APPLIED INSTRUMENTS, INC.

RF TEST AND MEASUREMENT

12/13/2016

# Limit Scan Feature Revision Brief for the AI Turbo S2 Satellite Meter

1. Update Software in Meter

To obtain the software that contains the revised Limit Scan feature as described in the document below, download updates for two software components using the FlashUpdate program:

a. Software Main Program (TS2 Main) v1.37 or newer

b. Limit Values – using the drop-down menu choose either 'Dish East' or 'Dish Central' or 'Dish West', depending on your geographic location. Load version 2.05 dish limit values into the meter. A list of which states are contained in each Dish Limits file is attached below.

Dish East	Dish Central	Dish West
Alabama	Alabama	Alaska
Connecticut	Arkansas	Arizona
Delaware	Illinois	California
District of Columbia	Indiana	Colorado
Florida	Iowa	Hawaii
Georgia	Kansas	Idaho
Indiana	Kentucky	Kansas
Kentucky	Louisiana	Montana
Maine	Michigan	Nebraska
Maryland	Minnesota	Nevada
Massachusetts	Mississippi	New Mexico
Michigan	Missouri	North Dakota
New Hampshire	Nebraska	Oklahoma
New Jersey	North Dakota	Oregon
New York	Oklahoma	South Dakota
North Carolina	South Dakota	Texas
Ohio	Tennessee	Utah
Pennsylvania	Texas	Washington
Puerto Rico	Wisconsin	Wyoming
Rhode Island		
South Carolina		
Tennessee		
Vermont		
US Virgin Islands		
Virginia		
West Virginia		

Note: When you open the FlashUpdate program, you will receive a Warning message alerting you that the previous Limit Values are no longer available. Press OK when this message appears.
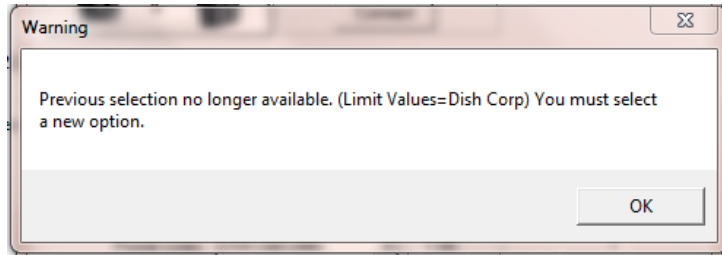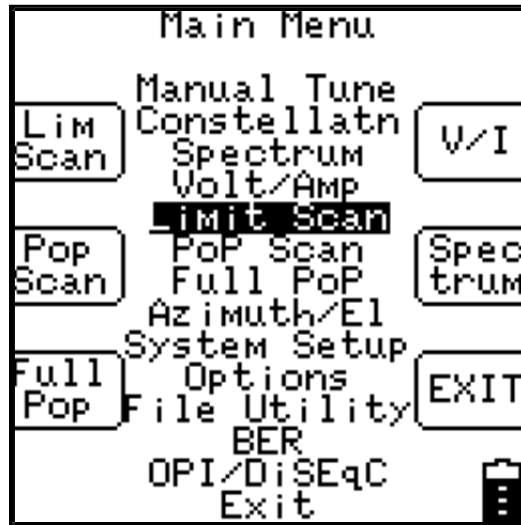

Then use the drop down box next to 'Limit Values' to choose the appropriate Dish Limits file, based on your geographic location.
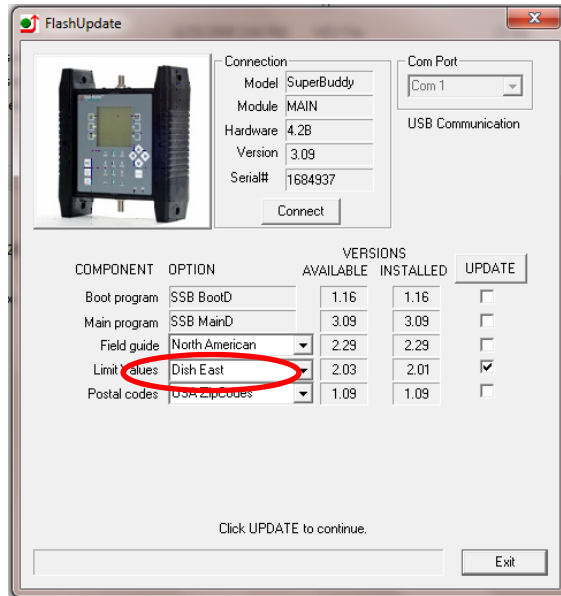
2. **Setup**

After the dish installation is complete, select "Limit Scan" from the main menu:

3. **Scanning**

Selecting "Limit Scan" from the Main Menu will start the Limit Scan screen.

