Anritsu envision : ensure

IQ Fiber Master™

LTE RF over CPRI and PIM over CPRI

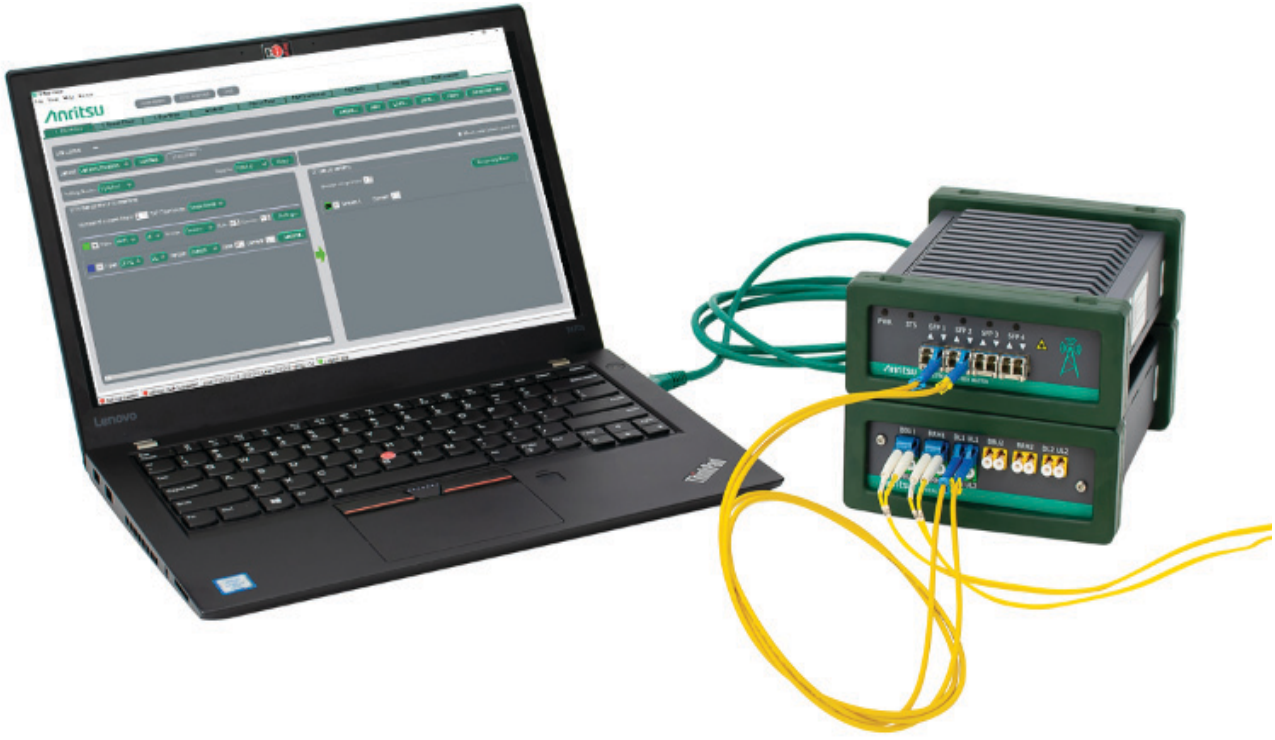
MT2780A

Introduction

PIM over CPRI and LTE RF over CPRI are ideal tools for troubleshooting interference and PIM issues in LTE networks from ground level by accessing the CPRI IQ data stream (uplink (UL) and downlink (DL)) between the Baseband Unit (BBU) and the remote radio head (RRH).

Capabilities and Functional Highlights

- LTE RF over CPRI measurements (Option 752): Provides a spectrum analyzer-like RF analysis from the IQ stream.
- PIM over CPRI measurements (Option 754): Provides a PIM over CPRI analysis from the IQ stream.
- PIM Analytics (Option 755): Provides analysis of the PIM data.



