TL-77

LUTHOR®
TECHNOLOGIES

PMR 446 TRANSCEIVER

PMR
446 MHz

USER'S MANUAL

CE 0700

We want to appreciate the confidence shown by purchasing this transceiver **LUTHOR TECHNOLOGIES modelo TL-77**.

This transceiver offers an innovative design in terms of technology and multi-functionality. Its high quality and extensive features make it one of the best equipments in its field, we trust in your total satisfaction with your expectations and communication needs.

Please read carefully the following manual before using the transceiver in order to guarantee the maximum performances.

The use of the symbol shows that this equipment it's under use restrictions in certain countries.

Countries where the use of this equipment is permitted, without prejudice that in any of them their administration request a licence, an authorisation or indicates some restrictions. In case of doubt we recommend you to request the competent authority of the country where you intend to use this equipment.

AT	BE	DK	FI	FR	DE	GR	IS
IE	IT	LI	LU	NL	NO	PT	ES*
SE	CH	GB	CY	CZ	EE	HU	LV
LT	MT	PL	SK	SI	BG	RO	

*ES: in the specific case of Spain, this PMR transceiver is free use and do NOT need a licence or authorisation for using it.

Contents

Cautions and practical advices

⚠ Both the transceiver and the elements supplied with it are not toys, and as you can see later on this text of compulsory reading for the user, prior to unpacking the equipment and its accessories detailed below, you should consequently keep them out of: children's, persons with reduced cognitive capacity, and domestic or wild animals reach.

⚠ Any repair must be made only for qualified personal, in case of any problem in the equipment or any of its components you must contact your dealer or a professional and qualified technical service.

⚠ Under no circumstances disassemble, modify or manipulate the transceiver, the battery or the charging elements. Apart from the physical hazard that this implies for the user, the equipment and the accessories would lose their warranty.

⚠ The inappropriate handling of the transceiver or its accessories, could make change any of the technical features of them, in such a way that might affect their operation, the equipment's security, the user's physical integrity or the technical parameters, which may affect the features as designed, manufactured and marketed. In those cases the user shall be solely responsible for all the disadvantages and liquidated damages that might result of this action, both the manufacturer and the dealer shall be relieved of such liability.

⚠ Do not use the transceiver for any purpose other than it was designed for.

⚠ Do not use the transceiver if you see deterioration or breakage in any of its parts. Do not hit the equipment or the battery and by all means avoid the risk of falling that may damage it.

⚠ Do not expose the product to extremely high temperatures up to 45° or temperatures below 0°. That could significantly affect its operation and the battery could even ignite or explode (read carefully the cautions and practical advices for batteries described in detail below in this manual).

⚠ Do not place the transceiver or the battery above heating sources such as radiators, heaters, etc... that might seriously damage the equipment or the battery with the consequent risk of malfunctioning or overheating of them causing a burn down or an explode.

⚠ Do not use or charge both the transceiver and the battery if they are wet. Make sure that

they are completely dry before using it or charging the battery. Neither use the equipment with your hands wet.

⚠ Do not supply the equipment with a different tension than the one indicated by the manufacturer. Neither use a different battery than the one supplied by the manufacturer for this equipment. It might cause a burn down or an explode. Do not following this advice will carry an important risk for both the equipment and the user.

⚠ Do not use the transceiver during a thunderstorm (lightning storm), you would be expose yourself to a potential risk and danger of serious injuries or even the death.

⚠ For cleaning the transceiver and its accessories make sure is turned off, use a damp cloth (not wet). Do not use liquids, detergents nor any other chemical substance. Do not clean with a dry cloth in order to avoid the creation of static electricity.

⚠ Do not use the transmission button PTT if is not necessary.

⚠ An extended transmission could lead to transceiver's or battery's overheating, causing a transceiver's failure, burns or even the battery's explosion. Take care specially if you change the battery, it is not recommended until the temperature has significantly reduced.

⚠ Do not use the transceiver in any susceptible of flammable or potentially explosive environment. Do not use the device specially on petrol stations, chemical industries, explosives factories, ammunition warehouses, close to combustibles, chemical products, storage silos, tank lorries with dangerous goods, in presence of gas, nor in demolition areas. For most of those scenes are some specially designed and authorised transceivers that can be used without any risk, consult your dealer.

