

Operating Instructions

ATMOS LS 31 LED

English



CE

GA1GB.150304.0

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1 Introduction

1.1 Notes on operating instructions



These operating instructions contain important notes on how to operate the ATMOS LS 31 LED safely, correctly and effectively.

The instructions are intended for the training and teaching of operating personnel and are intended as a reference. Reproduction, even partial, is only permitted with written permission from ATMOS.

These operating instructions must always be kept available near the device.



Care, period tests, regular cleaning and proper application are indispensable. They guarantee the operational safety and usability of the ATMOS LS 31 LED.

Maintenance, repairs and period tests may only be carried out by persons who have the appropriate technical knowledge and are familiar with the product. To carry out these measures the person must have the necessary test devices and original spare parts.



Read Chapter „2 Hints for your safety“ on page 7 before using the device for the first time. This helps you avoid potentially dangerous situations.

The product ATMOS LS 31 LED bears CE marking CE according to the EC Directive of the council for medical products 93/42/EEC and meets the basic requirements of Appendix I of the directive.

The product ATMOS LS 31 LED complies with all applicable requirements of the Directive 2011/65/EC restricting the use of certain hazardous substances in electrical and electronic equipment (“RoHS”).

The declaration of conformity and our general standard terms and conditions can be obtained on our website at www.atmosmed.com.







The quality management system at ATMOS has been certified according to international standards EN ISO 13485.

These operating instructions are valid for the following devices:

















- ATMOS LS 31 LED 507.4800.0
- ATMOS LS 31 LED Assembly module ATMOS S 61 Servant 531.2100.0

1.2 Explanation of pictures and symbols

In the operating instructions

 DANGER	Warning of a danger which causes immediate death or serious injury. Observe the necessary measures.
 WARNING	Beware of a danger which can cause death or serious injury. Observe the necessary measures.
 CAUTION	Beware of a danger which can easily hurt you. Observe the necessary measures.
ATTENTION	Indication of a danger where the product or other items can be damaged. Observe the necessary measures.
 Warning of a danger which can cause death or serious injury.	
 Information regarding possible material damage which can be caused.	
 Useful information on the handling of the device.	
1. Action. Go step by step	
. Result of an action.	

On device and type plate

 Follow operating instructions (blue)	 Observe operating instructions
 This product complies with the relevant requirements of the EU Directives	SN Serial number
 Manufacturer	 Manufacturing date
 Potential equalization	 Application part type BF
 Alternating current	 Fuse
 On, connected to the power supply	 Off, disconnected from the power supply
 Increase colour temperature (Light becomes whiter)	 Reduce colour temperature (Light becomes more yellow)
 Adjust colour temperature	 Signal input and signal output
 Do not dispose in the household waste	

1.3 Intended use

Product name:	ATMOS LS 31 LED
Main functions:	LED cold light source for optical instruments. Provides adjustable color temperature and includes an external trigger function.
Intended purpose:	Illumination of natural orifices for diagnosis (e.g. ear/nose/throat).
Intended Users/User profile:	Doctors and medical specialists.
Intended patient population:	All patients without restrictions.
Medical conditions to be diagnosed, treated or monitored:	Diagnostic examination of anatomy of all kinds.
Application organ:	No restrictions (mainly ear, nose, throat).
Application time:	< 60 min
Application sites:	Outpatient medical facilities, e.g. ENT practices, hospital outpatient departments, medical care centers.
Patient selection criteria:	None
Indications:	Light source may be used along with other instruments for visual inspection of anatomy.
Medical contra-indications:	None
Warnings:	None
The product is:	<input checked="" type="checkbox"/> active <input type="checkbox"/> non active
Sterility/specific microbial status:	Not sterile
Single use product/reprocessing:	No single use product. Reprocessing according to instructions for use.

