MON 210 1F/2F

MANUAL

UL. SCHUBERTA 104, 80-175 GDAŃSK, POLAND
PHONE: +48 58 3823 309, E-MAIL: handlowy@telmor.pl WWW.TELMOR.PL

Contents

1. Basic information 3
2. MON-210 types 3
3. Fiber installation 4
3.1. Optical return transmitters 5
3.1.1. Installation of optical units 5
4. POWERING NOTE 5
4.1. Common precautions: 5
4.2. Mains supply: 195...253V AC 6
4.3. Remote supply: 28...90V AC 6
5. Fiber management 6
6. Features 7
6.1. Diplex filters 7
5.2 Table of frequencies configuration depending on used DPF mode and MON-210 type: 7
7. Setting the forward and return path. 8
7.1. Main board overview: 8
7.2. Forward path 8
7.3. Return path 9
7.4. Return path Ingress Switch (IS) 9
7.5. Ingress filter (High pass filter) 10
7.6. Transmitter mode settings – RfoG (burst mode) 10
8. TIP functionality – remote management 10
9. NPR 11
10. Block diagrams 11
11. Technical parameters – table 12
12. Standards conformity 13
13. Final notes 14

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1. Basic information

The MON-210 can be installed either into a street cabinet or to the outdoor environment. The fibre node should be installed vertically so that the external cable connectors and ventilation hole are underneath, securing the housing with three mounting brackets. When positioning the amplifier in its final location, make certain that it has adequate ventilation on all sides. In particular, it is necessary to provide at least 100 mm of room above the amplifier for air circulation. The lid opens is lifted and separate from base. Before closing the lid ensure that:

- nothing is trapped between the lid and the case
- all case gaskets are in their correct positions
- lid seats evenly on the rubber gasket

To ensure appropriate ventilation, keep any items at least 5 cm away from the unit.

- Don't cover the unit with items such as newspapers, tablecloths, curtains, etc.
- Do not place any sources of open flame (such as burning candles) or strong heat near the unit.
- Do not put any containers with fluid on top of or near the unit.

Using 4 mm allen key, the lid retaining bolts are fasten in a diagonal sequence with a tightening torque of 3 Nm. The class of enclosure is IP54 when correctly installed and tightened. Node housing should be grounded with at least 4 mm2 grounding wire (Cu) from a proper earth to the grounding point.

The **MON-210** node has three dedicated cable connection points: one input for fibre entry and two coaxial RF ports. All coaxial outputs are F-type. Tighten the F connector with force no higher than 3nm.

The node accepts up to two fiber cables. These cables carry forward path and return path optical signals. When feeding the optical cable into the node, a suitable PG11 threaded feed-through adapter type D2 is available. The D2 adapter provides weather-tight entry for the fibre optic cables to enter the housing.

2. MON-210 types

The are 2 main types of MON-210:

1) MON-210 1F
   Version 1F has an integrated transceiver laser diode. It means that both, signal reception and transmission are transferred by one fiber connection. Node can receive optical signal that is transmitted on 1550nm +/- 10nm or 1310nm +/- 10nm wavelength.
   Transmission is made on other, specified wavelength that is in no collision to received signal.
   Wavelengths markings are specified on cover label and on serial number sticker that is located on side of the base.

   Example:

   

   1310nm is the receiver wavelength and 1550nm is the transmission wavelength

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2) MON-210 2F

Version 2F has a separate receiver module and transmission module.

Receiver module is mounted on board and can receive wide range of wavelengths (1100-1650nm).

Transmitter module is a plug-in that needs to be inserted in dedicated socket. Dedicated transmitter modules are OTBM plug-ins available separately.

3. Fiber installation

Fiber installation is a critical procedure and it should be done with carefulness. Incorrect handling of the fibers can result in damage and degraded performance.

Cleaning the fiber connectors:

• For correct optical operation ensure that all optical connectors are cleaned immediately before mating using a suitable optical connector cleaning kit.

• If a cleaning kit is not available, wipe the end of the connector using pure isopropyl alcohol (99%) and a lint-free wipe. Dry it with filtered compressed air. Wait until dry to insert connector into the adapter.

