

# Telular Corporation

## Requirements Document

### SX7M / SX7T Fixed Wireless Modem / Terminal

5/16/2007

Part Number: TBD

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# Revision History

Date	Revision	Summary	ECO	By/Approved
11/27/2006	0.0	Created	---	Gerard Knight
12/03/2006	0.1	Bulk changes resulting from meeting with Marketing		Gerard Knight
12/06/2006		<b>List of additions resulting from Meeting with Marketing:</b>		Gerard Knight
		User option for any voice call to suspend on ongoing packet data		
		“Copy protection” of billable software upgrades		
		Control of what users can and cannot download based on carrier (block of ESNs)		
		Added USB Host to supply 5 Volts @ 100mA		
		Added requirement for 12V Automotive power cable		
		Added Environmental requirements		
		Added RoHS requirement		
12/08/2006	0.2	<b>List of changes resulting from meeting with Marketing</b>		
		Added UL listed, CSA, CE for external power supply		
		Replaced LED definitions with update from Josh H.		
		Added cellular variant for 1xEVD-O Rel 0		
		Added section depicting SKUs		
		Added new POTS cmds from Edward S.		
		Replaced CLI with M2M interface		
12/22/06	0.3	Labeling changes 3.1.7 to 3.1.10 (Frank Collias)		Gerard Knight
		Added Product Matrix from Josh Hughes		
		Updated Cellular Variants to not conflict with product Matrix		
		Added Setup Wizard section from Josh Hughes		
		Added FOIP and MOIP modem details from Josh Hughes		
		Added requirement to support Verizon Access Manager Program		
		Filled in several TBDs		
3/8/2007		Updated RJ-11 Jack logic		Gerard Knight
		Updated LED definitions (Bruce Urban)		
		Updated Product SKU table (Bruce Urban)		
		Various other changes		
5/16/2007		Replaced SKU table with update from Darin H		Gerard Knight
		Added Super G3 33.6K fax modem		

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# 1 Introduction

This document details the requirements for the Telular SX7T/M Series of Fixed Cellular Terminals. These families of products offer CSD, SMS, and Internet services over various broadband cellular technologies.

The requirements set forth here are subject to a staged release plan. The release plan contemplates 3 releases before all the requirements are met.

## 2 Product Variants

### 2.1 Cellular Variants

#### 2.1.1 HSDPA

The SX7T HSDPA products shall use the Sierra Wireless MC8775V Radio Module which has the following features.

- a) HSDPA/UMTS frequency bands (850, 1900, 2100 MHz)
- b) EDGE/GPRS/GSM bands (850, 900, 1800, and 1900 MHz)
- c) HR/FR/EFR/AMR Vocoders

#### 2.1.2 1xEVDO Rev A

The SX7T 1xEVDO Rev A products shall use the Sierra Wireless MC5725V Radio Module which has the following features.

- a) 1xEVDO Rev. A service
- b) Dual-Band 800/1900 MHz
- c) EVRC and 13KQCELP Vocoders
- d) GPS

### 2.2 SX7T vs. SX7M

2.2.1 The SX7M and SX7T shall both support Ethernet, USB device and USB host interfaces.

2.2.2 The SX7T shall support a simulated PSTN port, supporting POTS phones, analog modems, analog fax machines, caller ID boxes, and telephone answering machines.

### 2.3 WiFi

2.3.1 The WiFi product variants shall provide 802.11b/g Access Point (AP) LAN functionality for internet access over the cellular WAN.

### 2.4 SKUs

The table below shows the SKUs known at this time, along with their key attributes, customer applications, and target regions.

