Rosenberger

COMMUNICATION

Passive Intermodulation Analyzers
PIM Test Solutions for all Applications

Rosenberger Group

Rosenberger is one of the worldwide leading suppliers of controlled impedance and optical connectivity solutions, system components for mobile communications networks, data centres and test & measurement as well as high voltage contact systems.

Contents

Competencies & Technology

Rosenberger's mission is to be recognized as an innovation and technology leader within its business segments. The most modern manufacturing technologies, the highest possible levels of efficiency in production and continuous development are our core competencies guaranteeing not only fast delivery and strict adherence to delivery dates, but also the highest levels in product quality.

Quality and Environment

The quality of our products, solutions and services is an essential part of our corporate strategy.

Rosenberger's quality philosophy is not just to optimize components and products, but to continuously improve and optimize all processes to ensure customer satisfaction: From product development, planning, procurement, production, sales, logistics and services to environmental policy. In summary, to offer maximum benefits to our customers all over the world.

Our quality responsibility includes being pro-active in protecting our environment and natural resources. We endeavour to avoid any environmental pollution, even beyond the requirements of legal regulations whenever possible.

PIM Test Solutions for all Applications

High-speed data transmission in today's global mobile communication networks demands high efficiency of network infrastructure. Passive Intermodulation (PIM) in a network can cause serious interferences and significantly degrade the network quality and impact KPI figures.

The cause of Passive Intermodulation is very complex and uncertain. It can be caused by low-grade transmission line components or even loose connectors, dirty surfaces, magnetic materials or the surrounding environment like a rusty roof. As a global leader of RF connectivity solutions, Rosenberger has a strong expertise in manufacturing of Low-PIM components as well as PIM T&M solutions for all applications:

- R&D / Test Lab
- Production Environment
- Site Testing

Passive Intermodulation

Passive Intermodulation (PIM) is a non-linear response of two or more signals of different frequencies mixing together in a passive device, e.g. antenna, cable, connector or splitter. Today, PIM has become a very serious and challenging task for mobile operators, equipment vendors and component manufacturers due to frequency planning in modern communication networks, the usage of high-power transmitters and more sensitive receivers in base stations. If a PIM with sufficient magnitude generated from a transmitter falls within an adjacent receiver channel, it causes serious interferences to the base station receiver and will significantly degrade the network quality of service.

The cause of PIM is very complex and uncertain. Even dirty surfaces, poor soldering, and loose connections will cause serious intermodulation. Hence, in theory, it cannot be calculated nor be simulated by software. To verify the PIM and look for the root cause, specific test instruments are required.

Passive Intermodulation Analyzers

Passive Intermodulation Analyzers (PIAs) are professional measurement instruments which are characterized by very low self intermodulation and high power level signal output. Their high accuracy receiver allows fast and precise measurements of the 3rd, 5th and 7th order intermodulation of passive devices under high-power conditions, e.g. connectors, cable assemblies, antennas, filters and other passive components.

Rack Analyzers	Desktop Analyzers	PIM Site Analyzer α
Manufacturers of passive components	Manufacturers of passive components	Site installation
Research & Development	Research & Development	
Laboratories	Laboratories	
Calibration centers	Calibration centers	

Definition of Intermodulation

Passive Intermodulation

Intermodulation occurs when two or more signals mix on a non-linear device and create undesired output at other frequencies.

In a communications system, this means that signals in one channel may cause interference with adjacent channels.

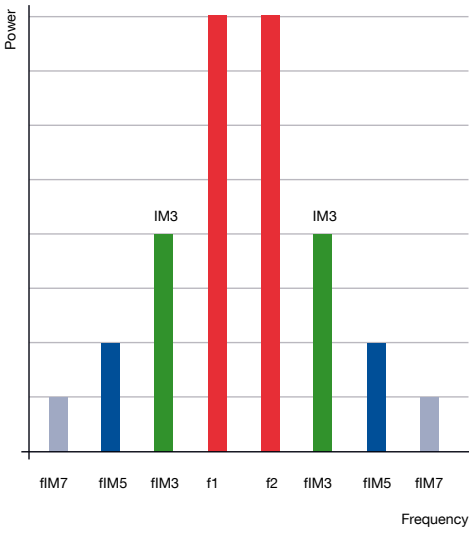
Considering that an input signal contains two frequencies, intermodulation can be indicated as follows:

