Installation Guide

Release 1.0 04/22/2005

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1.Product specification

1.1 Specification of MODEM

56AZBT is a V.92/V.90 modem designed combine with Class2 Bluetooth support of Azalia riser form factors. The chipset solution we adopt SmartLink/SmartRiser565 and CSR BlueCore2 single chip Bluetooth™ system for implement high performance Modem and Bluetooth features.

- Modem :
  - **V.92 (up to 56 Kbps down, 48 Kbps up)**
  - **Quick Connect (V.92)**
  - **Modem on Hold (V.92)**
  - **V.90 (up to 56 Kbps down, 33.6 Kbps up)**
  - **V.34(4.8 Kbps to 33.6 Kbps)**
  - **V.32 bis (4.8 Kbps to 14.4 Kbps)**
  - **V.23 (75 bps up, 1200 bps down)**
  - **V.22 bis (1200/2400 bps)**
  - **V.21, Bell 103 / Bell 212**
  - **Automode**
  - **V.44/V.42 bis/MNP5 data compression**
  - **V.42/MNP 2-4 error correction**
  - **Hayes AT Command**
  - **TIES escape code**
  - **ACPI power management**

- **Fax :**
  - **Group 3, Class 1**
  - **V.17**
  - **V.29**
  - **V.27 ter**

- **WHQL :**
  - **WLP 2.0 compliant**

- **Voice Features :**
  - **ADPCM voice compression**
  - **Digital Answering Machine**

- **Telephony Services :**
  - **Ring Detection**

- Wake Up on Ring
- On/Off hook control
- Call progress monitor
- DTMF detection and generation
- Voice/fax/modem distinction
- Caller ID (optional)

➢ **Video Conferencing :**
- V.80/H.324 interface support

➢ **International Approvals :**
- Single board layout for multiple country certification: FCC, CTR21, JATE and others

➢ **Operating System Support :**
- Windows (XP, 2000, ME, 98SE, 98, 95, NT4), Linux

➢ **Diagnostic Tool :**
- Modem Helper

1.2. Specification of Bluetooth

➢ **Features**
- Complete 2.4GHz radio transceiver and baseband
- Bluetooth ™ version 1.1 compliant (upgradable to ver.1.2)
- Bluetooth ™ Class 2 operation
- Park, Sniff, Hold and Sleep low power modes

➢ **General**
- Data Transmission Rate up to 723 kbps (asynchronous)
- Link Distance better than 10 meters (33 feet) in free space

➢ **General**
- Modulation : Frequency Hopping Spread Spectrum (FHSS) with Gaussian Frequency Shift Keying (GFSK)
- Frequency Range : 2.40GHz– 2.4835GHz (ISM Band)
- RF Channels : 79 channels for USA, Japan, and Europe (except France)
- RF Output Power : +4 dBm ma x. , Class 2 (upgradeable to 20dBm)
- Sensitivity : Better than –80dBm@0.1% BER
- Max. Input Level : - 20dBm

➢ **Baseband**
- Link Mode : ACL & SCO link supported

- **Network Capabilities : Piconet : point –to- point & point-to-multipoint and Scatternet supported**
- **Security :**
  - ✓ **Initialization: 4-digit PIN code**
  - ✓ **Authentication: Security Mode 2 support**
  - ✓ **Encryption: 128-bit Data Encryption support**
- **Data Packets : DM1/DH1, DM3/DH3, DM5/DH5**

➢ **Operating System Support :**

- **Windows XP/2000/ME/9x**

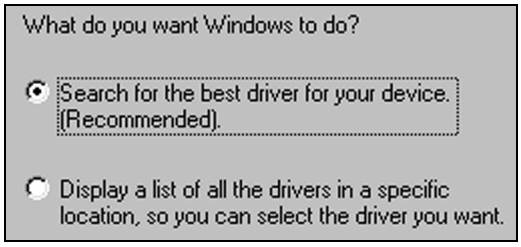
2. Hardware Installation Steps

1. Turn computer power off and unplug your computer from the power supply.
2. Remove the computer cover.
3. Insert Modem/Bluetooth combo card into MDC 1.5 connector of mother board.
4. Plug one end of the telephone cable into MODEM “LINE” jack . Plug the other end of the telephone cable into wall phone jack.
5. Turn computer power on.

3.MODEM Driver Installation

3.1 Windows 98SE

1. Boot the system. System will detect a new Device and request you to install its driver. Click **[** Next **]** button.
2. In the new dialog box, you have two choices to install a driver. The default choice is “Search for the best driver for your device” and click **[** Next **]** button

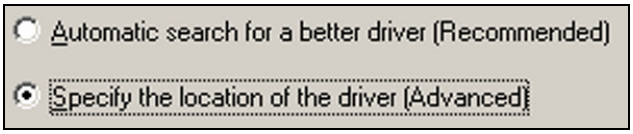


3. Choose “Specify a location”.

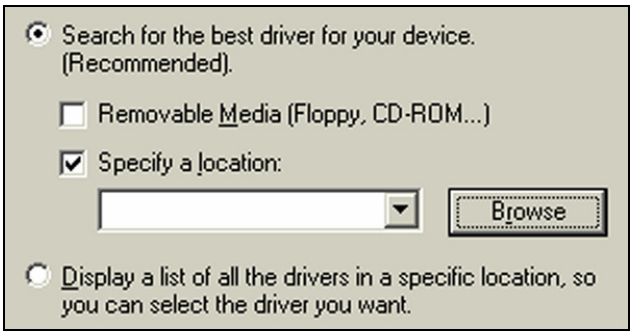
4. Insert the driver CD into the CD-ROM device. Click Browse and choose the CD-ROM Location (Ex: E:\Driver\Win98)
5. Windows 98 will copy the files into your hard disk. Click **[** Finish **]** button.

3.2 Windows ME

1. Boot the system. System will detect a new Device and request you to install its driver.
2. Choose “Specify the location of the driver”. Click **[** Next **]** button.



