WS Technologies Inc.

LimitTester
LTS200

Instruction Manual

Version 1.00

CONTENTS

INTRODUCTION

Thank you for choosing the LTS200 LimitTester. The LTS200 LimitTester is a software add-on for the BT100 series of Beacon Testers. It allows the user to compare beacon measurements obtained using the BT100 Beacon Tester to a pre-defined set of limits. A pass or fail indication is provided to the user during testing, and a LimitTester Test Report is generated.

This Instruction Manual explains the activation and the operation of the LimitTester application.

Please read this Operator's Manual to become familiar with the operation of the LimitTester application.

ACTIVATING THE SOFTWARE

When the LimitTester LTS200 is purchased you are provided with an activation code, a Limits Configuration Table spreadsheet file, a password for the Limits Configuration Table spreadsheet, and the electronic version of the Instruction Manual (this document).

The activation code provided to you is linked to a specific BT100 Beacon Tester serial number. Ensure that you are using that specified serial number Beacon Tester when activating the LimitTester.

Activating LimitTester on PDA:
To activate LimitTester on your PDA:
• Ensure you have Beacon Tester software Version 2.7 or greater.
• Insert the BT100 card into the PDA and run the Beacon Tester application.
• Tap on Options > Printing/Configuration Options.
• Enter the word *protocol* into the Organization field.
• A popup window will prompt you for your activation code.
• Enter your activation code and tap OK.
• A popup window will indicate that the BT100 was successfully modified. Tap OK.

GENERATING LIMITS FILES

General Description:
The Limits Configuration Table spreadsheet is where the Limits files are generated. The limits files are transferred to the PDA for use with the Beacon Tester application. Beacon measurements are then compared against these limits and a Pass or Fail is indicated to the user.

The Limits Configuration Table is password protected so that only an authorized user (supervisor or QA representative) can generate limits files. The person testing can use any of the limits files transferred to the PDA but cannot alter the limit values.

The authorized user can generate "default" limits files or "user-defined" limits files. The default limits have fixed values for each measurement limit, derived from Cospas-Sarsat requirements and BT100 measurement uncertainties. The user-defined limits allow the authorized user to enter custom values for each measurement limit value. The authorized user can select which measurements to include in each limits file generated.

Limits Configuration Table:
• On the PC, open the Limits Configuration Table spreadsheet file using Microsoft Excel™. The password to open this file is *limittester.*
• Select the measurements to be included by checking the appropriate boxes in the "Include" column on the left side of the spreadsheet.

Default Limits Files:
• Enter a Default limits filename in the Limits File Generation section. The revision number "1.00(D)" will automatically be added to the name entered. The "(D)" denotes default values.
• Click on the "Generate Default Limit File" button. (Note: If you receive a macro disabled error, see instructions here: http://support.microsoft.com/kb/215715.)
• The generated files will be located on the PC in the same directory as the Limits Configuration Table spreadsheet.
• Transfer the generated Limits Files to the PDA via ActiveSync or memory card. Place these files in the folder My Device> Beacon Tester> Settings> Limits.

User-Defined Limits Files:

• If desired, modify the upper and lower limits in the User-Defined Limits section.

• Enter a User-Defined limits filename and revision number in the Limits File Generation section. A "(U)" will automatically be added to the revision number to denote a user-defined file.

• If a User-Defined limit value exceeds certain values, a message box will notify the user of the acceptable minimum and maximum values

• Click on the "Generate User Limit File" button. (Note: If you receive a macro disabled error, see instructions here: http://support.microsoft.com/kb/215715.)

• The generated files will be located on the PC in the same directory as the Limits Configuration Table spreadsheet.

• Transfer the generated Limits Files to the PDA via ActiveSync or memory card. Place these files in the folder My Device> Beacon Tester> Settings> Limits.

NOTE: If this Limits folder does not exist on the PDA, it must be created in the following location: My Device> Beacon Tester> Settings.

Specific Instructions:

The LimitTester application will prioritize the BT100 Printing/Configuration settings before the Limits Configuration Table settings. For example, if the BT100 settings are set to "121.5 MHz only" mode, then no 406 MHz measurements will be shown in the LimitTester results. The BT100 settings will determine the input power measurement mode: 5 WATT, INT ANT, or EXT COAX and if the INT REF or EXT REF is used.