1.4 Function

Fanless high-performance LED light source (passive cooling) as a table device with a light output. Optionally light conductors from different manufacturers can be used via adapters. Continuous operation with the option for colour temperature

adjustment. Preferably in combination with the ATMOS Strobe 21 LED for a stroboscopic examination of the larynx. Flash and pilot light for vocal folds diagnostics via triggering with the stroboscope.

- Luminous intensity 150kLux at a distance of 5 cm to a high-performance light conductor end.
- Continuous operation with passive cooling, no noise emission
- Extremely long service life by LED technology (up to 50,000h)
- Colour temperature adjustable from 5.500 to 6500 K \pm 10 % in permanent light operation as well as in the externally controlled stroboscopy.
- Flexible adapter system, applicable on all common makes (ATMOS/Storz, Wolf, Olympus, Pentax, ACMI)
- Mains connection 100-240 V~ \pm 10 %, 50/60 Hz.
- Flash frequency 70 to 1000 Hz „Continuous light“.
- Duty cycle max 20 %

1.5 Intended users

Trained specialists for the medical endoscopy. Specialists for otolaryngology for the stroboscopic larynx examination. The operation and application may only be performed by trained and qualified staff.

1.6 Scope of delivery



ATMOS LS 31
LED



Power supply
cord



Storz adapter



Operating
Instructions

1.7 Transport and Storage

Only transport the device in a shipping carton, which is padded and offers sufficient protection.

If damage occurs during transport:

1. Document and report the transport damage.
2. Send the device to ATMOS, see Chapter „6.4 Sending in the device“ on page 16.

Environmental conditions for transport and storage:

- Temperature: -20 to +80 °C
- Relative air humidity: 30 to 95 % without condensation
- Air pressure: 500...1060 hPa

2 Hints for your safety

The safety of the ATMOS LS 31 LED complies with all the recognized rules of technology and the Directives of the Medical Devices Act.

Read and follow the safety instructions carefully before using the product.

2.1 General safety information

Only use accessories and options, which are specifically suited for combination with the product and which meet the performance and safety requirements.

If you wish to connect more than one device or application part, you must always observe their safety instructions.

Please ensure that the light source is illuminated even if there is no light conductor connected.

2.2 Dangers for users, patients and third parties

Protect yourself against an electric shock!

Burns and cardiac arrhythmia and even death are possible.

- Disconnect the device from the mains before cleaning or disinfecting it.
- Prior to each use check whether the device is damaged. Do not operate the device if you notice any damage. In this case, clean and disinfect the device and send it to ATMOS for repair.
- Only connect the device to a power supply with a protective conductor.
- Never touch the device's interfaces and the patient at the same time!
- Only use original accessories and original spare parts from ATMOS.
- Please pay attention to the period tests in chapter „6.1 Period tests“ on page 15.
- Do not change the device without the manufacturer's permission.
- Assembly, repairs, modifications and period tests may only be carried out by authorized persons.

Danger of blinding due to the high light intensity.

Eye injury is possible. People without blink reflex or with particular light sensitivity could go blind.

- Never look directly into the light source or light conductor.
- Never direct the light source into the patients eyes
- Never permit the patient to look into the light source or light conductor.
- The light source may only be operated by qualified personnel.

Heat development on the light source.

Burns are possible.

- Pay attention to the heat development of the light source.
- Switch off the light source when not in use.
- Do not touch the connection for the light conductor adapter.
- Do not place the product in a closed environment or beside other heat sources.

The device must always be functional.

Your patient could be injured during the treatment as a result of a missing diagnosis or light failure.

- ATMOS always recommends having an alternative light source ready to hand.

- Prior to each use a function check has to be performed.
- Please observe the notes on electromagnetic compatibility (EMC) of the device.

Explosion and fire hazard!

Burns and injuries are possible.

- Never operate the device in explosion-hazardous areas or areas which are oxygenated.
- Only use original accessories and original spare parts from ATMOS.

Only a fully functional product meets the safety requirements of users, patients and third parties. Please therefore read the following instructions carefully.

