LE910C1/LE910C4 Audio over USB Application Note

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APPLICABILITY TABLE

PRODUCTS

- LE910C1-NF
- LE910C4-NF
- LE910C1-EU
- LE910C4-EU
- LE910C1-AP
- LE910C4-AP
- LE910C1-LA
- LE910C4-LA
- LE910C1-SV
- LE910C1-SA
- LE910C1-ST
- LE910C4-CN

CONTENTS

1. INTRODUCTION

1.1. Scope

This document describes how to use audio over USB functionality.

1.2. Audience

This document is intended for editors who are about to write or edit documentation for Telit.

1.3. Contact Information, Support

For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com

Alternatively, use:

http://www.telit.com/support

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

http://www.telit.com

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4.   Text Conventions

Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.

Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.5.   Related Documents

- LE910Cx HW User Guide, 1VV0301298
- LE910Cx AT_Commands_Reference_Guide, 80502ST10950A
- Telit EVB User Guide, 1VV0301249

2. OVERVIEW

LE910Cx support voice streaming in both directions over USB to Host. And audio over USB functionality is only supported in voice call status. Figure 1 shows how voice over USB functionality works.

LE910Cx only supports the following features:

- The audio format must be PCM
- The channel count must be 1(mono)
- The bit depth must be 16-bits
- The sample rate must be 16KHz
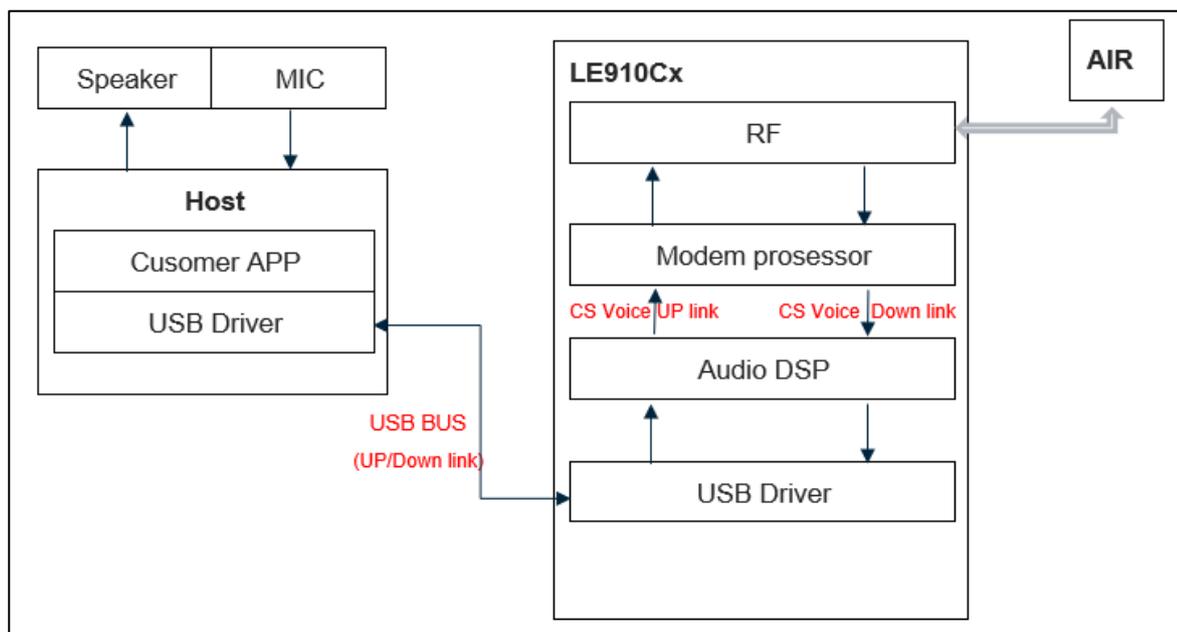
Figure 1 Voice over USB functionality

2.1. AT command to enable audio over USB functionality

2.1.1. USB composition configuration - #USBCFG

To enable audio over USB functionality, USB composition should be changed by #USBCFG=11 or #USBCFG=12.