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Base Model Numbers	Product Key Attribute	Customer
<b>CDMA V/D/F</b>		
SX7T-605C	Voice/SMS/Hi-Speed Data/Fax/GPS	Generic-US
SX7T-615C	Voice/SMS/Hi-Speed Data/Fax/GPS	Sprint
SX7T-625C	Voice/SMS/Hi-Speed Data/Fax/GPS	Alltel
SX7T-635C	Voice/SMS/Hi-Speed Data/Fax/GPS	Verizon Wireless
SX7T-645C	Voice/SMS/Hi-Speed Data/Fax/GPS	Telus Mobility
SX7M-400C	HiSpeed Data Modem Only	Generic
SX7M-415C	HiSpeed Data Modem Only	Sprint
SX7M-425C	HiSpeed Data Modem Only	Alltel
SX7M-435C	HiSpeed Data Modem Only	Verizon Wireless
SX7M-445C	HiSpeed Data Modem Only	Telus Mobility
<b>GSM V/D/F</b>		
SX7T-605G	Voice/SMS/Hi-Speed Data/Fax/GPS	Generic EU
SX7T-605G	Voice/SMS/Hi-Speed Data/Fax/GPS	Generic UK
SX7T-605G	Voice/SMS/Hi-Speed Data/Fax/GPS	Generic AU
SX7T-605G	Voice/SMS/Hi-Speed Data/Fax/GPS	Generic US
SX7T-655G	Voice/SMS/Hi-Speed Data/Fax/GPS	Cingular
SX7M-400G	HiSpeed Data Modem Only	Generic
SX7M-455G	HiSpeed Data Modem Only	Cingular

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### 3 Enclosure

- 3.1.1 The enclosure shall be smaller in size than the current SX5T, 5"x6"x1"
- 3.1.2 The enclosure shall be made of CE-rated plastic
- 3.1.3 The enclosure shall be Pantone (TBD) ("Dell Black") in color, with a Telular logo.
- 3.1.4 The enclosure shall have mounting holes to allow for wall mounting
- 3.1.5 The enclosure shall provide end user SIM/RUIM access
- 3.1.6 The enclosure shall allow for end user battery pack access
- 3.1.7 All labeling shall be screen printed. Ink color shall be white.
- 3.1.8 LEDs shall be labeled both on the top and on the side of the top cover, below LEDs, to facilitate easy viewing in either a single or stacked installation.
- 3.1.9 Each connector on the back side shall be labeled.
- 3.1.10 Standard size Telular logo shall be located on the top cover at the top left corner. A smaller Telular logo shall be located on the front side at the lower right corner

### 4 Connectors

The following connectors shall be included:

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- 4.1.1 An RJ-45 connector with a yellow ring shall be provided for the Ethernet Port
- 4.1.2 A USB Type B connector with a purple ring shall be provided for the USB Device port.
- 4.1.3 A USB Type A connector shall be provided for the USB Host port.
- 4.1.4 One or two TNC Antenna connectors shall be provided depending on whether the radio uses antenna diversity or not.
- 4.1.5 A Standard 12 VDC barrel connector shall be used for power entry.
- 4.1.6 A user detachable battery connector shall be provided.
- 4.1.7 A green grounding screw shall be provided.
- 4.1.8 The option for a RUIM/USIM socket shall be provided. (GSM or RUIM variants only)
- 4.1.9 Two RJ-11 Jacks shall be provided for the Simulated PSTN function. (SX7T family only)

## 5 Power Switch

There shall be a slide power switch capable of turning the unit on or off. The following table defines the operation of the power switch.

Switch	AC Valid	Battery Valid	State of Operation
On	Y	X	Normal Operation on AC, Charging if required
On	N	Y	Normal Operation on battery
On	N	N	Totally off
Off	Y	X	Charging Only, if required
Off	N	X	Totally off

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## 6 Configuration Reset Switch

- 6.1.1 A push button switch is required to restore the local default settings for Ethernet/USB connectivity. This is required because the unit could be configured such that it could no longer be locally accessed.
- 6.1.2 This reset function shall reset the password for local device management.
- 6.1.3 The local defaults will only be restored for a switch depression of 10 seconds or greater.

## 7 External Power Supply

- 7.1.1 The power supply shall be a desktop type
  - 7.1.2 The power supply shall operate over 90-264 VAC input
  - 7.1.3 The power supply shall have a 12 VDC output
  - 7.1.4 The power supply shall have a 3 wire detachable IEC input power cord
  - 7.1.5 The power supply shall be UL listed, CSA, and CE approved
- An automotive power cord for 12VDC operation shall be provided. Connector shall accommodate both U.S. and European connector configuration standards.