2.3 Damage to the device

Storage and operation in an unsuitable environment.

The electronics could be damaged.

- Please observe the ambient conditions regarding transport, storage and operation.

3 Setting up and starting up

3.1 Device overview

Front view



- ❶ Controller COLOUR TEMPERATURE
- ❷ Connection ADAPTER
- ❸ ON/OFF key

Rear view



- ❹ Connection F I/O for ATMOS Strobo 21 LED
- ❺ Connection mains cable
- ❻ Fuses
- ❼ Connection equipotential bonding

3.2 Use with other devices

Only qualified personnel may install electrical systems. The manufacturer of a medical electrical system is responsible for ensuring that performance, installation and commissioning, safety, specifications and intended use of the ATMOS LS 31 LED are not affected.

Observe the following information when connecting the device in the required combination:

- Refer to the specifications of IEC EN 60601-1 on medical electrical systems.
- Note in particular the information on the patient environment, multiple sockets and leakage current.

3.3 Connecting the device

CAUTION

Light failure during a treatment.

Your patient could be injured.

- Only connect a stroboscope from ATMOS.
- Only use the provided interlink cable or an original spare part from ATMOS.

Heat development on the light source.

Burns are possible.

- Do not place the product in a closed environment or beside other heat sources.

Carefully read the safety instructions in chapter „2 Hints for your safety“ on page 7 before using the product.

Transport damage


1. Check the device for any transport damage.
2. If the device is damaged: Document and report the transport damage. Send the device to ATMOS, see Chapter „6.4 Sending in the device“ on page 16.



Connect the adapter

1. Insert a suitable adapter to the connection adapter.

Connect a stroboscope

1. Refer to the guidelines for medical electrical systems in Chapter „3.2 Use with other devices“ on page 9.
2. Connect the ATMOS Strobe 21 LED as follows:

Type of stroboscope	Connection
ATMOS Strobe 21 LED with date of production up to 2016-09	<p>Trigger cable 507.4837.0 (Y-cable): Connection F I/O 1 1 to the connection microphone 2 and connection F-Out 3.</p>  <p>ATMOS LS 31 LED</p> <p>ATMOS Strobe 21 LED, up to 2016-09</p>

Type of stroboscope	Connection
ATMOS Strobo 21 LED with date of construction from 2016-10	Trigger cable 507.4838.0 Connection F I/O 1 ❶ to connection F I/O ❷. <div style="display: flex; justify-content: space-around; align-items: flex-end; margin-top: 10px;"> <div style="text-align: center;">  <p>ATMOS LS 31 LED</p> </div> <div style="text-align: center;">  <p>ATMOS Strobo 21 LED, from 2016-10</p> </div> </div>

Equipotential bonding and power supply

1. Connect the equipotential bonding if required.
 - ☞ The equipotential bonding must be connected if the spatial environment in which the product is used requires this. Refer to the specifications of IEC EN 60601-1.
2. Check that the mains voltage and device voltage match.
 - ☞ The device's details can be found on the type plate.
3. If the mains voltage and mains frequency correspond: Connect the device with the supplied mains cable to a power supply with a protective conductor.
4. Perform a function check, see Chapter „6.2 Function check“ on page 15.

4 Operation

4.1 Ambient conditions during operation

- Temperature: +10 to +35 °C
- Relative air humidity: 30 to 95 % without condensation
- Air pressure: 700...1060 hPa

4.2 Switch on the device

☞ Prior to each use perform a function check, see chapter „6.2 Function check“ on page 15.

1. Press the button ON / OFF.
 - » The light source is illuminated.

4.3 Switch off the device

1. Press the button ON / OFF.
 - » The light source is no longer illuminated.

4.4 Connect a light conductor

1. Switch off the device.
2. Insert the light conductor to the adapter, until it engages easily.

4.5 Remove the light conductor

1. Switch off the device.
2. Remove the light conductor from the adapter.

4.6 Adjust the colour temperature

1. Turn the controller COLOUR TEMPERATURE.
 - ☞ Turn it clockwise and the light becomes whiter or anti-clockwise and the light becomes more yellow.
2. If a camera is connected perform a white balance.