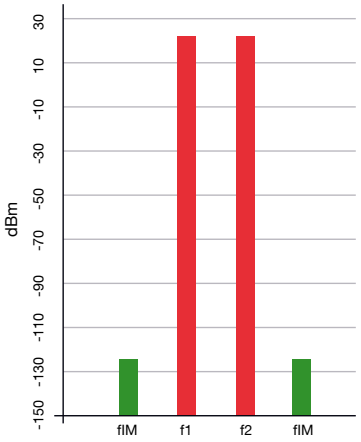
$f_{IM} = mf_1 \pm nf_2$

f_1 and f_2 are carrier frequencies

f_{IM} is the intermodulation frequency

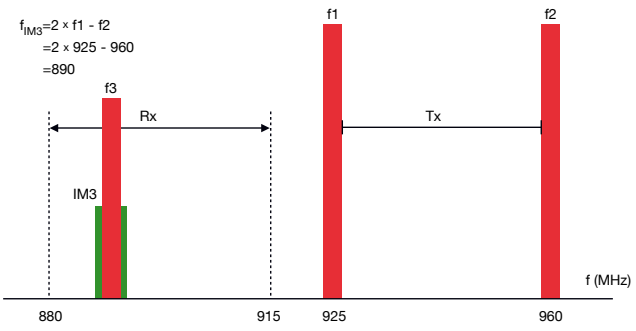
m + n is the order of f_{IM}. For example, when $f_{IM} = 2f_1 - f_2$, f_{IM} is called the 3rd order intermodulation frequency. Commonly, the 3rd, 5th and 7th order intermodulation signals will be considered. The 3rd order intermodulation signal always represents the worst case condition of unwanted signals generated since it is closest to the carriers and has the highest amplitude.





Intermodulation is normally specified in terms of dBm or dBc. For example, +43 dBm (20 Watt) is a typical input power level specified for device under test (DUT). If the allowable intermodulation level for DUT is required to be -117 dBm, thus the specification is -117-43 = -160 dBc.

IEC-62037 is an international standard for RF connectors, cable assemblies and cable intermodulation level measurement. It defines the intermodulation level, test principle and test procedure. In IEC standard chapter 6, it requires the residual intermodulation of an analyzer should be at least 10 dB below the specified value of DUT. In the above example, the residual intermodulation of the analyzer should be less than -170 dBc. The lower the self-intermodulation, the more accurate the test results obtained.



PIM Analyzer Main Features

Modular design

Rack types operated by broadband power amplifier (698 - 1000 MHz, 1800 - 2200 MHz, 2500 -2600 MHz and 698 - 2200 MHz). Easy to upgrade to specific bands by using additional filter units. The Multiplex Unit supports the automatic switching between the different bands.
Desktop types 698 - 1000 MHz: one base model 698 MHz , 800 MHz, 850 MHz, 900 MHz can have one additional filter from any other of these frequency bands. 1800 - 2100 MHz: one base model 1800 MHz, 1900 MHz, 2100 MHz can have one additional filter from any other of these frequency bands.
PIM Site Analyzer α Power unit and battery unit have the same form factor and are interchangeable in the field. Due to it's broadband design (698 - 2700 MHz), also band filter units are field replaceable. There is one band filter unit for each mobile band.

Dimensions

Rack types	19" rack, 4U, 600 mm, 3U, 600 mm
Desktop types	450 mm x 400 mm x 200 mm, approx. 20 kg weight
PIM Site Analyzer α	489 mm x 446 mm x 185 mm, approx. 19 kg weight, only base unit

Measures

Depending on model, 3rd, 5th, 7th, 9th and 11th order reflected or transmitted passive intermodulation for:
Antennas
Transmission lines
Connectors
Jumpers
Filters and combiners
Splitters
Other passive components, e.g. power mounted devices

Outstanding Dynamic

Residual IM-Level (2 x 43 dBm, S/N = 10 dB):	
Rack types	< -171 dBc, typical -175 dBc
Desktop types	< -171 dBc
PIM Site Analyzer α	< -168 dBc

Operation / Measurement Modes

Depending on model (detailed data sheet available on request)	
Passive Intermodulation:	PIM vs. Frequency / PIM vs. time / (multiple) PIM location
VSWR/Return loss under high RF power	
Distance to VSWR fault location DTF	
Optional built-in spectrum analyzer	
Isolation measurement	
CPRI based PIM monitoring and cancellation on fiber	

Testport

Power for rack & desktop types selectable from +36 to +46 dBm
Testport connectors for all rack, desktop & site types: 7-16. 4.3-10 on request

Control Software

for PC control of the analyzers is available at:
www.rosenberger.com/pia/downloads

Broadband Rack Types

Field proven, robust design for fast & precise multiband testing in production environment. Future-proof T&M equipment for R&D / Lab Testing.

Key Features

- Broadband base unit 698 - 2200 MHz supports testing of up to 9 mobile bands (using additional filter units + switch matrix)
- Other base units support 698 - 1000 MHz, 1800 - 2200 MHz, 2600 MHz, 3500 MHz for band specific testing
- Outstanding dynamic residual IM-Level <-171 dBc (2x 43 dBm), typical -175 dBc
- Fast & efficient PIM testing in production line
- "Reflected" or "Reflected & Transmitted" measurement

Overview of Benefits

- Reduction of T&M investment cost (for multiband-testing)
- Multiplex Unit supports automatic switching between different bands
- Modular design
- Future-proof: for upcoming new bands just add new filter unit

Rack Type

Rack Configuration

To measure reversed IM, EGSM 900 MHz band only:

Power Amplifier / Receiver Unit, 698 – 960 MHz Rosenberger No.: **IM-0710-BB**	alternative	Power Amplifier / Receiver Unit, 698 – 2200 MHz Rosenberger No.: **IM-0722-BB**
+		+
Filter Unit EGSM, reversed Rosenberger No.: **IM-FI-900R**		Filter Unit EGSM, reversed Rosenberger No.: **IM-FI-900R-C**