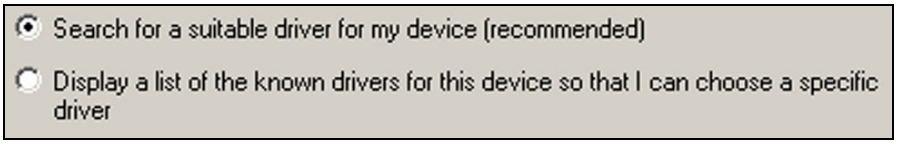
3. Choose “Specify a location”.
4. Insert the driver CD into the CD-ROM device.
   Click Browse and choose the CD-ROM Location (Ex: E:\Driver\WinME).



5. Click **[** Finish **]** button. Repeat step2, step3, step4 and step5 once.
6. Windows ME will copy the files into your hard disk. Click **[** Finish **]** button

3.3 Windows 2000

1. Boot the system. System will detect a new Device and request you to install its driver. Click **[** Next **]** button.
2. In the new dialog box, you have two choices to install a driver. The default choice is “Search for a suitable driver for my device” and click **[** Next **]** button.

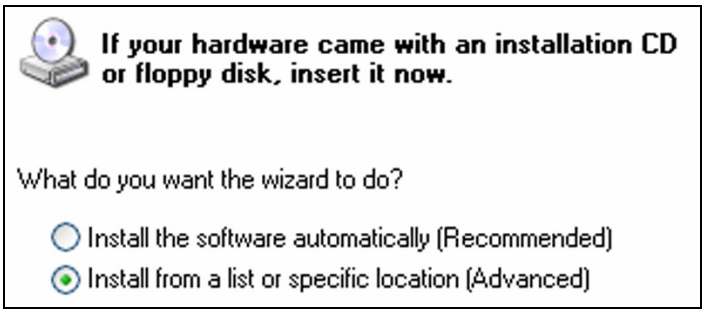


3. Choose “Specify a location”. Click **[** Next **]** button.

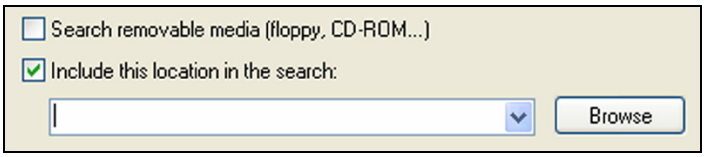
4. Insert the driver CD into the CD-ROM device. Click Browse and choose the CD-ROM Location (Ex: E:\Driver\WIN2K-XP).
5. Windows 2000 will copy the files into your hard disk. Click **[** Finish **]** button

3.4 Windows XP

1. Boot the system. System will detect a new Device and request you to install its driver.
2. In the new dialog box, you have two choices to install a driver. Choose “Install from a list or specific location”. Click **[**Next**]** button.



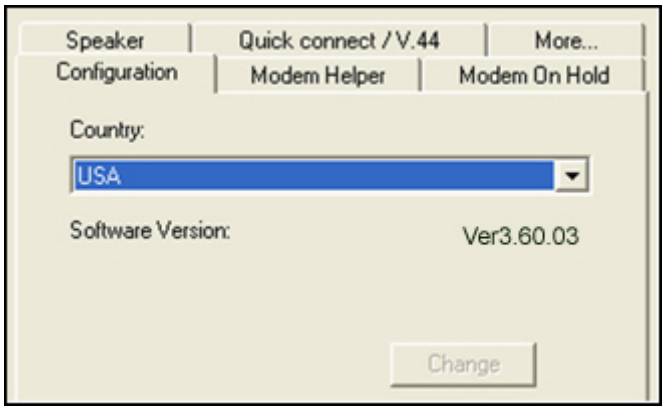
3. Choose “Include this location in the search”.



4. Insert the driver CD into the CD-ROM device. Click Browse and choose the CD-ROM Location (Ex: E:\Driver\WIN2K-XP). Click **[**Next**]** button.
5. Windows XP will copy the files into your hard disk. Click **[**Finish**]** button

3.5 Select Country for MODEM

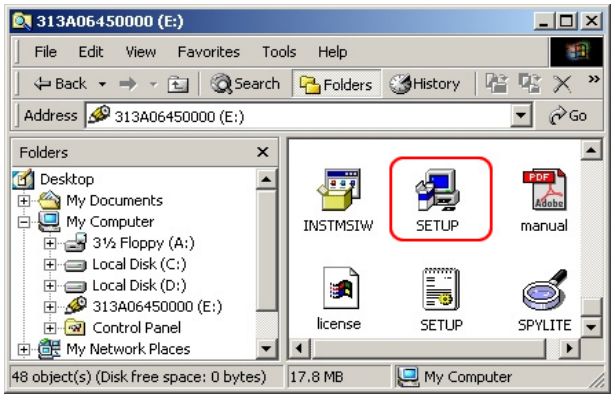
Control Panel → Modem Settings



4.Bluetooth software Installation

4.1 Driver install

1. Insert the driver CD ,then Run the setup.exe from CD ROM
   ,as figure below.(this driver-utility support Win98SE/ME/2000/XP)



2. This driver-utility will provide a **InstallShield Wizard** for installation.
3. Instillshield Wizard will auto reboot system after installation is completed .

5. AT Command

Modem operation is controlled by AT commands. These AT commands include the following:

1. Basic AT commands, for example ATDT123
2. Extended AT Commands for example AT&E,AT\A,AT%C,AT+MS
3. S-Register commands, for example ATS32=8
4. Fax Class 1 commands, for example AT+FTM
5. Voice commands, for example AT#VTX

   The command syntax and operation guidelines for each command category are described in the following sections.

   A command line is a string of characters sent from a DTE (Terminal or Data Terminal Equipment) to the DCE while the DCE is in command state. Command lines have a prefix, a body and a terminator. The prefix consists of the ASCII characters AT or at. The body consists of printable ASCII characters. Space characters other than <CR> (See register S3), and <BS> (See register S5) are ignored. <CR> is command terminator.

   Characters preceding the AT prefix are ignored.
   AT Command Guidelines

6. Basic AT commands consist of single ASCII characters, which may be preceded by a prefix character, for example &, and followed by a decimal number, for example AT&W1.
7. Missing decimal parameters are interpreted as 0. For example, if you type ATH, the command ATH0 is assumed.
8. Fax commands are preceded with the +F characters and terminated by semicolon (;) or <CR> character.
9. The modem supports editing command lines by recognizing the <BS> character.
10. The AT command sequence may be followed by any number of commands in sequence, with the exception of commands Z, D or A, where all characters following on the same command line will be ignored.
11. When a syntax error is found in the command line, an ERROR response will be returned to the DTE. Execution of commands D and A will be aborted if another character is entered before completion of the handshake.
12. When the modem has entered on-line data mode, it is possible to break the data transmission in order to issue more AT commands. This is done by the DTE sending a sequence of three escape characters (defined in S2, "+" by default). The maximum time allowed between receipt of the last character of the three and the sending of the OK code to the DTE is defined in S12.