⚠ Do not use the transceiver in hospitals nor close to medical equipments that can suffer interferences caused by radio frequencies. If you use medical equipments, get in contact with the manufacturer to ensure that the equipments are protected from the radio frequencies.

⚠ Do not use the transceiver close to a pacemaker. Do not use the device in a distance less than 30 centimetres from a pacemaker, since the device can interfere with it and result in a serious accident. To minimise the possible interference with a pacemaker, use the device on the opposite side of the body from the pacemaker location.

⚠ Turn off the transceiver when you board an aeroplane. The use of electronic devices on

board of an aeroplane is restricted and subjected to the rules applied to those devices. It can interfere with the navigation electronic instruments of the aeroplane. In case of doubt ask the crew members about the possible restrictions of using the transceiver also in other kind of public transports like trains, ships, etc.

⚠ Do not use the transceiver if you are driving any kind of vehicle. Concentrate yourself exclusively on driving. In addition to infringe traffic laws, you could put passengers, street users and your security, at serious risk.

⚠ In case of leaving the transceiver, leave it on a stable location. Giving a special attention on vehicles so that the device do not slow down the driving. Never place the transceiver in the operating range or on the inflatable protection systems (Airbag), because in case of a protection system activation, the transceiver will be throw out with at high speed and strength and could hit the driver or passengers with serious or lethal results.

⚠ On vehicles, it is possible that the transceiver could interfere or be interfered due to radio frequencies. That could cause the wrong operation of vehicle's electronic equipments or otherwise, the transceiver could be the interfered one. In this case, keep in contact with your dealer, technical service or manufacturer to report this abnormality. Keep special attention in case of electric or hybrid vehicles and prior of using the transceiver ask the manufacturer of this kind of vehicles.

⚠ When walking or moving, use the transceiver with caution to avoid physical risks of yourself and other people around.

⚠ To guarantee a greater performance of the transceiver's microphone and that the sound clearly arrives to your interlocutor, when you talk, make it keeping the transceiver between 5 and 10 centimetres from your mouth.

⚠ For connecting accessories like earphones, speakers, programming cables, etc... always turn off the transceiver previously. Once installed the accessory turn it on again. Use the manufacturer recommended accessories.

⚠ Prior to using earphones or micro-earphones, check the transceiver's volume, a high volume level will damage the ear. A prolonged use of those accessories could cause audition's harm: auditive capacity degradation, vertigo, dizziness, etc... that's why it is recommended to use a suitable volume and not extending its use for a long time, taking breaks and alternating the ear.

⚠ Please pay special attention to the use of transceiver's external accessories like earphones or micro-earphones, etc... The cable used for those accessories could get caught up on machinery, vehicles, etc... causing the consequent transceiver's or accessory material risk or even pose a danger the user's physical integrity. This applies also to cases for protecting the transceiver or the transceiver itself when using the belt clip.

⚠ While using the transceiver avoid the contact of the antenna with your eyes, your face or other parts of your body. Keep the antenna in a vertical position and far from your body during transmission, so the transceiver will give its maximum performance in addition to your physical integrity.

⚠ Do not take nor grab your transceiver through the antenna, making that can cause damages both to the antenna and the transceiver. Besides the bad operation of the equipment can cause physical damages to the user or to others.

⚠ Do not use the transceiver if the covering from the antenna is damaged, immediately replace the antenna if is a removable one or contact your authorised technical service if is a fixed antenna. Do not taking this advice into account can cause burns for radio frequency to the user.

⚠ The cards and documents with a magnetic band, as credit, telephone or medical cards, savings books, etc... can be damaged due to the transceiver's radio frequency. Likewise, take care with information's storage or memory devices, those could be damaged by the transceiver's radio frequency.

⚠ When using the transceiver in public places try not to disturb the people around you.

Cautions and practical advices for the battery and the charger

⚠ This transceiver is supplied with a Lithium-Ion (Li-Ion) battery.

⚠ The excessive battery's overheating can cause the battery to ignite or explode with the resulting risk of serious physical damages or even the death. Avoid exposing it to temperatures up to 45°.