To measure reversed IM, EGSM 900 MHz, 1800 MHz band and transmitted IM, PCS 1900 MHz band:

Power Amplifier / Receiver Unit, 698 – 960 MHz Rosenberger No.: **IM-0710-BB** Power Amplifier / Receiver Unit, 1800 – 2200 MHz Rosenberger No.: **IM-1822-BB**	alternative	Power Amplifier / Receiver Unit, 698 – 2200 MHz Rosenberger No.: **IM-0722-BB**
+		+
Multiplexer Unit, to switch between EGSM and DCS Filter Rosenberger No.: **IM-MPX**		Multiplexer Unit, to switch between EGSM and DCS Filter Rosenberger No.: **IM-MPX-0722**
+		+
Filter Unit EGSM, reversed Rosenberger No.: **IM-FI-900R**		Filter Unit EGSM, reversed Rosenberger No.: **IM-FI-900R-C**
+		+
Filter Unit PCS, transmitted Rosenberger No.: **IM-FI-1900T**		Filter Unit PCS, transmitted Rosenberger No.: **IM-FI-1900T-C**
+		+
Filter Unit DCS, reversed Rosenberger No.: **IM-FI-1800R**		Filter Unit DCS, reversed Rosenberger No.: **IM-FI-1800R-C**

Broadband Rack Types

Power Amplifier / Receiver Units

Rosenberger No.	Frequency Range RX	Frequency Range TX	Power Output	RX Noise floor
IM-0710-BB	698 - 960 MHz	698 - 960 MHz	52 dBm	< -135 dBm
IM-0722-BB-HP	698 - 2200 MHz	698 - 2200 MHz	52 dBm	< -135 dBm
IM-1822-BB	1800 - 2200 MHz	1800 - 2200 MHz	52 dBm	< -135 dBm
IM-2127-BB	1900 - 2700 MHz	2100 - 2700 MHz	52 dBm	< -135 dBm
IM-2526-BB	2500 - 2600 MHz	2600 - 2700 MHz	52 dBm	< -135 dBm
IM-3436-BB	3400 - 3500 MHz	3500 - 3600 MHz	52 dBm	< -130 dBm

Detailed specifications on request

Rack Filter Units with 3 dB coupler for Power Amplifier / Receiver Units above

Rosenberger No.	Frequency Band	E-UTRA Band	Frequency Range RX	Frequency Range TX	Power Output	Residual IM @ 2x 43 dBm	
						Reflected IM	Transmitted IM
IM-FI-700R	LTE 700, reversed	–	698 - 730 MHz	745 - 793 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-700T	LTE 700, transmitted	–	698 - 730 MHz	745 - 793 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-700LUR	LTE 700, reversed	12, 13, 14, 17	698 - 716 MHz 776 - 798 MHz	728 - 760 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-700LUT	LTE 700, reversed	12, 13, 14, 17	698 - 716 MHz 776 - 798 MHz	728 - 760 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-700APTR	DigDivII	28	698 - 748 MHz	758 - 803 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-700APTT	DigDivII	28	698 - 748 MHz	758 - 803 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-800R	AMPS, reversed	5	824 - 849 MHz	869 - 894 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-800T	AMPS, transmitted	5	824 - 849 MHz	869 - 894 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-850R	DigDiv, reversed	20	832 - 862 MHz	792 - 822 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-850T	DigDiv, transmitted	20	832 - 862 MHz	792 - 822 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-900R	EGSM, reversed	8	880 - 915 MHz	925 - 960 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-900T	EGSM, transmitted	8	880 - 915 MHz	925 - 960 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1800R	DCS, reversed	3	1710 - 1785 MHz	1805 - 1880 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1800T	DCS, transmitted	3	1710 - 1785 MHz	1805 - 1880 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1900R	PCS, reversed	2	1850 - 1910 MHz	1930 - 1990 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1900T	PCS, transmitted	2	1850 - 1910 MHz	1930 - 1990 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1900AWSR	PCS/AWS, reversed	2, 4	1710 - 1910 MHz	1930 - 2155 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1900AWST	PCS/AWS, transmitted	2, 4	1710 - 1910 MHz	1930 - 2155 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-TD-FR	TD-SCDMA F-Band, reversed	39	1880 - 1890 MHz	1900 - 1920 MHz	+36 ... +46 dBm	< -171 dB	< -165 dBc
IM-FI-TD-FT	TD-SCDMA F-Band, transmitted	39	1880 - 1890 MHz	1900 - 1920 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-TD-AR	TD-SCDMA A-Band, reversed	34	2115 MHz	2017.5 MHz	+36 ... +46 dBm	< -163 dBc	< -160 dBc
IM-FI-TD-AT	TD-SCDMA A-Band, transmitted	34	2115 MHz	2017.5 MHz	+36 ... +46 dBm	< -163 dBc	< -160 dBc
IM-FI-2100R	UMTS, reversed	1	1920 - 2060 MHz	2110 - 2170 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-2100T	UMTS, transmitted	1	1920 - 2060 MHz	2110 - 2170 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-2600R	LTE 2600, reversed	7	2445 - 2580 MHz	2620 - 2695 MHz	+36 ... +44 dBm	< -171 dBc	< -165 dBc
IM-FI-2600R-C	LTE 2600, reversed	7	2445 - 2580 MHz	2620 - 2695 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI2600T	LTE 2600, transmitted	7	2445 - 2580 MHz	2620 - 2695 MHz	+36 ... +44 dBm	< -171 dBc	< -165 dBc
IM-FI2600T-C	LTE 2600, transmitted	7	2445 - 2580 MHz	2620 - 2695 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-TD-ER	TD-E-Band, WCS, reversed	30	2300 - 2330 MHz	2340 - 2370 MHz	+36 ... +44 dBm	< -171 dBc	< -165 dBc
IM-FI-TD-ER-C	TD-E-Band, WCS, reversed	30	2300 - 2330 MHz	2340 - 2370 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-TD-ET	TD-E-Band, WCS, transmitted	30	2300 - 2330 MHz	2340 - 2370 MHz	+36 ... +44 dBm	< -171 dBc	< -165 dBc
IM-FI-TD-ET-C	TD-E-Band, WCS, transmitted	30	2300 - 2330 MHz	2340 - 2370 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc

Other frequency bands on request

Detailed specifications on request

Version -C of filter unit is limited in frequency range

Rack Filter Units with 3 dB coupler for Power Amplifier / Receiver Units above

Rosenberger No.	Frequency Band	E-UTRA Band	Frequency Range RX	Frequency Range TX	Power Output	Residual IM @ 2x 43 dBm	
						Reflected IM	Transmitted IM
IM-FI-2400R	WiFi 2400, reversed	–	2400 - 2428 MHz	2448 - 2484 MHz	+36 ... +44 dBm	< -171 dBc	< -165 dBc
IM-FI-2400R-C	WiFi 2400, reversed	–	2400 - 2428 MHz	2448 - 2484 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-2400T	WiFi 2400, transmitted	–	2400 - 2428 MHz	2448 - 2484 MHz	+36 ... +44 dBm	< -171 dBc	< -165 dBc
IM-FI-2400T-C	WiFi 2400, transmitted	–	2400 - 2428 MHz	2448 - 2484 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-3500R	WiMAX, reversed	40	3410 - 3484 MHz	3510 - 3594 MHz	+36 ... +44 dBm	< -171 dBc	< -165 dBc
IM-FI-3500R-C	WiMAX, reversed	40	3410 - 3484 MHz	3510 - 3594 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-3500T	WiMAX, transmitted	40	3410 - 3484 MHz	3510 - 3594 MHz	+36 ... +44 dBm	< -171 dBc	< - 165 dBc
IM-FI-3500T-C	WiMAX, transmitted	40	3410 - 3484 MHz	3510 - 3594 MHz	+36 ... +46 dBm	< -171 dBc	< - 165 dBc

Other frequency bands on request Detailed specifications on request Version -C of filter unit is limited in frequency range

Power Amplifier / Receiver Units

Rosenberger No.	Frequency Range RX	Frequency Range TX	Power Output	RX Noise floor
IM-0722-BB	698 - 2200 MHz	698 - 2200 MHz	50 dBm	< -135 dBm

Detailed specifications on request

Rack Filter Units with Filter Combiner* recommended for IM-0722-BB

Rosenberger No.	Frequency Band	E-UTRA Band	Frequency Range RX	Frequency Range TX	Power Output	Residual IM @ 2x 43 dBm	
						Reflected IM	Transmitted IM
IM-FI-700R-C	LTE 700, reversed	–	698 - 730 MHz	745 - 793 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-700T-C	LTE 700, transmitted	–	698 - 730 MHz	745 - 793 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-700LUR-C	LTE 700, reversed	12, 13, 14, 17	698 - 716 MHz 776 - 798 MHz	728 - 760 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-700LUT-C	LTE 700, reversed	12, 13, 14, 17	698 - 716 MHz 776 - 798 MHz	728 - 760 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-700APTR-C	DigDivII	28	698 - 748 MHz	758 - 803 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-700APTT-C	DigDivII	28	698 - 748 MHz	758 - 803 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-800R-C	AMPS, reversed	5	824 - 849 MHz	869 - 894 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-800T-C	AMPS, transmitted	5	824 - 849 MHz	869 - 894 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-850R-C	DigDiv, reversed	20	832 - 862 MHz	792 - 822 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-850T-C	DigDiv, transmitted	20	832 - 862 MHz	792 - 822 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-900R-C	EGSM, reversed	8	880 - 915 MHz	925 - 960 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-900T-C	EGSM, transmitted	8	880 - 915 MHz	925 - 960 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1800R-C	DCS, reversed	3	1710 - 1785 MHz	1805 - 1880 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1800T-C	DCS, transmitted	3	1710 - 1785 MHz	1805 - 1880 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1900R-C	PCS, reversed	2	1850 - 1910 MHz	1930 - 1990 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1900T-C	PCS, transmitted	2	1850 - 1910 MHz	1930 - 1990 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1900AWSR-C	PCS/AWS, reversed	2, 4	1710 - 1910 MHz	1930 - 2155 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-1900AWST-C	PCS/AWS, transmitted	2, 4	1710 - 1910 MHz	1930 - 2155 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-TD-FR-C	TD-SCDMA A-Band, reversed	39	1880 - 1890 MHz	1900 - 1920 MHz	+36 ... +46 dBm	< -171 dB	< -165 dBc
IM-FI-TD-FT-C	TD-SCDMA F-Band, transmitted	39	1880 - 1890 MHz	1900 - 1920 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-TD-AR-C	TD-SCDMA A-Band, reversed	34	2115 MHz	2017.5 MHz	+36 ... +46 dBm	< -163 dBc	< -160 dBc
IM-FI-TD-AT-C	TD-SCDMA A-Band, transmitted	34	2115 MHz	2017.5 MHz	+36 ... +46 dBm	< -163 dBc	< -160 dBc
IM-FI-2100R-C	UMTS, reversed	1	1920 - 2060 MHz	2110 - 2170 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc
IM-FI-2100T-C	UMTS, transmitted	1	1920 - 2060 MHz	2110 - 2170 MHz	+36 ... +46 dBm	< -171 dBc	< -165 dBc