If limits have already been defined for the presently selected satellite, the scanning will start immediately if the LNB is being powered. The Limit Scan is only useful if the LNB is being powered by the meter. Press the LNB soft-key (located near middle right area of screen) to power the LNB. On a multi-LNBF setup, press the LNB soft-key more than once to toggle from LNB1 to LNB2 to LNB3, etc. The satellite orbital position (i.e. 110.0W) related to each selected LNB port will be displayed in the top right corner of the LCD screen.
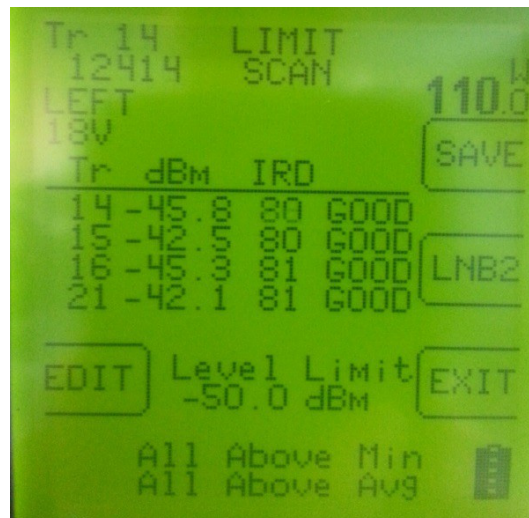
For each transponder to scan, the screen shows:
1) Tr – The transponder numbers to be scanned (transponders must be defined by user)
2) dBm – The measured dBm signal level value corresponding to each specified transponder
3) IRD – The measured IRD signal quality value corresponding to each specified transponder
4) A transponder grade next to each individual transponder:

a. FAIL - Below the minimum Signal Level limit or below the minimum IRD Signal Quality limits

b. Low - At or above the minimum Signal Level limit and at or above the minimum Signal Quality limits but below the average Signal Quality limits

c. Good - At or above the minimum Signal Level limit and at or above the average Signal Quality limits

5) Summary of Limit Scan results - At the bottom of the screen, the user will see a comparison to the **minimum** first (top row at bottom of screen) and the comparison to the **average** second (bottom row at bottom of screen). Possible Limit Scan summary messages that could be displayed at bottom of screen:

a. All Above Min – the measured IRD Signal Quality and Signal Level of all transponders tested are above the minimum limits

b. Some Below Min – the measured IRD Signal Quality or Signal Level of at least one of the transponders tested is below the minimum limit

c. All Above Avg – the measured IRD Signal Quality of all transponders tested is above the average limit and the measured Signal Level of all transponders is above the Signal Level limit.

d. Some Below Avg – the measured IRD Signal Quality of at least one of the transponders tested is below the average limit and the measured Signal Level of all transponders is above the Signal Level limit.

If a lock is not obtained for a transponder, the IRD column will display "??" instead of the measured signal quality value. The table will be filled in as the transponders are measured in sequence. When all limit scan transponders have been scanned, the individual transponder grades and the summary will appear on the screen.

The Limit Scan will continue running constantly until stopped by the user. You will receive a summary at the bottom of the screen after each cycle of limit scanning has been completed.

The following keys are active while scanning:
EDIT – lets you edit the transponder list and limits (see below)
SAVE – collects and stores a complete limit scan for later upload to a PC
LNB ON/OFF – also selects different LNBs in a multi-LNB system
EXIT - returns to the main Run screen
Left / Right Arrow keys – scroll between satellites (as in the Run Screen)

4. **Editing Limits**

If limits have not yet been defined, a message will be displayed that says "No limits for orbit". Press EDIT soft-key to define limits.
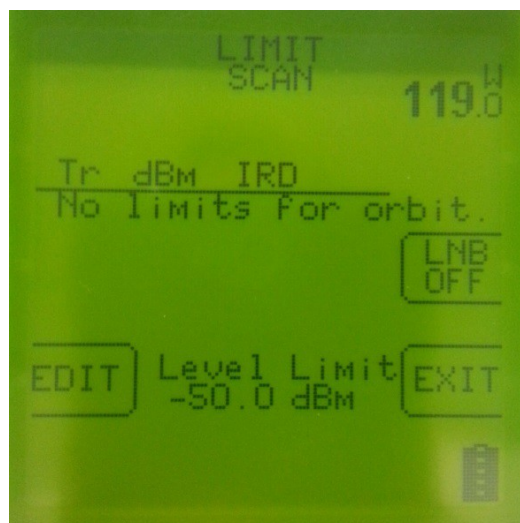

