

NAME OF TEST: Transmitter Rated Power Output

RULE PART NUMBER: 2.1033 (c)(6)(7) and 2.1046 (a)

TEST RESULTS: See results below

TEST CONDITIONS: Standard Test Conditions, 25 C

TEST PROCEDURE : TIA/EIA-603

UUT: 800 MHz PA module type T889-10 s/n 734573

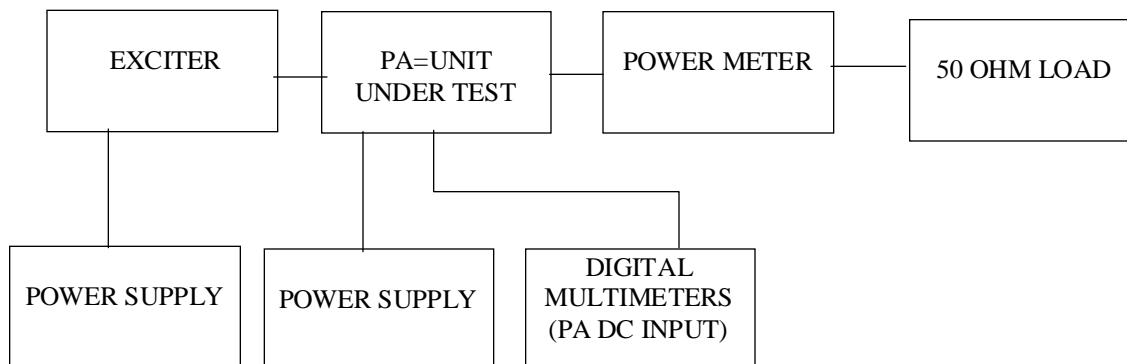
TEST EQUIPMENT: 50 Ohms RF load ,
 RF wattmeter Coaxial Dynamics model 81050 - 500Watt
 Digital Voltmeter, Fluke Model 87III
 Digital Ampermeter, Fluke Model 87III
 Tait manufactured base station modules :
 DC Power module 13.8V/15A T807-10 s/n 734019
 DC Power module 13.8 V/30A T808-10 s/n 734078
 Exciter module T881-10 s/n 734549

Note: all the ancillaries (Exciter, DC supplies) belong to the same base station manufactured by Tait

Constantin Pintilei

PERFORMED BY: _____ DATE: 11/22/99
 Constantin Pintilei

TEST SET-UP:



TEST RESULTS:

Frequency (MHz)	DC Voltage at Final (VDC)	DC Current into Final (ADC)	DC Power into Final (W)	RF Power Output (W)
853.000	13.76	12.3	169.3	20
	13.65	27.2	371.3	100

NAME OF TEST: Plots for the gain of the amplifier (carrier- wide band)

RULE PART NUMBER: as requested in correspondence 17012

TEST RESULTS: See results below

TEST CONDITIONS: Standard Test Conditions, 25 C

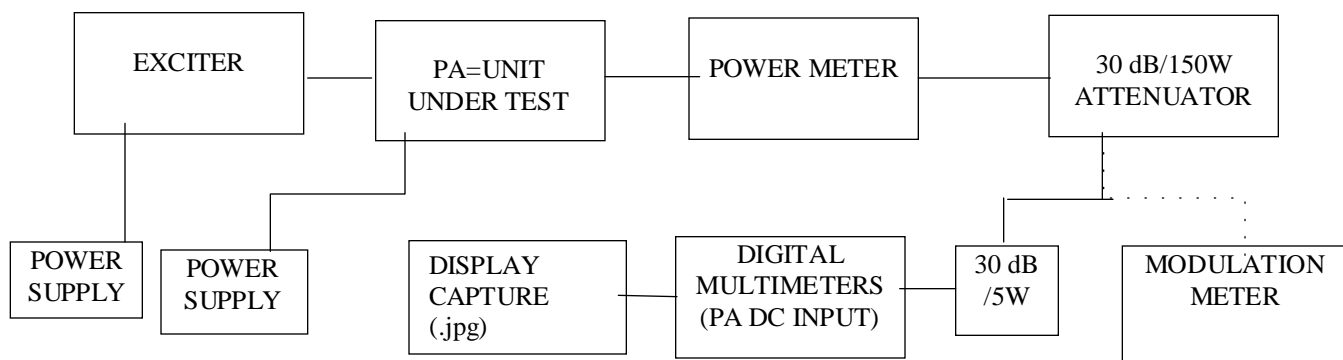
TEST PROCEDURE: 90.210 (m) and TIA/EIA-603

UUT: 800 MHz PA module type T889-10 s/n 734573

TEST EQUIPMENT: RF wattmeter Coaxial Dynamics model 81050 - 500Watt
 30dB attenuator/150W BIRD model 150-A-MFN-30
 RF splitter Minicircuits model 7FSC-2-4
 30dB attenuator/5W BIRD model 5-A-MFN-30
 Spectrum analyzer HP model E4401
 Communication analyzer IFR COM 120A -modulation meter
 Tait manufactured base station modules :
 DC Power Source 13.8V/30A T808-10 s/n 734078
 DC Power Source 13.8V/15A T807-10 s/n 734019
 Exciter module T881-10 s/n 734549

Note: all the ancillaries (Exciter, DC supplies) belong to the same base station manufactured by Tait

TEST SET-UP:



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PERFORMED BY:

 Constantin Pintilei

DATE: 11/22/99

TEST RESULTS:

4W input Exciter - 28.9 dBm

20W PA output -22.1 dBm Gain = -22.1-(-28.9)= 6.8 dB = 4.8 times (Expected 7dB/5 times)

100W PA output -15.0 dBm Gain = -15.0-(-28.9)=13.9 dB = 24.6 times (Expected 14dB/25 times)