*Limited frequency range with filter combiner, see data sheet Other frequency bands on request Detailed specifications on request Version -C of filter unit is limited in frequency range

Multiplexer

Rosenberger No.	No. Position	Remarks	
IM-MPX	6 x 6 to 1	for IM-0710-BB, IM-1822-BB	6 band are supported
IM-MPX-0722	3 x 6 to 1	for IM-0722-BB , IM-0722-BB-HP, IM-2127-BB	6 band are supported
IM-MPX-0722-9	3 x 9 to 1	for IM-0722-BB , IM-0722-BB-HP, IM-2127-BB	9 band are supported

Detailed specifications on request

Broadband Desktop Types

Needed for high portability and flexibility in production lines, R&D, Test labs.

Key Features

- One additional filter unit can be added to one base model
- Outstanding dynamic residual IM-Level <-171 dBc (2x 43 dBm)
- Fast & efficient PIM testing

Overview of Benefits

- Reduction of T&M investment costs (for multiband-testing)
- High flexibility/portability in test environment

Desktop Type

Desktop Configuration

Rosenberger No. Desktop Analyzer	Combined with	Rosenberger No. Filter Unit
IM-07LUP-BB	any one from	IM-FI-700APTPR IM-FI-700PR IM-FI-800PR IM-FI-850PR IM-FI-900PR
IM-07APTP-BB	any one from	IM-FI-700LUPR IM-FI-700PR IM-FI-800PR IM-FI-850PR IM-FI-900PR
IM-07P-BB	any one from	IM-FI-700LUPR IM-FI-700APTPR IM-FI-800PR IM-FI-850PR IM-FI-900PR
IM-08P-BB	any one from	IM-FI-700LUPR IM-FI-700APTPR IM-FI-700PR IM-FI-850PR IM-FI-900PR
IM-085P-BB	any one from	IM-FI-700LUPR IM-FI-700APTPR IM-FI-700PR IM-FI-800PR IM-FI-900PR
IM-09P-BB	any one from	IM-FI-700LUPR IM-FI-700APTPR IM-FI-700PR IM-FI-800PR IM-FI-850PR
IM-18P-BB	any one from	IM-FI-19AWSPR IM-FI-1900PR IM-FI-TD-FPR IM-FI-TD-EPR IM-FI-2000PR IM-FI-2100PR
IM-19AWSP-BB	any one from	IM-FI-1800PR IM-FI-TD-FPR IM-FI-TD-EPR IM-FI-2000PR IM-FI-2100PR

-BB can be combined with one external desktop filter unit

Rosenberger No. Desktop Analyzer	Combined with	Rosenberger No. Filter Unit
IM-19P-BB	any one from	IM-FI-1800PR IM-FI-TD-FPR IM-FI-TD-EPR IM-FI-2000PR IM-FI-2100PR
IM-TD-FP-BB	any one from	IM-FI-1800PR IM-FI-19AWSPR IM-FI-1900PR IM-FI-TD-EPR IM-FI-2000PR IM-FI-2100PR
IM-20P-BB	any one from	IM-FI-1800PR IM-FI-19AWSPR IM-FI-1900PR IM-FI-TD-FPR IM-FI-TD-EPR IM-FI-2100PR
IM-21P-BB	any one from	IM-FI-1800PR IM-FI-19AWSPR IM-FI-1900PR IM-FI-TD-FPR IM-FI-TD-EPR IM-FI-2000PR
IM-TD-EP-BB	any one from	IM-FI-1800PR IM-FI-19AWSPR IM-FI-1900PR IM-FI-TD-FPR IM-FI-2000PR IM-FI-2100PR
IM-24P	no option	no option
IM-26P	no option	no option
IM-35P	no option	no option