Below a certain power level the Power Rise Time measurement cannot be accurately determined. In this case "n/a" is returned as a measurement value. The user must check the box if a Fail is to be reported if "n/a" occurs.

Likewise, below a certain power level, the AM Modulation Factor measurement cannot be accurately determined. In this case "n/a" is returned as a measurement value. The user must check the box if a Fail is to be reported when "n/a" occurs.

Location:
The default limit files will use the Cospas-Sarsat default location values as specified in the location protocols. Use the user-defined limit to enter a latitude and longitude (in decimal degrees) along with a Δd value (in meters). If the decoded location is not within Δd meters of the latitude and longitude you specified then a Fail will occur. Un-check the "Fail if Location is default" box in the Miscellaneous Settings section if you do not want a Fail indication when decoding default location values.

Miscellaneous Settings:
If 121 is not detected no failure will occur unless the "Fail if 121 is not detected" box is checked.

If 243 is not detected no failure will occur unless the "Fail if 243 is not detected" box is checked.

If the decoded location data is default no failure will occur unless the "Fail if Location is default" box is checked.

If Int Ref is selected then no failure will occur unless the "Fail if Set to Int Ref" box is checked.

Changing Password:
The Configuration Limits Table spreadsheet comes with a unique password that is provided at the time of purchase. This password can easily be changed by File>Save As>Tools>General Options, and entering a new password. Enter your new password in the *"Password to open:"* box only.
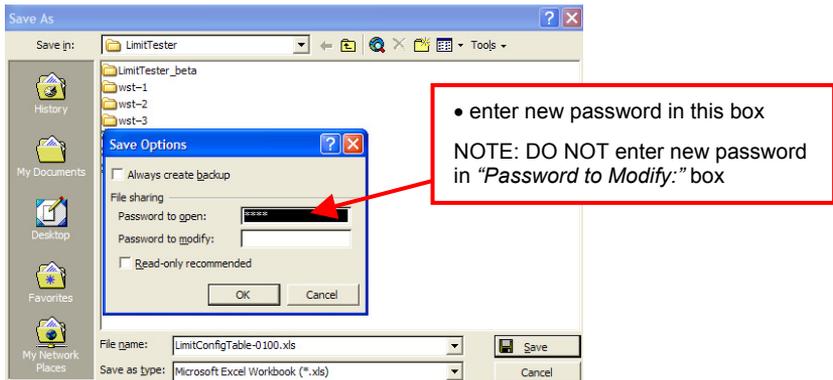
The authorized user should safeguard this password along with the original Limits Configuration Table spreadsheet file.

LIMIT TESTER OPERATION

Basic Operation:
- insert the BT100 Beacon Card into the PDA
- run the BT100 Beacon Tester application (version 2.7 or greater)
- tap on the Limits button
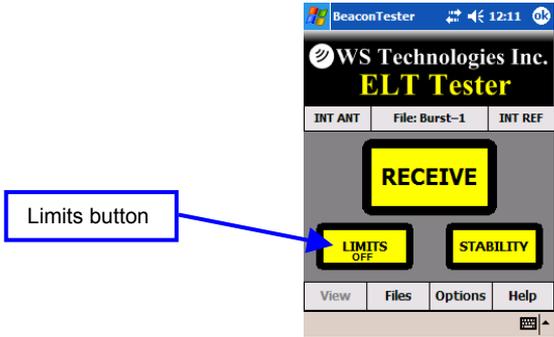
Limits button

- Select the desired Limits file and tap Open. Enable the Limits function by tapping Enable. Tap OK.

Enable button

Open button
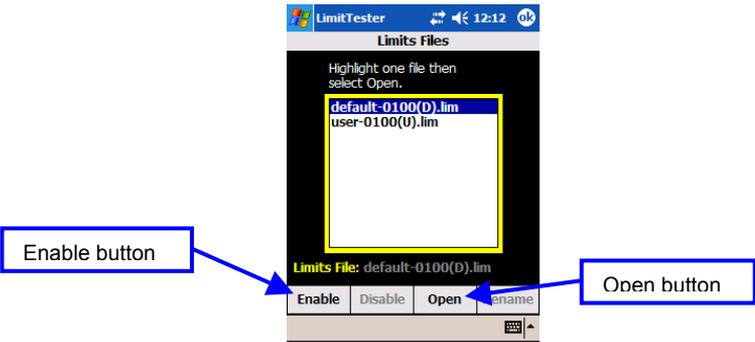
- The user can enable or disable the LimitTester from this screen.