AT Command Set

The modem will comply with the commands listed below. Parameters applicable to each command are listed below. Default factory configuration settings are marked by an asterisk *.
Features marked with (-) are not yet available in the current version.

5.1 Basic AT Commands

A/	Re-execute Command The modem repeats the last command line sent by the DTE. Usually used for re-dialing. Note: This command should not be terminated by <CR>.
A	Answer The modem will go off-hook and attempt to answer an incoming call. Upon successful completion of handshake, the modem will go on-line in answer mode. Notes: If +FCLASS=0 is selected, the modem will enter the connect state after exchanging carrier with the remote system. If no carrier is detected within the period specified in S7, the modem hangs up. Any character entered while connecting will abort the connection process. If +FCLASS=1, the modem will go off-hook in V21 answer mode. It will generate the V21 2100 Hz answer tone for 3 +/- 0.5 seconds, and following a delay of 70 ms, will proceed as if the +FTH=3 command were issued. At any stage up to (but excluding) the +FTH=3 command state, any character will abort the communication. If +FCLASS=8 (#CLS=8), the modem will go off-hook and a voice session will take place. Related S-Reg: S0
Bn	CCITT Control B0 Connect at V.22 1200 bps Result codes: OK n=0 Error Otherwise
Dn	Dial Directs the modem to go on-line, dial according to the string entered, and attempt to establish a connection. The Dial String may consist of any of the characters described below:

*	T Tone dialing (first character in the string) P Pulse dialing (first character in the string) L Redial last dialed number (first character in the string) 0-9 Digits 0 to 9. * Asterisk (tone only) # Hash (tone only) W Wait for dial tone; the modem will wait for dial tone before dialing the digits following "W". S6 register will be used for timeout. (X3 or higher) , (Comma), Pause for the time specified by S8 before resuming the dialing (Semicolon) Return to command mode after dialing. This allows the user to issue additional AT commands while remaining off-hook. Actual call progress will be entered only after a dial command issued without the ¡§;¡¨ terminator. S=n Dial the number stored in the directory; n=0-3 (see &Z). ! Flash; The modem will go on hook for a time defined by S24. @ Wait for silence; The modem will wait for at least 5 seconds of silence before resuming the dialing. If no such silence is detected before the expiration of the call abort timer (S7), the modem will terminate with NO ANSWER response (or BUSY if applicable). If answer tone arrives during execution of this parameter, the modem handshakes. (X3 or higher) (),< > (space) String format characters - ignored <i> any other character - ignored. Notes: If +FCLASS=0 is selected, the modem will attempt to connect with another data modem. The modem will use the time period specified in S6 and S7 as time-outs in the handshake process. If a timeout expires, the modem will go on-hook and respond with NO CARRIER response. The command will be aborted in progress is a DTE character is entered before completion of the handshake. If +FCLASS=1, the modem will attempt to connect with a fax machine (or modem) by entering the HDLC V21 channel 2 receive state (as if +FRH=3 had been issued).

	The command will be aborted upon receipt of a DTE character if the modem has not finished dialing. In this case the modem will go on-hook and return to command mode responding with NO CARRIER message. If the modem has finished dialing, It proceeds as if +FRH=3 command has been issued. If +FCLASS=8 (#CLS=8), the modem will go off-hook in V21 answer mode. It will decide (based on timers) when the other side answers in voice and a voice session will take place. Related S-Reg: S5,S6,S7,S16,S22,S28,S56
En *	Set local echo The modem enables/disables echo of characters to DTE. Parameter value is written to S13. E0 Disable command echo. E1 Enable command echo. Result codes: OK n=0 or 1 Error Otherwise Related S-Reg: S13
Hn *	Set ON/OFF hook H0 Modem hangs up (goes on-hook). H1 Modem goes off hook. Result codes: OK n=0 or 1 Error Otherwise
In	Identification/Information I1 Modem Name, Vendor Name, Modem Version, for example :

ModemX

ModemWorks Ltd.

Ver 1.10

I2 SW Provider /SW Version, for example

Smart Link Ltd.

Ver 1.20

I3 Chipset Vendor/Chipset ID, for example

Chip Vendor Ltd.

XY4220

I4 Modem active profile for example,

Active Profile:

S00=000 S01=000 S02=000 S03=000 S04=000 S05=000 S06=000 S07=000
S08=000 S00=009 S10=000 S11=000 S12=000 S13=000 S14=000 S15=000
S16=000 S17=000 S18=000 S01=019 S20=000 S21=000 S22=000 S23=000
S24=000 S25=000 S26=000 S27=000 S28=000 S29=000 S30=000 S31=000
S32=000 S33=000 S34=000 S35=000 S36=000 S37=000 S38=000 S39=000
S40=000 S41=000 S42=000 S43=000 S44=000 S45=000 S46=000 S47=000

I5 Stored profile 0

Active Profile 0:

(Same format as above)

I6 Stored profile 1

Active Profile 1:

	(Same format as above) I7 Display stored pone numbers (See &Z command)
Ln *	Speaker volume Select speaker volume. L0 Low L1 Low L2 Medium L3 High Result codes: OK n=0-3 Error Otherwise Related S-Reg: S30
Mn *	Speaker control Select when the speaker is On/Off. M0 Speaker always OFF M1 Speaker ON from start of dialing until receiving carrier M2 Speaker always ON M3 Speaker OFF from end of dialing until receiving carrier Result codes: OK n=0-3 Error Otherwise Related S-Reg: S29