• When fiber optic connectors are unmated, the optical fiber end faces must be protected from contamination using suitable dust caps.

Contamination of fiber end faces will reduce the performance of the optical fiber and could ultimately cause failure of the system. Contamination could also damage the fiber end faces when the connectors are mated.

DANGER! Do not look into the optical connector of the return transmitter with power applied. Laser light, visible or invisible, can seriously injure eyes or even cause blindness.

The optical receiver is integrated within the MON 210 and accepts both 1310 and 1550 nm wavelength optical inputs. The optical receiver provides led indicator test for received optical power to quickly determine status of the unit.

Optical input power led description:

- Red Optical input power is above high major alarm limit (default 0 dBm).
- Yellow Optical input power is below low AGC limit (-6dBm).
- Green Optical input power is within the nominal range (-6..0dBm).

3.1. Optical return transmitters

There are a variety of options for transmitter modules available for the return path – line of products is called OTBM and fits most Telkom-Telmor's optical nodes.

The return path transmitters are available either in 1310 nm or 1550 nm DFB versions, output power 3dBm.

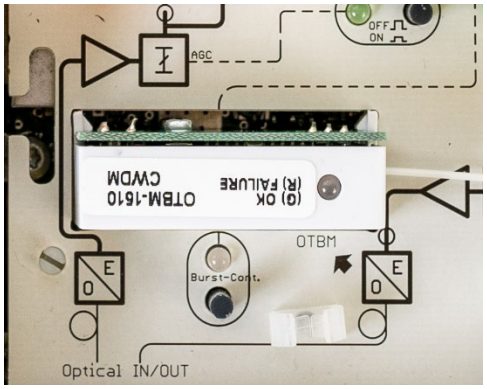
OTBMs can be delivered with CWDM transmitters. The CWDM lasers deploy 16 wavelengths in range of 1290..1610 nm with 3dBm optical output power.

There is a OTBM 1310nm FP version of transmitter with 0dBm output power.

The wavelength is marked on the product label, both on top and on a side.

3.1.1. Installation of optical units

Insert the unit by pressing it gently into place. The unit will fit only in one orientation. There is no need to switch off the supply voltage during module installation. In 1F version transceiver laser diode is already placed on board and no additional transmitter is needed, therefore there will be no socket on board.



4. POWERING NOTE

To reduce the risk of electric shock, do not remove the shielding cover of the power supply unit if it is connected. All electrical installations must be carried out by authorized and competent technicians in accordance with the national or regional electrical regulations.

4.1. Common precautions:

- The MON-210 node is intended for installation in restricted access locations (dedicated equipment rooms, equipment closet, or the like)
- Operate the device only on the specified supply voltage.
- Never touch live parts.
- Disconnect the power cord by the connector only. Never pull on the cable portion of the power cord.
- Do not place or drop heavy or sharp-edged objects on the power cord.

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- The power must be disconnected when installing or removing the MON-210.
- The MON-210 has no separate power switch thus the power plug must be easily accessible.