The plots are available in the next pages



11:55:22 Nov 21, 2000

Carrier 100W Wide band

Ref -15.05 dBm

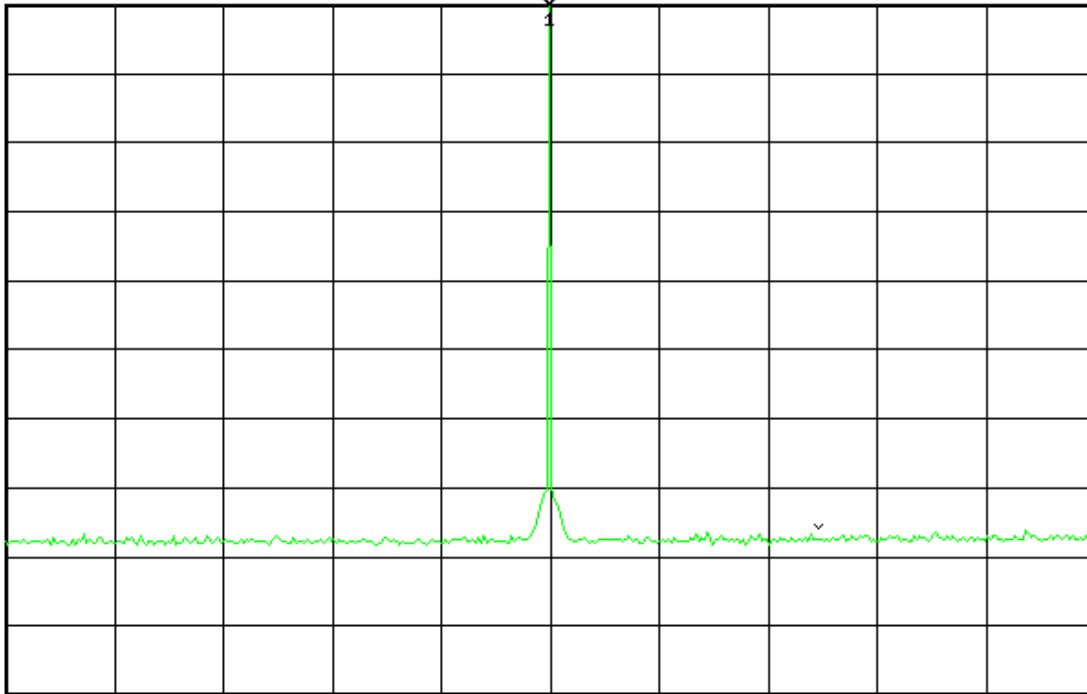
Atten 0 dB

Mkr1 853.0 MHz

-15.06 dBm

Peak
Log
10
dB/

M1 S2
S3 FC
AA



Center 853 MHz

#Res BW 10 kHz

VBW 10 kHz

Span 100 MHz

Sweep 2.5 s



12:23:02 Nov 21, 2000

Carrier 20W Wide band

Ref -15.05 dBm

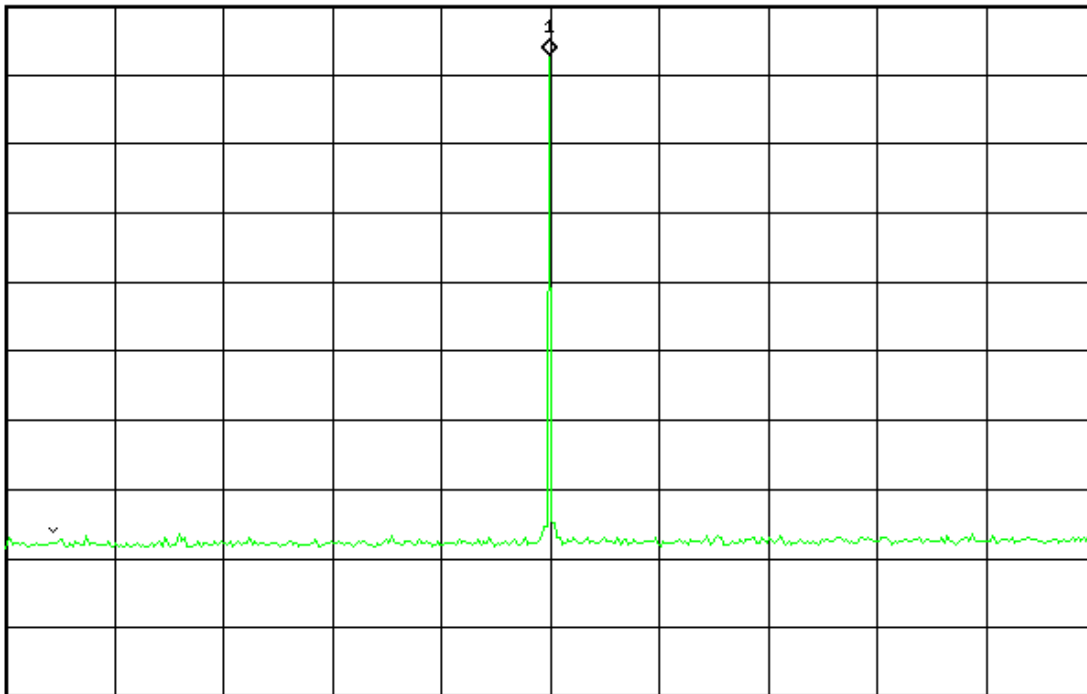
Atten 0 dB

Mkr1 853.0 MHz

-22.13 dBm

Peak
Log
10
dB/

M1 S2
S3 FC
AA



Center 853 MHz

#Res BW 10 kHz

VBW 10 kHz

Span 100 MHz

Sweep 2.5 s

156-90007-103

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12:30:45 Nov 21, 2000

Carrier 4W Exciter

Ref -28.87 dBm

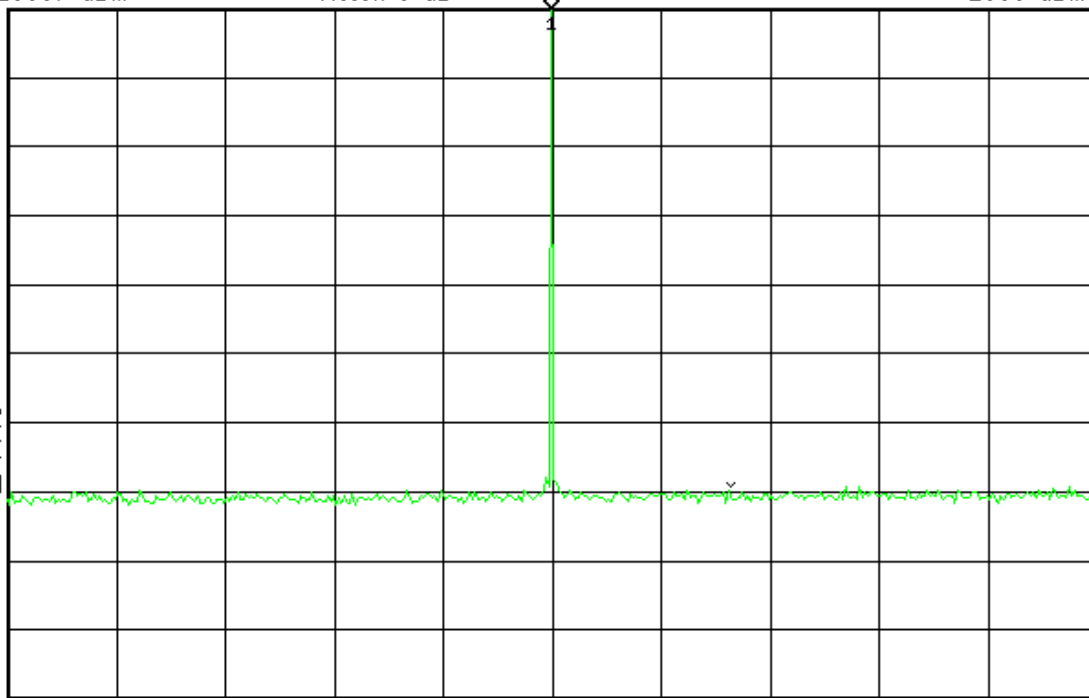
Atten 0 dB

Mkr1 853.0 MHz

-28.9 dBm

Peak
Log
10
dB/

M1 S2
S3 FC
AA



Center 853 MHz
#Res BW 10 kHz

VBW 10 kHz

Span 100 MHz
Sweep 2.5 s

NAME OF TEST: Transmitter Occupied Bandwidth

RULE PART NUMBER: 2.201, 2.202, 2.1033 c (14), 2.1049 (h), 2.1041, 90.209 (b)(5), 90.210 (g)

MINIMUM STANDARD: Mask G

Sidebands and Spurious [Rule 90.210 (g)]

Authorized Bandwidth = 20 kHz [Rule 90.209(b) (5)]

Fo to 5.0 kHz Attenuation = 0 dB

>5.0 kHz to 10.0 kHz Attenuation= $83 * \log(f_d \text{ KHz} / 5)$ dB>10.0 kHz to 250% Auth BW Attenuation = Lesser of:
 $116 * \log(f_d \text{ KHz} / 6.1)$ dB,