#USBCFG - USB composition configuration	
AT#USBCFG= **<composition>**	Set command sets the USB composition according to **<composition>** number given, where: 0 - use 0x1201 composition file 1 - use 0x1203 composition file 2 - use 0x1204 composition file 3 - use 0x1205 composition file 4 - use 0x1206 composition file 5 - use 0x1250 composition file 6 - use 0x1251 composition file

	7 - use 0x1252 composition file
	8 - use 0x1253 composition file
	9 - use 0x1254 composition file
	10 - use 0x1255 composition file
	11 - use 0x1230 composition file
	12 - use 0x1231 composition file
	13 - use 0x1260 composition file
	14 - use 0x1261 composition file
	0x1201: DIAG + ADB + RMnet + NMEA + MODEM + MODEM + SAP
	0x1203: RNDIS + DIAG + ADB + NMEA + MODEM + MODEM + SAP
	0x1204: DIAG + ADB + MBIM + NMEA + MODEM + MODEM + SAP
	0x1205: MBIM
	0x1206: DIAG + ADB + ECM + NMEA + MODEM + MODEM + SAP
	0x1250: RMNET + NMEA + MODEM + MODEM + SAP
	0x1251: RNDIS + NMEA + MODEM + MODEM + SAP
	0x1252: USB_MBIM + NMEA + MODEM + MODEM + SAP
	0x1253: ECM + NMEA + MODEM + MODEM + SAP
	0x1254: MODEM + MODEM
	0x1255: NMEA + MODEM + MODEM + SAP
	0x1230: DIAG + ADB + RMnet + AUDIO + NMEA + MODEM + MODEM + SAP
	0x1231: RNDIS + DIAG + ADB + AUDIO + NMEA + MODEM + MODEM + SAP
	0x1260: DIAG + ADB + RMnet + NMEA + MODEM + MODEM + SAP
	0x1261: DIAG + ADB + RMnet + NMEA + MODEM + MODEM + SAP
	After setting a new composition the device will reboot.
	If trying to set the same composition as currently set the command will return error.

	If composition settings failed the command will return error. If the new composition was set successfully the command will return OK. Default value for USB composition is 0x1201, **AT#USBCFG?** Will return 0 by default. **NOTE:** If **USBCFG** is 3, it is MBIM only mode. For that reason, you can't change the USB composition. If you want to change the USB composition, please use Main Uart or refer to "3.2.13. USB Interface" in SW User Guide document. **NOTE:** USB compositions 0x1260 and 0x1261 are compositions for Wi-Fi bundling and this USB compositions are not supported in LE910C1-SV/ST/SA
AT#USBCFG?	Read command returns the current composition set by number as detailed in the section above: 0x1201 composition file returns 0 0x1203 composition file returns 1 0x1204 composition file returns 2 0x1205 composition file returns 3 0x1206 composition file returns 4 0x1250 composition file returns 5 0x1251 composition file returns 6 0x1252 composition file returns 7 0x1253 composition file returns 8 0x1254 composition file returns 9 0x1255 composition file returns 10 0x1230 composition file returns 11 0x1231 composition file returns 12 0x1260 composition file returns 13 0x1261 composition file returns 14
AT#USBCFG=?	Test command returns all supported values of the parameters **<composition>.**

2.1.2. Audio DSP Configuraton - #ADSPC

Audio path should be changed by #ADSPC=6 or #ADSPC=6,0 after USB composition is changed by #USBCFG=11 or #USBCFG=12

Please note the following things:

- This functionality of audio over USB only supports Mono.
- #CAP command has no effect and is included only for backword compatibility.
- #SRP command has no effect and is included only for backword compatibility.

#ADSPC - Audio DSP Configuration	

AT#ADSPC=<n>
[,<ecns mode>]
	Set command switches the DSP profile audio path depending on parameter **<n>**
	
	Parameter:
	
	<n> - DSP profile configuration
	
	0 - Automatic (factory default)
	1 - Hands Free
	2 - Headset
	3 - Handset
	4 - Speaker phone Bluetooth
	5 - TTY
	6 - USB
	
	< ecns mode >
	
	0 - Disables ECNS mode (default)
	1 - Enables ECNS.
	
	NOTE:
	
	  • On Automatic mode:
	
	    Digital: handset
	
	    Analog: according to **#CAP**
	
	  • This command influence on the **#CAP**/ **#SRP**.
	  • On Active/MT/MO Voice Call return Error.
	  • When **#TTY** command enabled, SET **#ADSPC** command return Error.
	  • The **<n> = 4** Speaker phone Bluetooth has no effect is included only for backward compatibility.
	  • The **<n> = 5** "TTY" only configured DSP profile to "Full TTY" mode , to enable TTY mode and another TTY mode using by **#TTY** command.
	  • The **<n> =** 6 is only supported by "Disable ECNS mode".