4.7 Change the adapter

1. Switch off the device.
2. Remove the light conductor from the adapter.
3. Unscrew the adapter from the adapter connection.
4. Insert the desired adapter into the adapter connection.
5. Insert the light conductor into the adapter, until it engages easily.
 - ☞ Perform a function check, see Chapter „6.2 Function check“ on page 15.

5 Cleaning and Disinfection

We recommend that you always document all maintenance work and exchange of parts in writing.

It is the responsibility of the operator to ensure that the required results for cleaning and disinfection are adhered to. Generally validation and routine monitoring of the procedure is necessary.

▲ WARNING

Risk of infection due to germs on equipment and accessories.

Diseases may be transmitted.

- Wear disposable gloves during all cleaning and disinfection measures.
- Clean and disinfect the device if required.
- Clean and disinfect the device according to the operating instructions.

5.1 Disinfection of the product

▲ WARNING

Electric shock caused by liquid inside the device.

Burns and cardiac arrhythmia and even death are possible.

- Do not rinse the device under running water and do not immerse it in liquids.
- Make sure that the cleaning cloth is only damp and not wet.
- Do not subject the device to an autoclave or sterilisation.
- Do not immerse the device in disinfectant solution.

ATTENTION

Liquid in the light channel.

Damaged lens.

- Please ensure that liquid does not penetrate the light channel.
1. Switch off the device.
 2. Remove the light conductor.
 3. Clean the device with a damp, clean, fuzz-free cloth.
 4. Disinfect the device with a clean, fuzz-free cloth and a recommended disinfectant. See chapter „5.2 Recommended disinfectant“ on page 14.
- ☞ Clean and disinfect the light conductor according to the respective operating instructions of the manufacturer.
5. Attach the light conductor.
 6. Perform a function check, see Chapter „6.2 Function check“ on page 15.

5.2 Recommended disinfectant

ATTENTION

Unsuitable disinfectant.

Damage to the device surface, corrosion damage and stress cracks are possible.

- Only use disinfectants, which are recommended by ATMOS.
- Do **not use** disinfectants which contain the following ingredients:
 - Alcohol.
 - Organic or inorganic acids or bases.
 - Chloramines.
 - Phenol derivatives.
 - Anionic surfactants

5.2.1 Surface disinfectant

Observe the instructions for use of the disinfectant manufacturers. Note in particular the information on the concentration and material compatibility.

Disinfectant	Ingredients	in 100 g	Manufacturer
Green & Clean SK	Di alkyl dimethyl ammonium chloride	< 1 g	Metasys, Rum (Austria)
	Alkyl dimethyl ethyl benzyl ammonium chloride	< 1 g	
	Alkyl dimethyl benzyl ammonium chloride	< 1 g	
Dismozon® plus (Granulate)	magnesium monoperoxyphthalate hexahydrate	95.8 g	Bode Chemie, Hamburg
Incidin® Plus (application concentrate)	glucoprotamin	26 g	Ecolab, Düsseldorf

6 Maintenance and Service

Maintenance, repairs and period tests may only be carried out by persons who have the appropriate technical knowledge and are familiar with the product. To carry out these measures the person must have the necessary test devices and original spare parts.

ATMOS recommends: Work should be carried out by an authorized ATMOS service partner. This ensures that repairs and testing are carried out professionally, original spare parts are used and warranty claims remain unaffected.

6.1 Period tests

At least every 24 months a repeat test of the electrical safety should be performed according to IEC 62353.

ATMOS recommends an inspection according to the manufacturer's specifications.

6.2 Function check

Prior to each use a function check has to be performed.