4.2. Mains supply: 195...253V AC

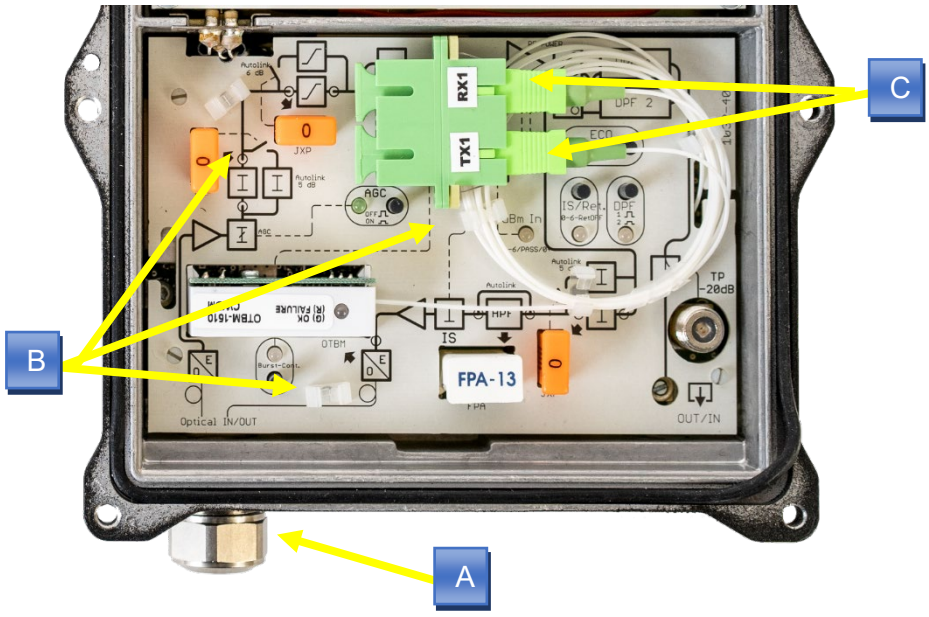
The locally powered MON-210 is connected to the main voltage of 220-230V AC via its own power cord. The power supply is double shielded and does not require separate grounding. However, ensure that the housing of the MON-210 is properly connected to the earth in order to meet safety requirements. Proper grounding will also improve protection from the effects of interference and thus increase the overall reliability of the system.

4.3. Remote supply: 28...90V AC

The supply voltage of the remote powered MON-210 is supplied via coaxial cables (max. 2A / port) or directly to the AC input. Both power inputs are protected with fuses.

5. Fiber management

Below (on picture) you will find an example of fiber layout. All cables should be delicately placed in dedicated holders that are mounted on a lid.



A) Fiber input
B) Fiber holders
C) Fiber adapters

Receiver adapter is market as RX1 and transmitter adapter is marked as TX1.

In 1F version of MON-210 there is just one fiber connection needed.

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6. Features

6.1. Diplex filters

Each version of MON-210 node is equipped with diplex filters mounted on board. The configuration of primary and secondary filters is specified in device lid.

For example: **MON-210-2F MV/Z or MON-210-2F PV/S**

MV

M stands for: 65/85MHz diplex filters (primary, default)
V stands for: 204/256MHz diplex filters (secondary)

P1V

P1 stands for: 85/110MHz diplex filters (primary, default)
V stands for: 204/256MHz diplex filters (secondary)

Switching between those filters can be done by local button or remotely by TIP communication command sent from HDTIP or TIP URC.

Green LED – DPF 1 (primary)

