

DOCUMENT NUMBER: TP1910329 Rev. A

DESCRIPTION: VxS-250 Final
Test Procedure
(S-band)

ECO NUMBER: _____

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Date: _____

Orig: _____

SIGN OFF DATE: mm/dd/yy

Proj Eng. _____

Mfg Mgr. _____

Documentation _____

Eng. Mgr. _____

Purchasing _____

Scope: The following procedure covers the final test of the VxS-250 (S-band) video transmitter module.

Test Equipment required:

Item	Critical parameter	Suggested
Power supply	0-20V @ 1 amps min.	
DC Ammeter	$R_s \leq 0.5 \Omega$	Fluke 8062
Function generator	20 Mhz min., 75 Ohm output	Wavetek Model 90
RF Power meter	2.5 Ghz min.	HP437
Spectrum analyzer	7.5 Ghz min.	
NTSC video pattern generator	Multi-burst, 75% Color bars, and pulse-and-bar patterns	Tektronix TSG100
Microwave signal generator	+10 dBm min. , 2.5Ghz	Marconi 2041
Double balanced diode mixer	2.5 GHz	Mini Circuits
Video Modulator/demodulator	525 line deemphasis	HP3717A
Color video monitor	None	
Video waveform analyzer	VM700	Tektronix VM700
20 dB attenuator	1 watt, 2.5 GHz	
Microphone connector shorting plug	none	custom

Preliminary Setup:

1. Install a tuning cover on the front (channel select switch) side in place of the standard cover. The tuning cover will remain in place throughout the entire testing sequence.
2. Set the DC supply to 10.0 Vdc, current limit to 1.0 amps. Set the supply power switch to OFF.
3. Except as noted, the spectrum analyzer controls should be set to AUTO.

Note: Throughout this procedure, items shown **bold** refer to controls on the DUT.

Alignment:

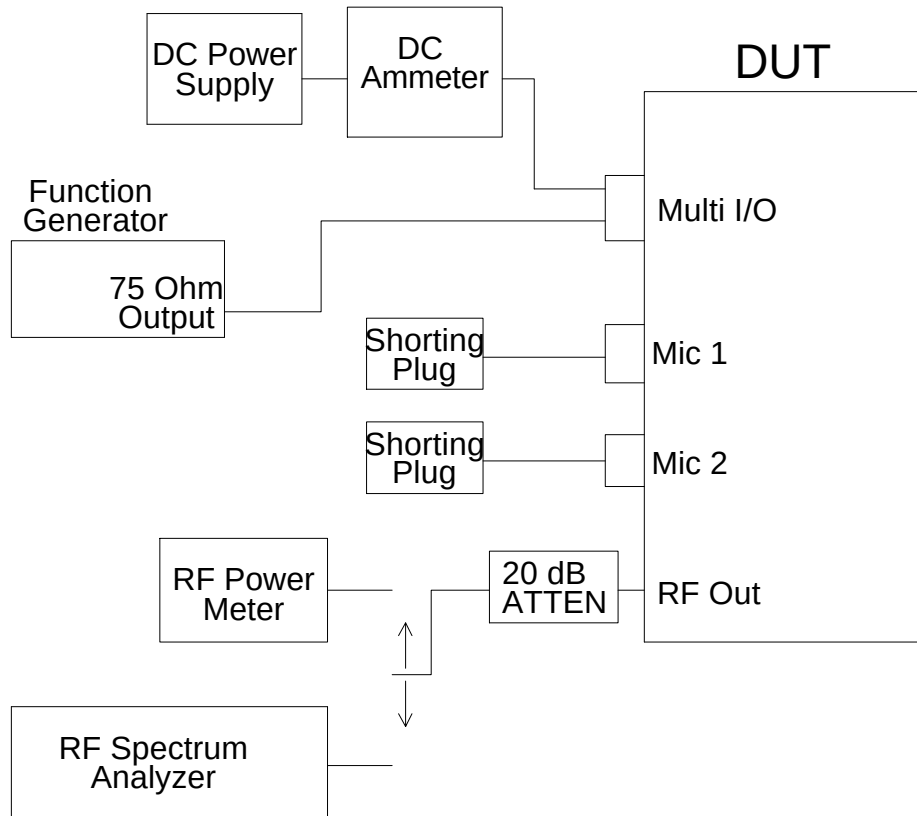
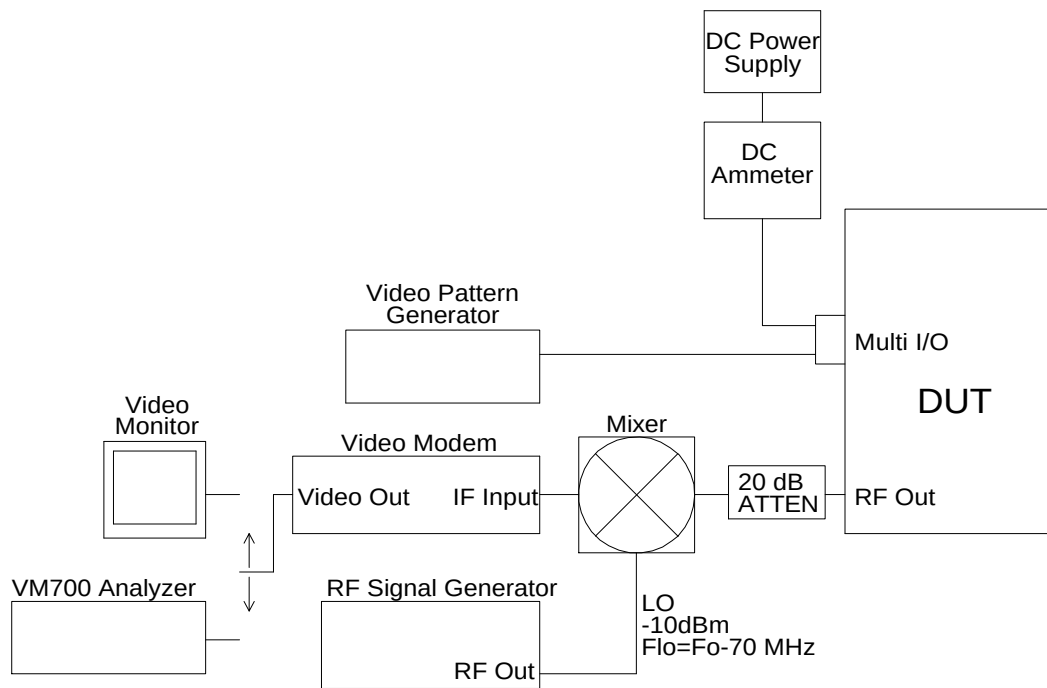
STEP	PROCEDURE	MEASURED AT	USING	NOTES
1.	Set the DUT power switch to OFF . Set up the test equipment as shown in Fig. 1. Connect the DUT output to the spectrum analyzer.			
2.	Set the power supply to ON .			
3.	Set the DUT power switch to ON .			
4.	Set the channel select switch to 4.			This sets the RF output frequency to mid-band, Mic 1 subcarrier to 7.5 MHz, Mic 2 subcarrier to 6.0 MHz. <u>mid-band frequency:</u> S-band : Fo=2450 MHz
5.	Set the function generator to ON to modulate the carrier.			<u>Function generator settings:</u> Amplitude = 457mV pp Frequency = 761 kHz
6.	Set the FM deviation. Adjust R109 to achieve a Bessel null in the output signal frequency spectrum.	J5 (RF output)	Spectrum analyzer	<u>Spectrum analyzer settings:</u> Span = 1 MHz / div. Center Freq. = 2450 MHz. The level of the nulled carrier should be at least 40 dB below the level of the unmodulated carrier.
7.	Set the function generator to OFF.			
8.	Connect the DUT output to the RF power meter.			
9.	Measure the RF output power while alternately selecting channels 1, 4, and 7. Select the channel that has the lowest output power.	J5 (RF output)	RF power meter	Make sure the PA tuning cover is installed.
10.	Set the RF output power. Adjust R73 to set the output power to 270 - 280 mW.	J5 (RF output)	RF power meter	

