

TP1910958

Test Procedure PD2-TX-5000-S Top Level

Revision 0.001

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Revision History

Rev	ECO No.	Description	Project Eng (Initials & Date)	Elec. Eng (Initials & Date)	Manager (Initials & Date)

1.0 Purpose This test procedure is for Manufacturing to confirm the proper operation of an S-band PD2 transmitter combined with a Stealth power amplifier.

2.0 Scope This procedure verifies the output power of an additional Power Amp when integrated with a S Band PD2 transmitter. The PD2 transmitter is a final tested unit and the power amp is a purchased part, 8720781.

3.0 Definitions / Acronyms

DUT – device under test

PA – power amplifier

4.0 Notes

Preliminary Setup:

1. Set the main DC supply to 12.0 Vdc, current limit to 7.0 amps, output off. Set the control DC supply to 5.0 Vdc, current limit to 50mA, output off.
2. Connect the power supplies to the DUT terminal block as shown in Figure 1 using suitable gauge wire. 18 AWG for 12 volt, 24 AWG for the control.
3. Except as noted the spectrum analyzer controls should be set to AUTO.
4. This test procedure assumes a fully tested Palladium II transmitter is installed in the DUT.
5. Although this is a 5 Watt TX, care is taken to not exceed 4.8 watts when operating at 12.0 volts so as not to exceed 5 watts if operated at 13.8 volts. FCC rules do not permit greater than 5 watt RF output.

5.0 Test Equipment Required

Item	Critical Parameter	Suggested
Power supply , main	0-20V,10 A	Agilent E3633A
Power supply, control	0-18V, 3A	Kikusui PAB 18-3A
Multimeter		HP 34401A
Attenuator	50W, 20 dB	Inmet 64671
Attenuator	5W, 20 dB	MCL BW-520WS
RF Power Meter		HP 437B
RF Power Sensor		HP 8481A

Spectrum Analyzer		Avantest U3771
Directional Coupler	10 dB	Narda 42404B-10
Power Splitter		8230007/MCL ZN2PD-9G
Video Generator	NTSC	Leader LCG-400
Video Monitor	NTSC	Sony LMD-1410
S-Band COFDM RX		DTC TF351
Attenuator	2W, 30 dB	MCL VAT-30 +

6.0 Test Equipment Setup

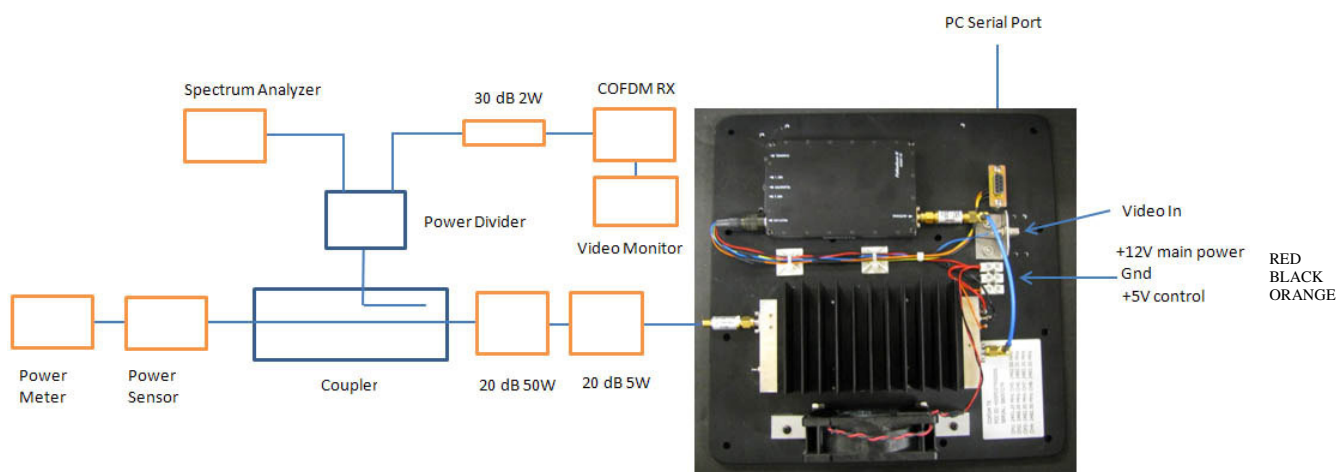


FIGURE 1

7.0 Test Procedure

STEP	PROCEDURE	MEASURED AT	USING	NOTES
1.	Set up the test equipment as shown in Fig. 1.			

