

ANYWAVE ATSC 60W DTV Transmitter Quick Start Guide

Version 1.1 – June 26, 2018





Copyright Notice

Copyright © Anywave Communication Technologies, Inc. 2018, All rights reserved. No part of this publication may be reproduced, translated, transcribed, stored in a retrieval system, or transmitted into any form or by any means, without the express written permission of Anywave Communication Technologies, Inc.

FCC Compliance

This equipment complies with relevant portions of Parts 2, 73, & 74 of the FCC rules governing LPTV operation.

Disclaimer

Information provided by Anywave Communication Technologies is believed to be accurate and complete; however, no liability can be assumed for its use.

The manufacturer makes no representations or warranties, either expressed or implied, by or with respect to anything in this manual, and shall not be liable for any implied warranties of fitness for a particular purpose or for any indirect, special, or consequential damages. Information in this document is subject to change without notice and does not represent a commitment on the part of the manufacturer.

USE OF THIS PRODUCT IN A MANNER OTHER THAN DESCRIBED IN THIS MANUAL MAY RESULT IN DAMAGE TO THE EQUIPMENT AND/OR PERSONAL INJURY.

PLEASE READ THIS MANUAL IN ITS ENTIRETY BEFORE ATTEMPTING TO INSTALL THE EQUIPMENT. CONTACT ANYWAVE WITH ANY QUESTIONS OR CONCERNS YOU MAY HAVE.

Anywave Communication Technologies Inc. 300 Knightsbridge Parkway, Suite 150, Lincolnshire, IL 60069 Tel: (847) 415-2258 Fax: (847) 415-2112 http://www.anywavecom.net



Unpacking

Carefully unpack the equipment and perform a visual inspection to determine if any apparent damage has occurred during shipment. Please notify the delivery carrier and Anywave immediately if shipment damage has occurred. Retain all original shipping materials.

Please locate and reference the Packing Check List to verify you have received all components of your system. Retain the Packing Check List for future reference.

Also, please identify and remove all packing materials and supports (foam pads, etc.) prior to initial turn on of the equipment.

Returns and Exchanges

Written approval and a Return Authorization Number (RAN) are required from Anywave for all equipment returns. Please direct all return inquiries to the Anywave Service Department at <u>support_us@anywavecom.com</u>, providing the Sales Order number and Serial Number(s) of the equipment. Complete details regarding the nature and circumstances of your return must be included in your RAN request. Proper handling and return shipping instructions will be provided with an approved RAN number.

Technical Support

Technical support and troubleshooting assistance for Anywave Transmitters is available through the Anywave Service Department during normal business hours (8:00 AM - 5:00 PM CST) at (847) 415-2258. Email questions to support_us@anywavecom.com.

Note: For all service and support requests, you will need to provide the Serial Number of the equipment with your Sales Order number. For future reference, please record that information here:_____





WARNING

THE VOLTAGES, CURRENTS, AND RF ENERGY IN THIS EQUIPMENT ARE DANGEROUS. PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY WARNINGS, INSTRUCTIONS, AND REGULATIONS.

IN THE CASE OF EMERGENCY, ENSURE THAT ALL POWER HAS BEEN DISCONNECTED.

ALWAYS DISCONNECT POWER BEFORE REMOVING COVERS, ENCLOSURES, OR SHIELDS. DO NOT PERFROM SERVICE ON THE EQUIPMENT WHEN ALONE OR FATIGUED. KNOW YOUR EQUIPMENT AND DO NOT TAKE RISKS.

This manual is provided as a general guide for trained and qualified personnel well aware of the dangers inherent in handling potentially hazardous electrical transmission equipment.

The installation, operation, maintenance and service of this equipment involves risks both to personnel and equipment, and must ONLY be performed by qualified personnel exercising due care. Anywave Communication Technologies, Inc. shall not be responsible for injury or damage resulting from improper handling or from the use of improperly trained or inexperienced personnel performing such tasks.