• Make a beacon measurement by tapping Receive.

• The decode screen will display briefly followed by the LimitTester screen.

• If all parameters pass, the LimitTester screen will indicate "All Parameters Passed" in green text. The Limits file used for the test is shown at the bottom of the LimitTester screen.

LimitTester — 12:20

All Parameters Passed

Parmeters	Measured Data	Limits Lower	Upper

Limits File: default-0100(D).lim

• If any parameters fail, the LimitTester screen will indicate "Failed Parameters" in red text along with a list of the failed parameters, the measured data, and the upper and lower limits. The Limits file used for the test is shown at the bottom of the LimitTester screen.

LimitTester — 5:40

Parameters Failed

Parameters	Measured Data	Limits Lower	Upper
Audio LF (Hz)	0	270	-
Duty Cycle (Hz)	100	31	57
Sweep Rate (Hz)	1.8	1.9	4.1

Limits File: default-0100(D).lim

• Tap OK on the LimitTester screen to return to the decode screens.

• To return to the LimitTester screen, tap the LT button which is located on the Detailed Measurements screens. (The background colour of this LT button show the Pass/Fail status.)

BeaconTester	12:20 OK
406 Detailed Measurements	
A78D014ED540401 LT	
Short Message	4/3/04 12:19:46 PM
INT ANT	File: Burst-2	INT REF
406 Frequency: 406.0258 MHz	
406 Power : 102 %	
Power Rise Time: < 5 ms	
Phase Deviation: -1.21 +1.02 rads	
Mod Rise Time: 188 us	
Mod Fall Time: 188 us	
Mod Symmetry: 0.0%	
Mod Bit Rate: 400.5 bps	
CW Preamble: 160.2 ms	
Graphics	Decode	Options	Next
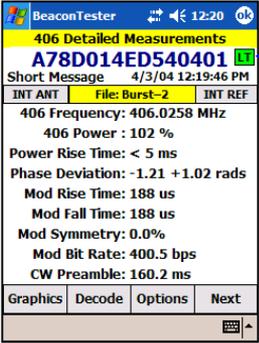
LT button
(green indicates
Parameters
passed)

BeaconTester	12:13 OK
406 Detailed Measurements	
A78D014ED540401 LT	
Short Message	4/3/04 12:13:13 PM
INT ANT	File: Burst-1	INT REF
406 Frequency: 406.0261 MHz	
406 Power : 102 %	
Power Rise Time: < 5 ms	
Phase Deviation: -1.27 +0.97 rads	
Mod Rise Time: 165 us	
Mod Fall Time: 198 us	
Mod Symmetry: 0.0%	
Mod Bit Rate: 400.4 bps	
CW Preamble: 159.9 ms	
Graphics	Decode	Options	Next
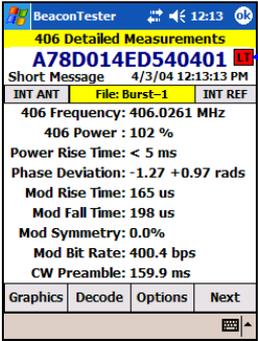
LT button
(red indicates
Parameters
failed)

LimitTester Report:

When the LimitTester is enabled, every beacon measurement will generate a LimitTester file. This file is located along with the standard Beacon Tester htm Test Report in the Beacon Tester > Measurement > Filename folder. This LimitTester file is named Filename(LT).htm.

<Filename-1>		folder name
	Filename-1.htm	test report
	Filename-1(LT).htm	LimitTester report
	graphics_enabler.class	utility file

LimitTester Report

A79FC3C3C3C3C3C

Organization:
Tested By:
Date: 2/27/04 5:37:41 AM
Tester Model/Serial No./File Name: BT100AVS/64020/wst-1
Tester Cal Due Date: Jan 25, 2010
Tester Temperature: 25°C
Test Limits File: default-0100(D).lim

Notes: Add text comments here.