AT#ADSPC?	Read command reports the active DSP profile configuration in the format: For TTY profile: #ADSPC: <n>

#ADSPC - Audio DSP Configuration	
	For Another DSP profile: #ADSPC: <n>, < ecns mode >.
AT#ADSPC=?	Test command reports the supported values for the parameter **<n>.**

3. HOW TO USE AUDIO OVER USB FUNCTIONALITY

This chapter describes how to use audio over USB functionality.

- Step 1: Install latest Telit USB driver and restart the PC
- Step 2: Change USB composition as AT#USBCFG=11 or AT#USBCFG=12
  - If USB composition is changed by AT#USBCFG=11 or AT#USBCFG=12, the device will reboot.
- Step 3: Verify audio interface is shown on Device Manager(Mic & Speaker)
  - If the USB audio is recognized properly, the USB audio device will have been add as shown below.
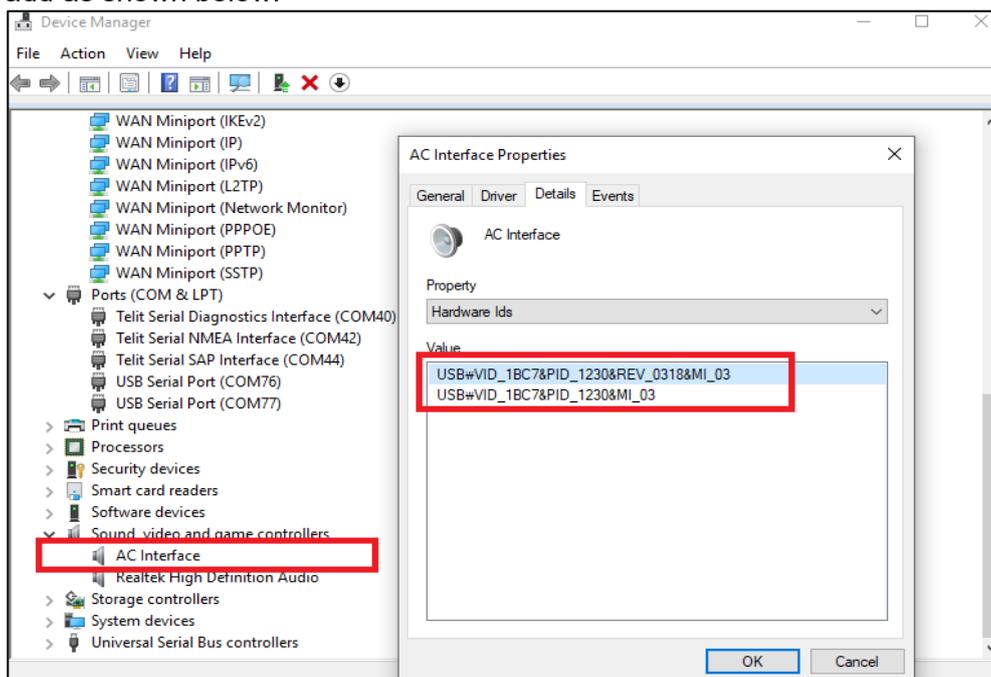
Note: The USB audio is supported for the Zero Installation.