The IQ Fiber Master (top) and Optical Tap (bottom) devices

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MT2780A IQ Fiber Master MT2780A (Requires option 752)

Optical Inputs

Up to four Small Form Pluggable (SFP) transceivers
Supports Rate 1 to Rate 8 CPRI (SFP dependent)

Line bit rate 1	614.4 Mbit/s
Line bit rate 2	1228.8 Mbit/s
Line bit rate 3	2457.6 Mbit/s
Line bit rate 4	3072.0 Mbit/s
Line bit rate 5	4915.2 Mbit/s
Line bit rate 6	6144.0 Mbit/s
Line bit rate 7	9830.4 Mbit/s
Line bit rate 8	10137.6 Mbit/s

Rear Panel Connectors

VDC	Input voltage 12 VDC @ 2 A
Ethernet 1	PC connection
Ethernet 2 and 3	Daisy Chain additional MT2780A sensors
USB C	for future applications
USB B	for future applications

Power Requirements

Voltage	12 VDC from supplied AC adapter
Current	2 A
Power consumption	30 W

PC Requirements

	(minimum specifications)
Processor	Intel core i3-6100 or AMD FX4350 processor (recommended, Intel core i7)
RAM	8 GB of RAM (recommended 16GB)
Ports	Ethernet, USB C and USB 2.0
Operating System	Windows 7 (or higher, 64-bit only)

Regulatory Compliance

European Union	EMC 2014/30/EU, EN 61326:2013, CISPR 11/EN 55011, IEC/EN 61000-4-2/3/4/5/6/8/11 Low Voltage Directive 2014/35/EU Safety EN 61010-1:2010 RoHS Directive 2015/863
Australia and New Zealand	RCM AS/NZS 4417:2012
South Korea	KCC-REM-A21-0004

Environmental

Operating Temperature	0 °C to 45 °C (based on SFP specs)
Storage Temperature Range	–40 °C to 71 °C
Maximum Relative Humidity	95 % RH at 40 °C, non-condensing

Size and Weight

Size	185 mm x 133 mm x 55 mm (2.1 in x 7.3 in x 5.2 in)
Weight	1 kg (2.2 lb)

Warranty

Duration	Standard, 3-year on the sensor.

LTE RF over CPRI (Option 752) (Requires MT2780A)

General

Supported Vendors	ALU, Ericsson, Huawei, Nokia, Samsung
LTE Bandwidth	5 MHz, 10 MHz, 15 MHz, and 20 MHz

Measurements

Measurements	Spectral analysis of CPRI IQ streams, absolute or relative frequency LTE UL or DL

Setup Parameters

Auto-detect	CPRI parameter set-up support (detects CPRI line rate, LTE air std (5 MHz, 10 MHz, 15 MHz and 20 MHz BW), sampling and number of antenna ports) and AxC group
LTE Bandwidth	5 MHz, 10 MHz, 15 MHz, and 20 MHz (LTE5, LTE10, LTE15 and LTE20)
Plot	Up to six plots containing up to 12 AxC traces (up to 12 AxC traces in one plot or distributed across six plots)
Windowing	Rectangle, Hamming, Hanning, Bartlett, Blackman, Gaussian, Flat top
Axes	x-axis: center, span, auto-scale. y-axis: ref level, dB/div, number of divisions
Sweep	Normal, max hold, min hold, hold, average, # averages (1-100)
Resolution	Resolution Bandwidth (RBW) 117 Hz to 30 KHz, #FFTs 1024 to 262144, based on 30.72 MB/s CPRI data rate, will vary for other CPRI data rates
Markers	Markers 1 to 6, each with a Delta marker, marker-to-peak, marker-to-center, marker-to-ref, marker delta-to-span, also frequency, power, or combined marker
Traces	Normal, max hold, min hold, hold, average. Persistence, restart, add, and remove. Up to 12 simultaneous traces per plot or one per plot
Spectrogram	Waterfall feature, scalable from 25 to 75 % of display window

Frequency

Frequency Range	Supports all LTE bands (CPRI IQ is baseband information)

Measurement Update

Rate	100 ms / 10 frames per second typical (dependent on PC performance, number of streams, data volume to be transferred to PC)

Results

Spectrum plots can be exported as PNG (whole screen, center only or current plot)

PIM over CPRI (Option 754) (Requires option 752)