Never operate the device if you detect any damage. In this case, clean and disinfect the device and send it to ATMOS for repair.

1. Check whether the device, the mains cable or connected parts are damaged.
2. Check whether the adapter is connected properly.
3. Connect a light conductor or check whether the light conductor is connected properly.
4. Aim the light conductor at a white surface.
5. Press the ON/OFF button to switch on the device.
 - » The light source is illuminated.
6. Turn the controller COLOUR TEMPERATURE and check whether the light changes accordingly.

6.3 Replacing the fuse

1. Switch off the device.
2. Remove the mains cable from the device.
3. Remove the fuse holder from the mains connection.
4. Replace both fuses.
5. Attach the fuse holder.
6. Connect the device to the mains supply.

6.4 Sending in the device

1. Clean and disinfect the products and accessories according to the operating instructions.
2. Place used accessories with the device.
3. Fill in the form QD 434 „Delivery complaint / return shipment“ and the respective **Decontamination certificate**.
 - ☞ This form is enclosed to each delivery and can be found at www.atmosmed.com.
4. The device must be well padded and packed in suitable packaging.
5. Place the form QD 434 „Delivery complaint / return shipment“ and the respective **decontamination proof** in an envelope.
6. Stick the envelope on the outside of the package.
7. Send the product to ATMOS or to your dealer.

7 Troubleshooting

The ATMOS LS 31 LED was subjected to a thorough quality control in the factory. However, should an error occur, you may be able to solve this yourself.

Light source

Error indication	Possible cause	Remedy
No light	Device is not switched on.	1. Switch on the device.
	Device is not connected to the power supply.	1. Connect the device. 2. Check that the connections are fitted properly.
	Defective mains cable.	1. Change the mains cable.
	Defective fuse	1. Replace the fuse.
Insufficient light.	Adapter is not connected properly.	1. Check whether the adapter is fitted properly.
	Adapter is not suitable for the light conductor.	1. Use an adapter which is suitable for the light conductor.
	Light conductor is defective.	1. Replace the light conductor.
The colours are unnatural.	Colour temperature is not coordinated.	1. Adjust the colour temperature. 2. If a camera is connected perform a white balance.

Stroboscopy

Error indication	Possible cause	Remedy
Stroboscopy does not work.	Trigger cable is not connected properly.	1. Check the trigger cable. ☞ Please observe the different trigger cables, see chapter „3.3 Connecting the device“ on page 10.

8 Accessories

Accessories	REF
Trigger cable for connection with the ATMOS Strobo 21 LED up to date of manufacture 2016-09	507.4837.0
Trigger cable for connection with the ATMOS Strobo 21 LED from date of manufacture 2016-10	507.4838.0
Adapter for light conductor with ATMOS/Storz connection	530.6100.0
Adapter for light conductor with Olympus connection	530.6101.0
Adapter for light conductor with Pentax connection	530.6102.0
Adapter for light conductor with Wolf connection	530.6103.0

9 Disposal

Packaging

1. Please recycle the packing.

ATMOS LS 31 LED

Do not dispose of the device with household waste.

The ATMOS LS 31 LED does not contain any hazardous goods.

1. Clean and disinfect the device.
2. In Germany: Send in the device to ATMOS or your specialized dealer. They will dispose of the device professionally.
3. In other countries: Dispose of the device professionally and according to country-specific laws and regulations.

In Germany the device is excluded from the Electrical and Electronic Equipment Act (ElektroG) according to the National Register for waste electric equipment because it may be contaminated. Do not dispose of the device with electronic waste.

The housing is fully recyclable. Refer to the country-specific laws and regulations.



