



## The Automated G/T Measurement Tool Using the LS-27 Series Tracking Receiver / Downconverter

October 2015



Harmonix Systems Inc./Lumistar Inc.



- **The Lumistar “Automated G/T Measurement Tool” is embedded in the LS-27 Series Tracking Receiver-Downconverter products**
  - **Available in PCI or Modular Formats**
  - **Standard Feature, no additional cost**
- **The “Automated G/T Measurement Tool” allows the User to make multiple G/T measurements simultaneously and in typically under one minute per measurement**

The Tool is embedded in the LRRS Application (Lumistar Range Receiver Software)

Here is a screen shot of the GUI at the start of the test.

In this example, two G/T measurements will be made in a dual-polarity tracking dish antenna

The User must enter the dish size, RF frequency, IF bandwidth setting, and daily NOAA Solar Flux Density numbers

\* G/T Calculator 288:09:32:47.011 Flux Data Stale

Save Recall Hardcopy

Channel Properties Control All Enabled Channels

**Ch 1 Enable** **Ch 2 Enable**

Receiver	
Freq (MHz)	2250.50 MHz
IF BW (MHz)	0.25
RF Level (dBm)	-52.7

Antenna	
Diameter (meter)	4.7
Beam Width (deg)	2

Receiver	
Freq (MHz)	2250.50 MHz
IF BW (MHz)	0.25
RF Level (dBm)	-64.1

Antenna	
Diameter (meter)	4.7
Beam Width (deg)	2

NOAA Solar Flux Density  
Updated at 282:11:08:01.454 2015

Freq (MHz)	Flux
410	53.0
610	77.0
1415	115.0
2695	131.0
4995	173.0
8800	285.0

Start Test  
Hot Sky  
Cold Sky  
Calculate Results

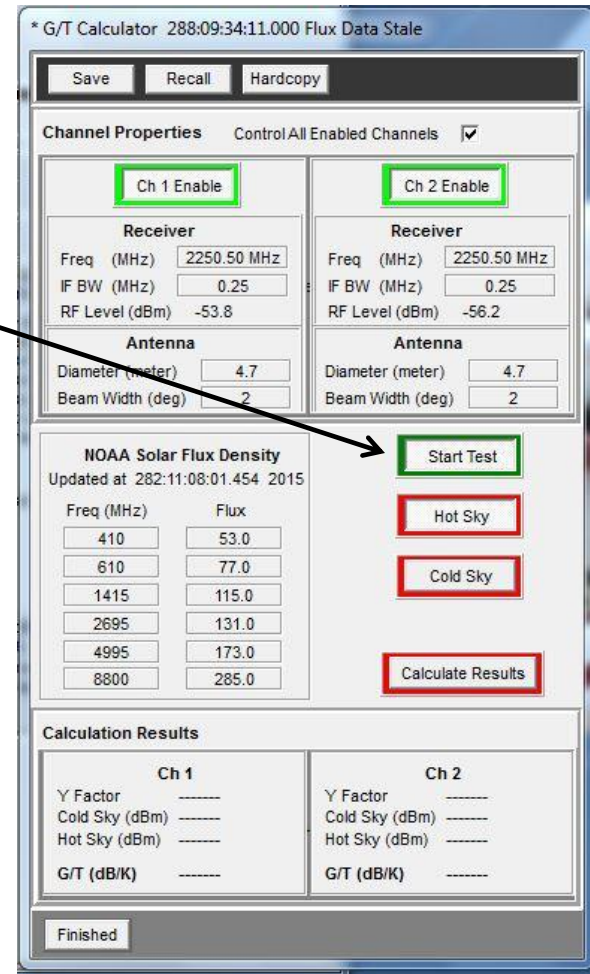
Calculation Results

Ch 1		Ch 2	
Y Factor	-----	Y Factor	-----
Cold Sky (dBm)	-----	Cold Sky (dBm)	-----
Hot Sky (dBm)	-----	Hot Sky (dBm)	-----
G/T (dB/K)	-----	G/T (dB/K)	-----

Finished



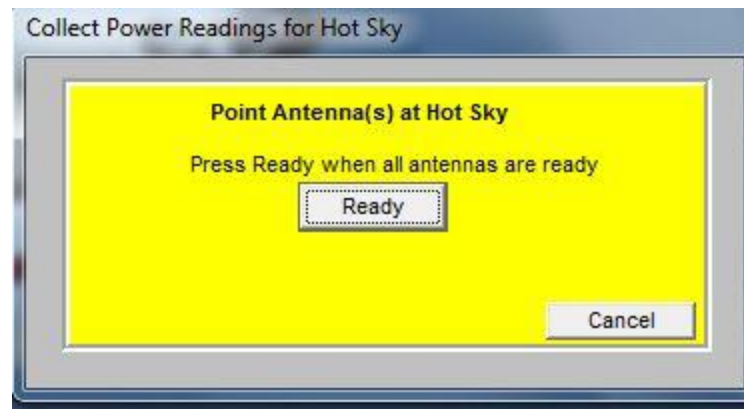
The Automated G/T Test is activated by clicking the “Start Test” button