Nn *	Automode control Enable/Disable Automode detection. N0 Automode detection disabled. A subsequent handshake will be conducted according to the contents of S32. N1 Automode enabled. A subsequent handshake will be conducted according to the Automode algorithm. Result codes: OK n=0 or 1 Error Otherwise Related S-Reg: S31
On	Returns to on-line data mode This command is normally used to connect the DTE back after an escape (+++) has been issued. O0 Return to on-line data mode. O1 Return to on-line data mode, retrain first. Result codes: OK n=0-1 Error Otherwise
P	Pulse dialing Forces pulse dialing. Applies to subsequent dialing commands. This command holds until the next T dial modifier or T command is received. The modem will go off hook and attempt to answer an incoming call. Upon successful completion of handshake, the modem will go on-line in answer mode. Related S-Reg: S16
Q *	Quiet result codes control

	Q0 Enable sending result codes to DTE. Q1 Disable sending result codes to DTE. Result codes: OK n=0 or 1 Error Otherwise Related S-Reg: S14
S	Read/Write S-Register This command has a few derivatives: Sn=v Sets the value v (decimal) to S-register n (v=0-255) Sn? Displays the value of S-register in decimal format (3 digits) Note: Some registers are read-only Result codes: OK All parameters valid Error Invalid S register or value. Trying to write to a read-only register
T	Tone dialing Forces tone dialing. Applies to subsequent dialing commands. This command holds until the next T dial modifier or T command is received. This command changes S14 to reflect the current dialing mode. Related S-Reg: S16
Vn	Verbose/Numeric result codes Select the time of result messages sent to the DTE. For a list of result codes and verbal messages see X command. V0 Short form (numeric) result codes to be sent to DTE.

*	V1 Long form (verbose) result codes to be sent to DTE. Result codes: OK n=0 or 1 Error otherwise Related S-Reg: S15
Xn	Extended result codes Select the subset of result codes to be used by the modem to the DTE. If the modem is in fax mode (+FCLASS=1), the only message sent to indicate connection is CONNECT without a speed indication. X0 Supported messages: OK, CONNECT, RING, NO CARRIER and ERROR, Blind call enabled. X1 Supported messages: OK, CONNECT xxxx, RING, NO CARRIER and ERROR, Blind call enabled. X2 Same as X1 + NO DIAL TONE message, Blind call disabled X3 Same as X1 + BUSY message, Blind call enabled.
*	X4 All messages supported, Blind call disabled (see list below). Notes: W,@ dial modifiers are ignored in X1, X2 S6 (Wait before dial) is ignored in X2, X4 if no W is specified in dial string S6 is set to 0 means a blind call

Table 1 - Result Codes

Result Code	Message	X0	X1	X2	X3	X4
0	OK	*	*	*	*	*
1	CONNECT	*	*	*	*	*
2	RING	*	*	*	*	*
3	NO CARRIER	*	*	*	*	*
4	ERROR	*	*	*	*	*
5	CONNECT 1200	1	*	*	*	*
6	NO DIAL TONE	3	3	*	3	*
7	BUSY	3	3	3	*	*
8	NO ANSWER	3	3	3	*	*
9	CONNECT 0300	1	*	*	*	*
10	CONNECT 0600	1	*	*	*	*
11	CONNECT 2400	1	*	*	*	*
12	CONNECT 4800	1	*	*	*	*
13	CONNECT 7200	1	*	*	*	*
27	CONNECT 9600	1	*	*	*	*
14	CONNECT 12000	1	*	*	*	*
15	CONNECT 14400	1	*	*	*	*
16	CONNECT 16800	1	*	*	*	*
17	CONNECT 19200	1	*	*	*	*
18	CONNECT 21600	1	*	*	*	*
19	CONNECT 24000	1	*	*	*	*
20	CONNECT 26400	1	*	*	*	*
21	CONNECT 28800	1	*	*	*	*

	66 COMPRESSION: - * * * * CLASS 5 67 COMPRESSION: - * * * * V.42BIS 69 COMPRESSION: - * * * * NONE 76 PROTOCOL: NONE - * * * * 77 PROTOCOL: LAPM - * * * * 78 PROTOCOL: MNP - * * * * 1021 MODULATION: V.21 - * * * * 1022 MODULATION: V.22 - * * * * 1032 MODULATION: V.32 - * * * * 1034 MODULATION: V.34 - * * * * 1103 MODULATION: B103 - * * * * 1122 MODULATION: - * * * * V.22BIS 1132 MODULATION: - * * * * V.32BIS 1134 MODULATION: - * * * * V.34BIS 1212 MODULATION: B212 - * * * * +F4 +FCERROR * * * * *
	<*> message will be generated when n has been selected <i> message will be replaced by message <I> when n has been selected <-> message will not be generated when n has been selected. Related S-Reg: S56

Yn * 	Select default configuration Select the default user defined configuration. Note: The default configuration is not loaded by Yn (See Zn) Y0 Select user template 0 Y1 Select user template 1 Y2 Select factory setting 0 Y3 Select factory setting 1 Related S-Reg: S161
Zn	Select user defined configuration Select the user defined configuration. Z0 Select default user template (as defined by Yn) Z1 Select user template 0 Z2 Select user template 1 Z3 Select factory setting 0 (&F0) Z4 Select factory setting 1 (&F1) Result codes: OK n=0-5 Error Otherwise Related S-Reg: S59

5.2 AT& Commands

&An	Connect message format Select the format of the CONNECT message.

*	&A0 no extra messages besides CONNECT xxxxx &A1 Add Modulation indicator: V.21/ V.22/ V.22BIS/ V.32/ V.32BIS/ V.34/ V.34BIS/ B103/ B212 For example: Modulation: V.34 &A2 Add Error Detection Protocol and Data Compression indicators. For example: Protocol: LAPM/MNP/NONE Compression: CLASS 5/V.42BIS/NONE &A3 Add Modulation Indicator + Error Detection Protocol + Data Compression indicators (see above). Related S-Reg: S70, S71
&Cn * 	Control Carrier Detect (CD,RLSD) behavior Controls the RLSD output behavior. &C0 RLSD is assumed to be ON all the time &C1 RLSD follows the carrier state Result codes: OK n=0 or 1 Error Otherwise Related S-Reg: S60
&Dn	Controls DTR behavior (NA) Controls the DTR output behavior. Note: This command is supported for compatibility. It has no significance in Modio environment.