Parameters	Measured Data	Lower Limit	Upper Limit	Pass/Fail
406 Freq (Hz) (INT REF)	406027771	406019575	406081425	Pass
406 Power (%) + CL(0)	101	5	105	Pass
406 Power Rise (ms)	< 5.5 ms	-	5.5	Pass
406 +Mod (rad)	1.08	0.96	1.24	Pass
406 -Mod (rad)	-1.06	-0.96	-1.24	Pass
406 Mod Rise (us)	252	40	260	Pass
406 Mod Fall (us)	220	40	260	Pass
406 Bit Rate (bps)	399.7	395.8	404.2	Pass
406 Preamble (ms)	159.5	157.6	162.4	Pass
406 Spectrum C1 (dB)	<	-20	3	Pass
406 Spectrum C2 (dB)	<	-30	7	Pass
406 Spectrum C3 (dB)	<	-35	12	Pass
406 Spectrum C4 (dB)	<	-40	24	Pass
121 Freq (Hz) (INT REF)	121500159	121493825	121506175	Pass
121 Power (%) + CL(-12.7)	44	5	105	Pass
121 Sweep Direction	down	don't care	don't care	Pass
Audio LF (Hz)	0	270	-	Fail
Audio HF (Hz)	1000	-	1630	Pass
SweepRange (Hz)	1000	640	1360	Pass
Duty Cycle (Hz)	100	31	57	Fail
Mod Factor (Hz)	N/A	84.5	100	Pass
Sweep Rate (Hz)	1.8	1.9	4.1	Fail
406 BCH	Valid	-	-	Pass

This file is a tabulated htm file so that it can be opened directly in Microsoft Excel™ or interrogated by your own script.

Pass/Fail Flag Bit:
A pass/fail bit is encoded into the source of the LimitTester Report. This may be convenient when using automated software when testing beacons. When viewing the LimitTester Report in Internet Explorer™, the source can be viewed (View > Source). At the bottom of the page is the Pass/Fail flag bit. A "-1" indicates Pass and a "0" indicates Fail.


```
<tr><td>406 Preamble (ms)</td><td>159.8</td><td>157.6</td><td>162.4</td><td style="background-color:
#00FF00;">Pass</td></tr>
<tr><td>406 Spectrum C1 (dB)</td><td><</td><td>-20</td><td>3</td><td style="background-color:
#00FF00;">Pass</td></tr>
<tr><td>406 Spectrum C2 (dB)</td><td><</td><td>-30</td><td>7</td><td style="background-color:
#00FF00;">Pass</td></tr>
<tr><td>406 Spectrum C3 (dB)</td><td><</td><td>-35</td><td>12</td><td style="background-color:
#00FF00;">Pass</td></tr>
<tr><td>406 Spectrum C4 (dB)</td><td><</td><td>-40</td><td>24</td><td style="background-color:
#00FF00;">Pass</td></tr>
<tr><td>121 Freq (Hz) (INT REF)</td><td>121500203</td><td>121493825</td><td>121506175</td><td
style="background-color: #00FF00;">Pass</td></tr>
<tr><td>121 Power (%) + CL(-12.7)</td><td>46</td><td>5</td><td>105</td><td style="background-color:
#00FF00;">Pass</td></tr>
<tr><td>121 Sweep Direction</td><td>down</td><td>up</td><td>up</td><td style="background-color:
#00FF00;">Pass</td></tr>
<tr><td>406 BCH</td><td>Valid</td><td>-</td><td>-</td><td style="background-color:
#00FF00;">Pass</td></tr>
</table>
<HR SIZE=2>
<H2>DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR
ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.</H2>
</table>
</body>
</html>
<!-- lim
Pass/Fail Flag (Pass = -1, Fail = 0)
-1
 -->
```

Pass/Fail flag when viewing source of (LT) Test Report

Re-Test Measurement with New Limits
The LTS200 LimitTester allows you to re-test a previous measurement with an alternate set of Limits. To do this:
• Open the alternate Limit file from the Limits Files screen.
• From the Options > Files screen, select and open the measurement file that you want to re-test. (Note: this file must have previously been generated with the LimitTester enabled.)
• The new resulting LimitTester file will be named: Filename(LT)current.htm
• The new Limits file name will be indicated on this report.
• Any further re-testing of this same measurement will overwrite the Filename(LT)current.htm file.