All local building and electrical codes as well as fire protection standards must be observed in the installation and operation of the equipment.



Contents

1	Introduction	.6
2	Organization of Manual	.6
3	TX System Overview	.7
4	TX System Interconnect	.8
5	Initial Turn On	.9



1 Introduction

This Quick Start Guide contains instructions to safely setup and turn on the Anywave 60W DTV Transmitter. Please note that trained and qualified personnel are required to install, maintain, and service this transmission equipment.

2 Organization of Manual

This Manual is broken up into several sections.

- <u>Section 3</u> <u>TX system Overview</u>: Provides a general overview of the 60W Transmitter System
- <u>Section 4</u> <u>TX System Interconnect</u>: Overview of interconnections of the major subassemblies contained in the Transmitter system
- <u>Section 5</u> <u>Initial Turn On</u>: How to safely turn on your Transmitter



3 TX System Overview

Final assembly and test of each transmitter is performed at the Anywave factory. The Exciter is setup on the desired channel frequency and the TX is tested with the complete RF system (if purchased) at full power into a load. All TX operating parameters are optimized and the Transmitter Forward and Reflected power meters are properly calibrated. Linear and Nonlinear precorrection is performed and automatically stored in non-volatile memory inside the Exciter. A Factory Test Report is completed for each system, providing a record of full power operating parameters and performance. The TX then goes through a final 24-hour burn-in period and check out before being shut done and packed up for shipment.

In your shipment, you should receive a copy of the following documentation.

- Packing Checklist
- Transmitter Factory Test Report
- 60W TX Quick Start Guide
- 60W PA and Exciter User Manuals

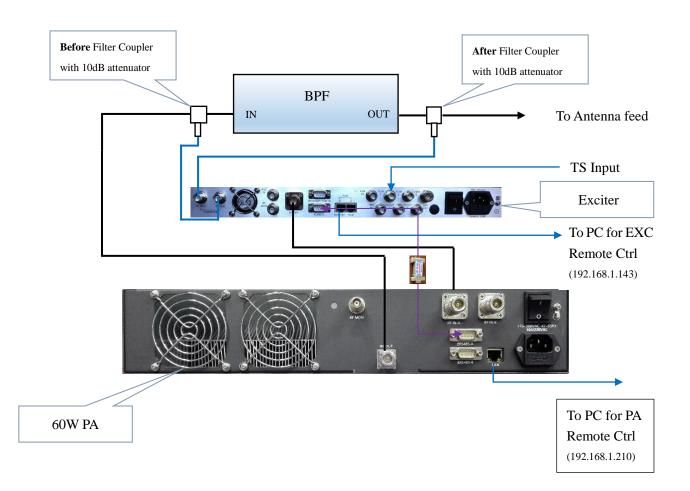
Carefully unpack and inspect all your equipment and please review the Packing Checklist when you receive your system to be certain you have received all your system components. Also, please be sure to identify and remove all packing materials and supports (foam pads, etc.) prior to initial turn on of the equipment.

All Single PA TX systems ship with an AC power cord included with the Exciter and PA. The PA shipment also includes an RS232 cable, for Exciter to PA communications, and a CAT5 Ethernet cable, for Exciter to PC built-in web interface Remote Monitoring and Control.



4 TX System Interconnect

The Anywave ATSC 60W DTV Transmitter consists of an Exciter, PA-U01-C-FA PA, and a BPF (optional) with two additional single port couplers for Exciter feedback samples (optional). The diagram below shows the overall system interconnect between the system components.





5 Initial Turn On

Please locate and have handy for reference a copy of your 60W TX Factory Test Report as well as the 60W TX Quick Start Guide, and PA-U01-C-FA PA and Exciter User Manuals.