*	&D0 DTR is taken to be ON all the time &D1 DTR drop causes entry to command mode without disconnect &D2 DTR follows DTR circuit definition &D3 DTR drop causes software reset (as in Z0) Result codes: OK n=0-3 Error Otherwise Related S-Reg: S63
&En * 	Connect message speed source Select the requested source for the speed field in the CONNECT message. &E0 DCE Speed &E1 DTE Speed Note: Since a virtual port is involved, the DTE is not bound by any UART limitation, and may be theoretically set as high as 921600. DTE speed is supported for compatibility only. It bears little significance in Modio environment. Related S-Reg: S71
&Fn	Sets factory configuration Select one of the factory settings. &F0 Select factory setting 0 &F1 Select factory setting 1 Result codes: OK n=0-1 Error Otherwise Related S-Reg: S59

&Hn * 	Sets flow control Select the user defined configuration. &H0 Flow control disabled (NA) &H1 HW flow control RTS/CTS (emulation) Result codes: OK n=0-1 Error Otherwise Related S-Reg: S62
&Kn	Same as %Cn
&Pn * 	Set pulse dial make/break ratio &P0 US & Canada 39%/61% (10 pps) &P1 UK & Hong Kong 33%/67% (10 pps) &P2 Same as 0, except at 20 pps &P3 Same as 1, except at 20 pps Result codes: OK n=0-3 Error Otherwise Related S-Reg: S28
&Rn 	Controls RTS behavior Controls the RTS output behavior. Note: This command is supported for compatibility. It has no actual effect &R0 RTS ignored

	&R1 Modem receives data only on RTS (NA) Result codes: OK n=0 or 1 Error Otherwise Related S-Reg: S61
&Sn	Controls DSR behavior Note: This command is supported for compatibility. It has no actual effect. &S0 DSR override (is assumed to be ON all the time) &S1 DSR follows circuit definition Result codes: OK n=0 or 1 Error Otherwise Related S-Reg: S64
&V	Display Active profile, Stored Profiles, Stored Phone Numbers (Equivalent to I4-I7 combined)
&Wn	Writes current configuration &W0 Write to template 0 &W1 Write to template 1 Result codes: OK n=0-1 Error Otherwise Written to registry.
&Zn	Stores dial string

	Stores/Displays dial string (up to 47 characters) &Zn=s Store dial string (n=0-4) &Zn=L Store the last dialed string (n=0-4) &Zn? Display the nth string &ZL? Display the last dialed string Written to registry.

5.3 AT\ Commands - Error correction control

\An *	Maximum MNP block Size \A0 64 characters maximum block size \A1 128 characters maximum block size \A2 192 characters maximum block size \A3 256 characters maximum block size Result codes: OK n=0-3 Error Otherwise Related S-Reg: S<basereg+1> of V.42 registers
\Bn	Transmit break to remote (-) In non-error correction mode, the modem will transmit a break signal to the remote modem with a length of n*100ms. If a number above 9 is entered, 9 is used. Result codes: OK if connected in data modem mode Error if not connected or if connected in fax modem mode
\Kn	Break Control (-) Controls the response of the modem to a break received from DTE or a remote modem or the \Bn command. The behavior parameter is written to Sxx \K0 Enter on-line command mode, no break sent to remote modem \K1 Clear data buffers and send break to remote modem \K2 Same as 0

	\K3 Send break to remote modem immediately \K4 Same as 0
*	\K5 Send a break to remote modem in sequence with transmitted data Related S-Reg: S<basereg+x> of V.42 registers Result codes: OK n=0-5 Error Otherwise
\Nn	Error correction operating mode \N0 Normal (Speed buffering) - No error correction \N1 Direct (pass-through) 128 characters maximum block size \N2 Reliable (error correction) mode. The Modem will attempt LAPM and then MNP
*	\N3 Auto reliable mode. Same as \N2, but will fall back to Normal \N4 LAPM error correction mode only, hang up upon failure. \N5 MNP error correction mode only, hang up upon failure. Result codes: OK n=0-5 Error Otherwise Related S-Reg: S<basereg> of V.42 registers

5.4 AT% Commands

%Cn *	Compression control %C0 Disable data compression %C1 Enable MNP5 data compression %C2 Enable V.42bis data compression %C3 Enable MNP5/V.42bis data compression Result codes: OK n=0-3 Error Otherwise Related S-Reg: S<basereg+2> of V.42 registers		
%En *	Line quality monitor control Controls whether or not the modem will automatically monitor the line quality and request a retrain (%E1), or fall back when quality is insufficient or fall forward when line quality improves (%E2). %E0 Disable line quality control %E1 Enable line quality control and auto retrain %E2 Enable line quality control and fallback/forward Result codes: OK n=0-3 Error Otherwise Related S-Reg: S39		
%Tn	Test mode		Auxiliary Registers Setup

	%T23 - %T32	Generate DTMF 0-9	
	%T33	Generate DTMF *	
	%T34	Generate DTMF #	
	%T35 - %T38	Generate DTMF A-D	
	%T39	V.25 Answer Tone (2100Hz)	
	%T40	V.25 Calling Tone (1300Hz)	
	%T41	Fax Calling Tone (1100Hz)	
	%T42	1800Hz Guard Tone	
	%T90	V.21 Channel 1 mark origin	S53=3, S143=0 S53=3, S143=0
	%T91	V.21 Channel 1 mark answer	
	%T90	V.23 Channel mark origin	S53=2 S53=2
	%T91	V.23 Channel mark answer	
	%T90	V.22 1200 origin	S53=5 S53=5
	%T91	V.22 1200 answer	
	%T90	V.22bis/V.34 origin (<=19200)	S53=6, S52=0/1 S53=6, S52=0/1
	%T91	V.22bis/V.34 answer (<=19200)	
	%T90	V.32/V.34 origin	S53=7, S52=0/1 S53=7, S52=0/1
	%T91	V.32/V.34 answer	
	%T90	V.32bis/V.34 origin	S53=9, S52=0/1 S53=9, S52=0/1
	%T91	V.32bis/V.34 answer	

	%T91	V.21 channel 2 mark	S53=3, S143=1
	%T76 %T77 %T78 %T79 %T80 %T81	V.27 2400 signaling V.27 4800 signaling V.29 7200 signaling V.29 9600 signaling V.17 12000 signaling V.17 12000 signaling	
	%T90 %T91	V.34 org signaling (>=21600) V.34 ans signaling (>=21600)	S53=14 S53=14
	%T90 %T91	V.34bis org signal (>=31200) V.34bis ans signal (>=31200)	S53=18 S53=18