-BB can be combined with one external desktop filter unit

Desktop Analyzer

Rosenberger No.	Frequency Band	E-UTRA Band	Frequency Range RX	Frequency Range TX	Power Output	Residual IM @ 2x 43 dBm Reflected IM
IM-07LUP-BB	LTE 700 LU	12, 13, 14, 17	698 - 716 MHz 776 - 798 MHz	728 - 760 MHz	+36 ... +46 dBm	< -171 dBc
IM-07APTP-BB	DigDivII	28	698 - 748 MHz	758 - 803 MHz	+36 ... +46 dBm	< -171 dBc
IM-07P-BB	LTE 700	–	745 - 793 MHz	698 - 793 MHz	+36 ... +46 dBm	< -171 dBc
IM-08P-BB	AMPS 800	5	824 - 849 MHz	869 - 894 MHz	+36 ... +46 dBm	< -171 dBc
IM-085P-BB	LTE 800 DigDiv	20	832 - 862 MHz	792 - 822 MHz	+36 ... +46 dBm	< -171 dBc
IM-09P-BB	EGSM 900	8	880 - 915 MHz	925 - 960 MHz	+36 ... +46 dBm	< -171 dBc
IM-18P-BB	DCS 1800	3	1710 - 1785 MHz	1805 - 1880 MHz	+36 ... +46 dBm	< -171 dBc
IM-19AWSP-BB	PCS 1900 / AWS	2, 4	1710 - 1910 MHz	1930 - 2155 MHz	+36 ... +46 dBm	< -171 dBc
IM-19P-BB	PCS 1900	2	1850 - 1910 MHz	1930 - 1990 MHz	+36 ... +46 dBm	< -171 dBc
IM-21P-BB	UMTS 2100	1	1920 - 2060 MHz	2110 - 2170 MHz	+36 ... +46 dBm	< -171 dBc
IM-24P	WiFi 2400	–	2400 - 2428 Mhz	2448 -2484 MHz	+36 ... +46 dBm	< -171 dBc
IM-26P	UMTS II / LTE 2600	7	2545 - 2580 MHz	2620 - 2695 MHz	+36 ... +46 dBm	< -171 dBc
IM-35P	WIMAX	40	3410 - 3484 MHz	3510 - 3594 MHz	+36 ... +46 dBm	< -171 dBc

Other frequency bands on request Detailed specifications on request

Desktop External Filter Units

Rosenberger No.	Frequency Band	E-UTRA Band	Frequency Range RX	Frequency Range TX	Power Output	Residual IM @ 2x 43 dBm Reflected IM
IM-FI-700LUPR	LTE 700 LU	12, 13, 14, 17	698 - 716 MHz 776 - 798 MHz	728 - 760 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-700APTPR	DigDivII	28	698 - 748 MHz	758 - 803 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-700PR	LTE 700	–	745 - 793 MHz	698 - 793 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-800PR	AMPS 800	5	824 - 849 MH	869 - 894 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-850PR	LTE 800 DigDiv	20	832 - 862 MHz	791 - 821 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-900PR	EGSM 900	8	880 - 915 MHz	925 - 960 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-1800PR	DCS 1800	3	1710 - 1785 MHz	1805 - 1880 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-19AWSPR	PCS 1900 / AWS	2, 4	1710 - 1910 MHz	1930 - 2155 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-1900PR	PCS 1900	2	1850 - 1910 MHz	1930 - 1990 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-TD-FPR	TD-SCDMA F	39	1880 - 1890 MHz	1900 - 1920 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-2100PR	UMTS 2100	1	1920 - 2060 MHz	2110 - 2170 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-2000PR	TD-SCDMA	34	2000 - 2015 MHz	2017.5 MHz	+36 ... +46 dBm	< -171 dBc
IM-FI-TD-EPR	TD-E-Band, WCS	30	2300 - 2330 MHz	2340 - 2370 MHz	+36 ... +46 dBm	< -171 dBc

Other frequency bands on request Detailed specifications on request

PIM Site Analyzer α

Band-specific PIM Site Analyzers belong to the past. Forget the headaches related to changing network infrastructure or new upcoming mobile bands. There is one future-proof model ready to support all kinds of mobile network infrastructure with a copper or fiber interface.

Key Features

- Power unit and battery unit have the same form factor and are interchangeable in the field
- PIM detection over CPRI (incl. cancellation function)
- Broadband Rx & Tx base model 698 - 2700 MHz with exchangeable filter units

Additional Features

- Continuous wave signal (no pulse)
- Portable with a rugged design
- Sunlight readable 12" touch screen
- Antenna isolation measurement
- DTF measurement (VSWR vs. Dist., PIM vs. Dist.)
- VSWR/Return loss measurement
- Battery and 110 / 220 V AC operation

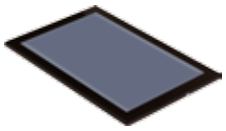
Overview of Benefits

- Reduction of T&M investment cost (for multiband-testing)
- Reduce OPEX for PIM Measurement (no tower climbing)
- Increased safety & simplified handling in workplace
- Quantify KPI improvements using CPRI cancellation function
- Future-proof: For upcoming new bands just add new filter unit

PIM Site Analyzer α Configuration

Broadband Base Unit
698 MHz - 1700 MHz

+



Tablet (included)

+

Power Unit
(included)

