

 **WS Technologies Inc.**

**LimitTester**  
**LTS100**

**Instruction Manual**

**Version 1.00**

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## INTRODUCTION

Thank you for choosing the LTS100 LimitTester. The LTS100 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 Instruction Manual to become familiar with the operation of the LimitTester application.

## ACTIVATING THE SOFTWARE

When the LimitTester LTS100 is purchased you are provided with an activation code 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:**

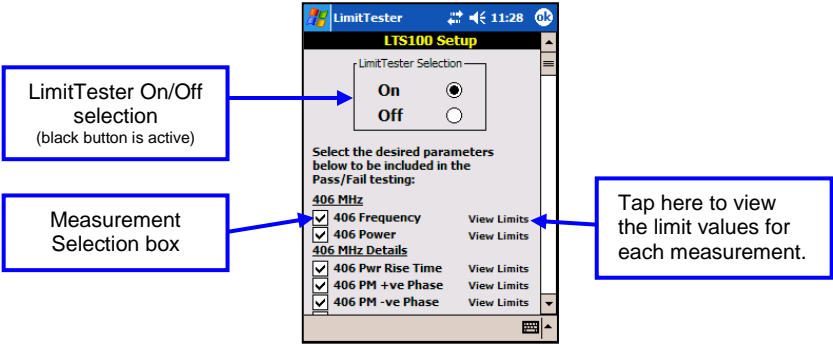
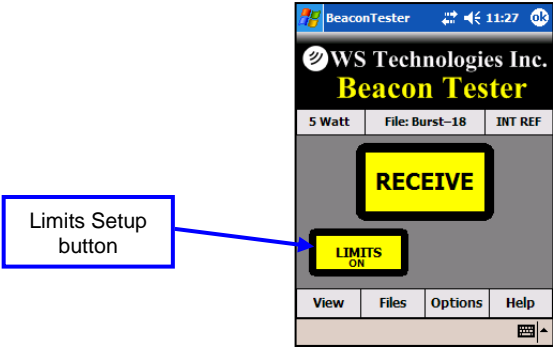
To activate LimitTester on your PDA:

- Ensure you have Beacon Tester software Version 3.0 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.

# LimitTester OPERATION

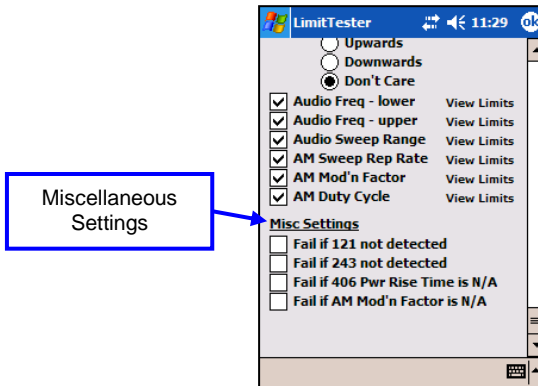
## Basic Setup:

- Insert the BT100 Beacon Card into the PDA.
- Run the BT100 Beacon Tester application (version 3.0 or greater).
- Tap on the Limits Setup button.



- Enable or disable the LimitTester by tapping the On or Off button.
- Select the measurements that you wish to include in the Pass/Fail test by checking the box adjacent to that measurement.
- To view the limits for each parameter tap on View Limits adjacent to the specific parameter. These limits are also shown in the LTS100 Specifications section at the end of this manual.

## Miscellaneous Settings:



- If 121 MHz is not detected no failure will occur unless the “Fail if 121 is not detected” box is checked.
- If 243 MHz is not detected no failure will occur unless the “Fail if 243 is not detected” box is checked.
- Below a certain power level the 406 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 121 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.

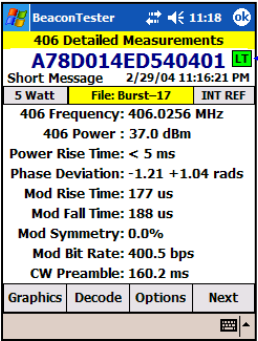
**NOTE:** The LimitTester application will prioritize the BT100 Printing/Configuration settings before the LimitTester settings. For example, if the BT100 settings are set to “121.5 MHz only” mode, then no 406 MHz measurements will be shown in the LimitTester results.

## Power Measurements:

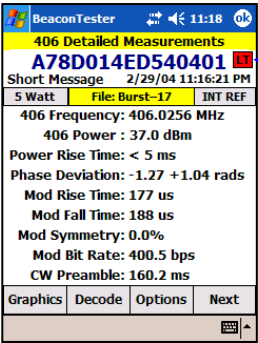
The BT100 settings will determine the input power measurement mode: 5 WATT, INT ANT, or EXT COAX.



- 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 shows the Pass/Fail status.)