STEP	PROCEDURE	MEASURED AT	USING	NOTES
2.	Turn on the output of the main DC power supply.			The cooling fan should turn on along with the PD2 TX. The power amplifier will be off. Current draw should be approximately 660 mA.
3.	Connect a PC with a serial port to the programming connector on the DUT. Open Palladium Mfg Config software on PC			8970146-xxx, File name: PalladiumMfgConfig.exe Confirm Connection to Palladium II and reading data from DUT.
4.	Set Configuration Frequencies and Set Power Calibration Frequencies on DUT Set each Level (dB) to 25 to start. Press the Commit All button to save and activate the changes.			Refer to Appendix A of this Procedure Config 1 to Minimum freq Config 2 to Intermediate freq 1 Config 3 to Center freq Config 4 to Intermediate freq 2 Config 5 to Maximum freq
5.	Turn the control power supply output on.			Current draw on the main supply will be approximately 6 amps and the power meter should be indicating output power from the amplifier.
6.	Set Minimum freq Level (dB) for an output power between 4.5 to 4.8 watts. Do not exceed 4.8 watts.		Control Software RF power meter	Adjustable in .25 dB increments Engineering Options Power Cal. Press the Commit button to activate the changes.
7.	Set DUT to Config 2 (Intermediate freq 1)		Control Software	
8.	Set Intermediate freq 1 Level (dB) for an output power between 4.5 to 4.8 watts. Do not exceed 4.8 watts.		Control Software	Adjustable in .25 dB increments Engineering Options Power Cal. Press the Commit button to activate the changes.

STEP	PROCEDURE	MEASURED AT	USING	NOTES
9.	Set DUT to Config 4 (Intermediate freq 2)		Control Software	
10.	Set Intermediate freq 2 Level (dB) for an output power between 4.5 to 4.8 watts. Do not exceed 4.8 watts.		Control Software RF power meter	Adjustable in .25 dB increments Engineering Options Power Cal. Press the Commit button to activate the changes.
11.	Set DUT to Config 5 (Maximum freq)		Control Software	
12.	Set Maximum freq Level (dB) for an output power between 4.5 to 4.8 watts. Do not exceed 4.8 watts.		Control Software RF power meter	Adjustable in .25 dB increments Engineering Options Power Cal. Press the Commit button to activate the changes.
13.	Perform the following steps (14 thru 22) for each config 1(Minimum freq), 3(Center freq) and 5(Maximum freq)			
14.	Record Test config frequency on data sheet per appendix A			
15.	Measure the RF output power. Record the value on the data sheet.		RF power meter	4.8 watts max. Repeat steps 6-12 if necessary
16.	Measure Modulated spectrum + 1.25 MHz -23 dBc min - 1.25 MHz -23 dBc min Record the values on the data sheet.		Spectrum analyzer	<u>Spectrum analyzer settings:</u> Span = 5 MHz. ResBW = 3 kHz. VideoBW = 3 kHz Trace/Averaging = On/25 per Minute.
17.	Video and SNR			Choose a Test Receiver config and set it to Center Freq per Appendix A & B.
18.	Set the video pattern to generate a color bar pattern.			

STEP	PROCEDURE	MEASURED AT	USING	NOTES
19.	<i>Check performance with color bar pattern.</i> Observe the Video picture on the video monitor. Note the test on the data sheet.		Video monitor	The picture should be clean and free of noise or distortion.
20.	Observe the video monitor and record SNR level on data sheet.			15 dB min
21.	Record 12 volt current draw			6 .5 Amps max.
22.	Program final frequencies.			Appendix C
23.	Measure the RF power for channels 1-8, and record on the data sheet. Record the channel output attenuation value on the data sheet.			Use the channel output attenuation if necessary to keep the power below 4.8 watts.
24.	Record the power calibration attenuation values on the data sheet.			
25.	Turn off control supply.			
26.	Turn off 12 volt supply			
27.	End of test.			