The User is prompted to be sure he has pointed his antenna exactly at “Hot Sky” (i.e. the Sun), and only then should he proceed by selecting “Ready”

**Note :**

***Lumistar recommends performing this Test when the Sun is at an Elevation of greater than +20 degrees***



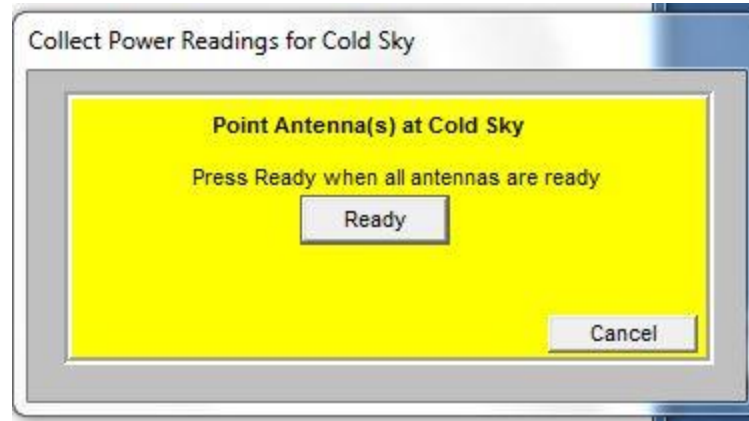
The G/T tool puts the Tracking Receiver – Downconverter in to “AGC Freeze” mode, waits a few seconds, optimizes the Gain for the most linear operational point, and then then begins to sample the power at the IF (no external IF power measuring devices are required!).



**After the “Hot Sky” readings are collected and saved, the User is asked to point the antenna to “Cold Sky and then proceed by clicking the “Ready” button.**

***Note :***

***Lumistar recommends performing this Test at the same elevation as Hot Sky measurement.***





Green border indicates “Hot Sky” measurements have been completed and stored while the “Cold Sky” measurements are being taken.



\* G/T Calculator 288:09:37:32.707 Flux Data State

Save Recall Hardcopy

Channel Properties ControlAll Enabled Channels

Ch 1 Enable

Ch 2 Enable

**Receiver**

Freq (MHz)

IF BW (MHz)

RF Level (dBm)

**Antenna**

Diameter (meter)

Beam Width (deg)

**Receiver**

Freq (MHz)

IF BW (MHz)

RF Level (dBm)

**Antenna**

Diameter (meter)

Beam Width (deg)

**NOAA Solar Flux Density**

Updated at 282:11:08:01.454 2015

Freq (MHz)	Flux
410	53.0
610	77.0
1415	115.0
2695	131.0
4995	173.0
8800	285.0

Start Test

Hot Sky

Cold Sky

Calculate Results

**Calculation Results**

Ch 1		Ch 2	
Y Factor	-----	Y Factor	-----
Cold Sky (dBm)	-----	Cold Sky (dBm)	-----
Hot Sky (dBm)	-----	Hot Sky (dBm)	-----
G/T (dB/K)	-----	G/T (dB/K)	-----

