

**Main Features**

- Broadband RX & TX base model
- Outstanding PIM performance (typ. <-132dBm)
- Continuous wave signal (no pulse), conformity with IEC 62037 – 1, full power to PIM source
- Peak Detector with high sensitivity captures PIM spikes down to 200µs length with real level
- Up to 11 filters connected to one Base Unit (optional Switch Matrix 6-way / 11-way)
- No production downtime when setup is rearranged
- Intuitive Software Operation
- Automated Report Generation
- Antenna Isolation Measurements
- DTF measurement
  - PIM vs. Distance (< 0.3m accuracy)
  - VSWR vs. Distance
- Measurement Modes
  - Passive Intermodulation:
    - PIM vs. Frequency
    - PIM vs. Time
  - VSWR/Return loss with high RF power
  - RF Spectrum Analyzer
  - Isolation Measurement
- Made for 24/7 production use, temperature controlled fan system, easy to replace dust filter



**Product Description**

The versatile Rack-Type **Passive Intermodulation Analyzer (PIA)** system provides an easy way to precisely determine the intermodulation characteristics and other RF parameters in a wide frequency range of

- |                         |                     |
|-------------------------|---------------------|
| • Antenna               | • Transmission Line |
| • Connectors            | • Jumpers           |
| • Filters and Combiners | • Splitters         |

This PIA is designed for the use in production lines to measure the reversed/transmitted intermodulation products. The **Base Unit (BU)** is equipped with a Windows computer, RF baseband hardware and two broadband power amplifiers according to the frequency range. It can be operated manually from the built in touchscreen or via a network connection either per remote desktop or a remote command interface for integration in production tools. The test system is completed by attaching one or more (up to eleven) **Filter Inserts (FI)** using a 1:1 cable or a **Switch Matrix (MPX)** which can be installed easily by user. Band switching is done automatically when measurement band is changed.

The user friendly graphical touch interface allows an easy report generation for every measurement, while guided measurements (planned in future release) forces staff to follow predefined test patterns.

The test setup complies with the test methods suggested by proposal paper IEC 62037 (IEC SC 46D.WG6).

**PIM RACK ANALYZER  
BASE UNIT**

**IM-R-BU-0722-150W  
IM-R-BU-2127-150W**

**General**

<b>Display</b>	9" Touch screen, readable in sunlight
<b>Dimensions</b>	6HU 550mm (266 × 483 × 650 H×W×D)
<b>Weight</b>	43 kg
<b>Mains Supply</b>	110-240VAC 2250W max., Inrush Current ~105A
<b>RF Ports</b>	
<b>TX out</b>	N-Type (if no Switch Matrix is used)
<b>RX, Isolation &amp; VSWR</b>	SMA-Type
<b>Opt. Switch Matrix</b>	SMA (TX & RX) and SMP-Type (VSWR)
<b>User Interface Ports</b>	2×USB, LAN
<b>Frequency Stability</b>	± 2.5 ppm

**PIM Analyzer RF (Base Unit)**

<b>IM Order</b>	3 <sup>rd</sup> , 5 <sup>th</sup> , 7 <sup>th</sup> , 9 <sup>th</sup> , 11 <sup>th</sup> , 13 <sup>th</sup> , 15 <sup>th</sup> , 17 <sup>th</sup>
<b>Transmit frequency range (seamless)</b>	
<b>IM-R-BU-0722-150W</b>	698 ... 2200 MHz
<b>IM-R-BU-2127-150W</b>	2100 ... 2700 MHz
<b>Output Power</b>	26 – 52 dBm
<b>At Testport of 3dB coupled Filters</b>	23 – 46 ± 0.5 dBm
	Some special filters may have higher attenuation and possible output power is reduced automatically depending on hardware setup (see filter datasheet for details).
<b>Residual PIM</b>	< -128 dBm (> 171 dBc @ 2x +43 dBm) <- 132 dBm (> 175 dBc @ 2x +43 dBm) typ.
	Some special filters may have reduced PIM performance (see filter datasheet for details).
<b>PIM vs. Distance</b>	
<b>Accuracy / Resolution</b>	< 0.3 m, all bands Depends on number of PIM sources and accuracy of cable velocity factor down to -120dBm PIM, 0 – 150m
<b>Range</b>	Switchable between connected filter inserts via software
<b>Filter Units</b>	

**Isolation Measurement RF**

<b>Frequency</b>	Downlink frequency band of filter unit
<b>RF Output</b>	+23 - 46 ± 0.5 dBm
<b>RF Input</b>	+27 dBm max operating +30 dBm max no damage +50 VDC max no damage
<b>Isolation</b>	0 – 60 dB
<b>Accuracy</b>	1.5 dB
<b>Resolution</b>	0.1 dB

**VSWR / Return Loss RF**

<b>Frequency</b>	Downlink frequency band of filter unit
<b>VSWR</b>	1.10 – 20.00
<b>Return Loss</b>	1.00 – 25.00 dB
<b>Distance to VSWR fault</b>	
<b>Accuracy / Resolution</b>	0.2 m (typ.) Depends on number of mismatch sources and accuracy of cable velocity factor
<b>Range</b>	0 – 150 m