 $50 + 10 \log_{10}(P)$ OR
70 dB>250% Auth BW $43 + 10 * \log(P)$ dB**Corner Points:**

Fo to 5.0 kHz Attenuation = 0 dB

>5.0 kHz to 10.0 kHz Attenuation= 0 dB to 25 dB

>10.0 kHz to 24.8 KHz Attenuation = 24.9 dB to 70 dB (100 Watts)

>10.0 kHz to 21.6 KHz Attenuation = 24.9 dB to 63 dB (20 Watts)

>24.8 kHz to 50kHz Attenuation = 70dB (100Watts)

>21.6kHz to 50kHz Attenuation = 63dB (20W)

>250% Authorized BW Attenuation = 56 dB (20 W), 63dB (100 W)

TEST PROCEDURE : TIA/EIA-603


TEST RESULTS: Meets minimum standard for Voice and Data FSK modulated input signals
(see data on the following pages)

UUT: 800 MHz PA module type T889-10 s/n 734573

TEST EQUIPMENT: RF wattmeter Coaxial Dynamics model 81050 - 500Watt
30dB attenuator/150W BIRD model 150-A-MFN-30
RF splitter Minicircuits model 7FSC-2-4
30dB attenuator/5W BIRD model 5-A-MFN-30
Spectrum analyzer HP model E4401
Communication analyzer IFR COM 120A -modulation meter
Modulation Source: Dataradio's Base Data Link Controller (BDLC) model D212
Tait manufactured base station modules :
DC Power Source 13.8V/30A T808-10 s/n 734078
DC Power Source 13.8V/15A T807-10 s/n 734019
Exciter module T881-10 s/n 734549

Note: all the ancillaries (Exciter, DC supplies) belong to the same base station manufactured by Tait

PERFORMED BY:

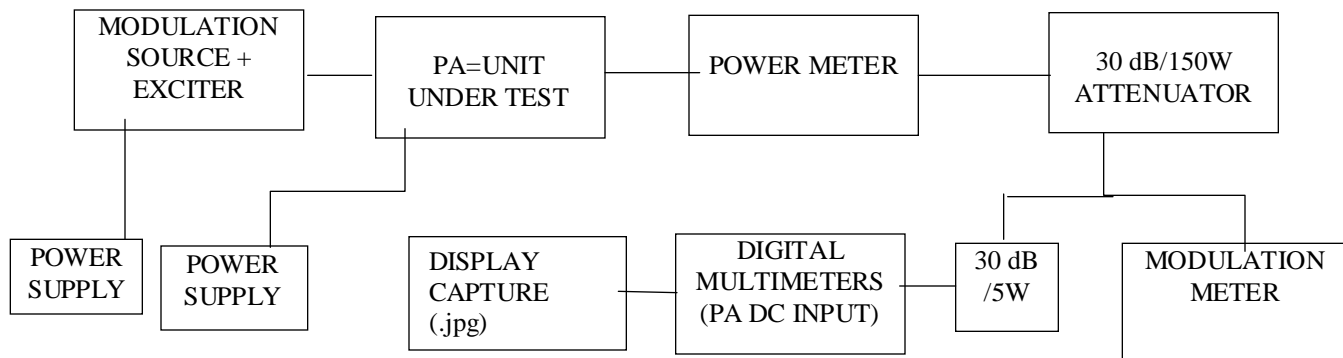

Constantin Pintilei

DATE: 11/22/99

TEST SET-UP AND INPUT SIGNALS (see next pages):

TEST DATA (follows the test set-up section)

TEST SETUP



RF SIGNALS DESCRIPTION AT THE INPUT OF THE UUT (PA MODULE T889-10)

The RF signals used to feed the UUT (PA module) are 4W narrow-band FM type generated in the Exciter module. Modulation source description 2.1047 (d), 90.209 (b) 90.210(g) follows

1) Tone

The transmit "txon1" command produce a 1/4 symbol rate (3200 or 2400 Hz) sine wave tone generated by the DSP processor. The DSP generates only certain frequencies and controls the amplitude of the tone in the range of 0.04-2.45 Vpp in 10mv steps biased at 2.5V DC.

The signal used to modulate the exciter was 3200Hz adjusted for 4800 Hz deviation.

OCBW (90.209) = $2*3200+2*4800=16000\text{Hz}$

Emission designator 16K0F3E

2) Digital modulation

The BDLC generates 4 level Squared Root Raised Cosine Frequency Shift Keying. (SRRC 4FSK). This digital modulation scheme is produced by the main CPU in conjunction with the DSP. The main CPU processes incoming binary data, applying Forward Error Correction (FEC), interleaving and scrambling, and from it generates an NRZ signal that is fed to the DSP processor for encoding and pulse shaping. The DSP processor assigns to every incoming pair of bits a symbol recorded in a level of frequency shift. The mapping follows a Gray scheme: 10-highest positive frequency shift, 11-lowest positive, 01-highest negative, 00-lowest negative, resulting signal being a 4-DC level digital. The DSP controls the deviation by generating appropriate amplitude levels as explained above.

TX Data Test Pattern:

The transmit "test data" pattern command produces a 2047 bit pseudo-random pattern. This pattern is generated by the internal software using the polynomial $X^{11}+X^9+1$ form and a 12-bit shift register. Initial value of the register is 111111111110 (FFE hex). The 2047 bit sequence is repeated thereafter as long is necessary to complete the test duration . This pattern is applied to the DSP processor data input for encoding and pulse shaping as described above.

The signal used to modulate the exciter was 25600 bps (12800 symbol rate) and 19200 bps(9600 symbol rate) SRRC 4 FSK.

For 12800 baud rate the deviation is set to 4.0 kHz. For 9600 baud rate the deviation is set to 4.7 kHz
OCBW Measured (90.209 (a), 2.202 c)(4)) 12800 symbol rate - 14280Hz, 9600 symbol rate -15820Hz
Emission designator: 12800 bauds 14K3F1D. 9600 bauds - 15K9F1D