## **8 Battery Pack and Battery Operation**

- 8.1.1 All units will be shipped with a NiMH battery pack.
- 8.1.2 End users are required to operate units with a battery pack installed. This insures detachment from the network during AC failures, and provides extra protection of non-volatile memory in harsh power grid environments.
- 8.1.3 The unit shall operate without a battery pack installed because manufacturing builds and tests units without a battery installed.
- 8.1.4 The battery shall provide 8 hours standby time
- 8.1.5 The battery shall provide 1 hour talk time
- 8.1.6 A discharged battery shall take less than 4 hours to charge to 90% of capacity.
- 8.1.7 When in an “off” state and no external DC voltage supplied, total battery drain shall be less than 100 uA.

## **9 WAN Requirements**

### **9.1 Internet Access over Cellular**

- 9.1.1 The WAN interface shall provide Internet access over cellular

### **9.2 IP Management**

#### **9.2.1 DDNS Client**

A DDNS (Dynamic Domain Name Server) client works with a DDNS server to allow mobile terminated access to a terminal despite it possibly having an unknown dynamic IP address. The DDNS server enables access to SX7s via the Internet using a programmable symbolic name, rather than an IP address.

9.2.1.1 A DDNS client shall be provided.

9.2.1.2 The DDNS client shall support the Mint DDNS standard.

9.2.1.3 The DDNS client shall be interoperable with Telular's, and commercially available DDNS servers.

## 9.2.2 Auto Connect

9.2.2.1 A mode for automatically connecting to the Internet upon power-on, loss of connection, or after termination of a circuit switched call, shall be provided.

9.2.2.2 A mode for automatically connecting to the Internet on LAN activity shall be provided.

9.2.2.3 The auto connect mechanism shall be user programmable to select mode and enable or disable.

## 9.2.3 Internet Connection Keep Alive

Prevents the closing of the Internet connection by the cellular network during extended periods with no data being transferred.

9.2.3.1 Keep Alive may use Ping to keep the Internet connection open.

9.2.3.2 Keep Alive shall be user configurable to enable and disable

9.2.3.3 The duration of inactivity before a Keep Alive action is taken shall be user configurable.

## 9.2.4 SMS Triggered Connect-Back ("Phone-Home")

This method can be used by a remote entity to establish a connection with an SX7 terminal that has an unknown IP address, and/or is behind a firewall. The remote entity will send a secure SMS to the terminal. The terminal will respond by initiating a connection to the remote entity.

9.2.4.1 SMS Triggered Connect-Back shall be provided

### **9.3 Remote Device Management (RDM)**

9.3.1 RDM shall be done Over-The-Air (OTA)

9.3.2 RDM Security

9.3.2.1 Unauthorized access to the terminal maintenance and configuration shall be prohibited using authentication and encryption.

9.3.2.2 Provisions for RDM access by customers to said customer's terminals shall be provided.

9.3.2.3 In such cases where customers are given access rights to their terminals, access by Telular shall be revocable.

9.3.3 All configuration settings shall be remotely readable and writable

9.3.4 FOTA (Firmware Over The Air)

9.3.4.1 Application Processor Firmware

9.3.4.1.1 The Application Processor Firmware shall be upgradeable in segments to minimize cost of data transmission

9.3.4.1.2 The following application firmware segments shall be individually upgradeable:

- a) Sticky Points (code patches)
- b) Arbitrary Files in the File System
- c) PSTN Simulator DSP code
- d) RTPs
- e) Downloadable Kernel Modules (DKM)
- f) Shared Libraries
- g) VxWorks OS

