Engineering Exhibit in Support of
Change of FCC ID Request
FCC Form 731

for the

Tait's T85x 400-440 MHz base station CASTEL0021

modulated with

4 FSK digital modulation from Dataradio's Base Data Link Controller (BDLC)

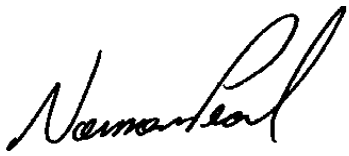
New FCC ID: EOTBDD4T85-1

Trade Name: Paragon/PD

October 4, 2000

AFFIDAVIT

The technical data included in this report has been accumulated through tests that were performed by me or by engineers under my direction. To the best of my knowledge, all of the data is true and correct.



Norman D. Pearl
Vice-president Engineering, Dataradio Inc.

Dataradio Inc., Montreal, Canada

ENGINEERING STATEMENT
OF CONSTANTIN PINTILEI

The application consisting of the attached engineering exhibit and associated FCC form 731 which have been prepared in support of a request for a Change in the FC ID for CASTEL0021. All changes involved fall under Class I or Class II Permissive Change types and they are entirely detailed within the current report.

The certificate CASTEL0021 has been granted to Tait Electronics Ltd. for the transmitter (Exciter+PA modules) part of its UHF base station. They both belong to the T85M-XY (see page 6 for part# description) UHF MHz base station. Dataradio Inc. buys this base station and uses it to build Paragon/PD, a wireless data base station. Dataradio Inc. modifies the exciter for the proposed digital modulation scheme, does the final assembly and markets the Paragon/PD unit. For marketing reasons Dataradio requests a new FCC ID to be granted for itself. The Paragon/PD data base station serves the genuine Dataradio Gemini/PD mobile family whose Permissive Change Class II request for the new modulation scheme and transmission rates is in process of being submitted.

One Class II Permissive type of change is demonstrated with this filing. The original certificate has been granted for F3E type of modulations for a unit equipped with audio low-pass filtering as per 90.210. The change consists of adding a new digital modulation source that bypasses the audio low-pass filter, therefore compliance has been demonstrated for mask 90.210 C. For this modulation source the emission designators are 14K3 and 15K9 F1D. This Class II permissive change involves the modulation source only and it is completely described with the current report. A second Class I Permissive change is detailed further in the circuit description Annex such that to clearly show all the changes related to this base station.

EXISTING CONDITIONS

The unit utilized for these occupied bandwidth and mask-compliance measurements was a prototype built from production CASTEL0021 with beta-level firmware used to create the modulation scheme. The exciter operates on frequencies ranging from 400.000 MHz to 440.000 MHz. The frequency tolerance of the exciter is .00015% or 1.5 parts per million and the output power of the PA is 100W as granted in CASTEL0021.

PROPOSED CONDITIONS

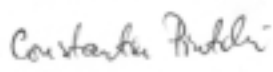
It is proposed to accept the change in identification request for the CASTEL0021 grant for operation in the band of frequencies previously outlined. The applicant anticipates marketing the device for use in wireless transmission of data.

PERFORMANCE MEASUREMENTS

All measurements for Occupied Bandwidth and mask compliance as per 2.1043 (b)(2) were conducted in accordance with the Rules and Regulations Section 2.1041and 2.1049 of Rules Service Co rev.2-154, Mar 15,2000. The measurements were made in the engineering laboratory located at 5500 Royalmount ave, Montreal, Canada. All measurements were made and recorded by myself or under my direction. The measurements were made between Sep 29, 2000 and Oct 04, 2000.

CONCLUSION

Given the results of the measurements contained herein, the applicant requests to be applied change in Identification together with Class II Permissive Change for the original Certificate CASTEL0021. The Emission designator list for the new FCC id. EOTBDD4T85-1 adds two new emission designators 15K9F1D and 14K3F1D to the existing list.



10/04/00
Constantin Pintilei
R&D Test Engineer, Dataradio Inc.

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Annex A: Instruction Manual

Annex B: Circuit Description

Annex C: Production Procedure

Annex D: External and Internal Pictures

Annex E: Digital Modulation Techniques

Qualifications of Engineering Personnel

NAME:	**Norman Pearl**
TITLE:	Vice-president Engineering
TECHNICAL EDUCATION:	Bachelor of Engineering (Electrical) (1979) McGill University, Montreal, Canada
TECHNICAL EXPERIENCE:	Professional engineer since 1979 24 Years experience in radio communications

NAME:	**Constantin Pintilei**
TITLE:	R&D Test Engineer
TECHNICAL EDUCATION:	Bachelor of Science Degree in Radiotechnique Electronic Engineering (1993) Technical University of Iasi, Romania
TECHNICAL EXPERIENCE:	7 Years experience in radio frequency measurements.

Statement Supporting the Change in Identification of Equipment- Rule part 2.933 (b)(1) to (7)

The original certificate CASTEL0021 has been granted to Tait Electronics Ltd., Burnside Christchurch 5, New Zealand, for its transmitter (Exciter+PA modules) on 01/19/1999.

The transmitter belongs to the T85M-XY (check at the page bottom for part# description) UHF 400-440 MHz base station. Dataradio Inc. buys this base station and uses it to build Paragon/PD, a base station for wireless data networks

For marketing purposes a Dataradio sticker with the logo has been stuck on the front panel and the new FCC ID label has been stuck on the rear side to cover the original FCC ID. Only the FCC information has been covered, all other identifications carried on the label (serial number, other certifications, manufacturer, etc) remain unchanged and available on the rear label.

External front and rear photographs showing the appearance of the exciter as per 2.1033 (c)(12) are provided as attachments. All other photographs (external sides, top and bottom and all internal photographs) do not change.

One Class II Permissive type of change is demonstrated with this filing. The original certificate has been granted for F3E type of modulations for a unit equipped with audio low-pass filtering as per 90.210. The change consists of adding a new digital modulation source that bypasses the audio low-pass filter, therefore compliance has been demonstrated for mask 90.210 C. For this modulation source the emission designators are 14K3 and 15K9 F1D. This Class II permissive change involves exclusively the modulation source.

Therefore all the original test results but those related to Mask B (90.210 (b)) compliance continue to be representative of and applicable to the exciter module. The compliance with Mask C is further demonstrated in this report.