General

Supported Vendors	ALU, Ericsson, Huawei, Nokia, Samsung
LTE Bandwidth	5 MHz, 10 MHz, 15 MHz, and 20 MHz
MIMO Support	SISO, 1x2, 2x2, 2x4, 4x4

PIM Measurements

Supported PIM Configurations	Multiband dual carrier - IM3-5 Single carrier - IM3-5 Single carrier harmonic - H2, H3
PIM Power Level	PIM measurement in dB relative to thermal noise floor (measurements in dBm or dBsb)
PIM Power Level Accuracy	± 1 dB (typical) (RMS level of digital PIM power on CPRI). Absolute (dBm) PIM accuracy will depend on UL gain accuracy of RRH
PIM Power Level Range	–10 dB below to +50 dB above RRH thermal noise. (–112 dBm to –52 dBm for LTE10 RRH with 2.5 dB NF, typical,)
Measurement Time - Acquisition	One-minute (typical), subsequent measurements 4 seconds per UL (typical)

Setup Parameters

Advanced Settings	PIM Desensitization pass/fail limit (dB) Noise floor auto-calibration of RRH under test Measurement result units (dBm, dBFS)
LTE Bandwidth	5 MHz, 10 MHz, 15 MHz, and 20 MHz (LTE5, LTE10, LTE15 and LTE20)
IQ Fiber Master Status	Connected/disconnected, SFP status indication (LOS, LOF, CPRI data), internal temperature
Configuration Check	Color-coded, interactive, fiber diagram associated with each test scenario Rules-based check (editable by user): Optical connectivity, CPRI connectivity, IQ stream capture, RSSI/TSSI, bandwidth, and LTE ID TX configuration
Measurement State	Measurement process update (acquiring, measuring, switching UL)
UL Under Test	Cycle sequentially through all ULs Test ULs individually (UL1, UL2, UL3, UL4) against all DLs

Distance-to-PIM Measurements

Accuracy	±1m (typical) PIM 10 dB or more above UL noise, quiet channel, single PIM source
Calibration	Verified PIM source (PIM source; part number 2000-1982-R) required. Calibration reference is antenna radome
Range	0 to 1000 m (free space, typical)
Measurement Time	60 seconds per UL (typical)

Results and Reports

Report Header	Site, Operator, and instrument details (report saved in PDF format)
Configuration Check	Pass/fail with detail
Pass/Fail	Pass/fail. per UL, with internal/external indication and PIM level (dBm or dBFS)
Spectrum	UL spectrum and PIM spectrum per antenna branch
DTP (Distance to PIM)	Graph showing distance (from a calibration point) to dominant PIM source

PIM Analytics (Option 755)

(Requires options 752 and 754)

PIM Analytics Measurements

PIM vs. Time	Long-term monitoring function (limited only by available hard drive space). Provides daily report and graphs and summary report. Basic event report available (CSV format) for post-processing
PIM Distribution	CDF plot, depicting distribution of measurements exceeding predefined, editable threshold (percent) against PIM level (dBm)
PIM Daily	Histogram of percentage of measurements exceeding threshold against time-of-day (24 hour)
Heat Map	Visual matrix to highlight the dominant RF power source causing PIM at the cell site

Setup Parameters

Advanced Settings	PIM Desensitization pass/fail limit (dB) Noise floor auto-calibration of RRH under test Bandwidth: 5MHz, 10MHz, 15MHz, and 20MHz Measurement result units (dBm, dBFS)
IQ Fiber Master Status	Connected/disconnected, SFP status indication (LOS, LOF, CPRI data), internal temperature
Configuration Check	Color-coded, interactive, fiber diagram associated with each test scenario Rules-based check (editable by user): Optical connectivity, CPRI connectivity, IQ stream capture, RSSI/TSSI, bandwidth, and LTE ID TX configuration
Measurement State	Measurement process update (acquiring, measuring, switching UL)
UL Under Test	Cycle sequentially through all ULs Test ULs individually (UL1, UL2, UL3, UL4) against all DLs

Results and Reports

(Including all the PIM Analytics Measurements)