- 1. With all equipment turned OFF, please make the cable connections according to the System Interconnect Diagram of section 4. Make sure the BPF or PA output is properly connected to your Antenna feed or a suitable station load before proceeding further.
- 2. Turn ON the Exciter via its rear panel AC switch.
- 3. Check Exciter settings. Check the operating Frequency of the Exciter by navigating to the Exciter FREQ submenu (simultaneously press Left and Right buttons)



Check the Exciter drive level is set to -25dBm by navigating to the Exciter RF submenu (from above, press ESC button then enter the RF submenu).



(Please refer to your Exciter User Manual for help with detailed operation of the Exciter).

- 4. Turn the 60W PA ON via the PA rear panel breaker, which should turn BLUE when ON.
- 5. The built-in FWD and REF power metering in your 60W TX has already been calibrated at the factory. The Exciter PAC submenu contains the System Forward and Reflected power meter readings PA_Fwd and PA_Ref. Visit the



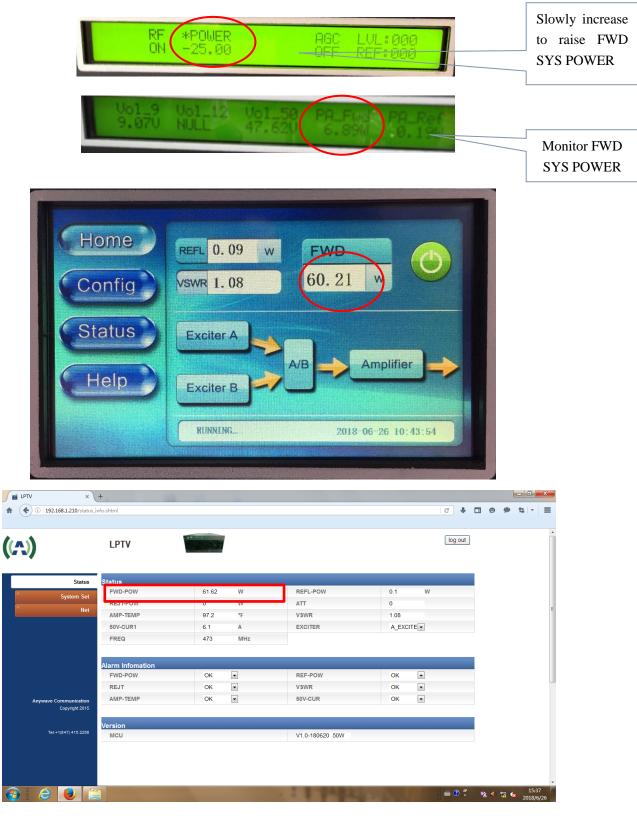
PAC menu on the Exciter LCD (under Advanced submenu) or the PA's touchscreen, or its Web interface and verify that the current (Cur1_50) are showing real values and not all 0s.