Note: For running AT%T Commands, The test DP driver must be present (This driver is supplied for OEM qualification usage)

5.5 AT+MS Command

+MS	Modulation select This command selects the modulation, optionally enables/disables Automode, and optionally specifies the lowest and highest connection rates. The command format is: AT+MS= [<mod>][,[<automode>][,[<min_rate>][,[<max_rate>]]]] <mod> a decimal number specifying the preferred modulation (automode enabled), or the modulation (automode disabled). <automode> 0/1 Automode disabled/enabled <min_rate> minimum rate for connection. If lower than the actual minimum rate for the selected modulation, the actual lowest supported rate will be taken. <max_rate> maximum rate for connection. If higher than the actual maximum rate for the selected modulation, the actual highest supported rate will be taken.
	Table 2 - +MS command parameters <mod> Modulation Possible rates 22 V.22 1200 122 V.22bis 2400,1200 32 V.32 9600, 4800 132 V.32bis 14400, 12000, 9600, 7200, 4800 34 V.34 33600, 31200, 28800, 26400, 24000, 21600, 19200,16800, 14400, 12000, 9600 56 K56Flex 32000,34000,36000 ..... ,56000 90 V.90 29333, 30666,32000 .....,56000 212 Bell 212 1200 103 Bell 103 300

	Examples: AT+MS=34,0,4800,33600 V.34, No Automode, Min. speed 4800, Max speed 33600 AT+MS=,1 Automode AT+MS=32,1,,14400 V.32 Automode, Max speed 14400 (min speed as before) Factory Settings: 90,1,300,56000 The requested modulation scheme will be written to S32 The requested min rate will be written to S33 The requested max rate will be written to S34 The actual rate may be read from S35 The actual modulation scheme may be read from S37 (The codes as specified in the Xn command) Other derivatives of the +MS command: AT+MS? report current MS settings (e.g. 34,1,9600,33600) AT+MS=? list the supported values +MS:(22,122.....), (0,1), (300-33600), (300-33600) Result codes: OK Syntax OK Error Otherwise Related S-Reg: S31-S37

5.6 AT+F Commands - Fax Support

+FCLASS=<value>	Sets Data/Fax Class1/Voice (0,1,8) mode. +FCLASS=<value> [<value> - 0,1,8 (Data/Fax Class1/Voice] Result codes: OK Syntax OK Error Otherwise +FCLASS? Returns the current setting Related S-Regs: S32, S150
+FAE	Data/Fax Auto Answer +FAE=<value> [<value> - 0,1 (Data/Fax Class1)] +FAE? Returns the current setting Related S-Regs: S151
+FTS= <value>	Stops transmission and waits. Terminates transmission and waits for <value>*10ms interval before responding with OK. ERROR is issued if the modem is on-hook. +FTS? Returns the current setting
+FRS= <value>	Receives Silence. Report back to DTE with OK after <value>*10ms silence interval has been detected. The command is aborted if any character is received from the DTE (The response will still be OK). ERROR is issued if modem is on-hook. +FRS? Returns the current setting

+FTM= <value>	Transmits data according to the defined modulation. ERROR is issued if modem is on-hook. Value Modulation 24 V.27 ter 2400 bps 48 V.27 ter 4800 bps 72 V.29 7200 bps 73 V.17 7200 bps long 74 V.27 7200 bps short 96 V.29 9600 bps 97 V.17 9600 bps long 98 V.17 9600 bps short 121 V.17 12000 bps long 122 V.17 12000 bps short 145 V.17 14400 bps long 146 V.17 14400 bps short +FTM=? Return 24, 48, 72, 73, 74, 96, 97, 98, 121, 122, 145, 146
+FRM= <value>	Receives data according to the defined modulation (See Values above) ERROR is issued if modem is on-hook. +FRM=? Return 24, 48, 72, 73, 74, 96, 97, 98, 121, 122, 145, 146 see +FTM
+FRH= <value>	Receives data using HDLC protocol and the defined modulation . ERROR is issued if modem is on-hook.

	<value> - 3 (V.21 channel 2 300 bps) +FRH=? Return 3
+FTH= <value>	Transmits data using HDLC protocol and the defined modulation . ERROR is issued if modem is on-hook. <value> - 3 (V.21 channel 2 300 bps) +FTH=? Return 3

5.7 AT* Commands - Black List Support

Note: The following command will always return OK as a result code.

*B	Return Blacklisted numbers Blacklisting is a country dependent parameter. When no time-out is defined: When a number is unsuccessfully called x successive times, it is blocked altogether, until next system reset. Further calls will return BLACKLISTED code. When time-out is defined: When a number is unsuccessfully called x successive times, it is blocked temporarily until the time-out expires. Calls within the time-out period will return DELAYED code. Format: No. Called Blocked Phone Index # of calls ' ' (blank) Phone number - not blocked (number still candidate for blacklist) or '*' (asterisk) - blacklisted/blocked or 'Xmin' - # of min to time-out-delayed Example 1: No time-out defined. Full blocking occurs No. Called Blocked Phone

	1	5	*	t1234
	2	3		t5678

Example 2: Time-out defined. Delay scheme used.

No.	Called	Blocked	Phone
1	5	2min	t1234
2	3		t5678

5.8 AT# Commands - Voice Modem Support

Note: All the following commands will return OK as a result code (or ERROR if the parameters are faulty), unless stated otherwise.

#BDR= <value>	Sets DTE Baud Rate <value> - DTE Baud rate (0-48) *2400
#CID= <value>	Enables the Caller ID feature in any mode #CID=0 - Disable Caller ID #CID=1 - Enable Caller ID (Verbose) #CID=2 - Enable Caller ID (Numeric) Writes the value to Sreg Related S-Reg: S75
#RG= <value>	Sets receive gain level (effects the AUDIO IN level) <value> - 0-7fff
#TL= <value>	Sets transmit level (effects the AUDIO OUT level) <value> - 0-7fff
#CLS= <value>	Same as +FCLASS=<value> Sets Data/Fax Class1/Voice (0,1,8) mode. Related S-Regs: S32, S150
#VBS	Bits per sample (ADPCM or PCM). #VBS=<value> [<value> - 2,4 (ADPCM), 8,16 (PCM)] #VBS? Returns the current setting #VBS=? Returns 2,4,8,16 Related S-Regs: S76
#VBT	Sets Beep tone timer for generating tones and DTMF.