Report Header	Site, Operator, and instrument details (report saved in PDF format)
Configuration Check	Pass/fail with detail
Longterm Monitoring	Graph per 24-hour period. Summary report (maximum, minimum, and mean PIM level and occurrence and duration of maximum PIM level)
Pass/Fail	Pass/fail per UL, with internal/external indication and PIM level (dBm or dBFS)
Spectrum	UL spectrum and PIM spectrum per antenna branch

Optical 3-port Tap

Tap Wavelength Connectors

Single-Mode (SM) 2000-1977-R	1310/1550 nm
Multi-Mode (MM) 2000-1978-R	850/1300 nm
Optical split	50/50 optical split, 3 fiber taps
Fiber Standard	OS2 for SM Om3, 4, and 5 for MM

Size and Weight

Size	185 mm x 133 mm x 55 mm (2.1in x 7.3 in x 5.2 in)
Weight	0.75 kg (1.6 lb)

Ordering Information

Part Number	Description
MX280020A	IQ Fiber Master Control Software (no cost; download from Anritsu.com)
MT2780A	IQ Fiber Master (shown) (requires option 752, minimum)
MT2780A-0752	LTE RF over CPRI (requires MT2780A)
MT2780A-0754	PIM over CPRI (requires option 752)
MT2780A-0755	PIM Analytics (requires options 752 and 754)

Standard Accessories

Part Number	Description
2000-1979-R	SM Fiber Optic Cable Kit, 30 cm, Simplex
2000-1980-R	MM Fiber Optic Cable Kit, 30 cm, Simplex
2000-1371-R	Ethernet cable, 2 m
40-209-R	AC power supply (and adapters for local AC line outlets)

Optional Accessories

Part Number	Description
68-11-R	SFP+ (Optical Module), SM 10.5 Gbps, 1310 nm
68-12-R	SFP+ (Optical Module), MM 10.5 Gbps, 850 nm
68-16-R	SFP+ (Optical Module), SM 9.83 Gbps, 1310 nm
808-16-R	Fiber Optic Cable, 3 m, Duplex MM 1.6 mm LC/PC LC/PC 50 µm
808-17-R	Fiber Optic Cable, 3 m, Simplex MM 1.6 mm LC/UPC LC/UPC 50 µm
808-18-R	Fiber Optic Cable, 3 m, Ruggedized Simplex SM LC/UPC LC/UPC
808-19-R	Fiber Optic Cable, 3 m, Ruggedized Duplex SM LC/UPC LC/UPC
2100-29-R	Fiber Optic Cable, 3 m, Simplex SM LC/UPC
2100-30-R	Fiber Optic Cable, 10 m, Simplex MM LC-SC
2100-31-R	Fiber Optic Cable, 3 m, Duplex SM LC/UPC
971-14-R	Ferrule Cleaner, 2.5 mm SC
971-15-R	Ferrule Cleaner, 1.25 mm LC
971-16	Fiber Ferrule Cleaner
2000-1849-R	SFP 4-slot ESD Box
2000-1977-R	3-port SM 1310/1550nm TAP (includes 2000-1979-R) (shown)
2000-1978-R	3-port MM 850/1300nm TAP (includes 2000-1980-R)
2000-1982-R	PIM source
2000-1981-R	Hard transit case

Manuals

Part Number	Description
10580-00467	IQ Fiber Master User Guide

Training at Anritsu

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• **United States**

Anritsu Americas Sales Company
450 Century Parkway, Suite 190
Allen, TX 75013, U.S.A.
Phone: +1-800-Anritsu (1-800-267-4878)

• **Canada**

Anritsu Electronics Ltd.
700 Silver Seven Road, Suite 120
Kanata, Ontario K2V 1C3, Canada
Phone: +1-613-591-2003
Fax: +1-613-591-1006

• **Brazil**

Anritsu Eletronica Ltda.
Praça Amadeu Amaral, 27 - 1 Andar
01327-010 - Bela Vista - Sao Paulo - SP
Brazil
Phone: +55-11-3283-2511
Fax: +55-11-3288-6940

• **Mexico**

Anritsu Company, S.A. de C.V.
Blvd Miguel de Cervantes Saavedra #169 Piso 1,
Col. Granada
Mexico, Ciudad de Mexico, 11520, MEXICO
Phone: +52-55-4169-7104