- Step 4: Set both AC interface(mic & speaker) as default device for playback & recording for Windows sound control panel
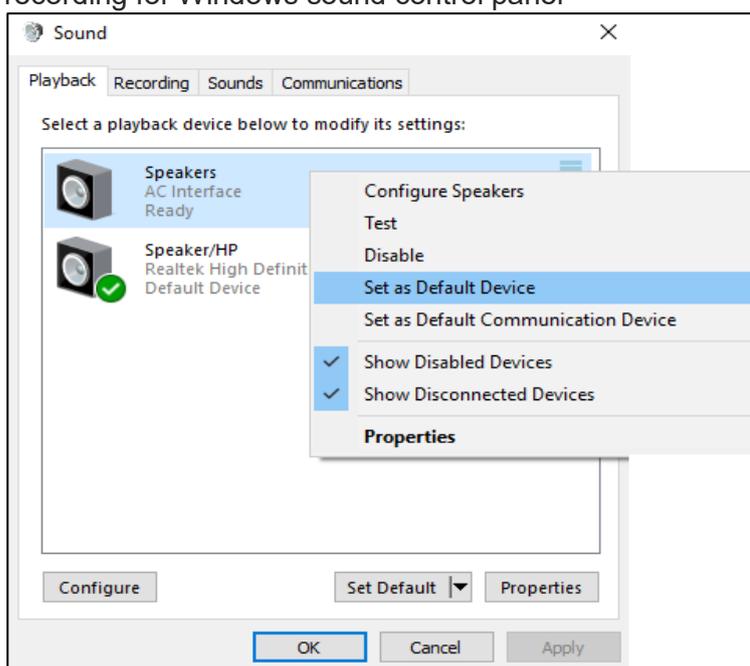
- Step 5: Disable the all other handset devices from the Windows sound control panel for Playback and Recording.
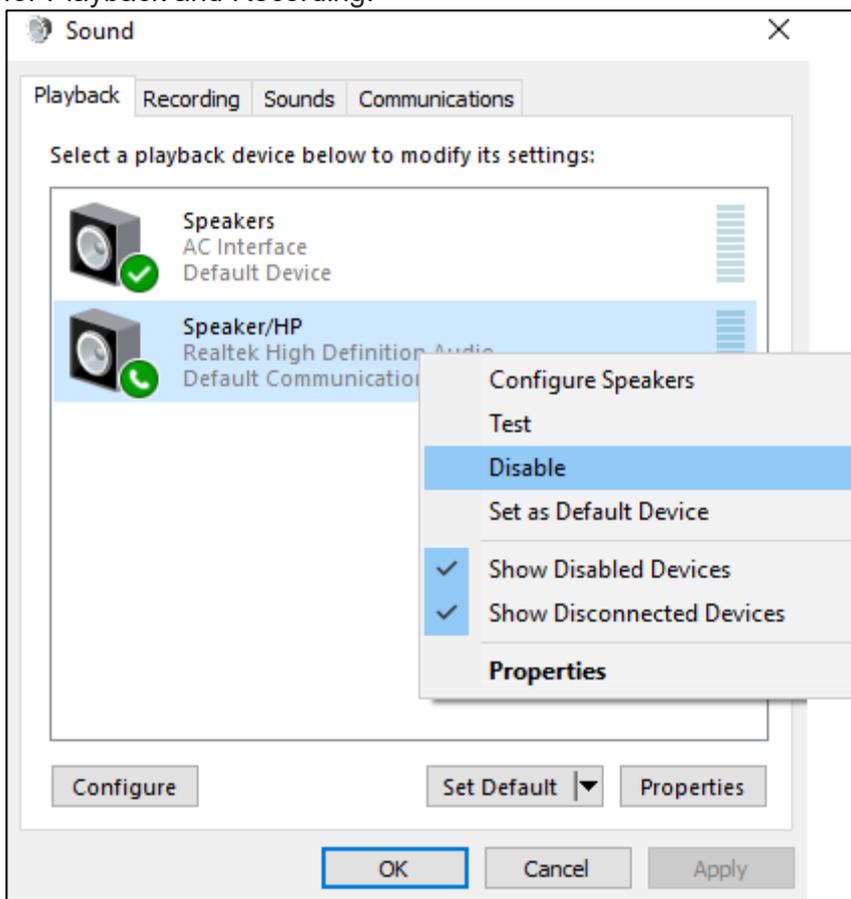
- Step 6: Select AC interface for microphone and speakers in audacity application on host.
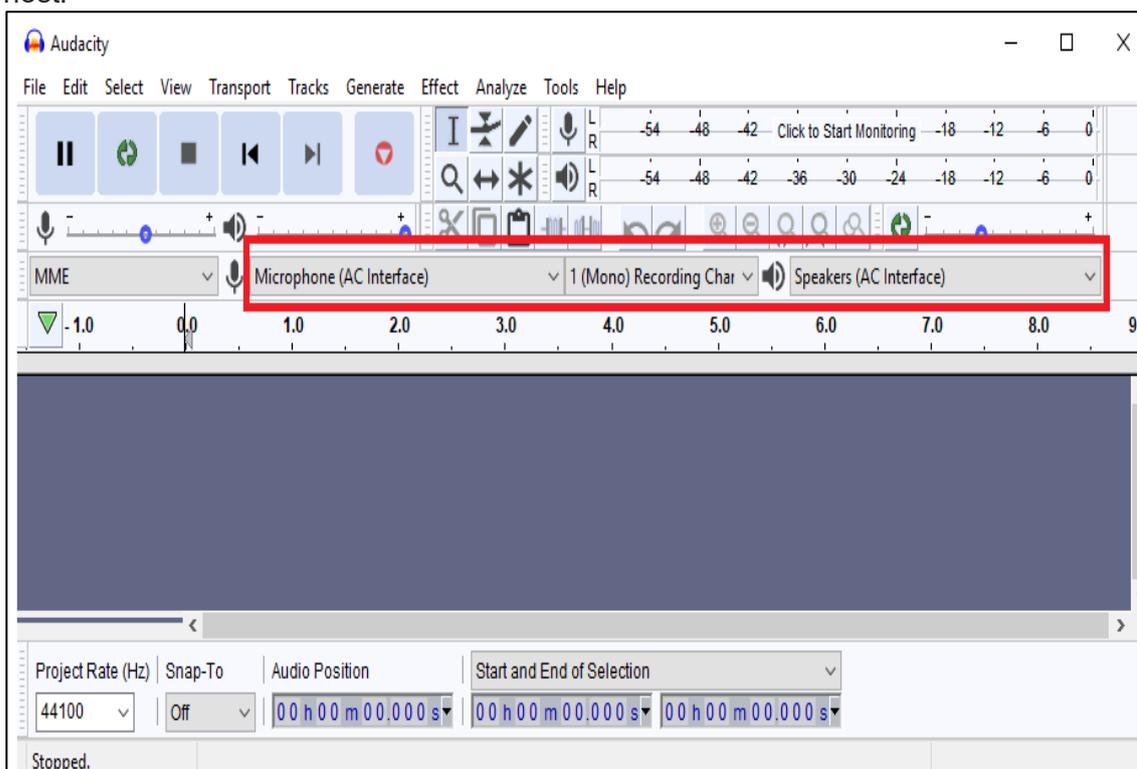
- Step 7: Select the modem port and open modem port to send AT command to modem.
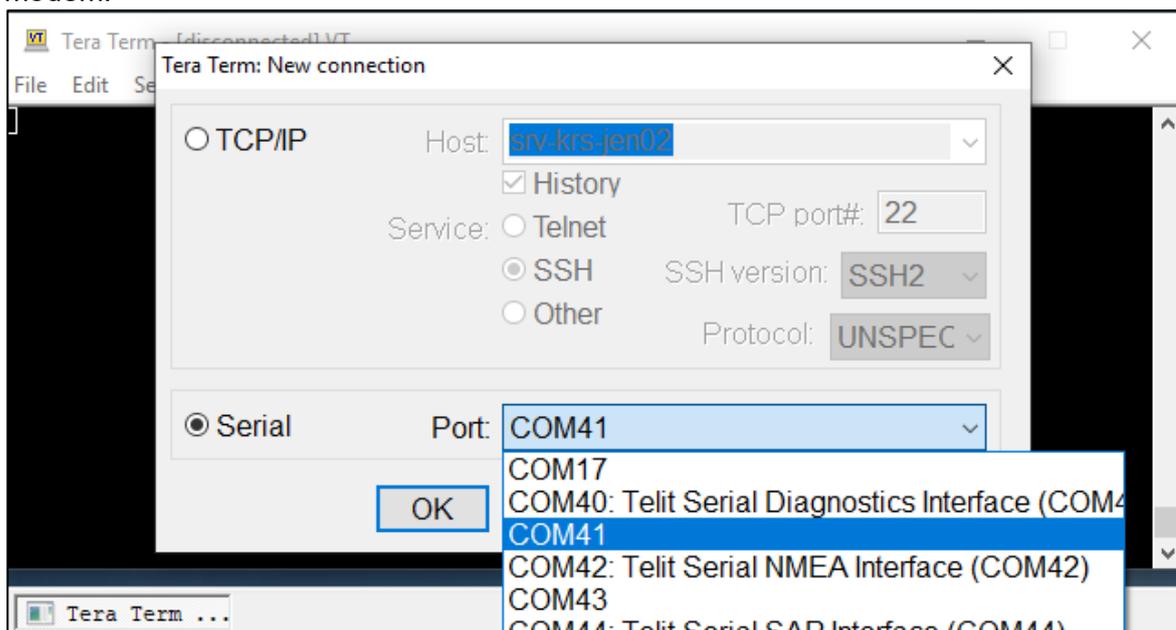
- Step 8: Send AT#ADSPC=6.0 or AT#ADSPC=6 to modem to change audio path to USB.
- Step 9: Make voice call
- In Audacity play wave file on the PC, The should be heard in Rx path of the voice call. The voice call Tx path should be recorded in Audacity.

4. GLOSSARY AND ACRONYMS

	Description
USB	Universal Serial Bus
PCM	Pulse Code Modulation
ECNS	Echo Canceller Noise Suppression
TTY	Teletypewriter

5. DOCUMENT HISTORY

Revision	Date	Changes
0	2019-06-13	Initial version
1	2019-10-15	Section 2.1.2 - Updated note description

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