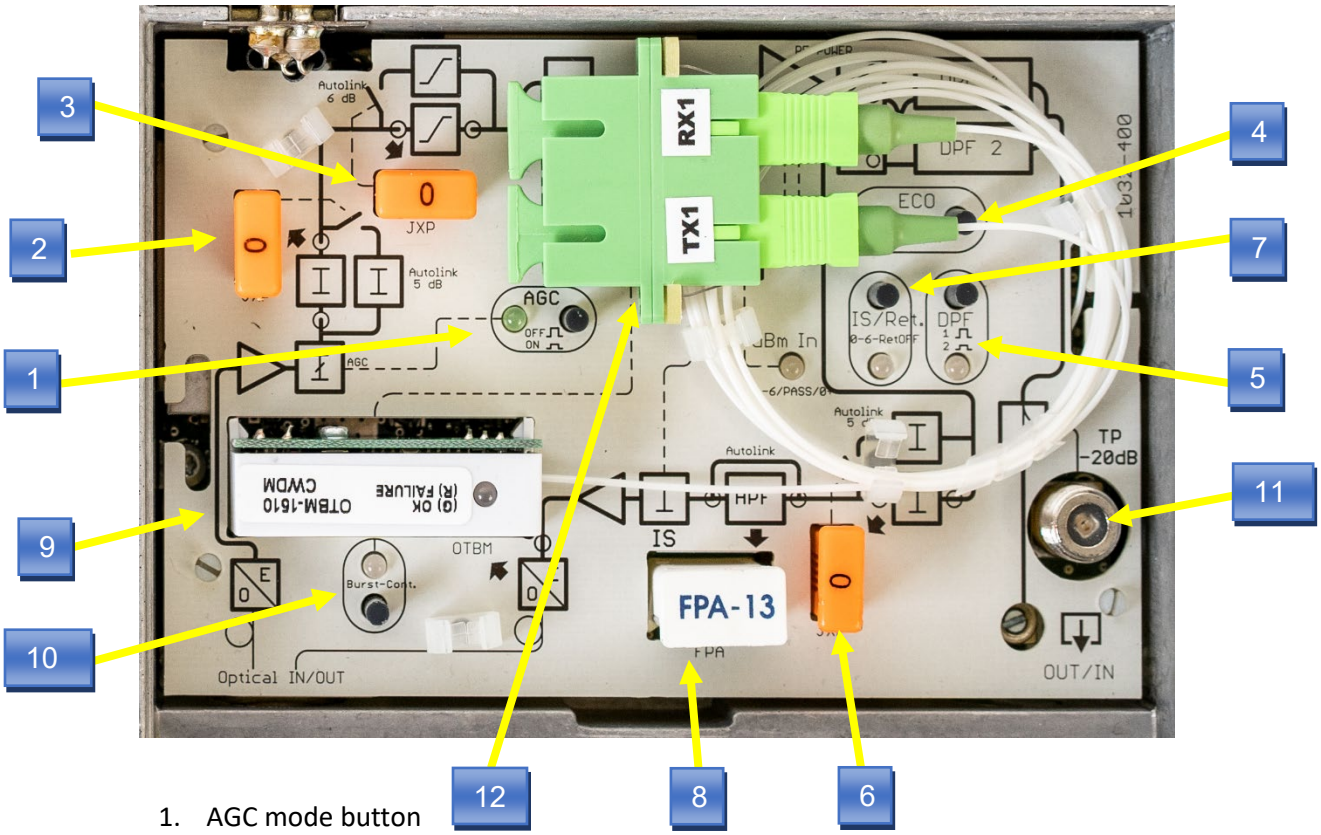
Yellow LED – DPF 2 (secondary)

5.2 Table of frequencies configuration depending on used DPF mode and MON-210 type:

DPF type	Downstream frequencies	Upstream frequencies
M - 65/85	85-1218MHz	5-65MHz
P1 - 85/110	110-1218MHz	5-85MHz
V - 204/256	256-1218MHz	5-204MHz

7. Setting the forward and return path.

7.1. Main board overview:



1. AGC mode button
2. Input Attenuator socket – A1
3. Input Equalizer socket – E1
4. Eco mode switch (ON/OFF) button
5. DPF switch (1/2) button
6. Return path attenuator socket – A2
7. Ingress switch button
8. HPF socket
9. Laser transmitter socket
10. Burst mode ON/OFF button
11. TP socket
12. Optical TX (output) and RX (input) connector adapters

7.2. Forward path

The input and output amplifier stages are both based on high performance solutions which allow the user to set MON-210 outputs for high output levels. The output stage uses a GaN

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hybrid module to improve RF performance over the entire 85 to 1218 MHz pass band. Note that MON-210 must have a proper matching at output port to ensure optimal and reliable operation.

Forward path gain control

MON-210 has build in AGC module to ensure possible best stability of incoming signals.

AGC can be turned ON and OFF depending on requirement of cable operator. Setting can be done locally by pressing AGC button. When green LED light is on – the AGC is ON. When LED is off then AGC is off.

To set a desired RF output level we need to use JXP plugin attenuator with desired attenuation value. Attenuation can be set from 0 to 20dB.

Forward path slope control

To set a desired slope level we need to use JXP plugin attenuator with desired attenuation value. Slope can be set from 0 to 20dB.

Slope value is the difference of signal levels between 85MHz and 1218MHz. For example 10dB attenuation module will set 85MHz output level 10dB lower than 1218MHz.