**PIM RACK ANALYZER  
BASE UNIT****IM-R-BU-0722-150W  
IM-R-BU-2127-150W****Spectrum Analyzer RF****Frequency  
Resolution Bandwidth  
Noise Floor  
Amplitude Accuracy  
RF Input**Uplink frequency band of filter unit  
120 Hz to 20 MHz RBW  
-135 dBm DANL at 1 kHz  
 $\pm 1.0$  dB typ.,  $\pm 1.5$  dB max  
-40 dBm max operating  
+10 dBm max no damage**Environmental****Operating Temperature Range  
Storage Temperature Range  
Relative Humidity  
Mechanical shock**-10°C to + 40°C  
-20°C to +80°C  
5% to 95% RH non-condensing  
1G**User Interfaces****Keyboard/USB-Memory  
Remote Control  
Reference  
Isolation  
Supply**2 × USB A connector (one each on front- and backpanel)  
1 × LAN, 1 × Micro-USB B connector  
1 × BNC 10 MHz  
Port 1: 7-16 Port 2: SMA-Type  
1x AC IEC C19

**Accessories**

	<b>Part Number</b>	<b>Description</b>
<b>Useful Accessories</b>	IM-R-ACSRY-Fil-BU	10 air filter mats for BaseUnit (420x375x15mm, Polyolefin, Filter class G2, Flammability F1)
	IM-R-ACSRY-Fil-FI	25 air filter mats for FilterUnit (130x45x15mm, Polyolefin, Filter class G3, Flammability F1)
	IM-R-HWO-ExtCtrl	External Control/Signalling Interface
	IM-R-SWO-CPRI	CPRI Software Option (requires HW Upgrade)
<b>Spare Parts</b>	60K408-800N1	7-16 Changeable Testport Connector
	64K401-800B1	4.3-10 Changeable Testport Connector
<b>Low PIM Adaptors</b>	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
	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 adapter
	60S164-S00N1	7-16 Male to 4.3-10 Male adapter
	60K164-S00N1	7-16 Female to 4.3-10 Male adapter
<b>PIM Standards</b>	60S110-KxxN1	-110dBm standard adapter (band specific) included with every filter unit
		xx: 07 LTE700; 08 DigDiv AMPS; 09 EGSM; 18 DCS; 19 PCS/AWS;
		21 UMTS; 26 LTE2600; other frequencies on request
<b>Low PIM Terminations</b>	60Z150-001	Low PIM termination (19" Rack type)
	60Z150-012	Low PIM termination (Benchtop type)
<b>Tools</b>	60W000-002	32mm torque wrench
	53W010-000	18mm torque wrench
	99W057-000	Adjustable flat wrench
<b>Test Cables</b>	LC02-186-4000	Test Cable 7-16 male / 7-16 male 4.0m
	LC02-186-1500	Test Cable 7-16 male / 7-16 male 1.5m
	LC02-188-4000	Test Cable 7-16 male / N male 4.0m
	LC02-188-1500	Test Cable 7-16 male / N male 1.5m
	SLJ12SP-60M64M-2.0m-00	Test Cable 7-16 male / 4.3-10 male 2.0m
	SLJ12SP-64M64M-2.0m-00	Test Cable 4.3-10 male / 4.3-10 male 2.0m

**Part Number designation**

**IM-R-xx-xxxx**

- **IM:** InterModulaton Analyzers
- **R:** Rack Analyzer
- **BU:** Base Unit
  - 0722-150W: 700-2200MHz Broadband Power Amplifier & Receiver, high power output
  - 2127-150W: 2100-2700MHz Broadband Power Amplifier & Receiver, high power output
- **FI:** Filter Insert
  - 07/B12-14-R: LTE700LU (ETSI Band12 to 14)
  - 08/B20-R: DigDiv (ETSI Band20)
  - 08/B5-R: AMPS(CDMA 800) (ETSI Band5)
  - 09/B8-R: EGSM (ETSI Band8)
  - 18/B3-R: DCS (ETSI Band3)
  - 19/B2+4-R: PCS + AWS (ETSI Band2 & 4)
  - 21/B1-R: UMTS (ETSI Band1)
  - 26/B7-R: UMTS II / LTE II (ETSI Band7)
  - xxxx-T Transmitted Models with -T suffix
- **MPX:SwitchMatrix** (User replaceable)
  - 6way: Switch Matrix with 6 ports for up to 6 connected filter inserts
  - 11way: Switch Matrix with 11 ports for up to 11 connected filter inserts
- **HWO:** HardWare Option
  - ExtCtrl: External Safety Control (Disable Amplifiers with some door contact etc.)
  - Conv-B71: Extends IM-R-BU-0722-150W to support 600 MHz Band
- **SWO:** SoftWare Option
  - VirtualFI: Virtual Cross Band Filters to combine existing Filters to measure cross band PIM
- **ACSRY:** Accessory
  - Fil-BU: Air inlet dust filter 10 filter mats 420x370x8mm (Polyolefin, Filter class G2, Flammability class F1 DIN53438)
  - Fil-FI: Air inlet dust Filter 25pcs Filter mats for Filter Units

**Order Number Example**

IM-R-BU-0722-150W	Base unit with broadband amplifier 700 -2700 MHz, receiver, fiber CPRI
IM-R-MPX-6way	Switch Matrix with 6 ports for up to 6 connected filter inserts
IM-R-FI-07/B12-14-R	Filter Insert for LTE700 Lower and Upper band (ETSI Band12, 13 & 14)
IM-R-FI-09/B8-R	Filter Insert for EGSM900 (ETSI Band8) Reversed IM
IM-R-FI-19/B2+4-T	Filter Insert for PCS + AWS (ETSI Band2+4) Reversed + Transmitted IM

While the information has been carefully compiled to the best of our knowledge, nothing is intended as representation or warranty on our part and no statement herein shall be construed as recommendation to infringe existing patents. In the effort to improve our products, we reserve the right to make changes judged to be necessary.

Draft	Date	Approved	Date	Rev.	Engineering change number	Name	Date
Kaindl B.	2016-10-12	Kaindl B.	2018-08-20	b01	25-0004	Kaindl B.	2025-08-04
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