10 Technical data

Voltage	100-240 V~ ± 10 %; 50/60 Hz
Power consumption	max. 55 VA
Fuses	2 x T 2.0 A / H
Power supply cord	2 m length, earthing contact plug, non-heating
Light intensity	Max. 150 kLux (in 5 cm distance of a 4.7 mm high-performance light guide)
Colour temperature	Adjustable 5500 K to 6500 K
Flash frequency	70 to 1000 Hz flash light and continuous light
Duty cycle	Max. 20 %
Operating time	Continuous operation with continuous light, short-term operation with flash light Short-term operation = 15 min operation; 15 min interval (= 50 % ED)
Cooling	Fanless
Protective earth conductor resistance	Max. 0.1 Ω
Earth leakage current	Max. 0.5 mA
Enclosure leakage current	Max. 0.1 mA
Patient leakage current	Max. 0.1 mA
Ambient conditions for transport/storage	-20 to +80 °C 30...95 % air pressure without condensation air pressure of 500...1060 hPa
Ambient conditions operation	+10 to +35 °C 30...95 % air pressure without condensation air pressure of 700...1060 hPa
Heat release	max. 35 Joule/s
Noise level	Continuous light, soundless, flash light @ max. power / 1000Hz : <35 dBA
Light conductor connections for	Storz, Wolf, Olympus, Pentax, ACMI
Dimensions HxWxD	117 x 138 x 290 mm
Weight	5.0 kg
Period tests	Repeat test of the electrical safety every 24 months. Recommended: inspection according to the manufacturer's specifications.
Protection class (EN 60601-1)	I
Degree of protection	IPX0
Classification in accordance with appendix IX EC Directive 93/42/EEC	I
CE marking	CE
UMDNS code	12-346
GMDN code	42572

11 Notes on EMC

- Medical electrical equipment is subject to special precautions with regard to EMC and must be installed acc. to following EMC notes.
- Portable and mobile HF communication facilities can influence medical electrical equipment.
- The use of other accessories, other converters and cables than stated may lead to an increased emission or a reduced interference immunity of the equipment or system.
- The electrical medical device must not be stacked next to or with other devices. When operation is required close to or in combination with other equipment, the electrical medical equipment must be observed to verify its intended operation in this arrangement.

Guidance and manufacturer's declaration - electromagnetic emissions

The ATMOS LS 31 LED is intended for use in the electromagnetic environment specified below. The customer or user of the ATMOS LS 31 LED should ensure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment - Guidance
HF transmission according to CISPR 11	Group 1	The ATMOS LS 31 LED uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
HF transmission according to CISPR 11	Class B	The ATMOS LS 31 LED is suitable for use in all establishments, including domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions according to IEC 61000-3-2	Class A	
Voltage fluctuations/flicker according to IEC 61000-3-3	Corresponds	

Guidance and manufacturer's declaration - electromagnetic immunity


The ATMOS LS 31 LED is intended for use in the electromagnetic environment specified below. The customer or user of the ATMOS LS 31 LED should ensure that it is used in such an environment.

Immunity Test	IEC 60601- Test Level	Compliance Level	Electromagnetic Environment - Guidance
Electrostatic discharge (ESD) according to IEC 61000-4-2	± 6 kV Contact ± 8 kV Air	± 6 kV Contact ± 8 kV Air	Floors should be wood, concrete, or ceramics tile. If floors are synthetic, the relative humidity should be at least 30 %.
Fast electrical transient/burst IEC 61000-4-4	± 2 kV Mains ± 1 kV I/Os	± 2 kV Mains ± 1 kV I/Os	Mains power quality should be that of a typical commercial or hospital environment.
Impulse voltage/surges according to IEC 61000-4-5	± 1 kV common-mode ± 2 kV differential mode	± 1 kV common-mode ± 2 kV differential mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations according to IEC 61000-4-11	< 5 % U_T (> 95 % Dip of the U_T) for 0.5 Cycles 40 % U_T (60 % Dip of the U_T for 5 Cycles) 70 % U_T (30 % Dip of the U_T for 25 Cycles) < 5 % U_T (>95 % Dip of the U_T) for 5 s	< 5 % U_T (> 95 % Dip of the U_T) for 0.5 Cycles 40 % U_T (60 % Dip of the U_T for 5 Cycles) 70 % U_T (30 % Dip of the U_T for 25 Cycles) < 5 % U_T (>95 % Dip of the U_T) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the ATMOS LS 31 LED requires continued function during interruptions of the energy supply, it is recommended to supply the ATMOS LS 31 LED from an uninterruptible power supply or a battery.
Magnetic field at the supply frequency (50/60 Hz) according to IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be that of a typical commercial or hospital environment.