+

1 Filter Unit
(e.g. 900 MHz)

+
Options

Battery Unit

CPRI Software Option
(HW ready)

Carry Bag

PIM Site Analyzer α Broadband Base Unit (tablet for wireless remote control included)

Rosenberger No.	Frequency Range RX	Frequency Range TX	Power Output	RX Noise Floor
IM-A-BU-0727	698 - 2700 MHz	see filter units	+20 ... +46 dBm	< -135 dBm

Other frequency bands on request

Detailed specifications on request

PIM Site Analyzer α Filter Units

Rosenberger No.	Frequency Band	E-UTRA Band	Frequency Range RX	Frequency Range TX	Power Output	Residual IM @ 2x 43 dBm Reflected IM
IM-A-FI-700/B12-13	LTE 700 LU	12, 13, 14, 17	698 - 716 MHz 776 - 798 MHz	728 - 760 MHz	+36 ... +46 dBm	< -168 dBm
IM-A-FI-800/B20	DigDivII	20	832 - 862 MHz	792 - 822 MHz	+36 ... +46 dBm	< -168 dBm
IM-A-FI-850/B5	AMPS 800	5	824 - 849 MHz	869 - 894 MHz	+36 ... +46 dBm	< -168 dBm
IM-A-FI-900/B8	EGSM 900	8	880 - 915 MHz	925 - 960 MHz	+36 ... +46 dBm	< -168 dBm
IM-A-FI-1800/B3	DCS 1800	3	1710 - 1785 MHz	1805 - 1880 MHz	+36 ... +46 dBm	< -168 dBm
IM-A-FI-1900/B2+4	PCS 1900 / AWS	2, 4	1710 - 1910 MHz	1930 - 2155 MHz	+36 ... +46 dBm	< -168 dBm
IM-A-FI-2100/B1	UMTS 2100	1	1920 - 2060 MHz	2110 - 2170 MHz	+36 ... +46 dBm	< -168 dBm
IM-A-FI-2600/B7	UMTS II / LTE 2600	7	2545 - 2580 MHz	2620 - 2695 MHz	+36 ... +46 dBm	< -168 dBm

Other frequency bands on request

Detailed specifications on request

PIM Site Analyzer α Power Unit (included)

Rosenberger No.	Voltage Range	Power
IM-A-BU-PU	110 / 220 V AC	750 W

PIM Site Analyzer α Battery Unit (optional, available separately)

Rosenberger No.	Remarks
IM-A-BU-BU	for three battery packs

PIM Site Analyzer α Battery Pack (optional, available separately)

Rosenberger No.	Capacity
IM-A-BU-BAT	99 Wh

PIM Site Analyzer α CPRI Software Option

Rosenberger No.	Remarks
IM-A-SWO-CPRI	software option to enable PIM detection, cancellation and distance measurement over CPRI

PIM Site Analyzer α Bag (optional, available separately)

Rosenberger No.	Remarks
IM-A-ACSRY-BAG	Carry Bag for PIM Site Analyzer α

Accessories

Standard Accessory Kit (included with delivery of every new unit)

Rosenberger No.	Remarks
IM-ACSRY-xx*	No matter which model, there are basic accessories supplied with every new unit. Some of the content is equipment type or country specific (e.g. power plug, manual) please see data sheet to find out which one is suitable to your application.

* xx fill in code requested power plug according region/country

Accessory Kit for Production/Lab Testing

Rosenberger No.	Remarks
99Z111-100	This optionally available accessory kit with low PIM components includes adaptors, test cables and tools frequently used and needed in production and lab environments.
99Z111-101*	

* including a Low PIM termination for 19" rack mount

Accessory Kit for Site Testing

Rosenberger No.	Remarks
99Z111-120	This optionally available accessory kit is optimized for field use and includes most frequently used adaptors, test cables, tools as well as a low pim termination.

Adaptors In-Series

Rosenberger No.	Remarks
60S101-KIMN1	7-16 male to 7-16 female adapter
60S101-SIMN1	7-16 male to 7-16 male adapter
60K101-KIMN1	7-16 female to 7-16 female adapter

Adaptors (Inter Series)

Rosenberger No.	Remarks
60S153-KIMN1	7-16 male to N female adapter
53S160-KIMN1	7-16 female to N male adapter
60S164-K00N1	7-16 male to 4.3-10 female
60S164-S00N1	7-16 male to 4.3-10 male
60K164-S00N1	7-16 female to 4.3-10 male

Adaptors -110 dBm

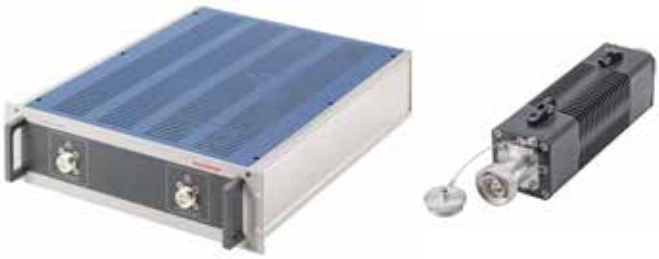
Rosenberger No.	Remarks
60S110-K07N1	-110 dBm standard adapter for LTE 700
60S110-K08N1	-110 dBm standard adapter for AMPS
60S110-K09N1	-110 dBm standard adapter for EGSM
60S110-K18N1	-110 dBm standard adapter for DCS
60S110-K19N1	-110 dBm standard adapter for PCS
60S110-K20N1	-110 dBm standard adapter for TD-SCDMA
60S110-K21N1	-110 dBM standard adapter for UMTS
60S110-K26N1	-110 dBm standard adapter for UMTS II / LTE / BRS-EBS
60S110-K35N1	-110 dBm standard adapter for WiMAX