⚠ Be careful with the equipment and specially with the battery. A hit could damage the equipment or the battery and if the worst comes to the worst the explosion or burn of the battery.

⚠ If you see a deterioration, a hit or a crack on the battery cover do not use it and replace it immediately. If you do not make it the battery could cause damages to the equipment or the user because of ignite or explode. Be particularly careful if from inside the battery leaks out any kind of liquid or another material, that could cause chemical burns on your skin or your eyes, in that case contact a doctor immediately for advice on how to proceed and go to the nearest emergency unit.

⚠ SERIOUS DANGER: under no circumstances short-circuit or short across the battery terminals, that could irreversibly damage the battery and if the worst comes to the worst the explosion or burn of the battery with the possible physical damages for the user, that could be extremely serious injuries or even the death. Consequently you must:

- Transport the equipment properly so that the terminals can not short-circuit accidentally.
- Do not carry it in your pocket with metallic objects like keys, coins, etc...
- Do not place the equipment with its terminals making contact on a metallic, wet or conductive surface, that will cause a short-circuit of the terminals.
- Avoid the contact of the equipment and the battery with water or conductive liquids.
- Do not lick, bite or touch with your wet hands the battery terminals.

⚠ Do not use the supplied battery by the manufacturer for another transceiver than the one

supplied. Do not following this advice implies an important risk of ignite or explode, and could seriously damage both the equipment and other people around.

⚠ Do not apply a soldering iron on the battery terminals, could cause the battery overheating with the consequent risk of suffering a serious accident.

⚠ Remember that inside a vehicle could reach extreme heat or cold temperatures, in one of those situations the battery could ignite or explode.

⚠ Never charge the battery with another charger than the one original supplied by the manufacturer. The charger is specific for the battery's technology. Using another charger will damage the battery and could cause the battery to ignite or explode with the consequent risk of suffering a serious accident.

⚠ Both the battery and charger contacts must be at all times clean. A bad maintenance of those elements and its deterioration could cause a bad operation, overheat, ignite or explode from the equipment.

⚠ Do not leave the transceiver or the battery close to magnetic fields. It is possible that this cause the bad operation of the transceiver or the battery. It is also possible the battery's discharge due to the action of this magnetic fields.

⚠ In case of not using the transceiver during a long period of time of weeks or months, it is strongly recommended to take off the Li-Ion battery and store it on a cool and dry place, without direct sun light and with a temperature between 5 and 25 degrees. Never store the battery completely discharged or with only a low load, that could cause an irreparable damage to the battery to the point of becoming unusable. It is also inadvisable to store the battery for a long period of time with 100% of the load, the ideal is store it with a 40% of the load, this will extend the battery's working life.

⚠ After a long period of time without being used, the Li-Ion batteries gradually lose its load. Whereby try to use it and charge it with a certain frequency in order to extend the battery's working life.

⚠ Do not use the charger/feeder if the cables or plugs are damaged. That could cause electrical shocks, ignites and explodes. Dispose the product and buy a new one from your dealer.

⚠ Do not use the charger/feeder if the socket outlet is damaged or loose. That could cause

electrical shocks, ignites and explodes. In that case, call a professional electrician to solve the problem.

⚠ During the charging process do not touch none of its components nor the battery. That could cause electrical shocks with serious security risk or even the death.

⚠ Do not touch the charger, any of its components nor the battery with wet hands nor your bare feet. That could cause electrical shocks with serious security risk or even the death.

⚠ Do not short-circuit the charger/feeder terminals. That could seriously damage the system and void it or even catch on fire with a serious risk for the security of the people and facilities where the equipment is located.

⚠ The Li-Ion batteries have a circuit available that cuts the energy supply once the charge is completed. Usually the charger shows this situation through a LED indicator. But facing the possibility of an error or an overheating both on the charger and on the battery, is appropriate not to let the charger permanently connected to the wall outlet and even less with the battery installed. Once the charge is completed it is strongly recommended to quit the battery from the charger and disconnect it from the electricity supplies.

