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SAFETY PRECAUTIONS AND WARNINGS

NOT ALLOWED TO CONNECT THE DEVICE TO REPEATERS!

THE SIGNAL LEVEL OF OVER 1 mW (+0dBm) CAN CAUSE DAMAGE DEVICE.

BE CAREFUL WHEN CONNECTING OF THE DEVICE TO EXTERNAL LINE AMPLIFIERS. MAKE SURE THAT THE USED AMPLIFIERS PERMIT TO CONNECT OF UP TO 10 mW (+10dBm) INPUT SIGNAL.

THE DEVICE AND ITS COMPONENTS COMPLY WITH THE SAFETY STANDARDS. HOWEVER, IMPROPER USAGE CAN CAUSE INJURIES AND FAILURE OF THE DEVICE OR ANY OTHER MATERIAL DAMAGE. TO AVOID THIS CAREFULLY READ THIS MANUAL BEFORE OPERATION.

EXPRESSLY PROHIBITED TO OPERATE THE DEVICE DURING THUNDER! LIGHTNING RODS, GROUNDING DEVICES AND LIGHTNING ARRESTORS CANNOT YET GIVE 100% PROTECTION. PHYSICAL CONTACT WITH THE DEVICE CONNECTED TO OUTDOOR ANTENNA IS DANGEROUS FOR THE HEALTH OR CAN CAUSE DEATH IN CASE OF A LIGHTNING DISCHARGE.

IF THE DEVICE USED FOR LONG-TIME MONITORING WITH THE OUTDOOR ANTENNA, THEN STRONGLY RECOMMENDED TO USE ADDITIONAL LIGHTNING ARRESTOR CONNECTED TO INDOOR GROUNDING BAR. TO AVOID PHYSICAL CONTACT OF PERSONEL WITH THE DEVICE. IT IS RECOMMENDED TO USE WI-FI WIRELESS CONTROL.

MUST BE AVOIDED CONTACTS OF OUTDOOR ANTENNA AND RF CABLE TO POWER LINES IN CASE OF STORM WEATHER.

ONLY QUALIFIED PERSONNEL IN INFORMATION TECHNOLOGIES AND CELLULAR TELECOMMUNICATIONS MUST OPERATE WITH THE DEVICE.

CAREFULLY KEEP THIS MANUAL AND TRANSFER IT TOGETHER WITH THE DEVICE IN CASE OF CHANGE OWNER.

GENERAL INFORMATION

Cellular Meter 2G/3G is a portable measurement instrument which designed to assistance at deployment and maintenance of cellular repeaters and other cellular equipment.

Cell Meter allows monitoring of the radiofrequencies within the main cellular bands: EGSM 900, GSM 850, DCS 1800, PCS 1900, 3G 2100 (3GPP Band I) and 3G 900 (3GPP Band VIII).

The device has connectors (holders) to install of up to 6 SIM-cards, which allows working with all telecom operators by switching over SIM-cards, which significantly saves time and drastically increases reliability of the device.

As a control and display unit for the device can be use any kind smart-phones and tablet computers based on Android and Apple iOS operating system (hereinafter referred to as OS), as well as Windows based personal computers (hereinafter referred to as PCs), laptops and tablet computers can be used via Wi-Fi or USB-host.

Wi-Fi allows operating with the device at a convenient distance and by a local wireless network. For long-term radio monitoring from a Windows-based PC the device provides charging and data connection by the USB-cable. Nevertheless, in case of thunderstorm strongly recommended to use Wi-Fi wireless connection, but charging from AC adapter.

If the USB-cable (or charger) connected before powering on the device, then device will operate only by the USB, that indicated by the red blinking LED. For Wi-Fi operation mode USB-cable (or charger) must be connected only after power on of the device or re-connect the cable thereafter. In other words, the device checks USB connection during powering on. If the cable is not connected (or disconnected thereafter), then device will switch to the Wi-Fi operating mode, which is indicated by the blue blinking LED. In order to return the USB operating mode, just switch off the device; connect cable and then switch on again.

EXTERIOR OF THE DEVICE



Picture 1.

Exterior of the device in the closed and open state.

- | | |
|--------------------------------------|--|
| 1 Removable front bezel. | 7 RF INPUT connector (+0 dBm max). |
| 2 Front bezel screws. | 8 RF OUTPUT connector (+10 dBm max). |
| 3 Data/charge Micro-USB connector. | 9 Removable aluminum lid. |
| 4 Battery charge indicator (yellow). | 10 SIM-card connectors (three pairs). |
| 5 Activity indicator (red/blue). | 11 Li-ON (Li-PO) accumulator battery. |
| 6 ON/OFF switching button. | 12 Wi-Fi module default reset contact. |

MAINTENANCE AND OPERATION

For proper operation of Cell Meter, make sure that RF connectors are in good condition. Wipe them with a clear alcohol when clean necessary. Strongly recommended to close connectors with safety caps for not only the transportation, but also when not in use.