MASK:.....G.,14K3F1D

SPECTRUM FOR EMISSION 14K3F1D

12800 bauds 4 level FSK
PEAK DEVIATION = 4000 Hz
SPAN = 200 kHz

PA input signal : 4W Exciter Output



13:03:58 Nov 21, 2000

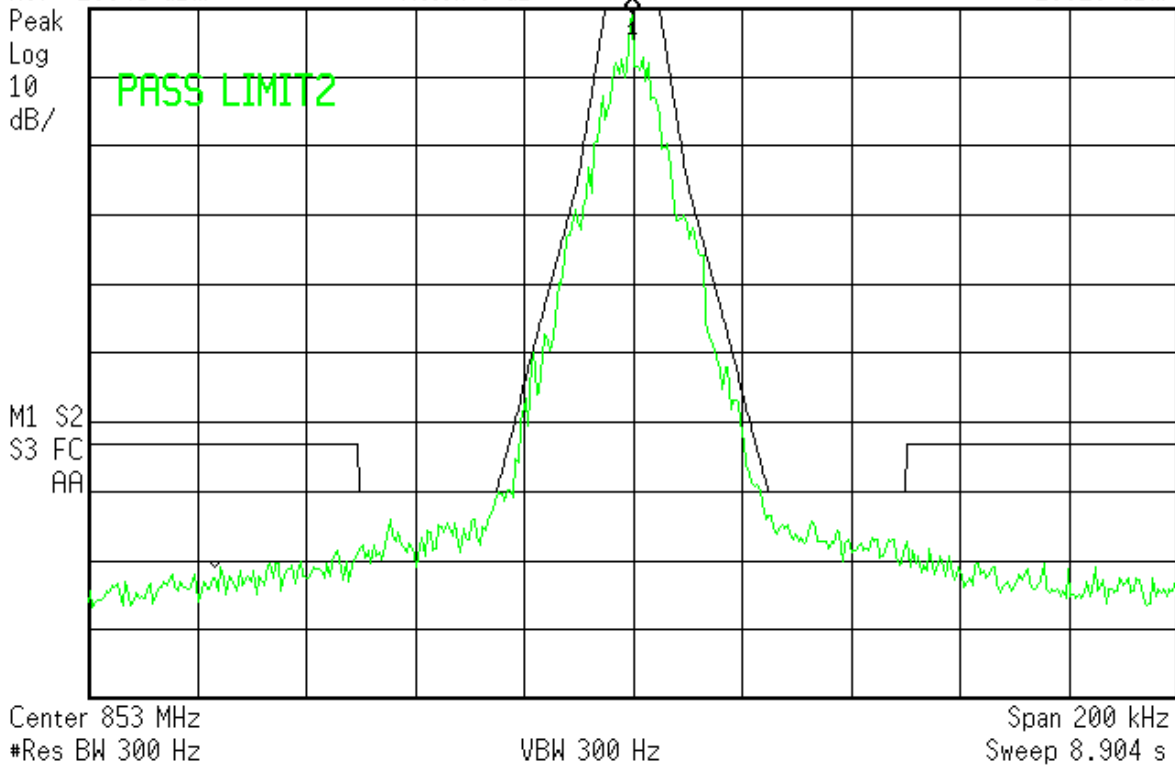
Data 14K3F1D Exciter

Ref -28.45 dBm

Atten 0 dB

Mkr1 853.0005 MHz

-29.26 dBm



PA output signals: 20W and 100 W plots (next page)