• **United Kingdom**

Anritsu EMEA L td.
200 Capability Green
Luton, Bedfordshire, LU1 3LU, U.K.
Phone: +44-1582-433200
Fax: +44-1582-731303

• **France**

Anritsu S.A.
12 avenue du Québec, Bâtiment Iris 1- Silic 612,
91140 Villebon-sur-Yvette, France
Phone: +33-1-60-92-15-50
Fax: +33-1-64-46-10-65

• **Germany**

Anritsu GmbH
Nemetschek Haus, Konrad-Zuse-Platz 1
81829 München, Germany
Phone: +49-89-442308-0
Fax: +49-89-442308-55

• **Italy**

Anritsu S.r.l.
Via Elio Vittorini 129, 00144 Roma, Italy
Phone: +39-6-509-9711
Fax: +39-6-502-2425

List Revision Date: 20191126

• **Sweden**

Anritsu AB
Isafjordsgatan 32C
164 40 Kista, Sweden
Phone: +46-8-534-707-00

• **Finland**

Anritsu AB
Teknobulevardi 3-5
FI-01530 Vantaa, Finland
Phone: +358-20-741-8100
Fax: +358-20-741-8111

• **Denmark**

Anritsu A/S
c/o Regus Fairway, Arne Jacobsens Allé 7, 5th floor,
2300 Copenhagen S, Denmark
Phone: +45-7211-2200

• **Russia**

Anritsu EMEA Ltd.
Representation Office in Russia
Tverskaya str. 16/2, bld. 1, 7th floor
Moscow 125009, Russia
Phone: +7-495-363-1694
Fax: +7-495-935-8962

• **Spain**

Anritsu EMEA Ltd.
Representation Office in Spain
Paseo de la Castellana, 141.
Planta 5 Edificio Cuzco IV
28046 Madrid, Spain
Phone: +34-91-572-6761

• **United Arab Emirates**

Anritsu EMEA Ltd.
Dubai Liaison Office
902 Aurora Tower
P O Box: 500311- Dubai Internet City
Dubai, United Arab Emirates
Phone: +971-4-3758479
Fax: +971-4-4249036

• **India**

Anritsu India Private Limited
6th Floor, Indiqube ETA, No.38/4
Adjacent to EMC2, Doddanekundi, Outer Ring Road
Bengaluru 560048, India
Phone: +91-80-6728-1300
Fax: +91-80-6728-1301

• **Singapore**

Anritsu Pte. Ltd.
11 Chang Charn Road, #04-01, Shriro House
Singapore 159640
Phone: +65-6282-2400
Fax: +65-6282-2533

• **P.R. China (Shanghai)**

Anritsu (China) Co., Ltd.
Room 2701-2705, Tower A
New Caohejing International Business Center
No. 391 Gui Ping Road
Shanghai 200233, P.R. China
Phone: +86-21-6237-0898
Fax: +86-21-6237-0899

• **P.R. China (Hong Kong)**

Anritsu Company Ltd.
Unit 1006-7, 10/F.
Greenfield Tower, Concordia Plaza
No. 1 Science Museum Road
Tsim Sha Tsui East, Kowloon
Hong Kong, P.R. China
Phone: +852-2301-4980
Fax: +852-2301-3545

• **Japan**

Anritsu Corporation
8-5, Tamura-cho, Atsugi-shi, Kanagawa, 243-0016
Japan
Phone: +81-46-296-6509
Fax: +81-46-225-8352

• **South Korea**

Anritsu Corporation, Ltd.
5FL, 235 Pangyoyeok-ro
Bundang-gu, Seongnam-si
Gyeonggi-do 13494, South Korea
Phone: +82-31-696-7750
Fax: +82-31-696-7751

• **Australia**

Anritsu Pty. Ltd.
Unit 20, 21-35 Ricketts Road
Mount Waverley, Victoria 3149, Australia
Phone: +61-3-9558-8177
Fax: +61-3-9558-8255

• **Taiwan**

Anritsu Company Inc.
7F, No. 316, Sec. 1, NeiHu Rd, Taipei 114, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817