LTS200 SPECIFICATIONS

PARAMETER	UNITS	C/S T.001 Limits	BT100 Uncert	DEFAULT LIMITS (including BT100 Uncert)		USER-DEFINED MAX INPUT RANGE	
406 MHz				Lower	Upper	Lower	Upper
406 Frequency (Int Ref)	Hz	±5000	±425	406019575	406081425	406.0 to 406.1 MHz	
406 Frequency (Ext Ref)	Hz	±5000	±1	406019999	406081001	406.0 to 406.1 MHz	
406 Power Level 5 WATT	dBm	35 to 39	±1	34	40	20 to 40 dBm	
INT ANT	%	n/a		5	105	0 to 150 %	
EXT COAX	%	n/a		5	105	0 to 150 %	
406 Power Rise Time	ms	<5	0.5	-	5.5	-	5.5
406 PM +ve Phase Deviation	rad	1.0 to 1.2	±0.04	0.96	1.24	0.2 to 3.0 rad	
406 PM -ve Phase Deviation	rad	-1.0 to -1.2	±0.04	-0.96	-1.24	-0.2 to –3.0 rad	
406 PM Rise Time	µs	50 to 250	±10	40	260	0 to 625 µs	
406 PM Fall Time	µs	50 to 250	±10	40	260	0 to 625 µs	
406 PM Symmetry	-	≤0.05	±0.005	-	0.055	0 to 0.5	
406 PM Bit Rate	Hz	396 to 404	±0.2	395.8	404.2	393 to 407 Hz	
406 CW Preamble	ms	158.4 to 161.6	±0.8	157.6	162.4	140 to 180 ms	
406 Spectral Mask	Corner 1	dBC	±kHz	-20	3	0 to –65 dB	0 to 5 kHz
	Corner 2	dBC	±kHz	-30	7	0 to –65 dB	5 to 9.5 kHz
	Corner 3	dBC	±kHz	-35	12	0 to –65 dB	9.5 to 18 kHz
	Corner 4	dBC	±kHz	-40	24	0 to –65 dB	18 to 25 kHz
121 &/or 243 MHz				Lower	Upper	Lower	Upper
121 Frequency (Int Ref)	Hz	±50 ppm	±150	121493825	121506175	121.49 to 121.51 MHz	
121 Frequency (Ext Ref)	Hz	±50 ppm	±30	121493895	121506105	121.49 to 121.51 MHz	
121 Power Level 5 WATT	dBm	14 to 27	±1.5	12.5	28.5	0 to 30 dBm	
INT ANT	%	n/a		5	105	0 to 110 %	
EXT COAX	%	n/a		5	105	0 to 110 %	
243 Frequency (Int Ref)	Hz	±50 ppm	±300	242987650	243012350	242.98 to 243.02 MHz	
243 Frequency (Ext Ref)	Hz	±50 ppm	±30	242987820	243012180	242.98 to 243.02 MHz	
243 Power Level 5 WATT	dBm	14 to 27	±1.5	12.5	28.5	0 to 30 dBm	
INT ANT	%	n/a		5	105	0 to 110 %	
EXT COAX	%	n/a		5	105	0 to 110 %	
Sweep Direction		UPWARDS or DOWNWARDS				UP, DOWN, DON'T CARE	
Audio Freq - lower	Hz	300	±30	270	-	30 to 900 Hz	-
Audio Freq - upper	Hz	1600	±30	-	1630	-	900 to 1630 Hz
Audio Sweep Range	Hz	≥700	±60	640	1360	0 to 1600 Hz	
AM Sweep Rep Rate	Hz	2 to 4	±0.1	1.9	4.1	1 to 5 Hz	
AM Mod'n Factor	%	85 to 100	±5	84.5	100	5 to 100 %	
AM Duty Cycle	%	33 to 55	±2	31	57	10 to 80 %	
406 Digital Message							
15 Hex ID				no verific'n of 15 Hex ID		15 Characters	
BCH error correcting field				verific'n of BCH1&BCH 2		verific'n of BCH1&BCH2	
406 Location							
Latitude	deg	-		C/S Default Value		-90 to +90 degrees	
Longitude	deg	-		C/S Default Value		-180 to +180 degrees	
Δ distance	m	-		0		100 km	

FREQUENTLY ASKED QUESTIONS

When I open a previous measurement that was created without LimitTester, the Limits button on the Receive screen disappears. How do I get it back?
On the Receive screen, tap Receive then Cancel. The Limits button will now be visible.

How do I get the LimitTest Report into my Excel spreadsheet?
Move the measurement file (example: burst-1(LT).htm) to your PC. From Excel select File > Open and select the measurement file.