All JXP plugin type sockets have autolink functionality. That means when you take off the JXP plugin there will be a bypass value turned on. For attenuation it is 5dB and for slope it is 6dB. Values can be different – always check the lid for proper value.

7.3. Return path

Return path gain control

To set a desired return path RF output level we need to use JXP plugin attenuator with desired attenuation value. Attenuation can be set from 0 to 20dB. This socket has also autolink functionality with 5dB attenuation value.

7.4. Return path Ingress Switch (IS)

Ingress switch can be used to attenuate return path or to cut it off completely. To do that locally we need to press the IS button. There are 3 values than can be set: 0db, -6dB, Ret OFF.

0dB (green led) – default value – no attenuation

-6dB (red led) – 6dB attenuation

RetOFF (led off) – return path cutoff – no signal will be transmitted, OTBM transmitter will be turned off.

7.5. Ingress filter (High pass filter)

FPA socket that can be filled with FPA plugin. The most common one is FPA-17.

This plugin filter attenuates frequencies lower than 17MHz. FPA plugin is not required for proper node functionality. If no plugin will be inserted then there will be a bypass path tuned on.

7.6. Transmitter mode settings – RFoG (burst mode)

Laser transmitter can work in two modes: Burst Mode and Constant Wave mode.

1) Burst Mode

Laser transmission is turned on only when return path RF signal level reaches certain point. In this case it's 75dBµV (according to ANSI / SCTE 174).

2) Constant Wave – continuous mode transmission

Laser is turned on all the time, even if there are no signals transmitted in return path or signal level is lower than 75dBµV.

8. TIP functionality – remote management

MON-210 is equipped with TIP receiver. Default reception frequency - 822MHz. That receiver allows to accept control signals. Node however cannot send any signals back to headend (HDTIP) or TIP URC.

Functionality than can be set by TIP:

Function	Description
Diplex filter switch	Setting the A or B DPF mounted on board
Eco mode	Maximum output power reduction in forward path (-2dB according to CENELEC 42), 2W less power consumption
Ingress Switch	Return path input level reduction, -6dB
Laser transmission mode	Switching between burst and continuous laser transmissions modes