All this Class II permissive change data as per 2.1043 are completely described with the current report. A second Class I Permissive change is detailed further in the circuit description Annex such that to clearly show all the changes related to this base station. None of them fell outside the purview of a permissive change described in 2.1043 hence the Change in Identification of Equipment as per 2.933 has been applied.

Part Number of the Tait UHF base station T85M-XY

M	Module Type	X	Freq Range	Y	Channel Bandwidth
1	Exciter (5W)	1	400-440 MHz	0	25 kHz
5	Receiver	2	440-480 MHz	5	12.5 kHz
9	Power Amplifier	3	480-520 MHz		

Part Number of the Paragon/PD UHF data base station BDD4 -85XY PPPS

X	Freq Range	Y	Channel Bandwidth	PPP	Transmitted Power	S	Supply
1	400-440 MHz	0	25 KHz	100	100W	0	12VDC external
2	440-480 MHz	5	12.5 KHz			2	dual 120V AC
3	480-520 MHz						

EQUIPMENT IDENTIFICATION:

TRADE NAME	**DESCRIPTION**	**Dataradio Inc PART NUMBER**
T85x	UHF Base Station	T85M-XY
D212	Base Data Link Controller (BDLC)	050-03330-00x
Paragon/PD	Assembly	BDD4-88XY PPPS

Changes In the Equipment: General Data - Rule Part 2.1043 (b)

The certificate CASTEL0021 has been granted to Tait Electronics Ltd. for its T881 Exciter module. It belongs to the T85M-XY (see previous page for part# description) UHF base station

The original certificate has been granted for 10K7F3E and 15K7F3E types of modulation for a unit equipped with audio low-pass filtering as per 90.210. The change consists of adding a new digital modulation source which bypasses the audio low-pass filter, therefore compliance has been demonstrated for mask 90.210 C. For this modulation source, the modulation scheme is 4-level FSK and its emission designators are 14K3 and 15K9 F1D. All hardware-related changes as per 2.1033 (c) (10) are explained further in the Circuit Description Annex B. All modulator source signal-related issues as per 2.1033 (c) (4) and (13) are explained below on page 9 and on Annex E.

The change above described involves the modulation source only, with no change occurring elsewhere in the circuitry. Therefore it fall under Class II Permissive Changes type as per 2.1043 (b)(2).

Another change consists in the addition of a flash ROM (EEPROM) memory module block powered from T881 9V power supply line. The memory module records settings related to the module for which values are found through calibration during production procedures. They concern reference level and deviation level settings to adjust the modulation and the frequency drift. Its full description is provided in Circuit Description Annex B. This change fall under Class I Permissive Change type as per 2.1043 (b)(1).

The characteristics affected by the first modification of above are:

Digital Modulation Techniques - part 2.1033.(c)(13)
Type of emission and Emission designators list - part 2.1033 (c)(4), 90.209
Occupied bandwidth and mask compliance requirement - part 2.1049,90.210(c)

They are entirely documented with the current report.

General Information about the Grantee and Certified Equipment -2.1043 (B)(2)
(as per Rule Part Number: 2.1033 (c).(1),(2),(5),(6),(7)

APPLICANT FOR NEW ID	Dataradio Inc., 5500 Royalmount Ave, suite 200, Town of Mount Royal, Quebec, Canada, H4P 1H7
ORIGINAL GRANTEE	Tait Electronics Ltd., Burnside Christchurch 5, New Zealand
MANUFACTURER:	Tait Electronics Ltd., Burnside Christchurch 5, New Zealand (T85x UHF Base station) DATARADIO Inc., Town of Mount Royal, Quebec, Canada, H4P 1H7 (D212 BDLC and Paragon/PD- final assembly)
MODEL NUMBER: PART NUMBER:	Paragon/PD BDD4-85XY PPPS
SERIAL NUMBER (S):	D212 address 1.0 -prototype 4-level FSK BDLC T857-10 s.n 729888 Exciter module T859-10 s.n 996041 PA module
FCC ID NUMBER: FCC RULES AND REGS:	CASTEL0021 FCC Part 2, 90
FREQUENCY RANGE:	400 MHz -440 MHz as per CASTEL0021 certificate
MAXIMUM POWER RATING:	100Watts as per CASTEL0021 certificate.
NUMBER OF CHANNELS:	1 Channel selectable from 256 channels as per Tait's manual
OUTPUT IMPEDANCE:	50 ohms, Nominal
VOLTAGE REQUIREMENTS:	10.9-16.3VDC (13.6 VDC Nominal)

EQUIPMENT IDENTIFICATION:

TRADE NAME	DESCRIPTION	DRI PART NUMBER
T85x	UHF Base Station	T85M-XY
D212	Base Data Link Controller (BDLC)	050-03330-00x
Paragon/PD	Assembly	BDD4-85XY PPPS

Data And Characteristics Not Affected By The Change-Rule Part Number: 2.1033 (c)(8),(9),(15),(16)

DC Voltages And Currents Into Final Amplifier (T881)	2.1033(c).(8)
Transmitter Tune Up Procedure	2.1033 (c) (9)
Data addressing Rule Part Number	2.1033(c) (15), (16): this unit is not designed for the mentioned purposes
MPE limits compliance	2.1091
Test results not affected by the change	2.1033(c)(14), 2.1041

Test data according to:
Part 2: 2.1046, 2.1051, 2.1053, and 2.1055
Part 90, Subpart I: 90.213
as follows:

Transmitter Rated Power Output	2.1046
Transmitter Spurious and Harmonic Outputs	2.1051
Field Strength of Spurious Radiation	2.1053
Frequency Stability and Frequency Tolerance	2.1055,90.213

DATA AND CHARACTHERISTICS AFFECTED BY THE CHANGE - Rule Part Number: 2.1033(c) (3),(4),(10), (11),(12),(13),(14)

INSTRUCTION BOOK 2.1033 (c) (3)
Annex A . The attached Technical Manual for the Paragon/PD data base station using SRRC4FSK is a preliminary version.

TYPE OF EMISSION: 2.1033(c)(4)

For Class II Permissive Change 4levelFSK 25kHz BW (12800baud, 4 FSK) **14K3F1D**
25kHz BW (9600baud, 4 FSK) **15K9F1D**

DESCRIPTION OF CIRCUITRY 2.1033 (c)(10)

SCHEMATICS 2.1033 (c)(10)

TRANSISTOR, DIODE, AND IC FUNCTIONS 2.1033 (c)(10)

Annex B. The attached Circuit Description details all the changes (both Class II and Class I permissive changes types) the Exciter T857 undergo.