STEP	PROCEDURE	MEASURED AT	USING	NOTES
11.	Set the channel select switch to 1.			This sets the RF output frequency to the lower band-edge, Mic 1 subcarrier to 7.5 MHz, Mic 2 subcarrier to 6.0 MHz. <u>lower band edge frequency:</u> S-band : Fo=2400 MHz
12.	Measure the RF output power. Record the value on the data sheet.	J5 (RF output)	RF power meter	RF output power must be 270 mW minimum.
13.	Measure the DUT total current. Record the value on the data sheet.	Multi I/O connector pin 2	Digital ammeter	Total current must be 220 mA. max.
14.	Set the channel select switch to 4.			This sets the RF output frequency to mid-band, Mic 1 subcarrier to 7.5 MHz, Mic 2 subcarrier to 6.0 MHz. <u>mid-band frequency:</u> S-band : Fo=2450 MHz
15.	Measure the RF output power. Record the value on the data sheet.	J5 (RF output)	RF power meter	RF output power must be 250 - 315 mW.
16.	Measure the DUT total current. Record the value on the data sheet.	Multi I/O connector pin 2	Digital ammeter	Total current must be 220 mA. max.
17.	Set the channel select switch to 7.			This sets the RF output frequency to the upper band-edge, Mic 1 subcarrier to 7.5 MHz, Mic 2 subcarrier to 6.0 MHz.
18.	Measure the RF output power. Record the value on the data sheet.	J5 (RF output)	RF power meter	RF output power must be 250 - 315 mW.
19.	Measure the DUT total current. Record the value on the data sheet.	Multi I/O connector pin 2	Digital ammeter	Total current must be 220 mA. max.
20.	Connect the DUT output to the spectrum analyzer.			
21.	Set the channel select switch to 1.			This sets the RF output frequency to the lower band-edge, Mic 1 subcarrier to 7.5 MHz, Mic 2 subcarrier to 6.0 MHz. <u>lower band edge frequency:</u> S-band : Fo=2400 MHz
22.	Set the function generator to ON to modulate the carrier.			
23.	Measure the modulation linearity. Measure the depth of the Bessel null. Note the test on the data sheet.	J5 (RF output)	Spectrum analyzer	<u>Spectrum analyzer settings:</u> Span = 1 MHz / div. Center Freq. = 2400 MHz. The level of the nulled carrier should be at least 20 dB below the level of the unmodulated carrier.