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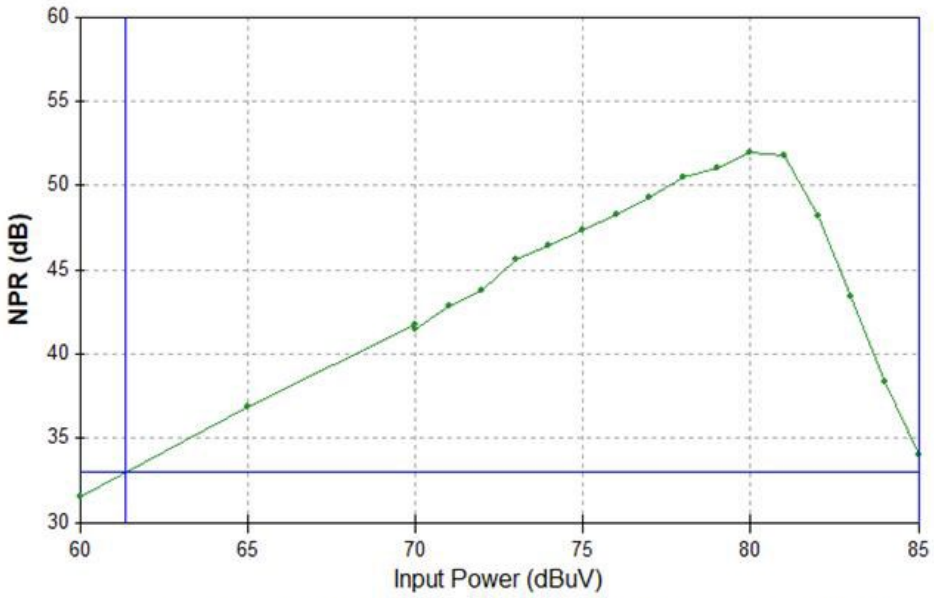
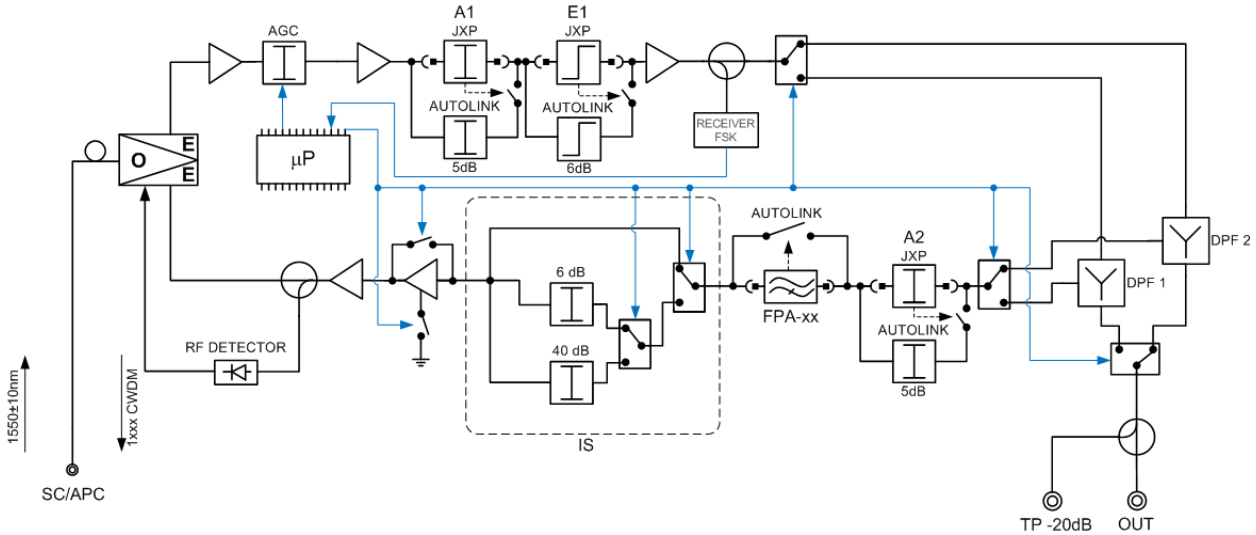
9. NPR



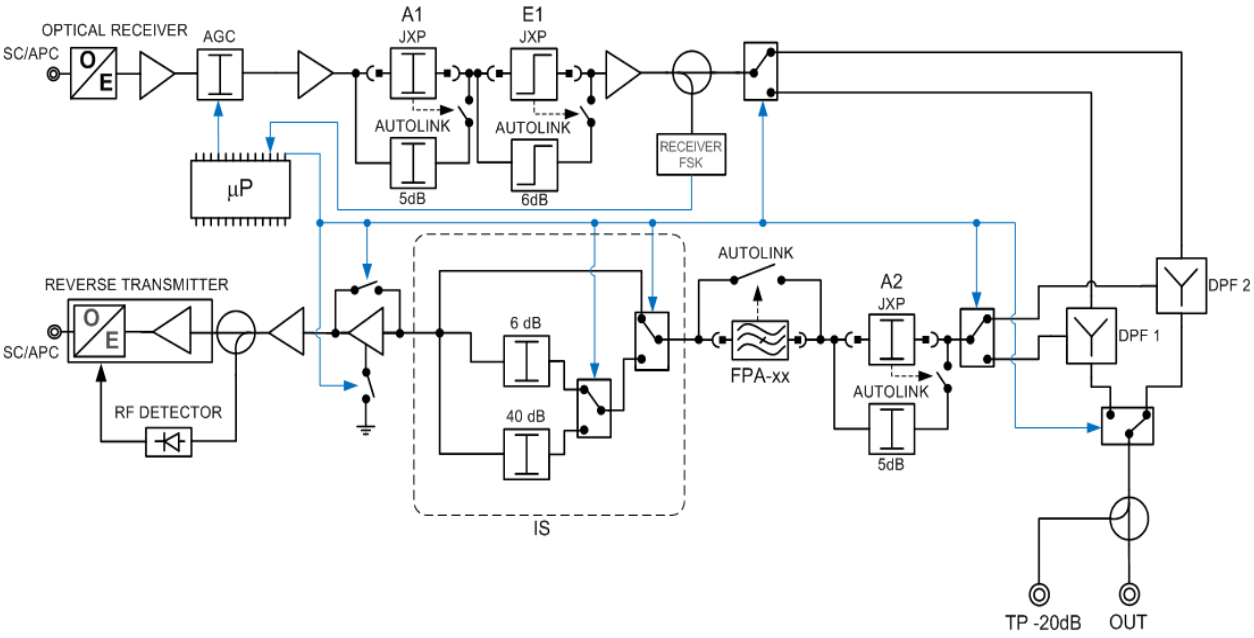
Date saved :	02/02/21	Maximum NPR :	80.0 dBuV Input
Test Name :	Sample		52.0 dB NPR
Technician :	PH	Spec Limit :	33.0 dB
DUT Model :	MON-210-2F/S	Min Passing :	61.4 dBuV
DUT Serial# :		Max Passing :	85.0 dBuV
Freq range :	5:65 MHz	Dynamic Range :	23.6 dB