9.3.4.2 Radio Module Firmware

9.3.4.2.1 The radio module software shall be upgradeable.

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### 9.3.5 Sensor Points

9.3.5.1 Wind River Sensor Point remote diagnostic technology shall be supported

## 10 LAN Requirements

### 10.1 LAN - Wired Connections

#### 10.1.1 Ethernet

10.1.1.1 The LAN shall provide Internet connectivity via the Ethernet port.

10.1.1.2 The Ethernet port shall support connection to an external hub or switch.

10.1.1.3 There shall be a version of product with a built in two or four Port Ethernet switch.

#### 10.1.2 USB

10.1.2.1 The LAN shall provide Internet connectivity via the USB Device port

10.1.2.2 The USB device port shall support DUN (dial-up networking).

### 10.2 LAN Utilities

#### 10.2.1 DHCP Server

10.2.1.1 A DHCP server shall be provided for automatic assignment of IP addresses of any device connected to the LAN.

10.2.1.2 The DHCP server shall be user configurable to on or off. Default shall be on.

10.2.1.3 Local IP addresses shall also be statically configurable.

#### 10.2.2 NAT

10.2.2.1 A Network Address Port Translation function shall be provided for sharing the single WAN IP address amongst multiple local IP addresses on the LAN.

#### 10.2.3 Firewall

10.2.3.1 A firewall function shall be provided.

10.2.4 ATE Support shall be provided as required (Automatic Test Equipment)

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## 10.2.5 SMS Services

### 10.2.5.1 SMS POP3 Adaptation: needs more definition

## 10.3 Local Device Management

### 10.3.1 Local device management shall be done using the Ethernet port

### 10.3.2 Internal Website

An internal website for maintenance and configuration shall be provided. This website is accessible over the LAN. The following sections describe the website's capabilities.

#### 10.3.2.1 System Settings

- Password Change
- Host Name Change
- Restore Factory Defaults Factory defaults(hidden)/ Carrier defaults
- System Reset
- Software Upgrade (Pull)

#### 10.3.2.2 WAN Configuration

- PPP Setup
- Physical Address Setting
- GPS Reporting Configuration

#### 10.3.2.3 LAN Configuration

- IP Address /Subnet Address Setting
- DHCP Setup
- GPS Applications Configuration

#### 10.3.2.4 Firewall Configuration

#### 10.3.2.5 Simulated PSTN Configuration

The following list of PSTN configuration items shall be manageable using the internal web site:

### 10.3.3 M2M Interface

10.3.3.1 An interface suitable for M2M shall be provided for reading and writing of all device configuration items

10.3.3.2 The M2M interface shall be password protected

10.3.3.3 The M2M interface shall be protected from hacking over the WAN

## 10.4 WiFi 802.11b/g

10.4.1 The WiFi product variants shall provide 802.11b/g Access Point (AP) LAN functionality for internet access over the cellular WAN.

## 11 Ethernet Port

11.1.1 The Ethernet port shall be 10/100 Base T with auto detect.

11.1.2 The Ethernet port shall support Local Device Management

## 12 GPS

**12.1.1 Units shall be configurable to report GPS location over the WAN or LAN in response to the following triggers:**

- a) Time Interval
- b) Change Magnitude
- c) Remote query
- d) Local query

**12.1.2 Mobility restriction shall be supported**

## 13 USB Device Port

13.1.1 The USB Device Port shall support USB 2.0 – Full Speed (12 Mbits/second)

13.1.2 The USB Device Port shall provide Internet access over cellular using DUN (Dial-Up Networking)

In general terms, the USB device supports PPP over USB for Internet access. DUN, Dial UP Networking, is a specific term for PPP over USB on a PC running Windows.

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13.1.3 The USB Device Port shall support PC Fax

13.1.4 The USB Device Port shall support PC CSD

## **14 Simulated PSTN**

### **14.1 Voice Service**

14.1.1 Voice service shall be supported on the Simulated PSTN

14.1.2 Voice service shall be supported during an active data session on the WAN, when simultaneous voice and data is supported by the radio and the serving network.

14.1.3 Dialing an emergency number shall terminate or suspend any existing network connection as required to make an emergency call.