Testport Connectors for PIM Site Analyzer α Filter Units

Rosenberger No.	Remarks
60K408-800N1	7-16 female
64K401-800B1	4.3-10 female

Terminations

Rosenberger No.	Remarks
60Z150-001	Low PIM termination for rack type, 7-16 female, 7-16 female
60Z150-020	Low PIM termination for portable type, 7-16 female, 7-16 male



Tools

Rosenberger No.	Remarks
60W000-002	32# torque wrench
53W010-000	18# torque wrench

Test Cables 7-16 / 7-16

Rosenberger No.	Remarks
LC02-186-1500	Test Cable 3/8" S FRNC 1.5 m, 7-16 male, 7-16 male
LC02-186-4000	Test Cable 3/8" S FRNC 4.0 m, 7-16 male, 7-16 male

Customized test cables on request

Test Cables 7-16 / N

Rosenberger No.	Remarks
LC02-188-1500	Test Cable 3/8" S FRNC 1.5 m, 7-16 male, N male
LC02-188-4000	Test Cable 3/8" S FRNC 4.0 m, 7-16 male, N male

Customized test cables on request

Test Cables 7-16 / 4.3-10

Rosenberger No.	Remarks
SLJ12SP-60M64M-2.0m-00	Test Cable 1/2" S PE 2.0 m, 7-16 male / 4.3-10 male

Customized test cables on request

Test Cables 4.3-10 / 4.3-10

Rosenberger No.	Remarks
SLJ12SP-64M64M-2.0m-00	Test Cable 1/2" S PE 2.0 m / 4.3-10 male / 4.3-10 male

Customized test cables on request

Service

Repair & Calibrations

To ensure highest precision of measurements, we recommend a calibration interval of 12 months. On-site calibration & repair service is optionally available. If you wish to send back a unit for calibration or repair, for smooth transaction please contact us prior to shipment.

Calibration FAQs

Calibration: Setting and calibration of the unit to the values based on factory-provided, initial calibration. Check for latest Firmware update.

Calibration frequency: To ensure highest precision of measurements we recommend a calibration interval of 12 months.

Cycle time: Standard cycle time is 10 working days after receipt of unit.

Service options: We are happy to inform about additional service options such as on-site calibration service or a service contract.

Download Software & Tools

www.rosenberger.com/pia/downloads

Service Contact

Phone + 49 8684 18-1777
Fax + 49 8684 18- 39 1777
pia_service@rosenberger.de

Support and Sales Locations

Europe, Middle East, Africa

Rosenberger Hochfrequenztechnik GmbH & Co. KG
Hauptstraße 1
83413 Fridolfing, GERMANY
Phone + 49 8684 18-0
Fax + 49 8684 18-1499
info@rosenberger.de
www.rosenberger.com

Rosenberger Site Solutions GmbH
Mayerhofen 45A
83410 Laufen, GERMANY
Phone + 49 8684 18-5000
Fax + 49 8684 18-1499
siso@rosenberger.de
www.rosenberger.com

Americas

Rosenberger Site Solutions, LLC
P.O. Box 8817, Lake Charles, LA 70606, USA
Phone + 1 337 598 5250
Fax + 1 337 598 5290
rlss@rlss.us
www.rlss.us

Brazil

Rosenberger Domex Telecom
Cabletech Avenue, 601
Guaramirim
CEP 12295-230
Cacapava - Sao Paulo, BRAZIL
Phone + 55 - 12 - 3221 8500
Fax + 55 - 12 - 3221 8543
vendas@rosenbergerdomex.com.br
www.rosenberger.com

Asia Pacific

Rosenberger Asia Pacific Electronic Co., Ltd.
No. 3, Anxiang Road, Block B
Tianzhu Airport Industrial Zone
Beijing, 101300, PR CHINA
Phone + 86 10 80 48 1995
Fax + 86 10 80 48 2438
info@rosenberger.com.cn
www.rosenberger.com

India

Rosenberger Electronic Co. (India) Pvt Limited
Plot No. 263, Sector 6
IMT Manesar, Gurgaon
Haryana-122050, INDIA
Phone + 91 1244 77 55 00
Fax + 91 1244 77 55 01
info@rosenberger.in
www.rosenberger.com

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Microsite

For further information refer to our microsite:
www.rosenberger.com/pia

Rosenberger
Hochfrequenztechnik GmbH & Co. KG
Hauptstraße 1 | 83413 Fridolfing
P.O. Box 1260 | 84526 Tittmoning
Germany
Phone +49 (0)8684 18-0
info@rosenberger.de
www.rosenberger.com
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