Annex C. Attached Production Procedure nr 164-20006-031 is a preliminary version.

FCC LABEL 2.1033 (c) (11)
The new FCC ID label has been stuck on the rear side to cover the original FCC ID. Only the FCC information has been covered, all other identifications carried on the label (serial number, other certifications, manufacturer, etc) remain unchanged and available on the rear label. A picture of the rear side with the label is provided in Annex D.

EXTERNAL PHOTOGRAPHS 2.1033 (c) (12)

INTERNAL PHOTOGRAPHS 2.1033 (c)(12)

Annex D. Shows internal pictures of the T857 Exciter after the production procedures above mentioned are applied. Also front and rear external pictures of the Exciter module (T857) and of the PA module (T859) showing the new FCC ID label on the rear side and the Dataradio logo sticker on the front side are included.

DIGITAL MODULATION TECHNIQUES 2.1033 (c)(13)

Annex E. Explains DBA protocol and digital modulation technique used to create modulator signal

TEST DATA Rule Part Number: 2.1033 (c)(14)

All applicable test data according to:
-Part 2: 2.1043 (b)(2), 2.1049
-Part 90, Subpart I: 90.209 and 90.210
are provided in next section of this Engineering Report

Modulation Characteristic Part 2.1047 (d), 90.209 (b), 90.210(g): Other types of equipment: this equipment is not provided with hardware audio low-pass filters, the filtering is entirely result of DSP firmware.

Unless otherwise noted, all of the measurements were conducted following the procedures set forth in the TIA/EIA-603 standards.

NAME OF TEST:

Transmitter Occupied Bandwidth

RULE PART NUMBER: 2.201, 2.202, 2.1033 c (14), 2.1049 (h), 2.1041

Emission Designator Determination

Necessary Bandwidth Measurement (90.209.(b))

This Exciter uses digital modulation signals, passing through a DSP implemented low-pass filter to an FM modulator. The necessary bandwidth calculation for this type of modulation (SRRC4FSK) is not covered by paragraphs (1), (2) or (3) from 2.202(c), the result exceeding by far the real necessary bandwidth obtained through simulations or measurement.

Therefore, the approach outlined in (2.202(c)(4)) is applicable in this case.

The results of 99% Occupied Bandwidth measurement are:

Baud rate	Deviation	Occupied Bandwidth	Emission designator
12800 bauds	± 4.15 KHz	14280 Hz	14K3
9600 bauds	± 4.7 KHz	15820 Hz	15K9

The measurement theory and set-up explanations follow.

Occupied Bandwidth Measurement

Theory of Measurement
The way to define the ***Occupied Bandwidth*** is "the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission" (FCC 2.202), so the mathematics for it are:

$$0.005*TP=P_{(f1)}=\int_{0}^{f1} PSD_{(f)}df$$

$$0.995*TP=P_{(f2)}=\int_{0}^{f2} PSD_{(f)}df$$

$$OBW=f2-f1$$

where TP (total mean power) is

$$TP=\int_{0}^{+\infty} PSD_{(f)}df=(1/t)\int_{-\infty}^{+\infty} |Z_{(t)}|^2 dt$$

and PSD (power spectral distribution) is

$$PSD_{(f)}=|Z_{(f)}|^2+|Z_{(-f)}|^2 \qquad 0\leq f<4$$

and expresses the positive frequency representation of the transmitter output power for z(t) signal.

By applying this mathematics to the measurements, it is possible to measure the Occupied Bandwidth using the RF signal's trace provided by a digital spectrum analyzer and processed further by computational methods.

The Occupied Bandwidth measurement is in two parts relatively independent of each other. The first gives the RF spectrum profile, and the second calculates the frequency limits and they result in the Occupied bandwidth. While the first involves RF measurement instrumentation, the second is strictly a computational part related to measured trace.

Getting an equally-sampled RF power spectrum profile requires a Digital Spectrum Analyzer. In addition to the instrument's usual requirements, a special attention must be paid to the analyzer's span (bandwidth to be investigated).

This bandwidth must be large enough to contain all the power spectral components created by the transmitter. The frequency step Δf, where the samples are picked, is directly dependent on the span's value.

Δf= span/number of points displayed

The frequency resolution will determine the measurement accuracy. So for greater accuracy, less bandwidth will give better values because of the constant number of points that can be displayed. Taking into account the purpose of transmitter, an acceptable balance can be set. For channel-limited transmitters all the power spectral components can be found in main channel and a number of adjacent channels, upper and lower, from the main channel. The relation between these two requirements, number of channels and accuracy, is depicted by:

$a(\%) \cong (2*k*n/N)*100,$

where a is desired accuracy, in percentage units, n is the number of channels in span, including main channel, N is displayed number of points and k= (authorized bandwidth) /channel bandwidth.

For usual spectrum analyzers N≅500, k=0.8 (20/25) for 25kHz channel transmitters or k=0.9 (11.25/12.5) for 12.5kHz channel transmitters, so $a \cong n/2.5$ (%) can estimate the expected precision for measurement.

All other requirements for spectrum analyzer are the same as they are for mask compliance determination.

The second part has computational requirements related to the trace's values processing.

The following operations must be performed over the trace's (x,y) points:

1. convert y value in dBm (or the analyzer's display y units) units power sample
2. convert y value in W units power sample,
3. add to total power every power sample and get total power value (W units for total power)
4. set low level (0.5%*total power)
5. detect x1-sample which pass low level (convert f1 integrals to sample summing)
6. convert (x1-1)-sample value in frequency units (the x-sample is already in occupied bandwidth),
7. store first frequency correspondent to (x1-1)-sample
8. set up level (99.5%*total power)
9. detect x2-sample which pass up level (convert f2 integrals to sample summing)
10. convert (x2)-sample value in frequency units (the x-sample is now out of occupied bandwidth),
11. store second frequency correspondent to (x2)-sample
12. read the frequency difference , this is ***Occupied Bandwidth***, and display the result.

Standard calculation precision is all that is required. The main error factor being the y display resolution is covering calculation precision.