⚠ During the charging process, if any of its components: transceiver, battery, cables, charger, wall feeder, etc... will give off smoke or a strange smell, with great caution disconnect the charger from the wall outlet and remove the transceiver or the battery in case is being charged alone. If the battery is installed on the transceiver remove it immediately and do not use the equipment. Get immediately in contact with your dealer or technical service.

⚠ Do not cover nor put any kind of objects over the transceiver, the battery, the charger, the feeder or the cables. That could cause an overheating or damages on the elements with the consequent risk of burn or explosion.

Main features

Frequency range: UHF from 446,00625 to 446,09375 MHz
Output power: 0,5W
16 memory channels
Analogical CTCSS and digital DCS tones
Voice encryption
VOX or hands free function with adjustable sensibility
Time Out Timer (TOT) function
Emergency alarm
Software programming via PC
High capacity Lithium battery

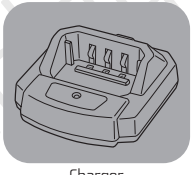
Unpacking of the equipment and content

Unpack carefully the content of your transceiver's box. We recommend you to verify the elements listed in the following table before discarding the package. If some element is missing or it had been damaged due to the shipping, please contact your dealer as soon as possible.

Supplied accessories

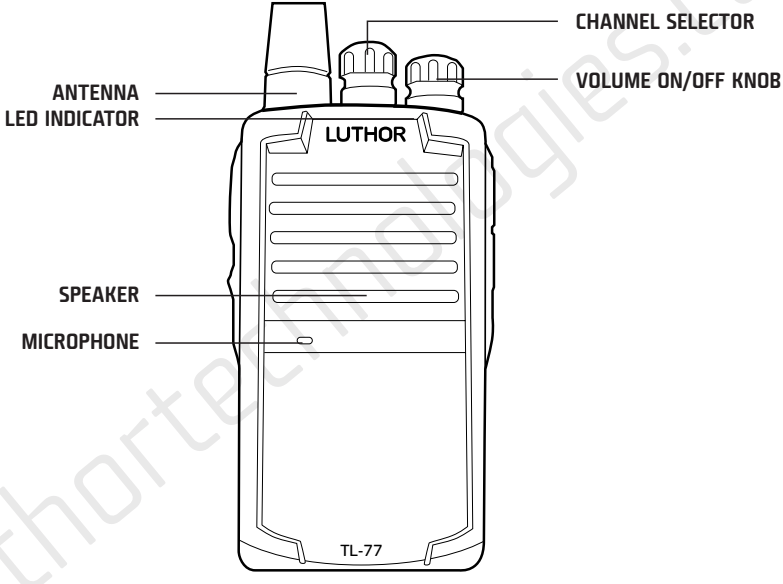

Battery pack

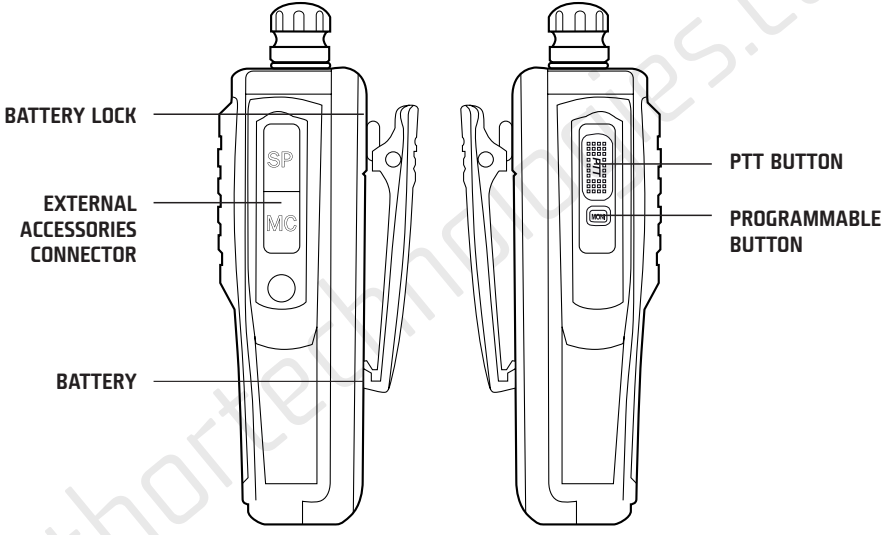

Belt-clip


Charger


User's manual

Transceiver's description





Basic operations

Turning on / Volume
Rotate the Volume/On/Off knob clockwise, when the transceiver is turned on you will hear a sound. To turn off the transceiver you only have to rotate the Volume/On/Off knob anti-clockwise.