	#VBT=<value> [<value> - 0-40 (* 1/10 ms)] #VBT? Returns the current setting #VBT=? Returns 0-40 Related S-Regs: S77
#VIP	Initializes Voice Parameters Related S-Regs: S75-S89
#VIT	Sets Inactivity timer. #VIT=<value> [0-255 (* 1/10 ms)] #VIT? Returns the current setting #VIT=? Returns 0-255 Related S-Regs: S19
#VLS	Voice Source selection. #VLS=<value> 0 - Telephone Line Select (Go on hook) 2 - Speakers 3 - Microphone 4 - Telephone Line Select + Samples routed to/from Speakers/Mic in TX/RX modes 6 - Speakerphone #VLS? Returns the current setting #VLS=? Returns 0,2,3,4,6 Result codes: OK n=0, 4, 6

	VCON n=2, 3 ERROR Otherwise (For 0, 4, 6, VCON will be issued upon line connection) Related S-Regs: S78
#VRA	Ringback Goes Away Timer (originate). This value is used during call progress to detect a voice answer. This is the interval between ringback ending and voice answer determined. #VRA=<value> [0-255 (*1/10 MS)] #VRA? Returns the current setting #VRA=? Returns 0-255 Related S-Regs: S79
#VRN	Ringback Never Came Timer (originate) This value is used during call progress to detect a voice answer. This is the interval without detection of ringback before voice answer is determined. #VRN=<value> [0-255 (*1/10 MS)] #VRN? Returns the current setting #VRN=? Returns 0-255 Related S-Regs: S80
#VRX	Go to Voice Receive Mode. Result codes: CONNECT Data may be sent ERROR VLS=0, 4, 6 and line not connected Note: Any input from the terminal will abort Voice Receive Mode
#VSD	Enables/Disables silence deletion (voice receive, ADPCM) (-)

	#VSD=<value> [0,1 - Disable/Enable] #VSD? Returns the current setting #VSD=? Returns 0,1 Related S-Regs: S81
#VSP	Sets Silence Period (voice receive, ADPCM) #VSP=<value> [0-255 (*1/10 ms)] #VSP? Returns the current setting #VSP=? Returns 0,255 Related S-Regs: S83
#VSR	Sets Sample Rate (PCM, ADPCM) #VSR=<value> [7200, 11025, 8000] #VSR? Returns the current setting #VSR=? Returns 7200, 11025, 8000 Only 7200 is currently supported Related S-Regs: S91
#VSS	Sets Silence Sensitivity (voice receive, ADPCM) (-) #VSS=<value> [0-3] (0-Disable, 3-allow noisy conditions #VSS? Returns the current setting #VSS=? Returns 0-3 Related S-Regs: S82
#VTD	Sets DTMF reporting capabilities in Voice Transmit, Receive, and Voice Online Command Modes. #VTD=<value><value><value> [0-3F]

	#VTD? Returns the current setting #VTD=? Returns ¡§<0-3F>,<0-3F>,<0-3F>¡¨
	Bit Settings Bit Description 0 Disable/Enable DTMF detection 1 Disable/Enable V.25 1300 Hz detection 2 Disable/Enable T.30 1100 Hz detection (Fax) 3 Disable/Enable V.25/T.30 2100 Hz detection (Modem) 4 Disable/Enable Bell 2225 Hz detection 5 Disable/Enable Busy/Dial tone detection 6-7 reserved Related S-Regs: S84-S86
#VTM	Enables timing mark placement. #VTM=<value> [0-10 (* 1/10 ms)] #VTM? Returns the current setting #VTM=? Returns 0-10 Related S-Regs: S87
#VTS	Generates a tone signal. #VTS= [x,y,z] | {x,z} | x, ... [x,y,z] x represents the first frequency (Hz) y represents second frequency (Hz) z represents the duration (in 100 ms units)

	{x,z} DTMF Digits with Variable Duration. x represents the DTMF digit (0-9,A-D,*,#) z represents the duration (in 100 ms units) DTMF Digits, with duration defined by #VBT. This is represented by a value x (non-bracketed) corresponding to a DTMF digit (0-9,A-D,*,#, !). Note: stands for flash.
#VGT	Sets Playback Volume [Default 192] #VGT=<value> [0-255 (*1/10 ms)] #VGT? Returns the current setting #VGT=? Returns 0-255 Related S-Regs: S74
#VTX	Go to Voice Receive Mode Result codes: CONNECT Data may be sent ERROR VLS=0, 4, 6 and line not connected
#SPK	Sets Full Duplex Speakerphone parameters #SPK=<mute>,<speaker>,<mic> <mute> 0 Microphone Mute * 1 Microphone On (default) 2 Room Monitor (mic on Max, Speaker off) <speaker> 0-15 - 2-30 dB attenuation * 5 - (Default)

	16 - speaker mute <mic> 0 - 0 dB gain * 1 - 6 dB gain (Default) 2 - 9 dB gain 3 - 12 dB gain Related S-Regs: S88-S90

5.9 AT#UD Command - Modem Diagnostics Support

Note: All the following commands will return OK

#UD	Returns diagnostics data Format: TBD

5.10 S-Registers

The S-Registers are summarized in the following table. Registers denoted with a * may be customized using the PTT Wizard Tool.

Factory defaults

Factory defaults are stored in the Windows OS registry. They are loaded at initialization time or by AT commands (&F,Z). In addition the designated default profile (as specified by the Yn command) is subsequently loaded.

The defaults shown are of the Smart Link factory settings 0 and 1.

S-Register Summary

Note: This S-register List is not to be used as is by End Users and in End User's manuals.

For end users the contents of the first 24 S-registers should suffice.

