service providers, infrastructure equipment manufacturers, educational institutions, government agency departments, and system integrators meet their complex and dynamic requirements.

Adaptors

Attenuators

Filters

Combiners

Tappers

Coaxial Cable

Fiber Cable

Couplers

Splitters

Terminators

Low PIM everything.

Radiocomm Low PIM Combiners

Radiocomm offers a wide range of narrowband X-plexers to help meet various requirements of the wireless industry. Our technical design provides minimum insertion loss and stable low PIM performance with different power ratings. These units can be used to combine multiple RF signals for cellular systems to help save space, complexity, and cost. We provide fast turnaround times for customized samples (~6 weeks) and have supplied components for several Tier 1 service providers and carriers.

Combiner Categories

- Low PIM Diplexer
- Low PIM Triplexer
- Low PIM Quadruplexer
- Low PIM 5-plexer
- Low PIM 6-plexer
- Low PIM 7-plexer
- Low PIM Hybrid Combiner

CUSTOMER SUCCESS STORY

Designing a Heptaplexer With Added Band 40 and 42 Requirements

The Customer Challenge

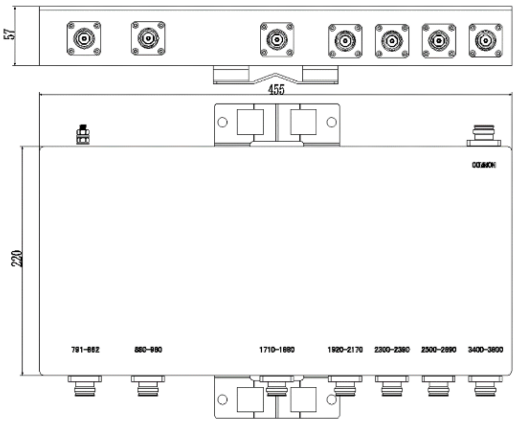
A European customer had a challenging design requirement that needed a solution in a short period of time: there were a total of seven (7) European bands including the new Band 40 and 42 to be combined for a military application. There was also strict PIM rejection (-161dBc) and high-power requirements (350W).

- Band 20 (791-862MHz)
- Band 8 (880-960MHz)
- Band 3 (1710-1880Hz)
- Band 1 (1920-2170MHz)
- Band 40 (2300-2390MHz)
- Band 7 (2500-2690MHz)
- Band 42/43/N78 (3300-3800MHz)

A traditional design approach would require the combination of multiple components. This would add significant cost, complexity, and potentially cause large insertion losses. An alternative solution would combine all seven ports into a single component that would meet all the requirements including high-power (350W) and high-level PIM rejection specifications. This would be a significant engineering design challenge.

The Radiocomm Solution

Radiocomm was called upon to design a customized solution that would manage the high-power requirement of 350W while still meeting all the specification design requirements of wideband frequency coverage, cross interference, low passive intermodulation, and low insertion loss. In one week the Radiocomm team was able to finalize a design and provide the simulation results of a proposed heptaplexer solution that would combine the additional bands into a single component while meeting all the design requirements for high performance.



Upon producing a prototype sample in just under 6 weeks, the customer confirmed that the customized design met all the design specifications.

Radiocomm continues to offer fast customization services with wideband frequency coverage and low PIM rejection specifications.

CUSTOMER SUCCESS STORY

Product Re-Design in Two Weeks

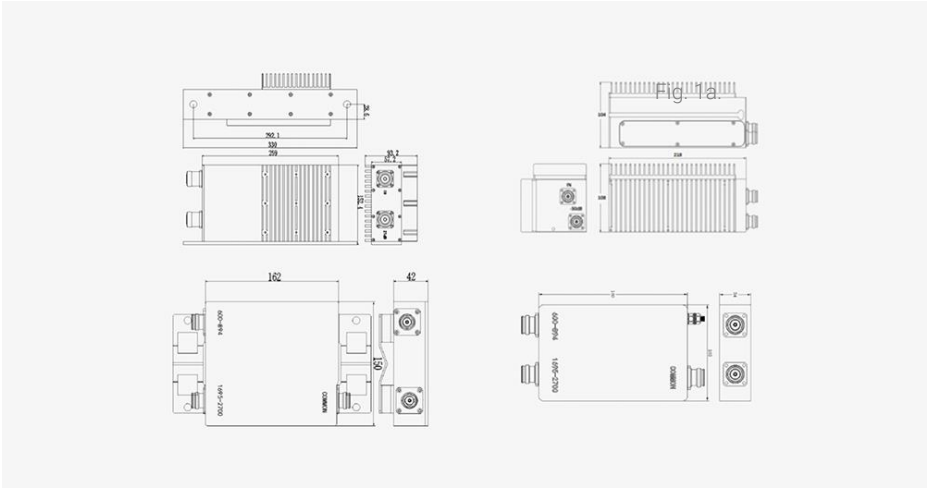


Fig. 1a.

A Tier-1 US wireless operator requested the following extra-low PIM (≤ -165 dBc) products for their 5G RF lab in the Pacific Northwest:

- XP2-P571 Diplexer (600-894/1695-2700 MHz)
- ATa-Pa10R Wideband (520 - 6000 MHz) 10dB Attenuator

Two months later we received our feedback from the Lab Manager. The products worked well, but the size was too big for their lab space. They requested a diplexer that was as small as possible with 4.3-10 connectors. They also wanted to fit an extra attenuator onto a 3U track on top of the existing three.

Within two weeks we delivered the size reduction that the customer requested. For the diplexer, the only difference in performance with the previous (larger) design is the small increase of insertion loss from 0.25dB to 0.5dB. For the attenuator, there was no difference in performance. To complement the new design, we also designed a new 19" 3U rackmount shelf that holds four ATA-Pa10R attenuators.