10. Block diagrams

A) 1F version



B) 2F version



11. Technical parameters – table

PARAMETERS		MON-210-2F	MON-210-1F
FORWARD PATH			
Input level range	dBm	-9...+2	
AGC range	dBm	-6...0	
Optical return loss	dB	>40	
Optical input wavelength	nm	1210..1650	1540..1560
Equivalent input noise current	pA/√Hz	<7	
Optical connector	/	SC/APC	
Frequency range	MHz	54,85,102,110,256…1218	
Flatness	dB	±0,75	
Max. output level (CENELEC 42; EQ=0dB)	dBµV	108 (106 with) ECO ON	
Output test point	dB	-20±1	
Return loss at RF otput	dB	18@40MHz-1,5dB/ oct.	

RETURN PATH			
Frequency range	MHz	5…45,65,85,204	
Flatness	dB	±0,75	
Laser transmitter type	/	OTBM (plugin)	BOSA (fixed)
OTHERS			
Power supply	V_{DC} / Hz	180…253/ 50-60	
		25…65/ 50-60	
Power consumption	W	<13W	
Minimum signal level for laser switch on (burst mode)	dBµV	75±1	
Connector	/	F (75Ohm)	
Operating temperature	°C	-20…+55	
Weight	kg	1,1	
Dimensions	mm	155x155x75	
Package	/	box	
Optical output wavelenght	nm	1270..1610 CWDM	
Optical output power	dBm/mW	3/2	

12. Standards conformity

MON-210 1F and 2F is in conformity with the following standards:

EN 60728-11:2017
Cable networks for television signals, sound signals and interactive services
Part 1: Safety
EN 62368-1:2014+AC:2015
Audio/video, information and communication technology equipment
Part 1: Safety requirements (IEC 62368-1:2014, modified)
EN 50083-2:2012+A1:2015
Cable networks for television signals, sound signals and interactive services
Part 2: Electromagnetic compatibility for equipment
EN 61000-3-2:2014
Electromagnetic compatibility (EMC) - Part 3-2: Limits for harmonic current emissions (equipment input current up to and including 16A per phase)
EN 61000-3-3:2013
Electromagnetic compatibility (EMC) - Part 3: Limits - Section 3:
Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current up to 16A per phase

following the provisions of Directives:

Directive 2014/30/EU of the European Parliament and of the Council (EMC Directive)
Directive 2014/35/EU of the European Parliament and of the Council (Low Voltage Directive)
Directive 2011/65/EU of the European Parliament and of the Council (RoHS Directive)

13. Final notes

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According to this directive the electrical or electronic equipment may not be treated as household waste but should be referred to a proper collection facility for recycling and recovery.

Proper handling of waste equipment helps prevent potential adverse effects on the natural environment and human health.

Contact your local authority for more details on the recycling and recovery of electronic materials in this product.

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