Image: set of the set of				A	
Image: Status Image: Status<					
Image: Status Image: Status<	Hama				
Image: Status Image: Status<	Home	50V 19 8	V CURI 6	76 A	
Status CuRi 0.00 A CuRi 0.00 A Tenne 99.23 F AT 0 FREQ 473 MHZ EXC-S A RUNNING 2018-06-26 10:49:50 V C • O 122084220/vanue/model C • O V C • O Status C • O Martin C • O V C • O V C • O V C • O V C • O V Vanue Vanue C • O Vanue </td <td></td> <td>49.0</td> <td></td> <td></td> <td></td>		49.0			
Status CuRi 0.00 A CuRi 0.00 A Tenne 99.23 F AT 0 FREQ 473 MHZ EXC-S A RUNNING 2018-06-26 10:49:50 V C • O 122084220/vanue/model C • O V C • O Status C • O Martin C • O V C • O V C • O V C • O V C • O V Vanue Vanue C • O Vanue </td <td>Config</td> <td>CUR2 0.00</td> <td>A CUR3 ().</td> <td>00 A</td> <td></td>	Config	CUR2 0.00	A CUR3 ().	00 A	
Status Telefo	A Company of the State of the S				
Image: Status Files of Status <	Chatura	CUR4 0.00	A CUR5 0.	00 A	
Image: Status Status FVD-POW 0152 Martinetonation Free 101 Martinetonation Free 102 Martinetonation Free Martinetonation Free Martineton Free 102 Martineton Free 102 Martineton Free Free Martineton Free Martineton Free Martineton Free <td>Status</td> <td></td> <td></td> <td></td> <td></td>	Status				
Status Status FND-POW 61.52 W AEFL-POW 0.1 W Status Statu		TEMP 99.23	F ATT U		
Status Status FND-POW 61.52 W AEFL-POW 0.1 W Status Statu	Help		MHZ EXC-S A		
x + 121.105.1210/status_info.ckml C + C C + C C + C C + C C + C C + C		11169 413			
x + 121.105.1210/status_info.ckml C + C C + C C + C C + C C + C C + C					
192.168.1.210/status_info.shtml C I IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		RUNNING	2018-06-2	26 10:49:50	
192.168.1.210/status_info.shtml C I IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII					
192.168.1.210/status_info.shtml C I IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII					
192.168.1.210/status_info.shtml C I IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII					
Status Status System Set FWD-POW 61.62 W REFL-POW 0.1 W MP-TEMP 97.2 'F VSWR 1.08 Sov-CUR1 6.1 A EXCITER A_EXCITE FREQ 473 MHz MHz MHz Version Version	× ±				
Status Status System Set Net FVD-POW 61.62 W REFL-POW 0.1 W REJT-POW 0 W ATT 0 0 0 ATT 0	∩ (T				
Status Status System Set Net FVD-POW 61.62 W REFL-POW 0.1 W REJT-POW 0 W ATT 0 0 0 ATT 0				C	+ 🗆 😕 🗭
Status Status System Set Net FWD-POW 61.62 W REFL-POW 0.1 W Met REJT-POW 0 W ATT 0 0 AMP-TEMP 97.2 'F VSWR 1.08 0 0 FRQ 47.3 MHz A_EXCITE A_EXCITE A_EXCITE FRQ 47.3 MHz OK N N N Alarm Infomation FUD-POW OK N VSWR OK N Corynghi 2015 OK N S0V-CUR OK N N				C	+ 🗆 👳 🗭
System Sat REJT-POW 61.62 W REFL-POW 0.1 W Nat REJT-POW 0 W ATT 0 AMP-TEMP 97.2 "F VSWR 1.08 SOV-CUR1 6.1 A EXCITER A_EXCITE FREQ 473 MHz Hiz Hiz Alarm Infomation FWD-POW OK REF-POW OK NK REJT OK VSWR OK OK MM- Corruption 2015 OK SOV-CUR OK Meterror	192.168.1.210/status_info.shtml				
System Sat REJT-POW 61.62 W REFL-POW 0.1 W Nat REJT-POW 0 W ATT 0 AMP-TEMP 97.2 "F VSWR 1.08 SOV-CUR1 6.1 A EXCITER A_EXCITE FREQ 473 MHz Hiz Hiz Alarm Infomation FWD-POW OK REF-POW OK NK REJT OK VSWR OK OK MM- Corruption 2015 OK SOV-CUR OK Meterror	192.168.1.210/status_info.shtml				
System Set Net REJT-POW 0 W ATT 0 AMP-TEMP 97.2 "F VSWR 1.08 Solv_CUR1 6.1 A EXCITER A_EXCITE FREQ 473 MHz WHZ WHZ Alarm Infomation FWD-POW OK REF-POW OK N REJT OK VSWR OK N AMP-TEMP OK 50V-CUR OK N	192.168.1.210/status_info.shtml				