S#	Function	Range	Units	PW	Default	AT Command
S0	Rings to Auto-Answer	0-255	rings		0	A
S1	Ring Counter	0-255	rings		0	
S2	Escape Character	0-255	ASCII		43	
S3	CR Character	0-255	ASCII		13	
S4	LF Character	0-255	ASCII		10	
S5	BS Character	0-255	ASCII		8	
S6	Wait Time for Dial Tone (Also wait before Blind Dialing)	2-255	s	*	2	D
S7	Wait Time for Carrier	1-255	s	*	60	D
S8	Pause Time for Dial (,)	0-255	s		2	D
S9	Carrier Detect Response Time	1-255	0.1s		6	
S10	Carrier Loss Disconnect Time	1-255	0.1s	*	128	

S11	DTMF Tone duration	50-255	0.001s	*	100	D
S12	ReservedEscape (+) Prompt Delay	0-255	0.02s	*	50	
S13	Echo	0-1			1	E
S14	Quiet	0-1			0	Q
S15	Verbose	0-1			1	V
S16	Pulse/ Tone	0-1		*	1	T,P,D
S17	Reserved					
S18	Test Timer	0-255	s		0	&T
S19	System Inactivity Timer	0-255	min		0	
S20	Reserved					
S21	Break Length	0-9	100ms		0	\B
S22	Origin/Answer	0-1			0	
S23	XOFF Character (NA)	0-127	ASCII		0	
S24	Flash Timer	0-255	10 ms		50	

Important Note: The following S-register List is only to be used by OEMs.
For end users, the contents of the first 24 S-registers should suffice.

S#	Function	Range	Units	PW	Default	AT Command
S25	Delay to DTR Off (NA)	0-255	0.01ms		0	
S26	RTS to CTS delay (NA)	0-255	0.01ms		0	
S27	Auto Answer clear timeout	0-255	s		8	
S28	Pulse Set/Break Ratio	0-4			0	&P,P,D
S29	Speaker Control	0-3			1	M
S30	Speaker Volume	0-3			2	L

S31	Automode Select	0-1			1	+MS
S33	Requested MIN Speed		bps Code			+MS
S34	Requested MAX Speed		bps Code			+MS
S35	Actual Speed after CONNECT (See Xn)		bps Code			
S36	Current Data Pump Status		Mod Code			
S37	Actual Modulation (DP)		Mod Code			
S38	Actual Rx Speed		Bps Code			
S39	Line Quality Control	0-2			2	%E
S40	Reserved					
S41	Received Signal Level				0	
S42	SNR		dB			
S43	Result Codes control				0	X
S44	Reserved					
S45	Transmit Gain Level	0-10	-dBM		250	
S46- S49	Reserved					
S50- S55	Reserved for Test					&T
S56	Extended Code	0-4			4	X

S57	Reserved					
S58	Reserved					
S59	Current Setting	0-5			0	Z, &F
S60	CD	0-1			1	&C
S61	RTS	0-1			0	&R
S62	Flow Control	0-3			1	&H
S63	DTR	0-3			0	&D
S64	DSR	0-1			0	&S
S65	Reserved					
S66	Circuit 106 (RTS)	0-1			0	
S67	Circuit 107 (DSR)	0-1			0	
S68	Circuit 109 (CD)	0-1			0	
S69						
S70	CONNECT message format	0-1			0	&A
S71	CONNECT msg speed source (DCE/DTE)	0-1			0	&E
S72	Handset Record Gain	0 - 255		*	19	
S73	Reserved				3	
S74	Playback Volume	0-255			153	#VGT
S75	CID Enable	0,1			0	#CID
S76	ADPCM Bits Per Sample	4,8,16			4	#VBS
S77	Beep Tone Timer	0-40	1/10 s		10	#VBT
S78	Line Selection Duration		0,2,3,6		0	#VLS
S79	Ring Goes Away Timer	0-255	1/10 s		70	#VRA

S80	Ring Never Came Timer	0-255	1/10 s		70	#VRN
S81	Silence Detect Enable	0,1			0	#VSD
S82	Silence Detect Sensitivity	0-3			2	#VSS
S83	Silence Detect Duration	0-255	1/10 s		55	#VSP
S84	Dtmf Tone Reports Cap0	0-3F			0	#VTD
S85	Dtmf Tone Reports Cap1	0-3F			0	#VTM
S86	DTMF Tone Reports Cap2	0-3F			0	#VTM
S87	Time Mark Placement	0-255	1/10 s		0	#VTM
S88	SPK <mute>	0-2			1	#SPK
S89	SPK <speaker>	0-15			5	#SPK
S90	SPK <mic>	0-3			1	#SPK
S91	Voice Sample Rate	1,2		1	1	#VSR
S92	Answer Delay	0-255	s	*	2	
S93-S99	Reserved for Diagnostics					
S100-S137	Reserved for V42					\A,\N, %C
S138	Mic Gain	0-255				
S139	Line record Gain	0-255				
S140-S142	Reserved					
S143	Reserved for Test					
S141-S143	Reserved					
S143	Test auxiliary	0-1			0	%T
S144-S145	Reserved					

S146	Pulse make Ratio	0-100	%	*	36	&P
S147	Pulse PPS	10,20	pps	*	10	&P
S148	Pulse Pause	0-255	10ms	*	80	
S149	Pulse Refresh	0-100	ms	*	0	
S150	FCLASS Value	0,1,8			0	+FCLASS
S151	FAE Value	0,1			0	+FAE
S152	Line Out Gain	0-255				
S153	Spk Out Gain	0-255				
S154	HSet Out Gain	0-255				
S155-S160	Reserved					
S161	Default Setting	0-1			2	Y
S162	Country Type	0-25			0	
S163-S169	Reserved					
S170-S174	Debug Registers					
S175-S179	Reserved					
S180-S191	Reserved for Diagnostics					
S192	Reserved					
S193	Processor Type	0-100			0	
S194-S196	Reserved				0	
S197	HW Diag					
S198	STRM Diag	0/1			0	*B

S199	Port Diag	0/1			0	*B
S200	Blacklist Enable	0/1		*	0	*B
S201	Blacklist Dial Attempts	0-255		*	5	*B
S202	Min Time between calls	0-255	Sec	*	120	*B
S203	Blacklist Time Out	0/1		*	5	*B

Federal Communications Commission (FCC) Statement

15.21
You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

15.105(b)
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

Operation is subject to the following two conditions:
1) this device may not cause interference and
2) this device must accept any interference, including interference that may cause undesired operation of the device.

FCC RF Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Note: The end product shall has the words "Contains Transmitter Module FCC ID: SMW56AZBT or Contains FCC ID: SMW56AZBT" on the ID label