Appendix A:

Test Frequencies and Band Limits:

Band	Minimum freq	Intermediate freq 1	Center freq	Intermediate freq 2	Maximum freq	Unit Type
S	2350	2400	2425	2450	2500	21

TP1910958 Rev. 0.001

01/03/12

Appendix B:

Initial DUT Parameters:

Unit Name:	DTC-1	Config:	Channel being programmed
Unit Address:	<i>Current Address</i>	Modulation Bandwidth:	2.5 MHz
Output Freq.:	As Required	Modulation Output:	On
Output Power:	High	Output Attenuation (dB):	0.00
Data Scrambling:	Off	Output Attenuation Low (dB):	32.00
Sleep Mode:	No	DVBT Service Name:	DTC_1
Video Input:	NTSC (Pal if required)	DVBT FEC Rate:	1/2
Video Sharpness:	Normal	DVBT Guard Interval:	1/32
Horizontal Resolution:	528	DVBT Modulation:	QPSK
Heartbeat:	Off	DVBT Spectrum Inversion:	Normal
		DVBT 4 kHz Offset:	none
MPEG Mode:	MPEG2	Narrowband FEC Rate:	2/3
MPEG4 Encoding Mode:	Low delay interlace	Narrowband Guard Interval:	1/16
MPEG4 Frame Rate:	Full	Narrowband Modulation:	QPSK
Audio Encoder:	32 kHz 12 bit stereo	Chain Number:	0
Audio Input Level:	24	Chaining Input:	OFF
Data Channel:	On	Chaining Output:	OFF
Data Baud Rate:	115200		

Note: **Bold Italics** items usually need to be entered for each configuration.

Appendix B:

Using Palladium RX Utility

Receiver Settings

Control software P/N 8970146-xxx

Unit Name	DTC-1	Config	(Channel being programmed)
Unit Address	<i>Current Address</i>	Down Converter LO	<i>Per Appendix A</i>
Unit Number	0	Down Converter LO side	Low
Rx Frequency	<i>Current Freq</i>		
	(NB) (DVBT)		
OFDM Bandwidth	2.5 MHz 8MHz	Power Up Line Standard	525
OFDM Guard Interval	1/16 1/32	Input Line Standard	status
OFDM Modulation	status	NTSC Mode	NTSC
OFDM FEC Rate	status	Blue Screen On Fail	On
OFDM Polarity	Normal See note		
Input A Level	status	Input A SNR	status
Input B Level	status	Input B SNR	status
Input C Level	status	Input C SNR	status
Input D Level	status	Input D SNR	status
Data Channel	On	BER Pre-errors	status
Data Baud Rate	status	BER Post-errors	status

TP1910958 Rev. 0.001

01/03/12

Data Parity	status	Packet Errors	status
Data Scrambling	See Appendix F		
MPEG4 Deblock Filter	Off	Globals	
Frame Rate	2	LNB Power	On
		On Screen Display	<i>Current</i>
<i>Channel</i>			
		Bandwidth Hunting	Off
<u>Globals</u>			
Display Diag	Enabled		
Config Select	Enabled		
Sync LED	Enabled	Input level offset (-30, +30)	0
Error LED	Enabled	RSSI level offset (-50, +50)	-30
AGC/RSSI S.F (0.0, +10.0)	3 (4 for C Band)		

Note: Click the Read button in the Globals section to retrieve current settings.

Setting Channel to program:

Enter the channel into the Config field or use the up/down arrows to the right of the Config field. If Link is checked, the receiver changes channels as the Config field is changed.

Setting Channel Frequency:

To set the Channel Frequency, Select the channel to program using the above step then enter the channel frequency into the Rx Frequency box in the utility. Ensure the Down Converter LO is correct for the appropriate band (refer to appendix A.) Ensure Unit Name and Encryption settings match customer specifications. Then click the Commit All button on the utility.

Note: All Bands DVBT Polarity = Normal

Appendix C:

Channel	Frequency (MHz)
1.	2451.25
2.	2466.00
3.	2482.50
4.	2482.50
5.	2482.50
6.	2482.50
7.	2482.50
8.	2482.50