14.1.4 User option for any voice call to suspend on ongoing packet data (voice priority).

14.1.5 POTS programming will function within voice service

14.1.6 TTY/TDD shall be supported during voice service

14.1.7 Type 1 (On Hook) Caller ID shall be supported during Voice Service.

14.1.8 Type 2 (Off Hook) Caller ID shall be supported during Voice Service.

14.1.9 A set of vertical services (i.e. \*69, \*70 etc.) shall be supported. The set is defined by the least common denominator of services that can be reasonably supported in CDMA and GSM systems. (TBD)

14.1.10 The glare behavior shall be user selectable to reject an incoming call during dialing, or to provide a call waiting tone during dialing.

14.1.11 The GSM Standard MMI shall not be supported.

14.1.12 Support of Supplementary Services and USSD

14.1.13 DTMF correction shall be supported

Correction for distortion of down link DTMF by Vocoder. Purpose is to ensure reliable operation with premises equipment (PBX, telemetry equipment). If necessary, can add programmability for user to select ON/OFF of dtmf compensation mode, or adjustment of sensitivity.

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## 14.2 Analog Fax (G3) Service

### 14.2.1 Analog Fax over CSD Bearer

Analog fax shall be supported over a CSD bearer only when the serving network supports it.

### 14.2.2 Analog Fax over TCP/IP Bearer – FOIP

FOIP shall be supported using the T.38 Protocol

### 14.2.3 G3 Modems Supported

- ITU V.17 - 7200, 9600, 12,000 and 14,400 bps
- ITU V.29 - 7200 and 9600 bps
- ITU V.27ter - 2400 and 4800 bps
- ITU V.21 Channel 2 - 300 bps FSK
- ITU T.30 Fax Protocol
- ITU T.4, MH and MR Image Format Conversion
- ITU T.4 Copy Quality Checking/CorrectionSuper G3 Modem 33.6KBPS

## 14.3 Analog Modem Service

### 14.3.1 The following analog modems shall be supported:

- a) ITU V.34 - 2400 to 33,600 bps
- b) ITU V.32/V.32bis - 4800 to 14,400 bps
- c) ITU V.23 - 75/1200 bps
- d) Bell 202 - 75/1200 bps
- e) ITU V.22bis - 1200 and 2400 bps
- f) ITU V.22 - 1200 bps
- g) Bell 212 - 1200 bps
- h) Compatible with 212A? (TBD)
- i) ITU V.21 - 300 bps
- j) Bell 103 - 300 bps
- k) ITU V.42 - LAPM Error Correction, Detection
- l) ITU V.42bis - Lempel-Ziv Data Compression
- m) V.90 Server Modem (56K)

### 14.3.2 The analog modem shall be able to negotiate from 33.6K and higher down to lower speeds? (TBD)

### 14.3.3 The analog modem shall support V.8?

## 14.4 RJ-11 Jack Programmability and Modes

In this section the RJ11 Jacks are referred to as J1 and J2. These jacks can be user configured using the local device management to support voice and data capabilities without the need for prefix dialing or POTS commands.

Normally, the two RJ11 jacks in the SX7t operate as extension jacks; if both jacks are off hook, they will both have the same signal on tip/ring. There are two modes of operation for the RJ11 jacks, Voice Only Mod (VOM) and Voice and Analog Mode (VAMM). These modes are configurable by POTS commands and/or the configuration web page.

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### 14.4.1 Voice Only Mode (VOM)

This operating mode sets both jacks to handle only voice calls by default. This operating mode can be overridden on either jack by using a dialing prefix. The dialing prefix in this mode indicates to the system that a fax/data call is to be launched on the jack that is issuing the dialing prefix. The dialing prefix override is for the next call only. After the call terminates, the default VOM operation returns.

### 14.4.2 Voice and Analog Modem Mode (VAMM)

This operating mode sets jack 1 (J1) to be the voice jack and jack 2 (J2) to be the fax/data jack. Like VOM, this mode's operation can be overridden by using a dialing prefix. If J1 has a dialing prefix pre-pended to the dial string, a fax/data call will be launched. If J2 has a dialing prefix pre-pended to the dial string, a voice call will be launched. The dialing prefix overrides are for the next call only. After the call terminates, the default VAMM operation returns.