Not AMP-TEMP 97.2 *F VSWR 1.08 S0V-CUR1 6.1 A EXCITER A_EXCITE_ FREQ 473 MHz MHz MHz	192.168.1.210/status_infc.shtml				
AMP-TEMP 972 F VSWR 108 60V-CUR1 6.1 A EXCITER A_EXCITE PREQ 473 MHz Konter Alarm Infomation FWD-POW OK REF-POW OK Mercer Alarm Infomation FUD-POW OK OK Mercer Coyright 2015 OK S0V-CUR OK Mercer	192.168.1.210/status_info.shtml LPTV Status System Set FWD-POW			0.1 W	
FREQ 473 MHz Alarm Infomation	192.168.1.210/status_info.shtml LPTV Status Status System Set Net	0 W	ATT	0.1 W	
Alarm Infomation REF-POW OK N FWD-POW OK N N OK N REJT OK VSWR OK N N Copyright 2015 OK S0V-CUR OK N	192.168.1.210/status_info.shtml LPTV Status System Set Net	0 W 97.2 °F	ATT VSWR	0.1 W 0 1.08	
FWD-POW OK REF-POW OK Image: Communication Correction of the contract of the contra	192.168.1.210/status_info.shtml LPTV Status System Set Net Net Sov-CUR1	0 W 97.2 °F 6.1 A	ATT VSWR	0.1 W 0 1.08	
FWD-POW OK REF-POW OK Image: Communication Correction of the contract of the contra	192.168.1.210/status_info.shtml LPTV Status System Set Net Net Sov-CUR1	0 W 97.2 °F 6.1 A	ATT VSWR	0.1 W 0 1.08	
REJT OK VSWR OK Image: Communication Copyright 2015 Copyright 2015 OK Image: Copyright 2015 OK Image: Copyright 2015 I	192.168.1.210/status_info.shtml LPTV Status System Set Net Net Status Status FWD-POW REJT-POW AMP-TEMP S0V-CUR1 FREQ	0 W 97.2 °F 6.1 A	ATT VSWR	0.1 W 0 1.08	
AMP-TEMP OK Copyright 2015 Version Version	192.168.1.210/status_info.shtml Status Status System Set Net Net AMP-TEMP 50V-CUR1 FREQ Alarm Information	0 W 97.2 *F 6.1 A 473 MHz	ATT VSWR EXCITER	0.1 W 0 1.08 A_EXCITE	
Copyright 2015	192.168.1.210/status_info.shtml Status System Set Net Net AMP-TEMP S0V-CUR1 FREQ Alarm Infomation FWD-POW	0 W 972 "F 6.1 A 473 MHz	ATT VSWR EXCITER REF-POW	0.1 W 0 1.08 A_EXCITE®	
	192.168.1.210/status_info.shtml Status System Set Net Net Alarm Infomation FWD-POW REJT	0 W 972 "F 6.1 A 473 MHz OK x OK x	ATT VSWR EXCITER REF-POW VSWR	0.1 W 0 1.08 A_EXCITE OK OK	
	192.168.1.210/status_info.shtml Status System Set Net Net Net Amp-TEMP Sov-CUR1 FREQ Alarm Infomation FWD-POW REJT AMP-TEMP Svecommunication AMP-TEMP	0 W 972 "F 6.1 A 473 MHz OK x OK x	ATT VSWR EXCITER REF-POW VSWR	0.1 W 0 1.08 A_EXCITE OK OK	
	192.168.1.210/status_info.shtml Status Status System Set Net Net AmP-TEMP Solv-CUR1 FREQ Alarm infomation FV/D-POW REJT AMP-TEMP Copyright 2015	0 W 972 "F 6.1 A 473 MHz OK x OK x	ATT VSWR EXCITER REF-POW VSWR	0.1 W 0 1.08 A_EXCITE OK OK	
	192.168.1.210/status_info.shtml Status System Set Net Net Net Amp-TEMP Sov-CUR1 FREQ Alarm Infomation FWD-POW REJT AMP-TEMP Version Version	0 W 972 "F 6.1 A 473 MHz OK x OK x	ATT VSWR EXCITER REF-POW VSWR 50V-CUR	0.1 W 0 1.08 A_EXCITE OK OK	
	192.168.1.210/status_info.shtml Status System Set Net Net Net Amp-TEMP Sov-CUR1 FREQ Alarm Infomation FWD-POW REJT AMP-TEMP Version Version	0 W 972 "F 6.1 A 473 MHz OK x OK x	ATT VSWR EXCITER REF-POW VSWR 50V-CUR	0.1 W 0 1.08 A_EXCITE OK OK	
	192.168.1.210/status_info.shtml Status System Set Net Net Net Amp-TEMP Sov-CUR1 FREQ Alarm Infomation FWD-POW REJT AMP-TEMP Version Version	0 W 972 "F 6.1 A 473 MHz OK x OK x	ATT VSWR EXCITER REF-POW VSWR 50V-CUR	0.1 W 0 1.08 A_EXCITE OK OK	
	192.168.1.210/status_info.shtml Status System Set Net Net Net Amp-TEMP Sov-CUR1 FREQ Alarm Infomation FWD-POW REJT AMP-TEMP Version Version	0 W 972 "F 6.1 A 473 MHz OK x OK x	ATT VSWR EXCITER REF-POW VSWR 50V-CUR	0.1 W 0 1.08 A_EXCITE OK OK	