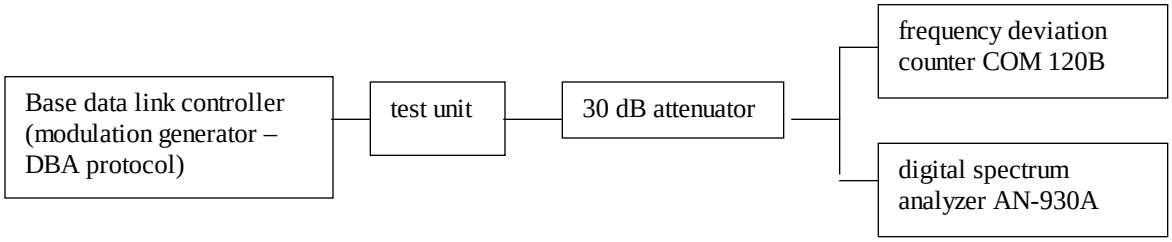
The absolute error for this measurement is -0/+2*(Δf). It is not possible to decrease span bandwidth under 2 channels bandwidth because this will affect the significance of result by cutting off the power's spectral distribution edges.

2. Dataradio's Measurement Set-Up

For the above requirements, the occupied bandwidth of a transmitter was measured using an IFR AN930 A spectrum analyzer having adequate macrofunction to perform computational part. The number of power spectrum samples (N) is 500. Because in test

results frequency deviation was also a parameter, measurement instruments were completed with an IFR COM-120 B for frequency deviation determination.

The measurement set-up is:



The AN-930 A spectrum analyzer's parameters are adjusted as follow:
-total span is adjusted at 2.8*channel space this means 70 kHz for 25 kHz channel and 35 kHz for 12.5 kHz channel. This setting will result in frequency sample step (f) of 140 Hz for 25 kHz channel and 70 Hz for 12.5 kHz channel.
-RBW is set to 300 Hz, this is better than 1% of total span bandwidth.
-video filter is set to 1Khz;
-all other parameter of the instrument are automatically adjusted to obtain calibrated measurements (sweep time 4s).
-central frequency and reference level are adjusted to the unmodulated carrier frequency and level.

The AN 930 A spectrum analyzer's Occupied Bandwidth macrofunction input parameters are:
-central frequency, same as above, the unmodulated carrier frequency.
-channel spacing, 25 kHz or 12.5 kHz according to the signal,
-percentage of Occupied Bandwidth 99%.

The macro operations are:
-a peak hold trace is created after a large enough nr. of sweeps to ensure the relevance for OBW. This trace is read;
-follow all the computational steps required.
Each sample is converted from dBm to mW and add to total power (tpow) variable. Then are computed the limits of 0.5% and 99.5% by using variable remaining percent (RemPer), and in same time are stored sample number where these two percentage meet. Then are assigned to the markers the correspondent frequencies of numbers.
- Occupied Bandwidth is then displayed as Delta mode marker (difference between markers).
-return to operational mode.

NOTE 1: The computational part could be performed on any instrument featured with data acquisition.
NOTE 2: An approximation of the occupied bandwidth calculation can be performed by measuring at the points at which the spectrum, measured with a spectrum analyzer of 300 Hz resolution bandwidth, is 25dB down relative to the unmodulated carrier reference level.

NAME OF TEST: Transmitter Occupied Bandwidth
Paragon/PD Modem at 12800 baud 4FSK

Mask compliance data in support of Emission Designator **14K3F1D**

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

MINIMUM STANDARD: Mask C
Sidebands and Spurious [Rule 90.210 (c)]
Authorized Bandwidth = 20 kHz [Rule 90.209(b) (5)]

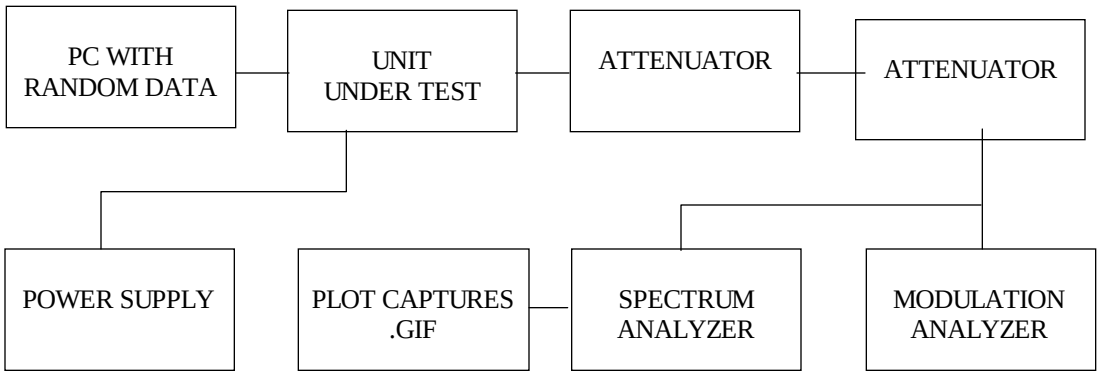
Fo to 5.0 kHz	Attenuation = 0 dB
>5.0 kHz to 10.0 kHz	Attenuation= 83*log(f_d KHz /5) dB
>10.0 kHz to 250% Auth BW	Attenuation = Lesser of: 50dB or 29 log (fd2/11)dB
250% Auth BW	43 + 10*log(P)
Corner Points:	
f_0 to 5.0 kHz	Attenuation = 0 dB
>5.0 kHz to 10.0 kHz	Attenuation= 0 dB to 25 dB
>10.0 kHz to 15.0 KHz	Attenuation = 27.8 dB to 38 dB
>15.0 kHz to 20.0 KHz	Attenuation = 38 dB to 45.3 dB
>20.0 kHz to 24.0 KHz	Attenuation = 45.3 dB to 50 dB
>24.0 kHz to 50.0 KHz	Attenuation = 50 dB
>250% Auth BW	Attenuation = minimum 63 dB (100 W)

TEST RESULTS: Meets minimum standard (see data on the following pages)

TEST CONDITIONS: Standard Test Conditions, 25 C
TEST EQUIPMENT: Attenuator, BIRD Model / 100-A-MFN-30 / 30 dB / 100 Watt
Attenuator, BIRD Model / 5-A-MFN-20 / 20dB / 5 Watt (not used for the Exciter plot)
DC Power Source, Model Astron VS 20M
Communication Analyzer, Model IFR COM120B for Modulation Analyzer
Spectrum Analyzer, Model HP E4401

PERFORMED BY: Constantin Pintilei DATE: 10/02/00

TEST SET-UP:



NAME OF TEST: Transmitter Occupied Bandwidth (Continued)
Paragon/PD Modem at 12800 baud 4FSK

MODULATION SOURCE DESCRIPTION:

TX Data Pattern:

The transmit data pattern is DBA protocol- type of "idle" packets data pattern as described in Annex E "Digital Modulation Techniques". After this data follows the modulation process described, the resulting base band signal feed the modulator's input of the Exciter.