### 14.4.3 MO Call Routing

The following table assumes that the system is idle before either of the jacks seize the line, i.e. no calls are active, and the cellular service allows simultaneous voice and data calling.

J1	J2	Mode	Tone	Comments
On	On	X		
Off	On	VOM	Dial Tone	Launch voice call
On	Off	VOM	Dial tone	Launch voice call
Off	On	VAMM	Dial tone	Launch voice call
On	Off	VAMM	Dial tone	Launch fax/data call
On	On	X		
Override	On	VOM	Dial tone	Launch fax/data call
On	Override	VOM	Dial tone	Launch fax/data call
Override	On	VAMM	Dial tone	Launch fax/data call
On	Override	VAMM	Dial tone	Launch voice call

Override = Dialing prefix to override the current jack mode.

### 14.4.4 MT Call Routing

Mobile terminated calls are also affected by jack mode setting.

Mode	Fax/data	Voice	Comments
VAMM	J2	J1	Fax/data on J2. Only J2 will receive alert signal by disabling J1. J1 will be re-enabled after line J2 line seizure or alert end. Voice on J1. J2 will be disabled during an MT voice call alert so only J1 will ring. J2 reenabled after J1 line seizure or alert end.
VOM	X	J1 & J2	Fax/data MT calls are rejected. Voice calls are rung through.

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#### 14.4.5 Voice Channel Access Rules via Voice Priority

This section describes the system Voice Priority setting. The SX7t can be set so that voice calls take priority over any other connection activity in the system. This applies only to mobile originated calls.

Voice Priority	WAN connected	Dial tone	Comments
Enabled (default)	X	Normal	Pause WAN if necessary (EVDO).
Disabled	Yes	E911	E911 call will be launched. System will halt any connectivity activity necessary to accomplish this
Disabled	No	Normal	Voice calls launched as normal.

#### 14.4.6 Limitations

Due to hardware limitations, there is an RJ11 jack priority built into the system. The priority is to J2 in the system. For J1 to be able to detect off hook or on hook, J2 must already be on hook. In other words, for any jack activity to be detected on J1 (on hook, off hook or hook flash), J2 *must* be idle (on hook). If J2 goes off hook, any changes in J1 hook state cannot be detected by S/W.

#### 14.4.7 Prefix Dialing

14.4.7.1 Prefix Dialing shall be provided to override the current mode of an off-hook RJ-11 jack.

14.4.7.2 There shall be user programmable prefixes that allow numeric and non-numeric entries.

14.4.7.3 User programmable dialing prefixes shall not invalidate the standard prefixes.

14.4.7.4 Prefix dialing shall apply to voice and data modes

### 14.5 POTS Programming

POTS programming uses a Plain Old Telephone Set to program internal settings by dialing special sequences.

14.5.1 POTS Programming shall support the following:

- a) Entering programming/configuration mode
- b) Activating CDMA units by manual entry of MDN/MIN mobile numbers
- c) Setting independent functions (voice, fax, CSD, FoIP/MoIP) of RJ-11 jacks
- d) Pre-fix dialing (\*1#, \*2#, ext) for fax and CSD functions, one time and always modes
- e) Reset user defaults (ex:\*107\*1#)
- f) Setting USB for CSD?
- g) Setting USB or RJ-45 for packet data?
- h) Properties (username and password) for "Always On" packet data?

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- i) ROH Continuous/Non-Continuous
- j) Automatic End-Of-Dialing
- k) Polarity Reversal – MO
- l) Polarity Reversal – MT
- m) Self-Test Interval
- n) Dial Tone Type
- o) Restore User Settings to PRI Values
- p) On-Hook Voltage Level
- q) Disconnect Tone

## 15 IP Modems

These “modems” work in conjunction with the analog modems as defined in the Simulated PSTN section. IP modems packetize data from the analog modem and transmit the packets over the Internet. Likewise, IP modems de-packetize data from the Internet and transmit the data to the analog modem.