STEP	PROCEDURE	MEASURED AT	USING	NOTES
24.	Set the function generator to OFF.			
25.	Check the levels of the audio subcarriers. Measure the levels of the two audio subcarriers. Note the test on the data sheet.	J5 (RF output)	Spectrum analyzer	<u>Spectrum analyzer settings:</u> Span = 2 MHz / div. Center Freq. = 2400 MHz. The subcarriers should be between –25 and -30 dBc.
19.	Check spurious output levels. Measure the levels of the 2 nd and 3 rd harmonics. Note the test on the data sheet.	J5 (RF output)	Spectrum analyzer	<u>Spectrum analyzer settings:</u> Span = 500 MHz / div. Center Freq. = 4800 MHz. The level of the harmonics should be -45 dBc or less.
26.	Set the channel select switch to 4.			This sets the RF output frequency to mid-band, Mic 1 subcarrier to 7.5 MHz, Mic 2 subcarrier to 6.0 MHz. <u>mid-band frequency:</u> S-band : Fo=2450 MHz
27.	Set the function generator to ON to modulate the carrier.			
28.	Measure the modulation linearity. Measure the depth of the Bessel null. Note the test on the data sheet.	J5 (RF output)	Spectrum analyzer	<u>Spectrum analyzer settings:</u> Span = 1 MHz / div. Center Freq. = 2450 MHz. The level of the nulled carrier should be at least 30 dB below the level of the unmodulated carrier.
29.	Set the function generator to OFF.			
30.	Check the levels of the audio subcarriers. Measure the levels of the two audio subcarriers. Note the test on the data sheet.	J5 (RF output)	Spectrum analyzer	<u>Spectrum analyzer settings:</u> Span = 2 MHz / div. Center Freq. = 2450 MHz. The subcarriers should be between –25 and –30 dBc.
31.	Check spurious output levels. Measure the levels of the 2 nd and 3 rd harmonics. Note the test on the data sheet.	J5 (RF output)	Spectrum analyzer	<u>Spectrum analyzer settings:</u> Span = 500 MHz / div. Center Freq. = 4900 MHz. The level of the harmonics should be -45 dBc or less.
32.	Set the channel select switch to 7.			This sets the RF output frequency to the upper band-edge, Mic 1 subcarrier to 7.5 MHz, Mic 2 subcarrier to 6.0 MHz.
33.	Set the function generator to ON to modulate the carrier.			

STEP	PROCEDURE	MEASURED AT	USING	NOTES
34.	Measure the modulation linearity. Measure the depth of the Bessel null. Note the test on the data sheet.	J5 (RF output)	Spectrum analyzer	<u>Spectrum analyzer settings:</u> Span = 1 MHz / div. Center Freq. = 2500 MHz. The level of the nulled carrier should be at least 20 dB below the level of the unmodulated carrier.
35.	Set the function generator to OFF.			
36.	Check the levels of the audio subcarriers. Measure the levels of the two audio subcarriers. Note the test on the data sheet.	J5 (RF output)	Spectrum analyzer	<u>Spectrum analyzer settings:</u> Span = 2 MHz / div. Center Freq. = 2500 MHz. The subcarriers should be between -25 and -30 dBc.
37.	Check spurious output levels. Measure the levels of the 2 nd and 3 rd harmonics. Note the test on the data sheet.	J5 (RF output)	Spectrum analyzer	<u>Spectrum analyzer settings:</u> Span = 500 MHz / div. Center Freq. = 5000 MHz. The level of the harmonics should be -45 dBc or less.
38.	Set up the equipment as shown in Fig. 2.			
39.	Connect the video modem output to the VM700 analyzer.			
40.	Set the channel select switch to 4.			This sets the RF output frequency to mid-band, Mic 1 subcarrier to 7.5 MHz, Mic 2 subcarrier to 6.0 MHz.
41.	Set the video pattern to generate a multiburst pattern.			
42.	Set the VM700 analyzer to measure the transmitter frequency response.			<u>VM700 analyzer keystrokes:</u> -Adjust the analyzer to view a line in the range of 21 to 262 (field 1 or 2) -press <MEASURE>, then select MULTIBURST from the lists on the display -select averaging ON
43.	Check the video response. Note the test on the data sheet.	J5 (RF output)	VM700	The video signal should measure 0 ± 0.5 dB from 0.5 to 4.2 MHz.
44.	Set the video pattern to generate a 75% color bar pattern.			
45.	Check performance with color bar pattern. Observe the demodulated Video picture on the video monitor. Note the test on the data sheet.	J5 (RF output)	Video monitor	The picture should be clean and free of noise or distortion.
46.	Set the video pattern to generate a pulse and bar pattern.			

STEP	PROCEDURE	MEASURED AT	USING	NOTES
47.	<i>Check performance with pulse and bar pattern.</i> Observe the demodulated Video picture on the video monitor. Note the test on the data sheet.	J5 (RF output)	Video monitor	The picture should be clean and free of noise or distortion.
48.	End of test.			Remove the tuning cover from the DUT.

**Figure 1****Figure 2**