For 12800 baud rate, the deviation is set to 4.15kHz. For deviation readings it has been used the IF filter of 30KHz

NECESSARY BANDWIDTH (Bn) CALCULATION

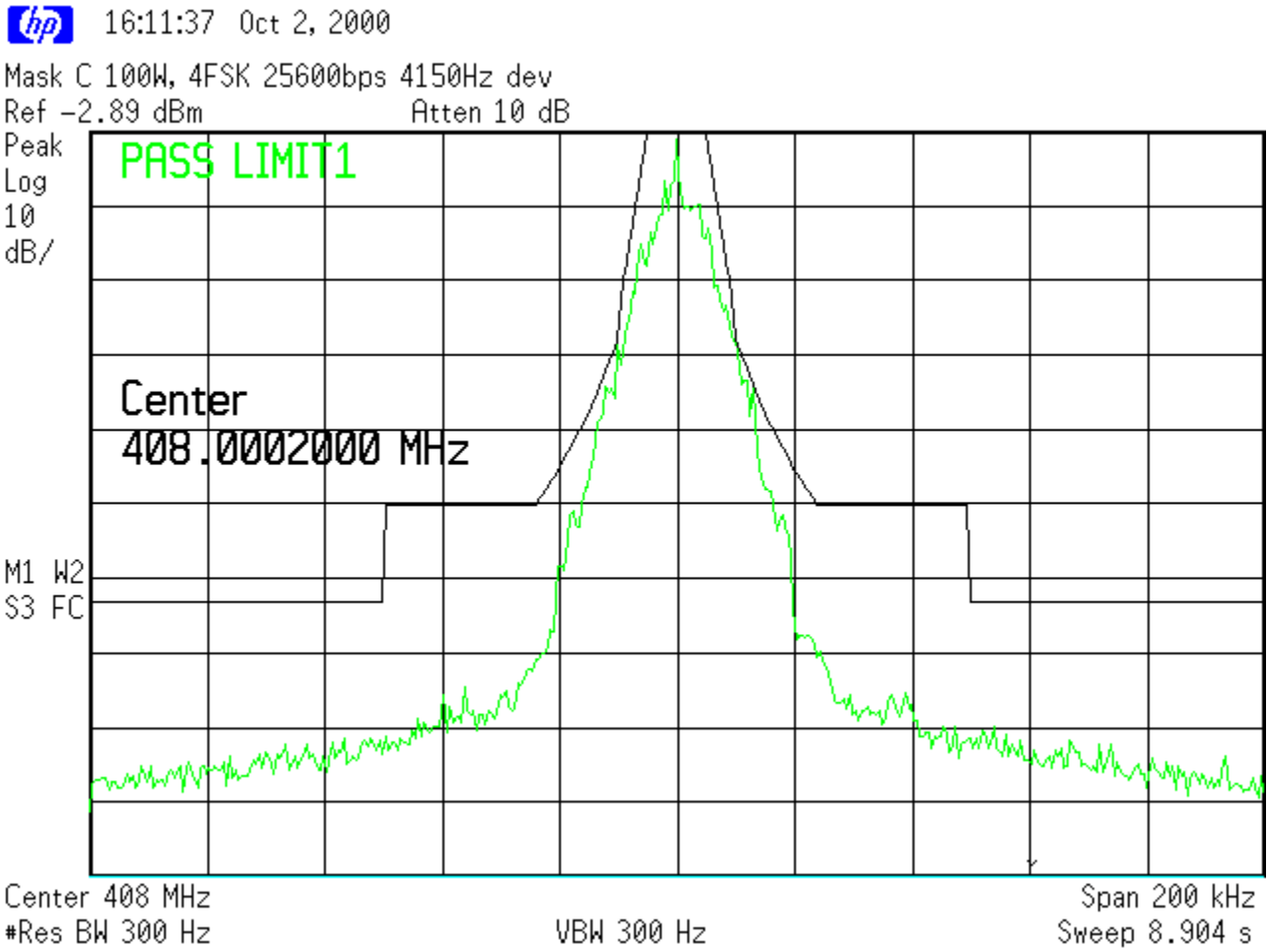
See Page 11 for emission designator determination.

The corresponding emission designator prefix for necessary bandwidth
14K3F1D for 12800 baud rate, 4.15 kHz deviation

TEST DATA: Refer to the following graphs:

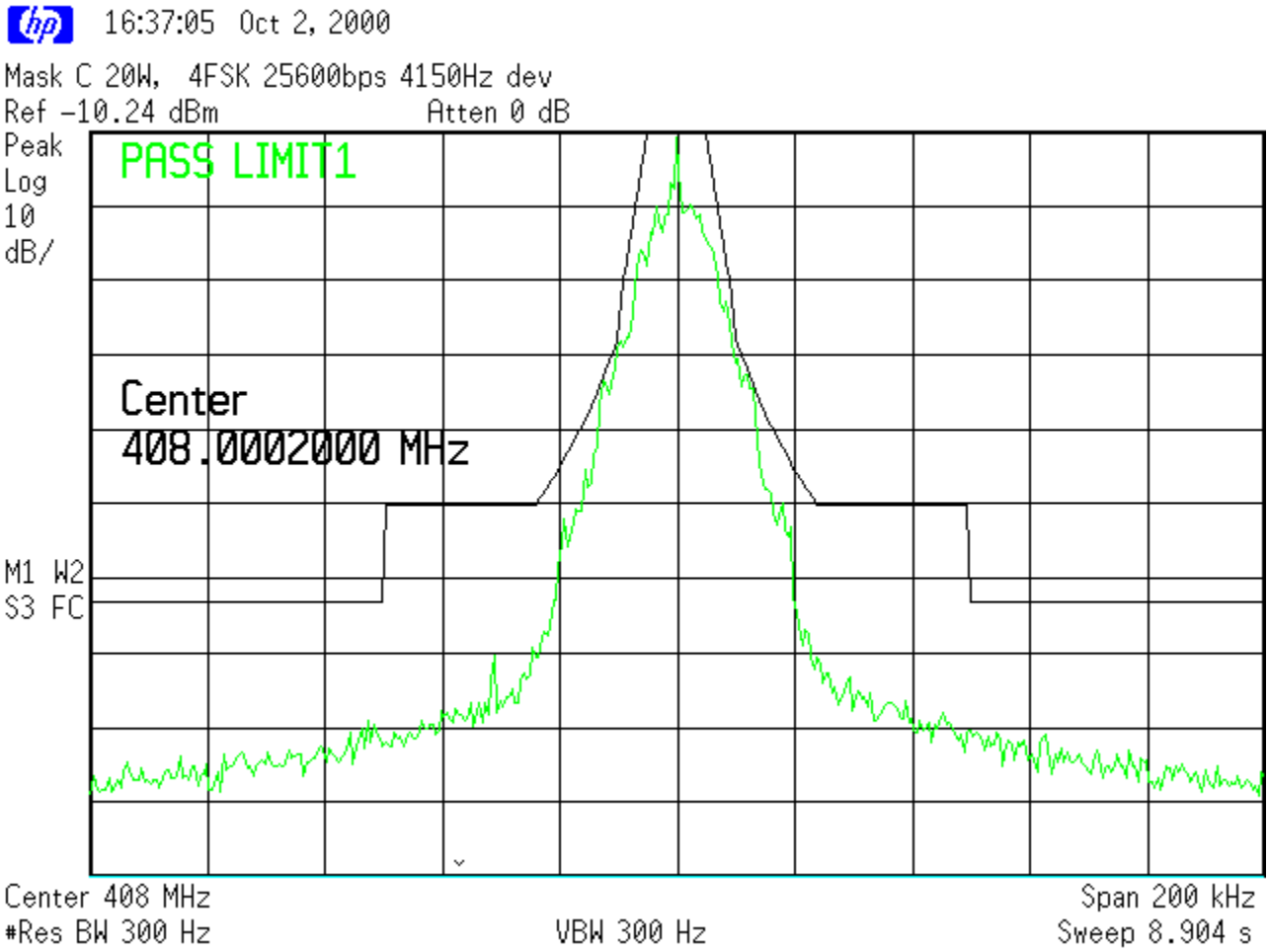
MASK: C, 14K3F1D, 100W

SPECTRUM FOR EMISSION **14K3F1D**
OUTPUT POWER: 100 Watts
12800 bauds, 4 level FSK
PEAK DEVIATION = 4150 Hz
SPAN = 200 kHz



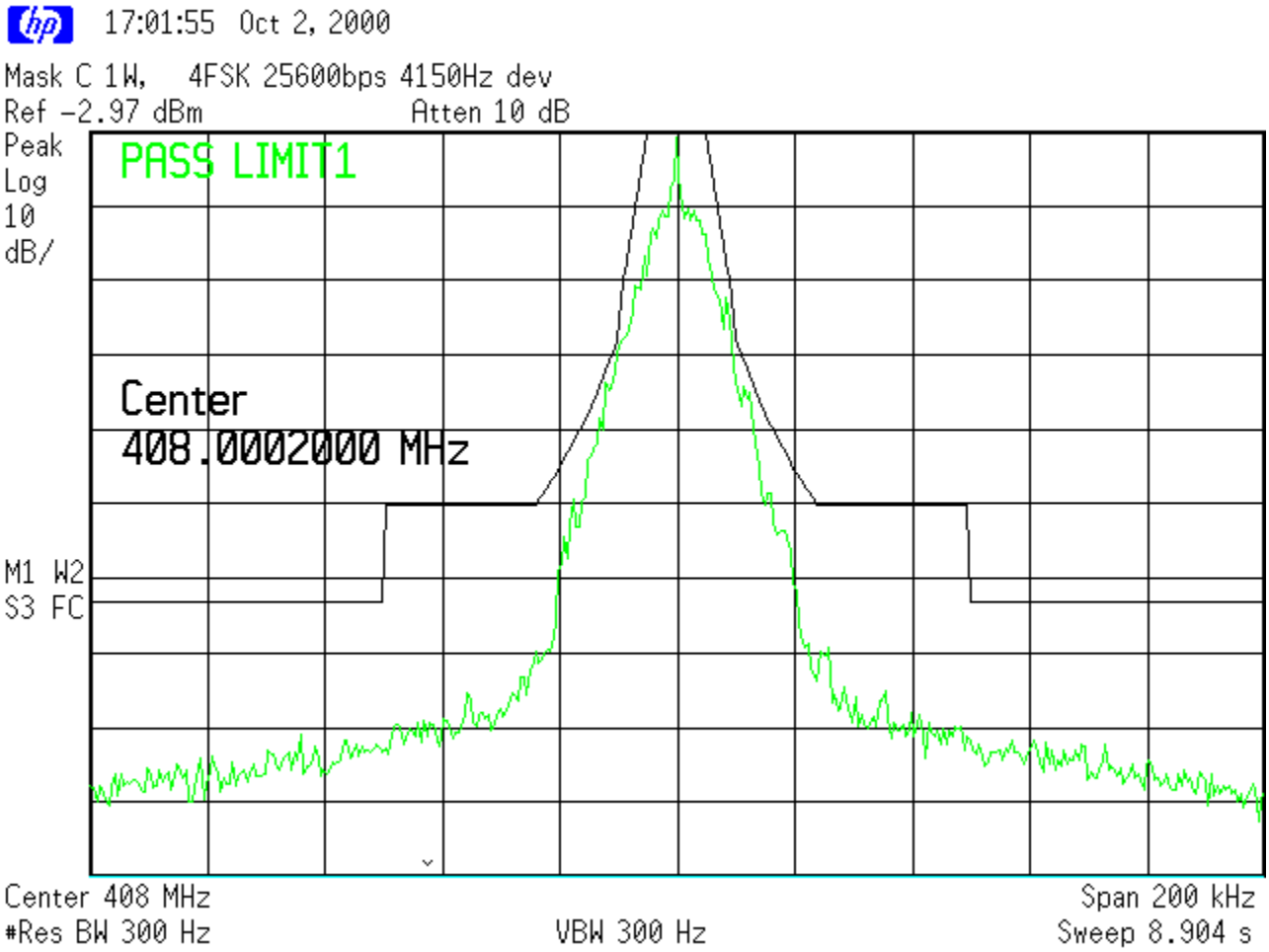
MASK: C, 14K3F1D, 20W

SPECTRUM FOR EMISSION **14K3F1D**
OUTPUT POWER: 20 Watts
12800 bauds, 4 level FSK
PEAK DEVIATION = 4150 Hz
SPAN = 200 kHz