Our new designs were well received, but an additional request came: "Could you prevent the heat from all units from flowing up to the top attenuators where they are stacked on shelves?". This was a big concern with their current manufacturer as the upper units would overheat constantly, and a tray fan was considered that would blow forced air from the bottom.

The Radiocomm engineering team responded by informing the client that the units were already tested to operate safely without a fan or forced air. The ATA-Pa10R Attenuators could be used in twelve, fully-loaded stacked 3U shelves (for a total of 12 x 4 = 48 attenuators) without fans, and the attenuators in the top shelf will work just fine without additional parts.

The feedback was well received, and the units were implemented into a final design within those two weeks.

Acentury is strongly committed to deliver great customer service alongside our world-class products. We continue to use our experience and technical expertise to design solutions tailored to our client's needs.

Why Radiocomm?

Extra-low PIM (-165 dBc) components

Industry-leading low PIM performance for indoor, outdoor and 5G applications.

5G Sub-6GHz frequency coverage

Ultra-wide frequency coverage, from 4G to 5G Sub-6GHz / CBRS / LAA / C-band.

Fast customization in 6 weeks

Specifications within 3-5 business days. Samples available in 6 weeks.

Engineered for high reliability and low TCO

<0.01% field return rate with near-zero maintenance.

We stand by our products

1-year warranty and manufacturing test report for each shipped low-PIM component.

Supplying Tier 1 mobile network operators

Trusted by North American telecom operators, cable MSOs, and network equipment manufacturers.

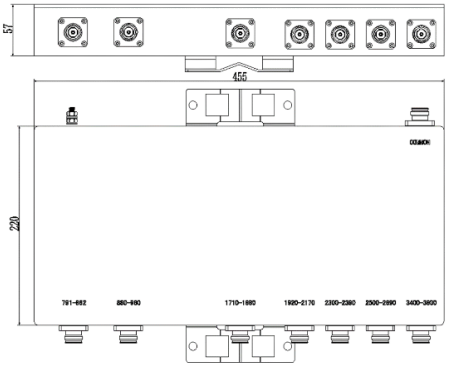
★★★★½

“Your team is innovative, customer first and very responsive.”

- Rated by our Tier 1 Carrier Customers

FEATURED PRODUCT

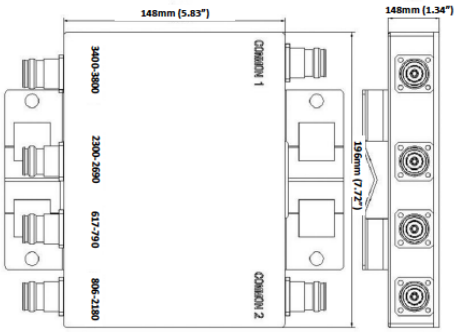
Low PIM Heptaplexer (XP7-P404)



Part Number	XP7-P404
Pass Band (Mhz)	Band 20 (791-862), Band 8 (880-960), Band 3 (1710-1880), Band 1 (1920-2170), Band 40 (2300-2390), Band 7 (2500-2690), Band 42/43/N78 (3300-3800)
Insertion Loss	< 0.5dB
Input Return Loss	≥20 dB
Isolation	≥50 dB
Power Handling	50W CW/Avg. per input port, 350W CW/Avg. at COMMON Port
Impedance	50ohms
Connector	4.3-10 Female
PIM	≤ -161 dBc @43dBm X2 (Typical -165dBc)
Temperature Range	-40 ~ +65 °C
Dimensions (W X D X H) / Weight	455 x 220 x 57 mm / ≤19.0 kg
Notes	Wall /Mast Mounting Bracket
Application	Indoor / Outdoor (IP66)
Humidity	Relative 0-95%
Lightning Protection	3 kA, 10/350 μs pulse
MTBF	500,000 hours maximum

FEATURED PRODUCT

Extra Low PIM 4:2 Narrow Band Combiner (CM4-P516)



Part Number	CM4-P516
Pass Band (Mhz)	Input Port 1: 617-790MHz, Input Port 2: 806-2180MHz, Input Port 3: 2300-2690MHz, Input Port 4: 3400-3800MHz, Output Port 1: COMMON 1, Output Port 2: COMMON 2
Insertion Loss	3.5 +/- 0.4dB
Isolation	≥22 dB
Power Handling	5W per input port (Derate -1.2%/°C. above 25°C)
Connector	4.3-10 Female
PIM	≤ -165dBc @ 43 dBm X 2
Temperature Range	-40 ~ +65 °C
Dimensions (W X D X H) / Weight	196 x 148 x 34 mm (7.72 x 5.83 x 1.34 inch)
Mounting	Wall/ Pole Mount
Application	Indoor / Outdoor (IP66)
Humidity	Relative 0-95%
Lightning Protection	3 kA, 10/350 µs pulse
VSWR	≤ 1.25:1

Product Specifications

1 YEAR WARRANTY

Our product catalogue consists of over 100 different combiners with a mix of different specifications. We are also able to customize products depending on your project's unique needs. See below for the current range of specifications for the products in our catalogue.
Or browse specific part numbers on our website.

Types
Diplexers
Triplexers
Quadruplexers
5-plexers
6-plexers
7-plexers
Wideband Hybrid Combiners

Power Handling
1-10W
30W
40W
50W
100W
150W
200W
250W
300W
500W

Connector
DIN Female
NEX10 Female
N Female
4.3-10 Female

PIM Rejection (IM3)
≤ -160dBc
≤ -165dBc

Frequency Range
520 - 6000MHz
520 - 3800 MHz
600 - 2700 MHz
698 - 2700 MHz

Application
Indoor (IP54)
Indoor/Outdoor (IP67 / 68)

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