Adjusting the volume
Rotate the Volume/On/Off knob clockwise or anti-clockwise to adjust the volume to the desired level.

Channel selection
Rotate the channel selector to select the desired channel.
You can identify the selected channel by the numbers engraved on the channel selector, or with the sound signal if you have the voice guide activated.

Transmitting
Press the PTT button to transmit, speak to the transceiver with a normal voice, by pressing the PTT button the LED indicator on the front side of the transceiver will light in red colour. Release the PTT button in order to receive and listen. When receiving a transmission the LED indicator will light in green colour.

VOX function (hand's free)
This function allows the user to transmit without needing to press the PTT button, the equipment actives the transmission automatically when hears a sound. This function has to be activated through the programming software.
You can get full details about its configuration on the Advanced operations section.

Monitor function

The monitor function opens the equipment's reception, switching off completely the noise filter or transceiver's squelch.

You can turn on/off the use of this function by pressing the lateral programmable button.

Alarm function

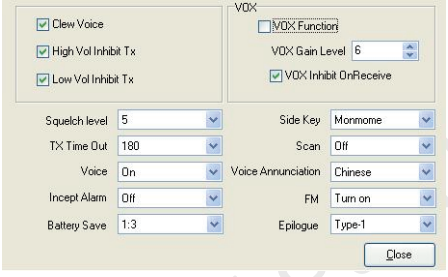
This equipment can send out an alarm or emergency signal in case of necessity. By keeping pressed the lateral programmable button (below the PTT button) for a few seconds, when you hear the sound alarm signal you should press and hold the PTT button to transmit it.

The alarm signal is transmitted to all the Luthor TL-77 equipments it doesn't matter which channel they have selected.

You can turn on/off the use of this function by pressing the lateral programmable button.

Advanced operations (through programming software)

For the use of the specific advanced functions you should have the necessary software to configure the equipment.
Once the software is running you must access to the functions section.



VOX function
To activate the VOX function you have to select the "VOX function" option, and right after select the desired "VOX gain level".

NOTE: This transceiver has different VOX (voice activation without pressing the PTT button) levels between 1 and 9. If you select level 1 you will get the lowest values of VOX gain, therefore your transceiver will activate the conversation with very little noise.

VOX Inhibit OnReceive
In case of activating the VOX Inhibit OnReceive option, while receiving any signal the VOX function will be always deactivated.

Squelch level
Select a squelch level in such way that you do not have problems with the reception of the desired signal. If you select a too high level you will lose reception distance.

NOTE: This transceiver has different squelch (noise reduction system) levels between 0 and 9. "0" is squelch open, and from 1 to 9 you will obtain the different levels of noise reduction, where "9" is the highest level of reduction (we recommend you to select the level "5").

TX Time Out (TOT)
The TOT function has been designed for limiting the maximum transmission time. When the transmission exceeds the previously fixed time your transceiver will cut the transmission.

NOTE: The time is fixed in seconds.

Side Key
With this option you will be able to select the function available for the programming lateral button on your equipment.
The following selectable options are available:

- **Off**: by selecting this option the programmable button will become unusable, and therefore if you press it no action will be done.
- **Monmome**: by selecting this option the programmable button will activate the Monitor function.
- **Alarm**: by selecting this option the programmable button will send out a sound alarm

Voice
The "Voice" function turns on/off the transceiver's voice guide.

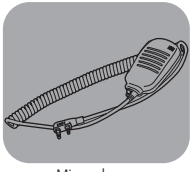
Voice Annunciation
With this option you can select the language that will be used for the voice guide.

Incept Alarm
The "Incept Alarm" function allows you to turn on/off the possible reception of alarm signals on any channel coming from another Luthor TL-77 equipments.