15:43:37 Nov 21, 2000

Data 14K3F1D 20W PA

Ref -21.7 dBm

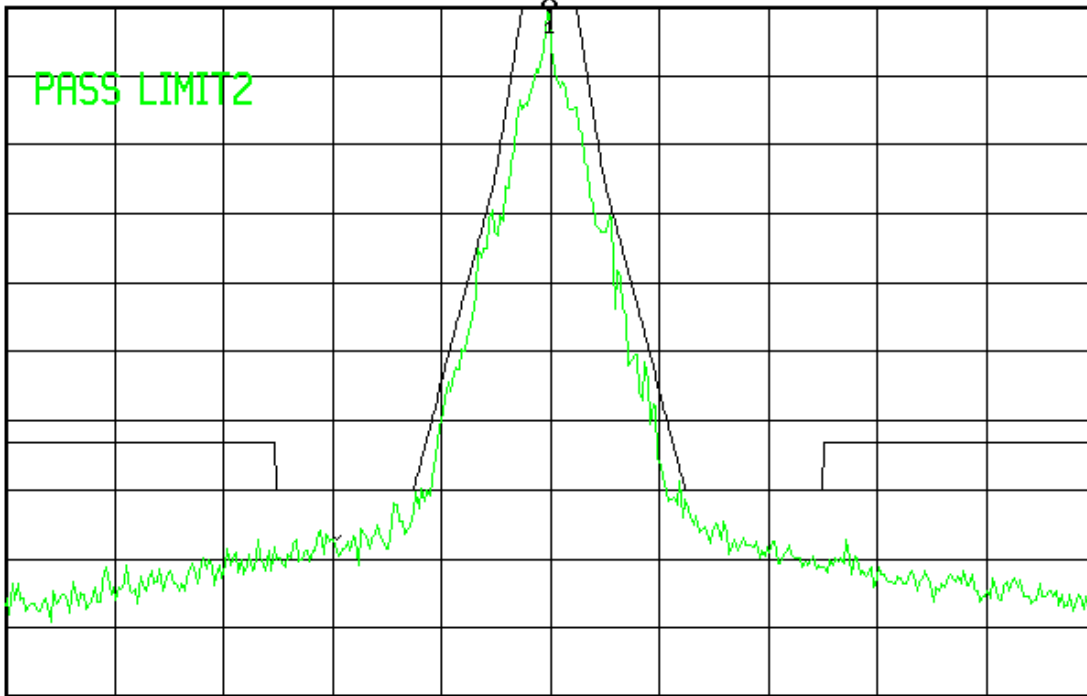
Atten 0 dB

Mkr1 853.0005 MHz

-22.47 dBm

Peak
Log
10
dB/

M1 S2
S3 FC
AA



Center 853 MHz

#Res BW 300 Hz

VBW 300 Hz

Span 200 kHz

Sweep 8.904 s



15:52:40 Nov 21, 2000

Data 14K3F1D 100W PA

Ref -14.5 dBm

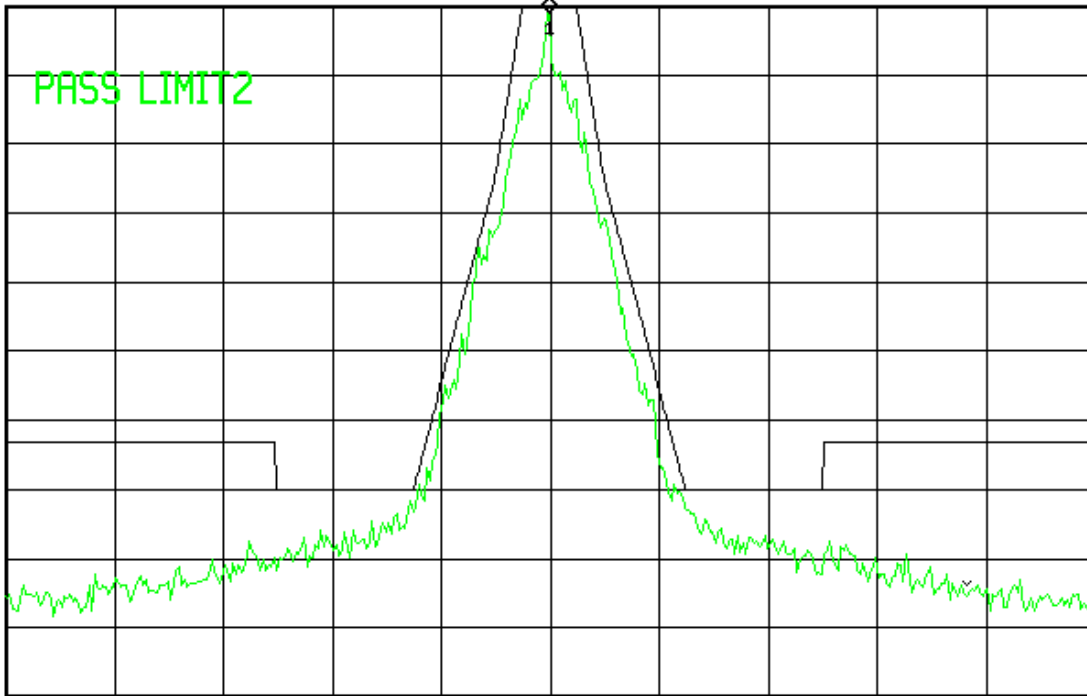
Atten 0 dB

Mkr1 853.0005 MHz

-15.53 dBm

Peak
Log
10
dB/

M1 S2
S3 FC
AA



Center 853 MHz

#Res BW 300 Hz

VBW 300 Hz

Span 200 kHz

Sweep 8.904 s

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MASK:.....G.,15K9F1D

SPECTRUM FOR EMISSION 15K9F1D

12800 bauds 4 level FSK
PEAK DEVIATION = 4500 Hz
SPAN = 200 kHz

PA input signal : 4W Exciter Output



16:57:59 Nov 21, 2000

Data 15K9F1D Exciter 4W

Mkr1 853.0005 MHz

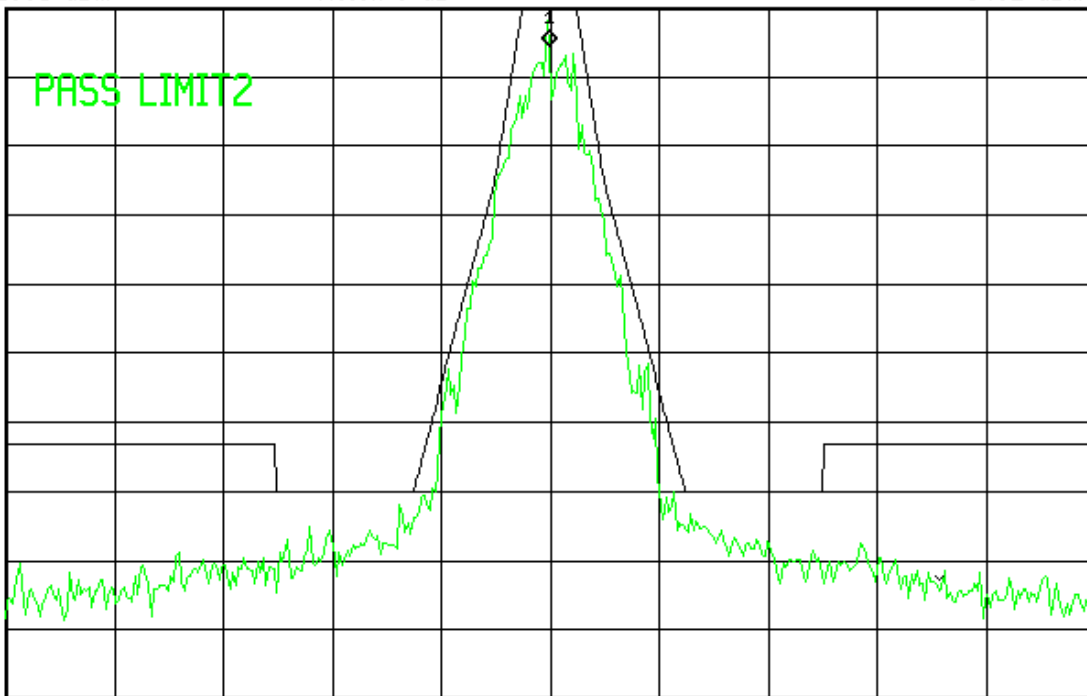
Ref -28.5 dBm

Atten 0 dB

-34.2 dBm

Peak
Log
10
dB/

M1 S2
S3 FC
AA



Center 853 MHz
#Res BW 300 Hz

VBW 300 Hz

Span 200 kHz
Sweep 8.904 s

PA output signals: 20W and 100 W plots (next page)