6. You are now ready to bring the TX up to power. To accomplish this, slowly increase the drive level out of the Exciter by increasing the POWER setting in the Exciter RF submenu while watching the PA_Fwd power increase accordingly on the PAC submenu (you will need to navigate between the Exciter RF and PAC submenus), or the PA's touchscreen, and its Web Interface.



Begin to slowly raise the FWD System power by using the UP button on the Exciter, while monitoring the PA_Fwd system power meter on the Controller HOME screen as shown below.





- 7. Continue to slowly raise the FWD power until you reach the full 60W, or your desired TPO. Be careful to make small increases in the value of POWER as you approach the desired output level.
- 8. Check the SNR and Shoulder (LIMD and UIMD) RF performance of your system on the Exciter hi level status screen, as well as the exciter's pages on the PA's touchscreen as shown below. Linear and Non-Linear corrections were already performed and optimized at a TPO of 60W in the factory and so the stored correction coefficients should produce good results.



If you are operating at a TPO less than 60W and wish to rerun corrections, please proceed with the following steps, otherwise please skip ahead to step 12.

9. (*Optional Step* - Rerunning Corrections) If you are operating at reduced power and wish to rerun corrections to achieve better performance, you may now perform Linear and Non-Linear corrections. (Please refer to the Exciter User Manual for detailed instructions on running corrections). Before running corrections, it is important to verify proper feedback signal levels. There are two feedback signal samples used to compute corrections. "RF IN A" (After BPF) is used to calculate Linear correction coefficients while "RF IN B" (Before BPF) is used to compute the Non-Linear correction coefficients.



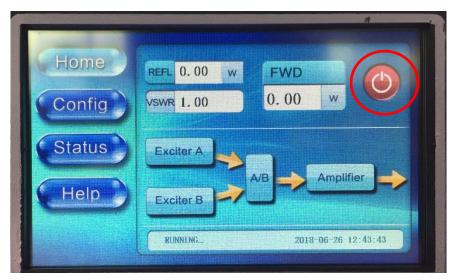
- 10. (Optional Step) Navigate to the Exciter "DPD" submenu in the Advanced User menu (simultaneously press Left and Right buttons, then simultaneously press UP and Down buttons). Be sure the value of Feedback Sample Signal Input (FSSI) for both A (after) and B (before) reads somewhere between 45% and 75% which roughly corresponds to a value of -15 to -5 dBm as measured on a power meter (note: the FSSI indicator toggles between A and B and will "flash" when the signal level is out of range, too high or too low). Add or remove the appropriate attenuator padding to achieve feedback signal levels in the desired range. Note the AFTER filter feedback sample is used to compute the SNR and Shoulder Metrics displayed.
- 11. (*Optional Step*) Navigate to the Exciter "SYSTEM" submenu and select UPDATE under ADPC to run corrections. The exciter will then proceed through 4 stages of correction, computing Linear and Non-Linear corrections, and automatically saving the coefficients into non-volatile memory upon completion. The correction process typically takes from 8-10 minutes to complete while real-time performance metrics of SNR and Shoulder performance are displayed on the LCD.
- 12. Check RF Performance metrics (SNR, LIMD, UIMD) on the front panel screen of the exciter, as well as on the PA's touchscreen.