Battery Save
The Battery Save function optimizes to the maximum the use of the equipment's battery in order to extend its time of use.

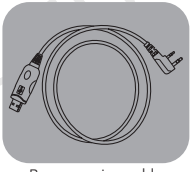
Optional accessories

Vehicle charger



Microphone

Earphone



Programming cable

Alternative battery

Troubleshooting guide

Problem	Possible cause	Possible solution
The transceiver does not ignite	The battery is not properly adjusted. The battery is exhausted. The battery is too old.	Reinstall the battery. Charge the battery. Replace the battery.
The transceiver is on but no sound is heard on the speaker	The power button is not correctly adjusted. Confirm that the CTCSS/DCS tones are correctly adjusted.	Turn the volume up. Adjust the tones through software.
Auto-transmit during standby mode	The VOX level is adjusted too low.	Turn off VOX or adjust it to an upper level.
During communication you receive another groups or receive a distorte signal	The frequency and CTCSS/DCS tones used are the same than another users. The scrambler is turned off.	Change de CTCSS/DCS, frequency or channel settings. Turn on the scrambler through software.
The transceiver do not send out the alarm signal	The programmable button is not set with the alarm signal. You do not press PTT button right after pressing the alarm button.	Turn on the alarm signal through software. Keep pressing PTT buttion while the alarm sounds.

Problem	Possible cause	Possible solution
The transceiver do not receive the alarm signal	The reception of alarm signal is turned off.	Turn on the reception of alarm signal through software.

Technical specifications

Equipment's reference	LUTHOR TECHNOLOGIES TL-77
Frequency range	UHF from 446,00625 to 446,09375 MHz
Memory channels	16 channels
Voltage	DC 7,4V
Working temperature	from -30°C (-22F) to +60°C (140F)
Output power	500mW
Mode	F3E (FM)
Maximum deviation	< ± 5 kHz
Adjacent channel power	< - 60 dB
Stability	< 5 ppm < 0,2 µV
Output audio power	> 500 mW
Weight	180 g (battery and antenna included)
Dimensions (H x M x L)	115 mm x 54 mm x 35 mm

Parameters

CTCSS (analogical tones)

1	67.0	11	94.8	21	131.8	31	171.3	41	203.5
2	69.3	12	97.4	22	136.5	32	173.8	42	206.5
3	71.9	13	100.0	23	141.3	33	177.3	43	210.7
4	74.4	14	103.5	24	146.2	34	179.9	44	218.1
5	77.0	15	107.2	25	151.4	35	183.5	45	225.7
6	79.7	16	110.9	26	156.7	36	186.2	46	229.1
7	82.5	17	114.8	27	159.8	37	189.9	47	233.6
8	85.4	18	118.8	28	162.2	38	192.8	48	241.8
9	88.5	19	123.0	29	165.5	39	196.6	49	250.3
10	91.5	20	127.3	30	167.9	40	199.5	50	254.1

DCS (digital tones)

1	D023N	20	D122N	39	D243N	58	D343N	77	D464N	96	D662N
2	D025N	21	D125N	40	D244N	59	D346N	78	D465N	97	D664N
3	D026N	22	D131N	41	D245N	60	D351N	79	D466N	98	D703N
4	D031N	23	D132N	42	D246N	61	D356N	80	D503N	99	D712N
5	D032N	24	D134N	43	D251N	62	D364N	81	D506N	100	D723N
6	D036N	25	D143N	44	D252N	63	D365N	82	D516N	101	D731N
7	D043N	26	D145N	45	D255N	64	D371N	83	D523N	102	D732N
8	D047N	27	D152N	46	D261N	65	D411N	84	D526N	103	D734N
9	D051N	28	D155N	47	D263N	66	D412N	85	D532N	104	D743N
10	D053N	29	D156N	48	D265N	67	D413N	86	D546N	105	D754N
11	D054N	30	D162N	49	D266N	68	D423N	87	D565N		
12	D065N	31	D165N	50	D271N	69	D431N	88	D606N		
13	D071N	32	D172N	51	D274N	70	D432N	89	D612N		
14	D072N	33	D174N	52	D306N	71	D445N	90	D624N		
15	D073N	34	D205N	53	D311N	72	D446N	91	D627N		
16	D074N	35	D212N	54	D315N	73	D452N	92	D631N		
17	D114N	36	D223N	55	D325N	74	D454N	93	D632N		
18	D115N	37	D225N	56	D331N	75	D455N	94	D645N		
19	D116N	38	D226N	57	D332N	76	D462N	95	D654N		