NOTE: U_T is the AC mains voltage prior to application of the test level.

Guidance and manufacturer's declaration - electromagnetic immunity

The ATMOS LS 31 LED is intended for use in the electromagnetic environment specified below. The customer or user of the ATMOS LS 31 LED should ensure that it is used in such an environment.

Immunity Test	IEC 60601-Test Level	Compliance Level	Electromagnetic Environment - Guidance
Conducted interference according to IEC 61000-4-6	3 V _{Effective} value 150 kHz to 80 MHz	3 V _{Effective} value	Portable and mobile communications equipment should be separated from the ATMOS LS 31 LED including the cables by no less than the distances calculated/listed below. Recommended distances: $d = 1.2 \cdot \sqrt{P}$ $d = 1.2 \cdot \sqrt{P}$ for 80 MHz to 800 MHz $d = 2.3 \cdot \sqrt{P}$ for 800 MHz to 2.5 GHz where „P“ is the max. power in watts (W) and d is the recommended separation distance in meters (m). Field strengths from fixed transmitters, as determined by an electromagnetic site (a) survey, should be less than the compliance level (b). Interference may occur in the vicinity of equipment containing following symbol: 
Radiated HF disturbances according to IEC 61000-4-3	3 V/m 80 MHz to 2.5 Hz	3 V/m	
NOTE 1: With 80 MHz and 800 MHz the higher frequency range applies. NOTE 2: These guidelines may not be applicable in every case. The emanation of electromagnetic waves is affected by absorption and reflection of buildings, objects and people.			
(A) The field strength of stationary transmitters, such as base stations of radio telephones and land mobile radio devices, amateur radio stations, AM and FM radio broadcast and TV broadcast cannot be accurately predicted theoretically. To determine the electromagnetic environment in regard to stationary transmitters, a study of the location is to be considered. If the measured field strength at the location where the ATMOS LS 31 LED is used exceeds the above compliance level, the ATMOS LS 31 LED is to be observed to verify the intended use. If abnormal performance characteristics are noted, additional measures might be necessary, e. g. a changed arrangement or another location for the ATMOS LS 31 LED (B) Over the frequency range of 150 kHz to 80 MHz, field strengths should be lower than 3 V/m.			

Recommended safety distance between portable and mobile RF Communications equipment and the ATMOS LS 31 LED

The ATMOS LS 31 LED is intended for use in electromagnetic environment in which radiated disturbances are controlled. The customer or user of the ATMOS LS 31 LED can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications equipment and the ATMOS LS 31 LED as recommended below, according to the maximum output power of the communications equipment

Power of transmitter W	Safety distance, depending on transmit-frequency m		
	150 kHz to 80 MHz $d = (3.5/\sqrt{P}) * \sqrt{P}$	80 MHz to 800 MHz $d = (3,5/\sqrt{E1}) * \sqrt{P}$	800 MHz to 2.5 GHz $d = (7/\sqrt{E1}) * \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters for which the maximum nominal output is not indicated in the above table, the recommended safety distance d in meters (m) can be determined using the equation belonging to the respective column whereas P is the maximum nominal output of the transmitter in watts (W) acc. to manufacturer's specification.

NOTE 1 By 80 MHz and 800 MHz the higher frequency range applies.

NOTE 2 These guidelines might not be applicable in any case. The emanation of electromagnetic waves is affected by absorption and reflection of buildings, objects and people.

12 For your notes

For your notes



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