The limit editing function may be activated in three ways:
1) By pressing EDIT soft-key from the Limit Scan screen

2) By activating the Limit Scan from a satellite that does not have limits defined, or
3) By scrolling via left/right arrow keys or the LNB soft-key to a satellite that does not have limits defined

When a satellite with no limits is selected, the edit screen contains zeros for all transponders:
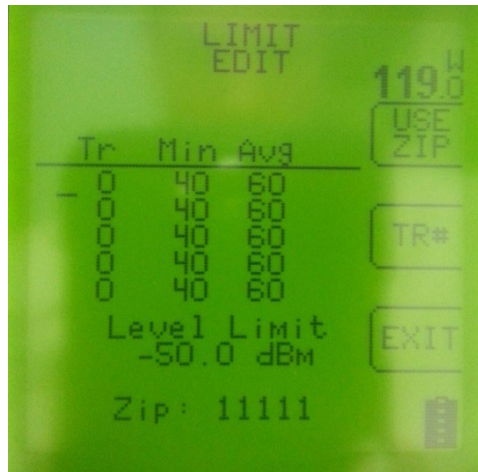
4.1   Loading Preset Limits

The soft-key labeled "USE ZIP" is usable for most Dish Network satellites (61.5, 72.7, 77, 110, 118.7, 119, and 129). When there are preset minimum and average IRD and minimum Signal Level values available for the satellite, pressing the USE ZIP soft-key will auto-populate the fields with minimum and average values specified by Dish Network.

To auto-populate the minimum and average IRD signal quality value fields based on your geographic location (zip code) in the Limit Scan feature:

1) Using the soft-keys, select MENU,
2) Using the arrow keys, highlight 'Limit Scan'.
3) Press Enter
4) Press the EDIT soft-key.
5) If the zip code shown at the bottom of the screen is the correct zip code for your present location, then press the USE ZIP soft-key.
6) If the zip code shown at the bottom of the screen is not the correct zip code for your present location, then use the up or down arrow buttons to move the cursor down to the Zip code field, use the meter's numeric keypad to enter your local zip code, and then press Enter button.
7) Press the EXIT soft-key to return to the main Limit Scan screen to use this feature and begin running a Limit Scan.
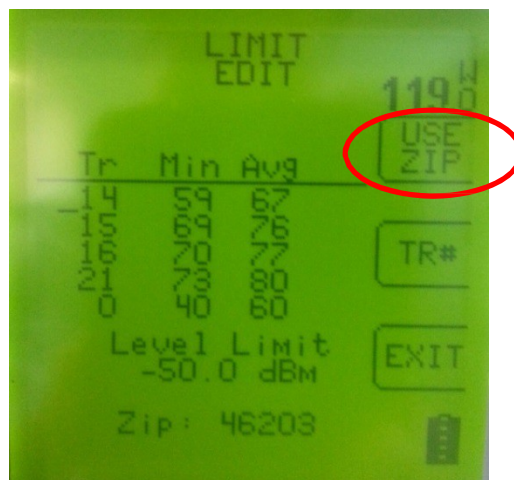
4.2   Initialization

The default values consist of the standard Dish Network set of transponders. The defaults may be restored by pressing the PRESET key in the Options screen.

Saving Limit Scans

You may find it beneficial to document the Limit Scan to prove that the signal level and quality of the key transponders are adequate before you leave the site. To accomplish this, you may save the Limit Scan to the flash memory of the AI Turbo S2 while out in the field. Then you can upload it to a PC when back at the office to store the documentation on your   hard drive or forward it on to upper management if required. Since the Limit Scan function only scans the key   transponders (up to five per satellite), it is much less time consuming to use than the Proof of Performance Scan feature   that scans all transponders on the satellite.

To save a Limit Scan, press the SAVE soft-key in upper right hand corner of LCD screen. The meter will then perform a Limit Scan on the key transponders for LNB1. Then it will automatically send the necessary commands to toggle to LNB2 and LNB3 and will scan through those key transponders if you've indicated in the System Setup that you're connected to a multi-LNB assembly.