For communicating with remote analog modems, IP modems will require some form of an IWF to translate IP back to analog. In some cases the far end might be satisfied with IP data, and no IWF would be needed. With an SX7T at the far end, analog to analog communication could be supported without an IWF.

The following types of IP modems shall be supported.

- FOIP - Analog Fax over IP / Telular or 3<sup>rd</sup> Party Fax Gateway (IWF)
- MOIP - Analog Modem Over IP / Telular IWF
- FOIP - Analog Fax over IP / Point to Point
- MOIP - Analog Modem Over IP / Point to Point

## 16 USB Host

### 16.1 The USB Host Port shall support USB 2.0 – Full Speed (12 Mbits/second)

### 16.2 The USB Host Port shall supply a nominal 5 Volts at 100 milliamps

### 16.3 Targeted USB devices

For revenue protection, the ability to push new device drivers OTA would obviate the need for support and management of user licenses.

The following devices may be supported:

- a) WiFi
- b) Bluetooth
- c) IP Video Camera
- d) Hard Disk Drive
- e) USB Memory Stick

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# 17 LED Indicators

## 17.1 LED definitions

LED	1	2	3	4	5	6	7	
	Power	MSG	PSTN	Service / SIM	RSSI	RSSI	RSSI	
Off		No Msgs	On Hook - No Wan		No GPS,Sig			
Solid	AC/Normal	VM / POTS	On hk / Wan	Service / 2G	1 Bar + GPS	2 bars	3 bars	
Slow	DC only	SMS / Flash		Service / 2.5G	1 Bar	1 bar	2 bar	
Fast		Both / FOTA	On Hk / Wan Tx	Service / 3G				
Solid	AC/chrg	Norm / Prog mode	Off hk / Wan	Roam Srvc / 2G				
Slow	Low DC		Off hk / No Wan	Roam Srvc / 2.5G				
Fast			Off Hk / Wan Tx	Roam Srvc / 3G		Off	Off	Off
Solid	Batt fault		ROH / Wan	No Service	On	Off	Off	none
Slow	DC crit		ROH / No Wan	PIN Locked	On	Slow	Off	Lowest
Fast			ROH / Wan Tx	SimErr/NoSim/NetReject	On	On	Off	Fair
					On	On	Slow	Good
					On	On	On	Best

  

<u>Programming Mode</u>	<u>Unprovisioned CDMA</u>
Alternate Red/Grn	Fast Red

	<b>PSTN Error</b>	ROH will be cleared by going on hook. PSTN error will not
Solid	PSTN Err / Wan	
Slow	PSTN Err / No Wan	
Fast	PSTN Err / Wan Tx	

## 17.2 Programming Mode

17.2.1 LED number 3 shall alternate between Red and green in the programming mode.

17.2.2 LED number 2 shall indicate the type of programming mode.

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## **17.3 PSTN Error**

17.3.1 Indicated by LED number 3 being red and it shall not clear by placing receiver on hook.

17.3.1.1 Solid = PSTN Error/WAN

17.3.1.2 Slow = PSTN Error/ No Wan

17.3.1.3 Fast = PSTN Error/ Wan TX

## **17.4 Un-provisioned CDMA**

Indicated by fast flashing red LED number 4.

# **18 Device Management and Configuration**

18.1.1 Local device management and configuration shall be supported.

See Local Device Management in LAN section and POTS Programming in the Simulated PSTN section

18.1.2 The device shall support remote management and configuration

See Remote Device Management in WAN section

# **19 RUIM/USIM**

19.1.1 3V/1.8V RUIM/USIMs shall be supported

Need to check what Mfg/Sizes/types are supported (TBD)

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## 20 Supporting Software

### 20.1 End User Software

20.1.1 Standard Web Browser Define web browsers tested with (Iexp, Mozilla)

20.1.2 USB Driver Installation Wizard

20.1.3 Full Setup Wizard

20.1.4 Firmware Upgrader. Revenue protection (send enable software key) media alone does not work

20.1.5 SMS POP3 Adapter and Install Wizard

20.1.6 Carrier Specific Software

20.1.6.1 Verizon Access Manager Program shall be supported

20.1.7 "Copy protection" of billable software upgrades

20.1.8 Control of what users can and cannot download based on carrier (block of ESNs)

Are there special connection managers, utilities, etc. required by each targeted carrier?