Periodically check the level of the accumulator battery during the operation and recharge when necessary. The battery voltage and the approximate percent of the charge level indicated in the main menu or in the headline of the operating modes of the software; it depends on the OS type and version. Operation with a low-charged battery can cause of failures. Remember that the accumulator's capacity decreases at very low and very high temperatures. Cell Meter switch off automatically when the battery discharged below the minimum threshold or by timer after 10 minutes of idle.

Note: Yellow charging indicator will switched off when the battery is 95% full. This indicate that quick cycle of charging (by high current) is finished.

Installation of SIM-Cards

Install inside the Cell Meter at least one SIM-card before start operation. Can be installed up to 6 SIM-cards in order to analyze all available mobile network operators (MNO) by switching the SIM-cards in the program. The "all channels scanning" function will indicate levels of all channels independently of SIM-card selected in software; however, at least one SIM-card is required for normal operation of the Cell Meter. If no SIM-card in the selected holder, then "all channels scanning" and some other functions become inactive in software.

To install SIM-cards you have to partially disassembly device (picture 1). Screw out four front bezel screws (2) and remove the front bezel (1). Pull out the upper aluminum lid (9) in towards to the just removed front bezel (it might require muscle force). Make sure that Cell Meter is off before start working with SIM-cards. Place the SIM-cards into connectors (10) in any convenient order. Labeling of the connectors corresponds to numeration in the software. Switch on the device without lid and bezel and check device operation with all the installed SIM-cards.

Note: PIN-code must we deactivated!

Carefully place accumulator battery and its wires inside the case. Assemble device in the reverse order. Avoid to damage wires insulation when close the lid. Not recommended to apply force when tightening the screws of the front bezel - it is just a plastic.

Software Installation

Software for Android devices is available on Play Market™, for iOS devices – on App Store™, as well as on our Web site for Windows-based PC's. To install Windows-based software, launch Internet browser and follow the link <http://cell.sdelab.ru/>. Select type of the device and then follow the link corresponding to the applicable operating system and authorize installation of the application or save on local drive to install later without Internet connection. To receive new software versions, check updates on our Web site. Software version number defined by file name. You can find information on the current version of available software in menu item "Settings/About" the program or using the OS means. In case of Internet access, updates checked automatically and proposed to install if available.

Our Web site will also contain this description and other documentation and useful information.

Setup Wi-Fi for AP and AP+STA Mode Operation.

The Wi-Fi module of the device is set via the embedded WEB interface. By default, the device creates "CELLMETER" Wi-Fi network and operates as an access point ("AP mode"). Connection also possible to establish via local Wi-Fi network, you will need to switch its Wi-Fi module to "AP+STA mode" by means WEB interface. For this purpose connect to "CELLMETER" Wi-Fi network, launch the browser and enter IP address <http://10.10.100.254/>, login and password: admin / admin. Select English language in the right upper corner. Press "Scan" on "STA Settings" tab, then select the required local Wi-Fi network and press "OK". Fill in the access password field and press "Save". Select "AP+STA mode" on the "Work Mode" tab, press "Save" and "Restart". After restart, "CELLMETER" network will arise and the WEB interface will be accessible both by IP address <http://10.10.100.254/> and by the local network IP address. If you set "STA mode", then after restart, the "CELLMETER"

network will not arise and the WEB interface will be only accessible by the IP address set by the local network router. For further software operation with the device find out its IP address and enter it in the “CELLMETER” software settings. Operation of the device cannot be guaranteed for all types of routers. We tested operation with such popular routers as ZyXEL, D-Link, TP-Link, OpenWRT.

Cell Meter in “AP+STA mode” indicates the local network connection by blue blinking twice a second. In this case, connect control gadget to local network too and configure Cell Meter software to the local network address. Data transmission activity is indicated by frequent blinking in time with the data. Connection failure or disconnection is indicated once a second.

Cell Meter in “AP mode” indicates creation of “CELLMETER” network by blue color once a second and frequent blinking in time with the data.

You can return to “AP mode” via the WEB interface or reset of the device’s Wi-Fi module parameters to the initial status. For this purpose, you can use “DFLT” control point near Micro USB connector below the front lid of the device (pos. 12 in pic. 1). For reset switch on the device and short “DFLT” control point for 2-3 seconds together with the minus common circuit, for example, with Micro USB connector case.

Caution! Operation of two or more devices in the “AP” access point mode in one place and simultaneously is not provided.

Replacement of the Accumulator Battery

Lithium battery is the only component which might require to be replaced during entire life of the device. To replace the battery you have to disassemble the device (picture 1). Screw out four front bezel screws (2) and remove the front bezel (1). Pull out the upper aluminum lid (9) inwards towards the just removed front bezel (it might require muscle force). Carefully disconnect the accumulator from the device connector.

Before connection to the device, make sure that proper type, matching of the connector and correct polarity of the new accumulator. Minus wire of the battery must be connected to the common circuit (grounding) of the device.