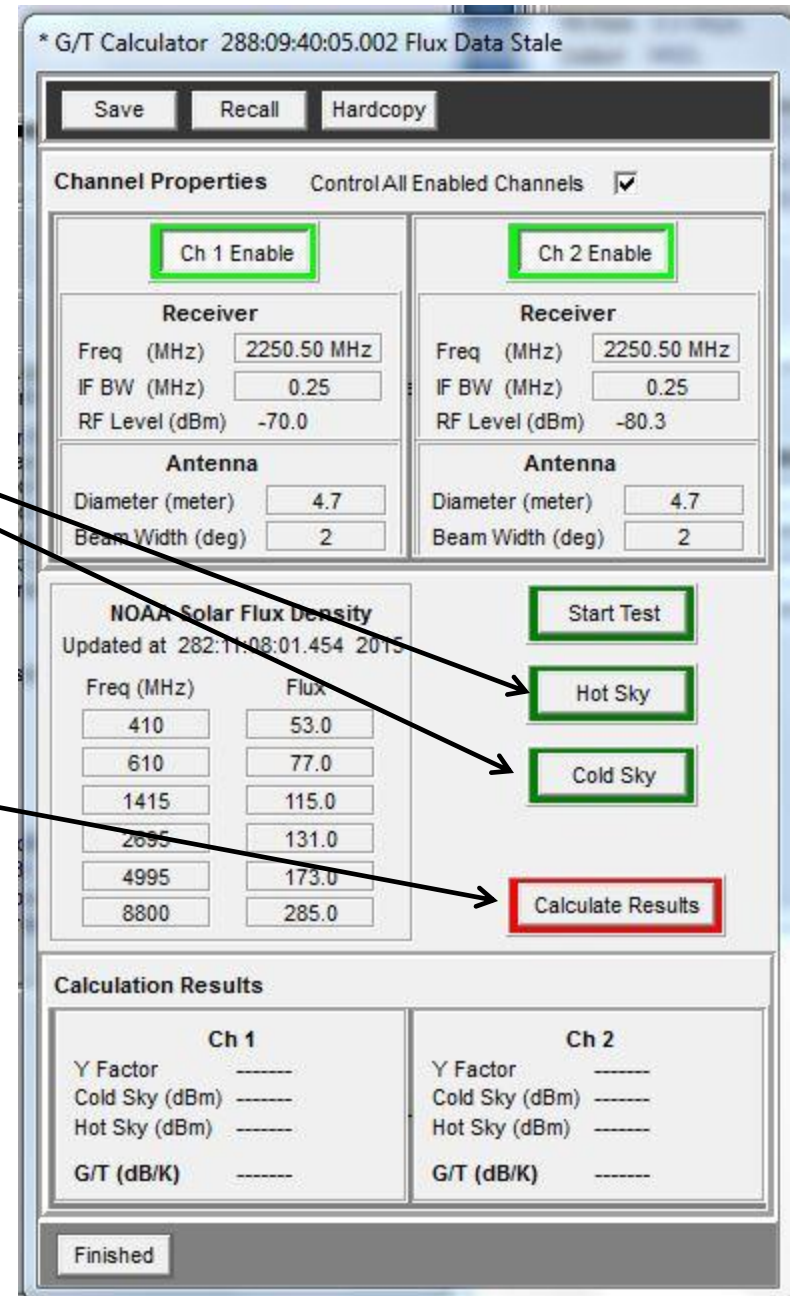
Finished





After “Cold Sky” reading are taken, the green borders indicates both “Cold Sky” and “Hot Sky” measurements have been collected and stored.

The User is now ready to perform the calculation for the final test results by clicking the “Calculate Results” button”



The calculated results are displayed at the bottom of the GUI.

The total time required to run the test for any number of receivers is typically under one minute.

The test result can be saved or recalled. A JPG hardcopy of the test result can be stored.

When the test is “Finished, the G/T Tool is closed and the receiver is placed back into AGC Auto mode.

G/T Calculator 288:09:43:06.995 Flux Data Stale

Save Recall Hardcopy

Channel Properties Control All Enabled Channels

Ch 1 Enable Ch 2 Enable

**Receiver**  
Freq (MHz) 2250.50 MHz  
IF BW (MHz) 0.25  
RF Level (dBm) -67.4

**Antenna**  
Diameter (meter) 4.7  
Beam Width (deg) 2

**Receiver**  
Freq (MHz) 2250.50 MHz  
IF BW (MHz) 0.25  
RF Level (dBm) -68.5

**Antenna**  
Diameter (meter) 4.7  
Beam Width (deg) 2

NOAA Solar Flux Density  
Updated at 282:11:08:01.454 2015

Freq (MHz)	Flux
410	53.0
610	77.0
1415	115.0
2695	131.0
4995	173.0
8800	285.0

Start Test  
Hot Sky  
Cold Sky  
Calculate Results

**Calculation Results**

	Ch 1	Ch 2
Y Factor	9.924	9.365
Cold Sky (dBm)	-67.348	-67.240
Hot Sky (dBm)	-57.424	-57.875
G/T (dB/K)	11.410	10.783

Finished



It has been shown that Lumistar's G/T Measurement Tool will accurately measure the G/T of any receiving system, saves the User a lot of time by automating the process and also eliminates the need for any external measurement equipment (such as IF power meters, etc....)

G/T Calculator 288:09:43:06.995 Flux Data Stale

Save Recall Hardcopy

Channel Properties Control All Enabled Channels

Ch 1 Enable Ch 2 Enable

Receiver		Receiver	
Freq (MHz)	2250.50 MHz	Freq (MHz)	2250.50 MHz
IF BW (MHz)	0.25	IF BW (MHz)	0.25
RF Level (dBm)	-67.4	RF Level (dBm)	-68.5

Antenna		Antenna	
Diameter (meter)	4.7	Diameter (meter)	4.7
Beam Width (deg)	2	Beam Width (deg)	2

NOAA Solar Flux Density  
Updated at 282:11:08:01.454 2015

Freq (MHz)	Flux
410	53.0
610	77.0
1415	115.0
2695	131.0
4995	173.0
8800	285.0

Start Test  
Hot Sky  
Cold Sky  
Calculate Results

Calculation Results

	Ch 1	Ch 2
Y Factor	9.924	9.365
Cold Sky (dBm)	-67.348	-67.240
Hot Sky (dBm)	-57.424	-57.875
G/T (dB/K)	11.410	10.783

Finished