16:50:13 Nov 21, 2000

Data 15K9F1D 20W PA

Ref -21.8 dBm

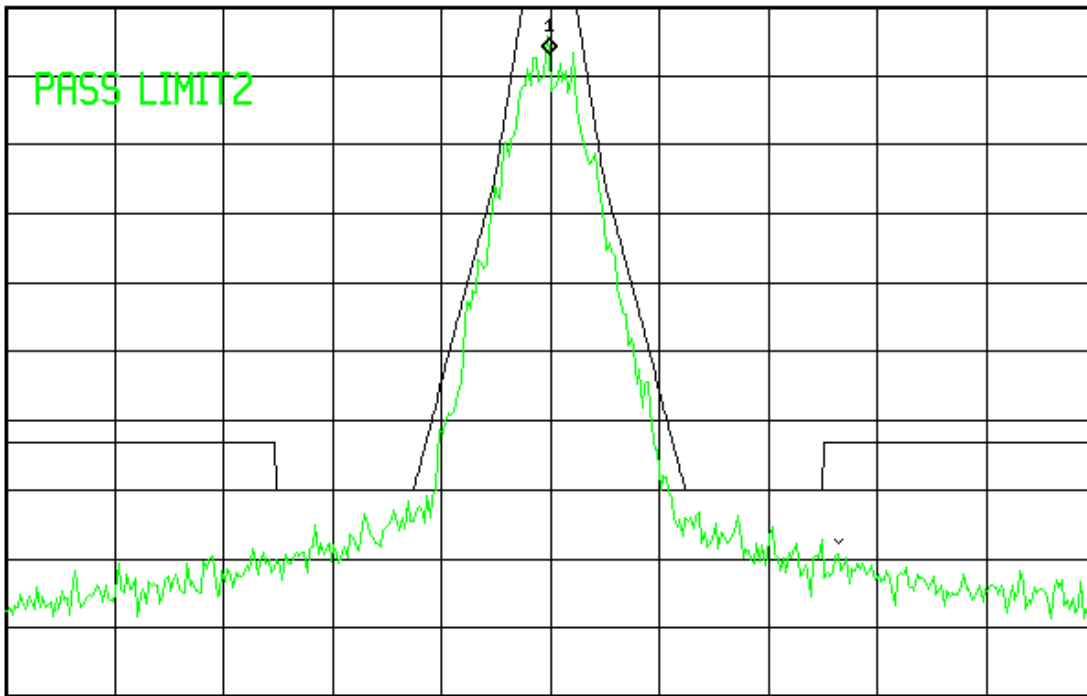
Atten 0 dB

Mkr1 853.0005 MHz

-28.58 dBm

Peak
Log
10
dB/

M1 S2
S3 FC
AA



Center 853 MHz

#Res BW 300 Hz

VBW 300 Hz

Span 200 kHz

Sweep 8.904 s



16:33:57 Nov 21, 2000

Data 15K9F1D 100W PA

Ref -14.5 dBm

Atten 0 dB

Mkr1 853.0005 MHz

-19.56 dBm

Peak
Log
10
dB/

M1 S2
S3 FC
AA



Center 853 MHz

#Res BW 300 Hz

VBW 300 Hz

Span 200 kHz

Sweep 8.904 s

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MASK:.....G,,16K0F3E

SPECTRUM FOR EMISSION 15K6F1D

TONE = 3200 Hz
PEAK DEVIATION = 4800 Hz
SPAN = 200 kHz

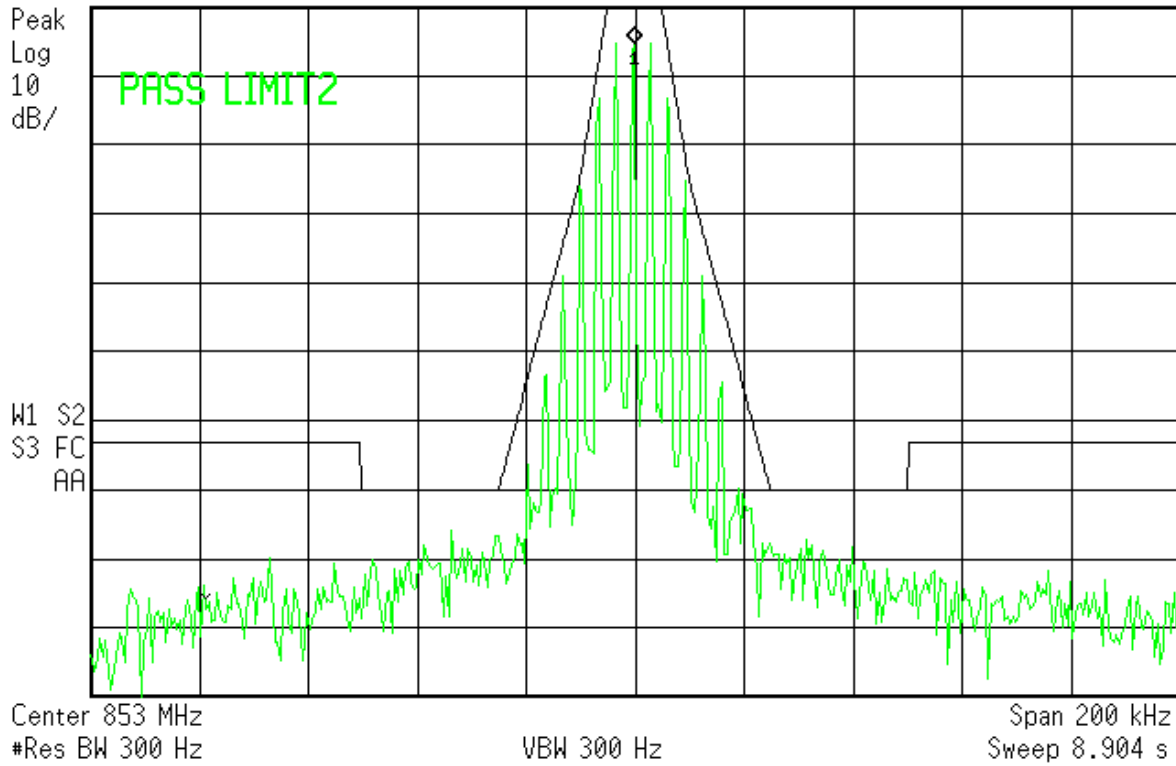
PA input signal : 4W Exciter Output