MASK: C, 14K3F1D, 1W _exciter output

SPECTRUM FOR EMISSION **14K3F1D**
OUTPUT POWER: 1 Watts
12800 bauds, 4 level FSK
PEAK DEVIATION = 4150 Hz
SPAN = 200 kHz



NAME OF TEST: Transmitter Occupied Bandwidth
Paragon/PD Modem at 9600 baud 4FSK

Mask compliance data in support of Emission Designator **15K9F1D**

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

MINIMUM STANDARD: Mask C
Sidebands and Spurious [Rule 90.210 (c)]
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 KHz /5) dB
>10.0 kHz to 250% Auth BW	Attenuation = Lesser of: 50dB or 29 log (fd2/11)dB,
250% Auth BW	43 + 10*log(P)

Corner Points:

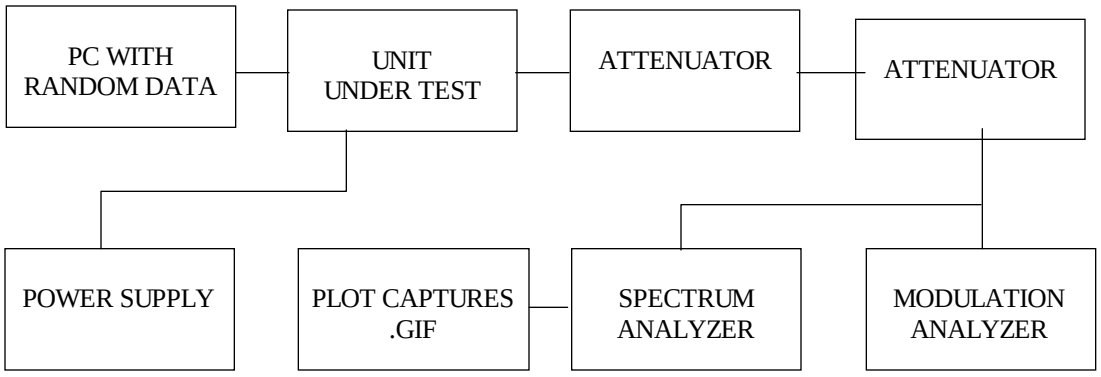
f_0 to 5.0 kHz	Attenuation = 0 dB
>5.0 kHz to 10.0 kHz	Attenuation= 0 dB to 25 dB
>10.0 kHz to 15.0 KHz	Attenuation = 27.8 dB to 38 dB
>15.0 kHz to 20.0 KHz	Attenuation = 38 dB to 45.2 dB
>20.0 kHz to 24.0 KHz	Attenuation = 45.2 dB to 50 dB
>24.0 kHz to 50.0 KHz	Attenuation = 50 dB
>250% Auth BW	Attenuation = minimum 63 dB (100 W)

TEST RESULTS: Meets minimum standard (see data on the following pages)

TEST CONDITIONS: Standard Test Conditions, 25 C
TEST EQUIPMENT: Attenuator, BIRD Model / 100-A-MFN-30 / 30 dB / 100 Watt
Attenuator, BIRD Model / 5-A-MFN-20 / 20dB / 5 Watt (not used for the Exciter plot)
DC Power Source, Model Astron VS 20M
Communication Analyzer, Model IFR COM120B for Modulation Analyzer
Spectrum Analyzer, Model HP E4401

PERFORMED BY: Constantin Pintilei DATE: 10/02/00

TEST SET-UP:



NAME OF TEST: Transmitter Occupied Bandwidth (Continued)
Paragon/PD Modem at 9600 baud 4FSK

MODULATION SOURCE DESCRIPTION:

TX Data Pattern:

The transmit data pattern is DBA protocol- type of "idle" packets data pattern as described in Annex E "Digital Modulation Techniques". After this data follows the modulation process described, the resulting base band signal feed the modulator's input of the Exciter.

For 9600 baud rate, the deviation is set to 4.7 kHz. For deviation readings it has been used the IF filter of 30KHz

NECESSARY BANDWIDTH (Bn) CALCULATION

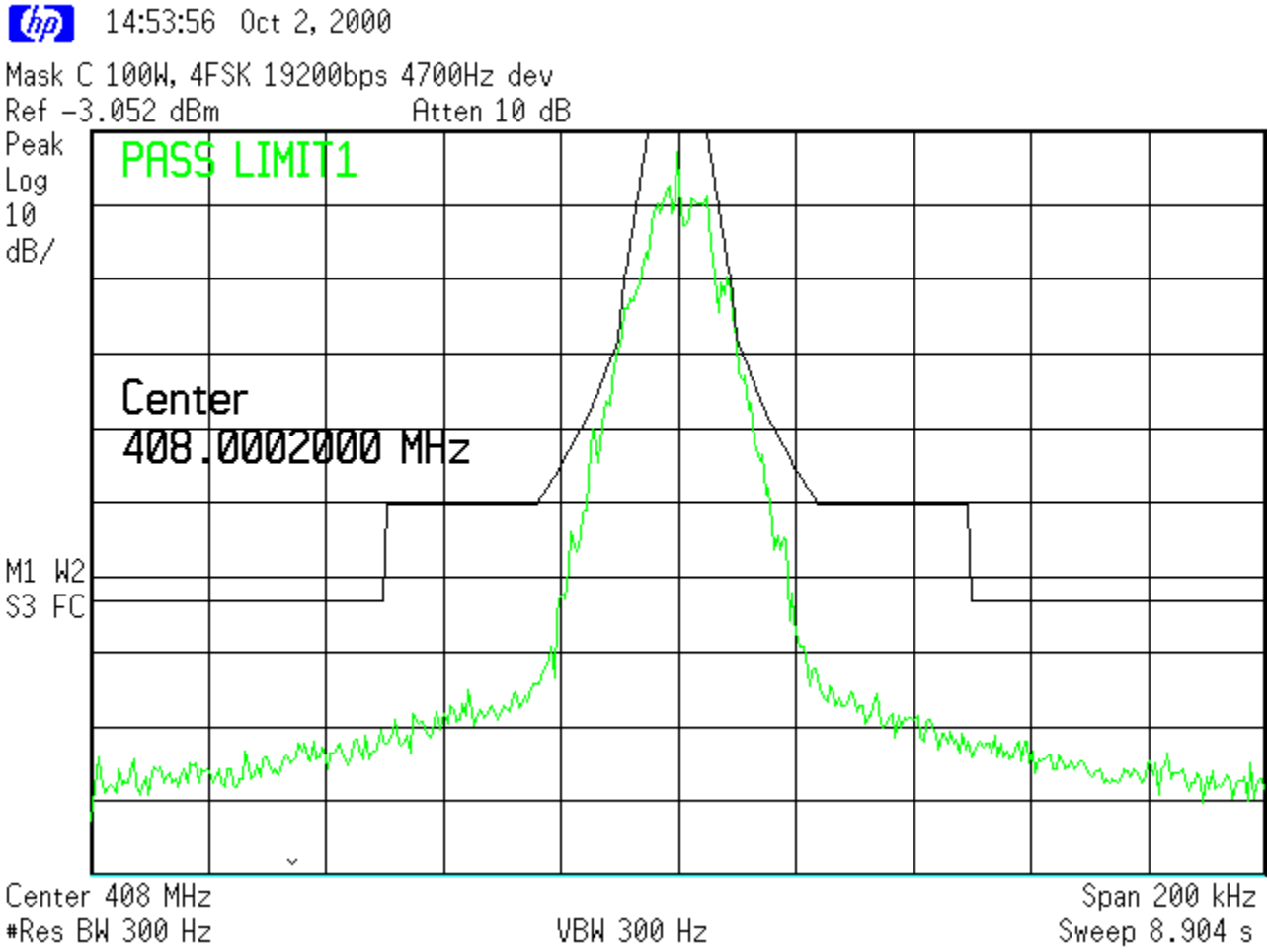
See Page 10 for emission designator determination.