20.1.9 SX7 User Setup/Installation Wizard on CD

The purpose for the user "Setup Wizard" would be to allow a software interface between an End User computer and the SX7 to initially configure everything from the mobile number (CDMA), RJ-11 functionality, USB, and internet packet data. Therefore, replacing the need for POTS programming or prefix dialing. This would be an exe file on a CD or internet download compatible with Windows 2000 and higher. It should also allow a "configuration" file (user defaults) to be saved to facilitate setting up multiple units (minus the mobile number). Should follow the process of asking questions relevant to the Model selected by the End User, boxes being "checked" or "filled out" before allowing the user to select "next page". A review page will be shown at the end to confirm settings before saving to NV memory.

Action Items to be completed by the Wizard:

- MDN & MIN for CDMA
- J1 & J2 functionality (voice, CSD, MoIP/FoIP) that will detect MO/MT calls and handles them appropriately as stated in the product spec.
- Internet packet data

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- Set up dialup session with Windows and SX7, username/password/dialing number
- Select USB B Host, local PC
- Select Ethernet, local PC or LAN
- “Always ON” connectivity
- CSD modem settings (baud rate, timing, ect.) for Telemetry applications
- Advance feature settings, ex: DTMF correction ON or OFF
- Possible future USB Host & Device driver installation
- Possible future functionality for setting up Bluetooth connectivity
  - Cellular handset to SX7T RJ-11 jack output for premise POTS phones
  - Handsfree kits for voice calls
  - Device to SX7 T for CSD transmission
  - Device to SX7T for Packet Data transmission

## 20.2 Supply Chain Software

20.2.1 First Flasher

20.2.2 Re-Flasher

20.2.3 Diagnostics

20.2.4 PST

## 21 Supporting Services

### 21.1 Fax Gateway Service - FOIP (IWF)

This is an Internet service for converting between FOIP data and analog fax signals on the PSTN. Users can use this service to send analog faxes between an SX7T and any analog fax machine on the real PSTN, without the need for 2G network fax service.

21.1.1 Telular shall provide a fax gateway service.

### 21.2 MOIP IWF

This is an Internet service for converting between MOIP data and analog modem signals on the PSTN. Users can use this service to send analog modem data between an SX7T and any supported analog modem on the real PSTN, without the need for 2G network fax services.

21.2.1 Telular shall provide a MOIP IWF service.

### 21.3 DDNS Web Server

See WAN requirements section for detail on DDNS.

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21.3.1 A DDNS Web Server shall be provided by Telular.

## **22 Environmental Specifications and Regulatory Requirements**

### **22.1 Regulatory Requirements**

#### **22.1.1 All Product Variants**

22.1.1.1 FCC Part 15 certification is required

22.1.1.2 FCC Part 22/24 certification is required

22.1.1.3 RoHS Compliance is required

#### **22.1.2 SX7T-605G (HSDPA)**

The following approvals are required for all HSDPA product versions only:

22.1.2.1 PTCRB

22.1.2.2 Cingular Wireless Network Approval

22.1.2.3 CE

#### **22.1.3 SX7T-605C EVDO)**

The following approvals are required for all EVDO product versions only:

22.1.3.1 CTIA

22.1.3.2 Verizon Wireless Network approval

### **22.2 Environmental Requirements**

22.2.1 Operating Temperature  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) to  $+50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ )

22.2.2 Up to 95% relative humidity (non-condensing)

22.2.3 Storage Temperature  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ) to  $+60^{\circ}\text{C}$  ( $140^{\circ}\text{F}$ )

22.2.4 Up to 95% relative humidity (non-condensing)

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