17:36:29 Nov 21, 2000

Tone 3200Hz Dev 4800Hz 16K0F3E Exciter 4W
Ref -28.6 dBm Atten 0 dB

Mkr1 853.0005 MHz
-33.93 dBm



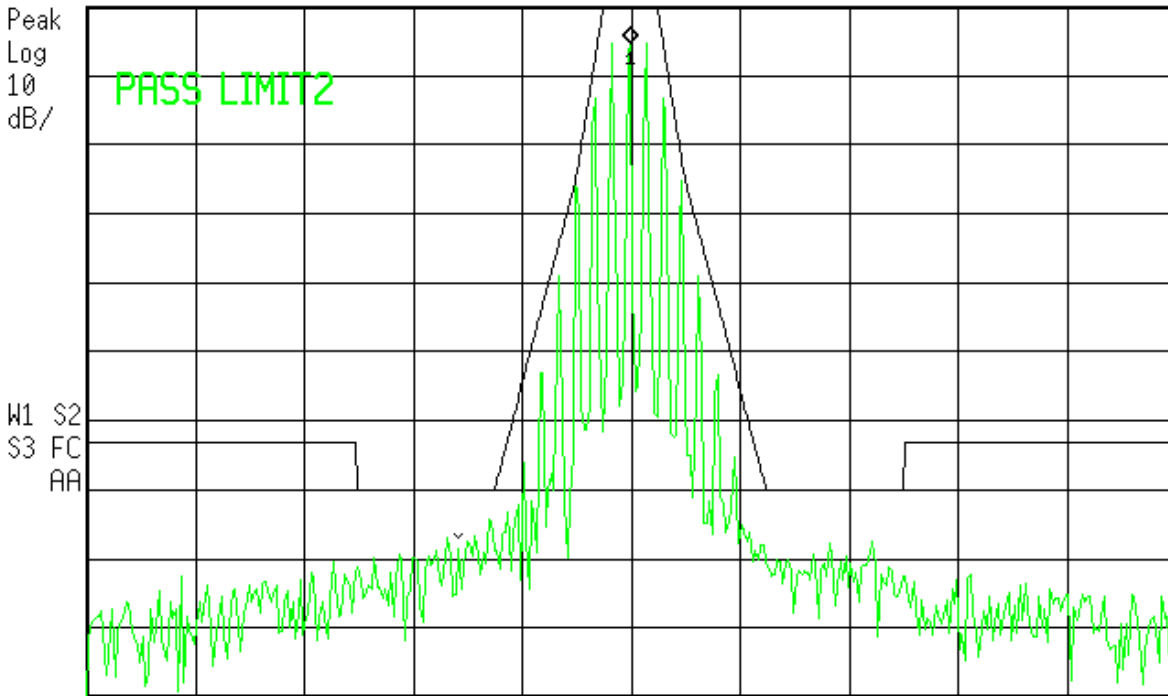
PA output signals: 20W and 100 W plots (next page)



17:31:01 Nov 21, 2000

Tone 3200Hz Dev 4800Hz 16K0F3E 20W PA
Ref -21.37 dBm Atten 0 dB

Mkr1 853.0005 MHz
-26.61 dBm



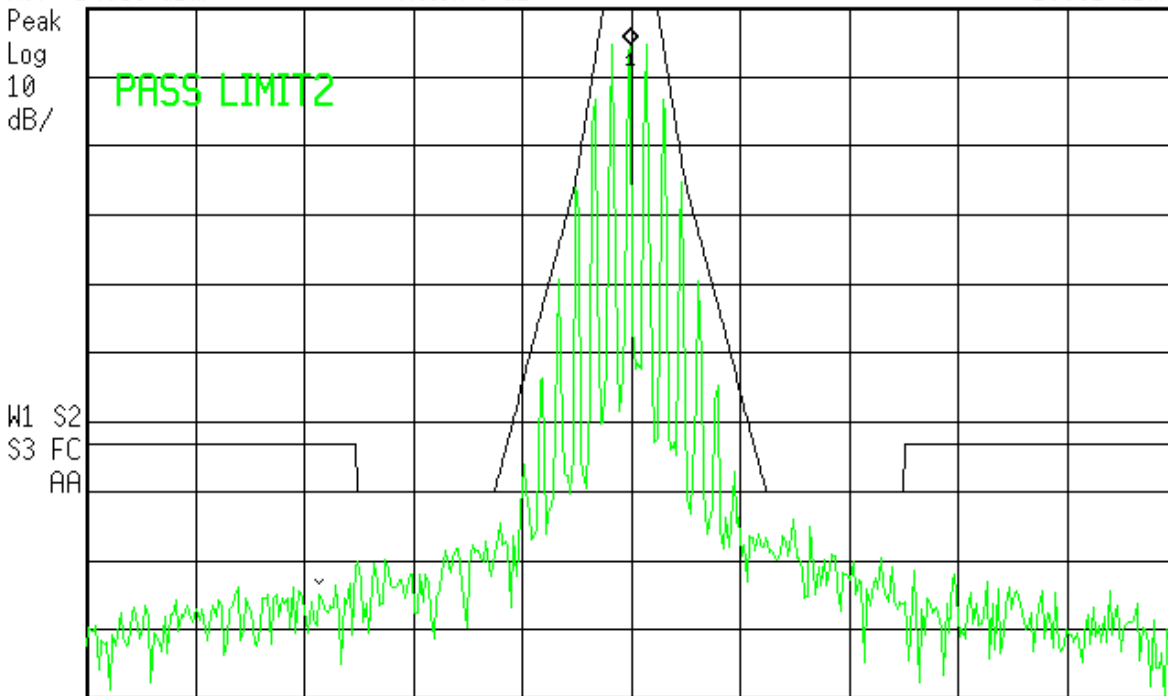
Center 853 MHz Span 200 kHz
#Res BW 300 Hz VBW 300 Hz Sweep 8.904 s



17:33:14 Nov 21, 2000

Tone 3200Hz Dev 4800Hz 16K0F3E 100W PA
Ref -14.58 dBm Atten 0 dB

Mkr1 853.0005 MHz
-19.91 dBm



Center 853 MHz Span 200 kHz
#Res BW 300 Hz VBW 300 Hz Sweep 8.904 s

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