The corresponding emission designator prefix for necessary bandwidth
15K9F1D for 9600 baud rate , 4.7 kHz deviation

TEST DATA: Refer to the following graphs:

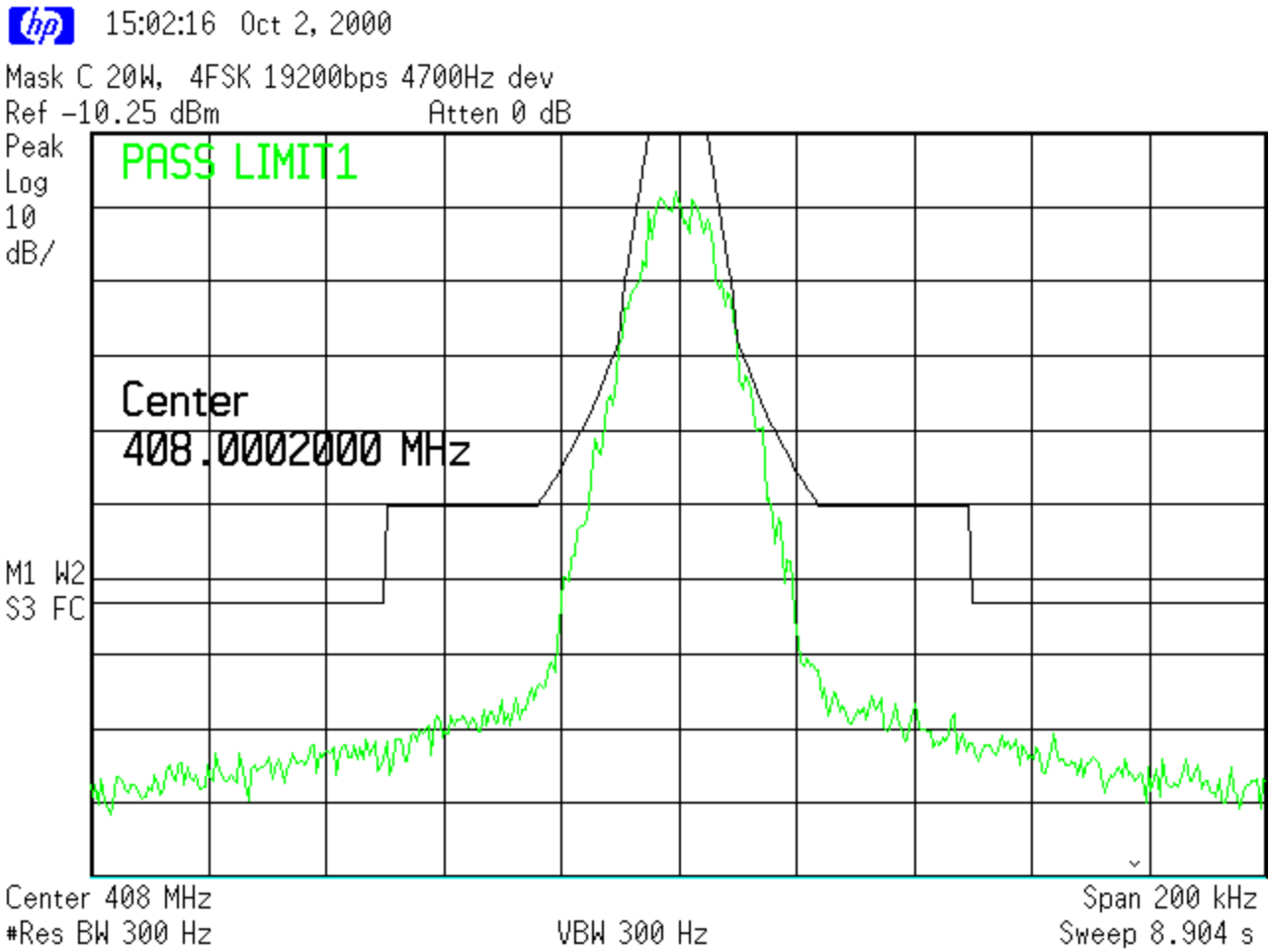
MASK: C , 15K9F1D, 100W

SPECTRUM FOR EMISSION **15K9F1D**
OUTPUT POWER: 100 Watts
9600 bauds, 4 level FSK
PEAK DEVIATION = 4700 Hz
SPAN = 200 kHz



MASK: C , 15K9F1D, 20W

SPECTRUM FOR EMISSION **15K9F1D**
OUTPUT POWER: 20 Watts
9600 bauds, 4 level FSK
PEAK DEVIATION = 4700 Hz
SPAN = 200 kHz



MASK: C , 15K9F1D, 1W Exciter output

SPECTRUM FOR EMISSION **15K9F1D**
OUTPUT POWER: 1 Watts
9600 bauds, 4 level FSK
PEAK DEVIATION = 4700 Hz
SPAN = 200 kHz