Caution! If you connect an accumulator with improper polarity, this will damage both the device and the accumulator battery. In this case, battery can be explosion-dangerous!

Connect the new accumulator to the device. Switch on the device to check operability. Carefully place accumulator battery and its wires inside the case. Assemble device in the reverse order. Avoid to damage wires insulation when close the lid. Not recommended to apply force when tightening the screws of the front bezel - it is just a plastic.

Caution! Fully charge the accumulator battery. Yellow indicator will switch off when battery 95% charged.

SHORT SOFTWARE DESCRIPTION

Our software regularly upgraded, so this section describes only its most important parameters. New software versions are available on Play Market™ and App Store™, as well as on our Web site <http://cell.sdelab.ru/>.

Basic Software Functions:

I. Scanning of all channels.

This function simultaneously scans all frequency channels (voice and control) of all operators and displaying it graphically. This allows to setup antenna in such direction so that peak signals of all operators will an approximately equal level. For better displaying, you have to tune bands of channel numbers dedicated for local MNO's and colors in menu settings.

II. Scanning of all control channels in the graphical form.

This function is similar to I (above), but it only displays signal levels of control channels of all MNO's. This contributes higher speed of the device, but reduces stability. The device can start to work with only one MNO, which is dominating in signal level. Just restart the function in such cases.

III. Scanning of all control channels in the table form.

This function is similar to II (above), but information is in digital values of channel numbers and their levels in the table form.

IV. Scanning of service and neighbor stations of SIM selected MNO.

This function displays information of the levels and channel numbers of service and neighbor stations of the selected SIM card operator. Besides, it

gives a lot of additional information on the system. In this mode, the device is trying to register in the network of the selected operator. This function is similar to service monitor mode of cellular phones, but data displayed in a more convenient form and table. Some columns of table can be set hidden in menu settings.

V. Measuring of isolation (insertion loss, attenuation).

This function finds a free frequency channel at the INPUT connector and then measures the level of the own signal generated at the OUTPUT connector. This allows to measure attenuation from 0 dB to more than 110 dB, which is enough to determine the level of isolation between donor and service antennas for repeaters. Use an external directional coupler if required to check RF matching (VSWR) of cable or other passive components (antennas, splitters, combiners, etc.). It will be difference (matching value) between forwarded and reflected levels at the coupling connector. Bigger difference means better matching. Preferably, matching value is higher than 10 dB, i.e. ratio VSWR < 2.

VI. Measuring of the signal quality.

This mode displays the level of the received signal in time by a diagram during a call to an answering machine phone number. While the connection is set, the Base Station measures the level of errors (BER) and sends it to device to display. Upon expiration of the answering machine time and drop call, the device performs redial. Enter a free of charge phone numbers of answering machines for all installed SIM-cards in software settings.

Caution! Please do not use phone numbers where people operated!

Main features of Windows based software.

The device is compatible with Window based PC via USB cable or Wi-Fi connection. Software for PCs and laptops is a bit more functional, because of there are more system resources and a “mouse”.

For Wi-Fi operation, first activate the Wi-Fi on the PC and then switch on the device. Start searching of Wi-Fi access point on the PC. Select CELLMETER in the list and connect to this network (Note: this network has no Internet connection). Launch Cell Meter software and it will detect device automatically. The device will indicate data communication by frequent blinking of blue LED.

Caution! Simultaneous operation of two or more devices in the Wi-Fi access point mode not provided.

For the USB operation, first make sure that device is off, then check cable connection and then switch on the device. The red LED blinking will indicate cable data mode. Launch the Cell Meter software and it will detect device automatically. The device indicates USB data communication by frequent blinking of red LED. Once the data cable disconnected, the device will switch to Wi-Fi mode. To return it to cable mode re-establish the cable connection and restart the device.

Main features of Android and Apple iOS based software.

The device is compatible with Android and Apple iOS-based apps (smartphones, tablet computers, etc.) only by Wi-Fi. Android software is available on Play Market™, for iOS devices – on App Store™. You can use “CELLULAR METER” for quick search.

When software installation completed, switch on the device, if it is charging then temporary disconnect the charging cable to switch to Wi-Fi mode. Activate Wi-Fi on the gadget. Start searching and select CELLMETER network in the list. Connect your Gadget to CELLMETER network. Launching the software and select Wi-Fi connection. The device indicates data communication by frequent blinking of blue LED.

Caution! Simultaneous operation of two or more devices in the access point mode not provided.

WARRANTY AND POST-WARRANTY SERVICE

The manufacturer shall perform warranty repair (elimination of manufacturing defects) of the device within 12 months upon the date of its retail sale.

The accumulator battery warranty is 6 months upon the date of sale, but no more than 12 months upon the date of manufacture.

The serial number on the device case shall determine the date of manufacture.

The service lifetime of the device in case of proper usage is at least 5 years.

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Attention to: Andrey Sviyazov.

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Send us any comments and proposals by e-mail: info@sdelab.ru