LT button  
(green indicates  
Parameters  
passed)



LT button  
(red indicates  
Parameters  
failed)

## LimitTester Report:

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

### <Filename-1>

Filename-1.htm  
Filename-1(LT).htm  
graphics\_enabler.class

folder name  
test report  
LimitTester report  
utility file

<b>LimitTester Report</b>				
A78D014ED540401				
<b>Organization:</b>				
<b>Tested By:</b>				
<b>Date:</b> 3/1/04 12:13:44 AM				
<b>Tester Model/Serial No./File Name:</b> BT100A/64021/Burst-20				
<b>Tester Cal Due Date:</b> Aug 17, 2012				
<b>Tester Temperature:</b> 25°C				
<hr/>				
<b>Notes:</b> Add text comments here.				
<hr/>				
Parameters	Measured Data	Lower Limit	Upper Limit	Pass/Fail
406 Freq (Hz) (INT REF)	406027474	406019575	406045425	Pass
406 Power (dBm)	37.0	34	40	Pass
406 Power Rise (ms)	< 5.5 ms	-	5.5	Pass
406 +Mod (rad)	0.89	0.96	1.24	Fail
406 -Mod (rad)	-1.32	-0.96	-1.24	Fail
406 Mod Rise (us)	165	40	260	Pass
406 Mod Fall (us)	188	40	260	Pass
406 Bit Rate (bps)	400.4	395.8	404.2	Pass
406 Preamble (ms)	160.2	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
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.

**Re-Testing a Previous Measurement with New Limits:**

The LTS100 LimitTester allows you to re-test a previous beacon measurement with an new set of Limits. To do this:

- Open the LTS100 Setup screen and check or uncheck the boxes for the new desired measurements.
- 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
- Any further re-testing of this same measurement will overwrite the Filename(LT)current.htm file.

# LTS100 SPECIFICATIONS

PARAMETER	UNITS	C/S T.001 Limits	BT100 Uncert	DEFAULT LIMITS (including BT100 Uncert)	
406 MHz				Lower	Upper
406 Frequency (Int Ref)	Hz	±5000	±425	406019575	406045425
406 Frequency (Ext Ref)	Hz	±5000	±1	406019999	406045001
406 Power Level 5 WATT	dBm	35 to 39	±1	34	40
INT ANT*	%	n/a		5	105
EXT COAX*	%	n/a		5	105
406 Power Rise Time	ms	<5	0.5	-	5.5
406 PM +ve Phase Deviation	rad	1.0 to 1.2	±0.04	0.96	1.24
406 PM -ve Phase Deviation	rad	-1.0 to -1.2	±0.04	-0.96	-1.24
406 PM Rise Time	µs	50 to 250	±10	40	260
406 PM Fall Time	µs	50 to 250	±10	40	260
406 PM Symmetry	-	≤0.05	±0.005	-	0.055
406 PM Bit Rate	Hz	396 to 404	±0.2	395.8	404.2
406 CW Preamble	ms	158.4 to 161.6	±0.8	157.6	162.4
406 Spectral Mask		Corner 1	dBC   ±kHz	-20	3
		Corner 2	dBC   ±kHz	-30	7
		Corner 3	dBC   ±kHz	-35	12
		Corner 4	dBC   ±kHz	-40	24
121 &/or 243 MHz				Lower	Upper
121 Frequency (Int Ref)	Hz	±50 ppm	±150	121493825	121506175
121 Frequency (Ext Ref)	Hz	±50 ppm	±30	121493895	121506105
121 Power Level 5 WATT	dBm	14 to 30	±1.5	12.5	31.5
INT ANT*	%	n/a		5	105
EXT COAX*	%	n/a		5	105
243 Frequency (Int Ref)	Hz	±50 ppm	±300	242987650	243012350
243 Frequency (Ext Ref)	Hz	±50 ppm	±30	242987820	243012180
243 Power Level 5 WATT	dBm	14 to 30	±1.5	12.5	31.5
INT ANT*	%	n/a		5	105
EXT COAX*	%	n/a		5	105
Sweep Direction		UPWARDS or DOWNWARDS or DONT CARE			
Audio Freq - lower	Hz	300	±30	270	-
Audio Freq - upper	Hz	1600	±30	-	1630
Audio Sweep Range	Hz	≥700	±60	640	1360
AM Sweep Rep Rate	Hz	2 to 4	±0.1	1.9	4.1
AM Mod'n Factor	%	85 to 100	±5	84.5	100
AM Duty Cycle	%	33 to 55	±2	31	57

\* Measurements made with the BT100 in the INT ANT or EXT COAX mode cannot determine the absolute output power of the beacon. The resulting measurement is a measure of the signal strength determined from the RSSI output from the receiver. A calibrated setup must be used in order to determine the absolute beacon power.

## FREQUENTLY ASKED QUESTIONS

### **When I do a self-test measurement of the beacon, the 406 phase modulation measurements fail. Is the beacon defective?**

Older models of beacon used an ovenized oscillator for frequency stability. When you use self-test, the oscillator has not had a chance to warm up, thus distorting the phase modulation measurement. Try repeating the self-test 2 or 3 times.

### **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.

### **When I print the LimitTester report the green and red background colours relating to Pass and Fail do not appear on the report.**

This is normal. Viewing the report on your computer screen will show the colours. Printing the report will show text only – no background colours.

### **Is there a way to modify the limits values?**

The LTS100 software does not allow the user to change the limit values. The user would need to upgrade to the advanced LimitTester LTS200 which has more features and allows the user to create user-defined limits.