Memorised channels

Channel number	Table number	Frequency (MHz)	Tone number	QT/DQT adjustment
1	1	446,00625	10	94,8 Hz
2	8	446,09375	08	88,5 Hz
3	3	446,03125	13	103,5 Hz
4	6	446,06875	05	79,7 Hz
5	4	446,04375	17	118,8 Hz
6	2	446,01875	18	123,0 Hz
7	7	446,08125	19	127,3 Hz
8	5	446,05625	07	85,4 Hz
9	1	446,00625	14	107,2 Hz
10	8	446,09375	15	110,9 Hz
11	3	446,03125	16	114,8 Hz
12	6	446,06875	06	82,5 Hz
13	4	446,04375	27	D132N
14	2	446,01875	28	D155N
15	5	446,05625	29	D134N
16	7	446,08125	30	D243N

We have done everything possible to obtain the maximum of detail in this manual, but we are not responsible for any possible omission as well as printing errors or translation. All the specifications are subject to change by **LUTHOR TECHNOLOGIES** without previous notice.

Note on environmental protection:

This symbol on the equipment or its packaging indicates that at the end of the useful life of this product the user is legally obligated to fulfil the European Directive 2012/19/EU, on 4 July 2012 (in the legislative Spanish system RD 110/2015 on 20 February 2015), on Waste Electrical and Electronic Equipment, which applies the following: the electrical and electronic equipment, as well as batteries and rechargeable batteries, can not be treated as normal household waste, but must be delivered to the corresponding collection point.

By ensuring that this product is rejected correctly, you help with this action to prevent negative consequences for the environment and human health which could be caused by its inappropriate management. The recycling of materials helps to preserve natural resources.

To receive detailed information about the recycling of this product, please contact the city office, the most nearby waste disposal service or the establishment where you purchased the product.

Declaration of conformity

CE 0700

The undersigned, in representation of:

Company:	GENEREUS S.L.
Adress:	Industria 5, nave 8 08160 Montmeló – Barcelona (España)
Telephone number:	(+34) 93 599 17 65
VAT number:	B66339029
E-mail address:	gestiontecnica@genereus.com

We declare under our sole responsability the conformity of the following product:

Type of equipment:	UHF PMR-446 mobile transceiver for free use
Brand name:	LUTHOR TECHNOLOGIES
Model number:	TL-77
Manufacturer:	GENEREUS S.L.
Manufacturing site:	China

Al que se refiere esta declaración, con las normas u otros documentos normativos :

EN 60950-1:2006+A11:2009+ A1:2010+A12:2011+A2:2013	Safety regarding information technology equipments. General requirements.
EN 50566:2017 / EN 62209-2:2010	Product standard to demonstrate the compliance of wireless communication devices with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields, hand-held and body mounted devices in close proximity to the human body
EN 301 489-1 V2.2.0 EN 301 489-5 V2.2.0	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Part 5: Specific conditions for Private land Mobile Radio(PMR) and ancillary equipment (speech and non-speech)
EN 300 296 V2.1.1	Rule referred to portable equipments for the land mobile service intended to be used on private mobile radio networks on the 446 (PMR446) frequency band.
Directive RoHS 2011/65/UE	About restrictions of the use of certain hazardous substances in electrical and electronic equipment (EEE).

In accordance with the requirements of Directive 2014/53/UE, of the European Parliament and the 16th April 2014 Council, transposed into Spanish law by Royal Decree 188/2016 of 6th May 2016.
More additional information related with the equipment, accessories, images, updated management software, etc... are available on the official website: www.luthortechnologies.com

Josefa Paredes Martínez

Manager

Montmeló, 6th June 2018

“LIFE IS GOOD COMMUNICATION”

luthortechnologies.com

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