Your TX should now be up and running properly into your load or on-air antenna. Continue to monitor system parameters as you allow the transmitter to operate and stabilize at full output power for another 30 minutes.



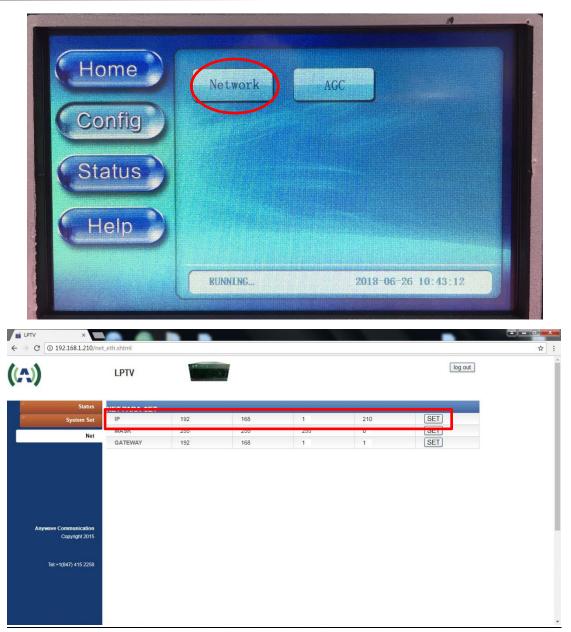
- 13. Navigate to the CAL setting under the AD3 Advanced submenu and select CAL then press OK to calibrate the FWD PWR meter on the Exciter front panel to 100%.
- 14. To turn the TX On/Off, please use the RF On/OFF control in the RF submenu of the exciter LCD or the exciter web interface. You may also use the TX ON/OFF button on the PA's Home page, as shown below.



15. For Remote TX Monitoring and Control, you may network to the PA LAN RJ-45 rear panel connection at 192.168.1.210 – you can change the PA ipaddress by navigating to the Config submenu on the PA's touchscreen, then press Network button, and change the value of IP, or you can change it via the PA's Web Interface (please reference your PA User Manual for details). You may also network to the Exciter REMOTE RJ-45 rear panel connection at 192.168.1.143 – you can change the exciter ipaddress by navigating to the CONFIG submenu (simultaneously press Left and Right buttons) and change the value of IP (please reference your Exciter User Manual for details).



ATSC 60W Quick Start Guide



16. If using the Exciter Built-in remote web interface for remote control, please be sure to set the Exciter to REMOTE mode (set CTL to RMT) before leaving the transmitter site. The Remote/Local setting is located under the SYSTEM submenu. Most of the Local TX controls are available on the remote web interface, including On/Off, Raise/Lower power, etc. (refer to the Exciter user manual for details). For the PA, both its Web Interface and its local touchscreen can control its settings simultaneously.



ATSC 60W Quick Start Guide





Anywave Communication Technologies Inc. 300 Knightsbridge Parkway, Suite 150, Lincolnshire, IL 60069 Tel: (847) 415-2258 Fax: (847) 415-2112 Email: <u>sales us@anywavecom.com</u> <u>http://www.anywavecom.com/en/</u>