After the Limit Scan is complete, a screen will appear that allows you to type in the date, location, technician name or ID number, and any notes. Use the numeric keypad to fill in these fields and then press the NEXT soft-key.
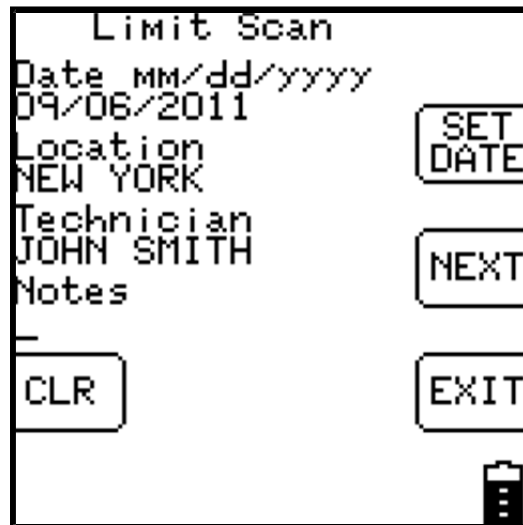
Then you must type in a unique file name for this Limit Scan. An error message will appear if you enter a name that has already been used.

After you type in the file name using the numeric keypad, press "SAVE" and the system will copy the file from temporary storage to flash file storage.

```
┌─────────────────────────────┐
│        Limit Scan           │
│ File name                   │
│ DISH 1000.4 WEST_           │
│                             │
│                             │
│                  ┌──────┐   │
│                  │ SAVE │   │
│                  └──────┘   │
│  ┌─────┐         ┌──────┐   │
│  │ CLR │         │ EXIT │   │
│  └─────┘         └──────┘   │
│                        ▐█▌  │
└─────────────────────────────┘
```

If an error occurs during the copy process or if the flash storage area is too full, the message "Flash copy failed" will appear and the test data will be lost.

There is file storage space for about 70 files. The actual limit depends on the number of transponders used.

5. Install PC Software & Transferring Data Files to PC

The process for transferring the saved Limit Scans to your PC is identical to the process for transferring saved Proof of Performance scans. Please see the Proof of Performance Testing section of the operation manual for instructions of how to transfer the saved files to your PC using the SatTransfer application. SatTransfer version 2.12 or higher is required to display the Dish Network revised Limit Scan results properly.

A screenshot from an example of a transferred Limit Scan file is shown below.

Limit Scan

Filename : 1000.4 92
Date: 03/28/2014
Time: 00:00:00
Location: AI
Technician: SH
Notes: 1000.4 92
Level: dBm
Level Limit: -50.0
Result: FAIL

FieldGuide: North American V2.18
Software: 3.08
Model: SuperBuddy
Serial: 1681830
LNB Model: 1000.4 East
Region: NE Continental US
Switch: DpPlus

Satellite: 61.5 West

Tran	Freq MHz	Error MHz	Level dbm	IRD SigQ	C/N db	Lock Status	LNB Volts	LNB mA	Min SigQ	Avg SigQ	Grade
5	1032.320	-0.310	-35.6	44	12.5	LOCK	18.3	270	48	53	FAIL
7	1061.480	-0.415	-36.9	42	12.2	LOCK	18.3	270	47	52	FAIL
10	1994.780	1.077	-28.3	57	14.6	LOCK	18.3	270	59	64	FAIL
12	1965.620	0.953	-30.2	48	13.2	LOCK	18.3	270	48	52	Low

Satellite: 72.7 West

Tran	Freq MHz	Error MHz	Level dbm	IRD SigQ	C/N db	Lock Status	LNB Volts	LNB mA	Min SigQ	Avg SigQ	Grade
12	1965.620	0.829	-31.3	34	10.9	LOCK	18.3	270	42	45	FAIL
16	1907.300	0.881	-32.3	34	11.0	LOCK	18.3	270	42	45	FAIL
17	1207.280	-0.328	-33.3	43	12.4	LOCK	18.3	270	51	54	FAIL
21	1265.600	-0.336	-33.0	45	12.7	LOCK	18.3	270	51	53	FAIL

It is recommended to select File/Properties/Results Only before printing Limit Scans to reduce the number of columns printed. Most field technicians do not need to or want to see the transponder parameters (modulation type, code rate, baud rate).