Engineering Exhibit in Support of
Class II Permissive Change Request
FCC Form 731

for the

Mobile Data Platform Transceiver (UHF (403 MHz-512MHz) MDP)

With the

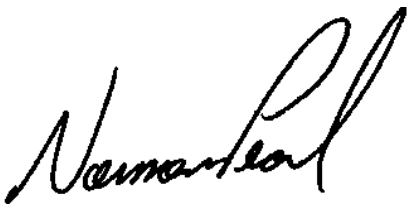
Data Radio Gemini Modem

FCC ID: EOTGPDA
Trade Name: GEMINI/PD

October 27, 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 has been prepared in support of a request for a Class II Permissive Change for EOTGPDA.

The certification EOTGPDA has been granted to Dataradio Inc for its Gemini/PD radio modem. Gemini/PD is comprised of the Dataradio COR Ltd. (DRL) Mobile Data Platform (MDP) UHF (403 MHz-512MHz) Transceiver with the Dataradio Inc Gemini Modem. Dataradio Inc does the final assembly and markets the Gemini/PD unit. The original certificate has been granted for a 2-level FSK type of modulation scheme (DGMSK) with 8K60, 15K0 and 15K3 F1D emission designators. The change consists of adding a new modulation scheme, 4-level FSK with two new emission designators 15K6 and 16K0 F1D. This change involves the firmware only, with no change whatsoever occurring in the hardware.

EXISTING CONDITIONS

The unit utilized for these occupied bandwidth and mask-compliance measurements was a prototype built from production EOTGPDA with beta-level firmware used to create the modulation scheme. The transceiver operates on frequencies ranging from 403.000 MHz to 512.000 MHz. The frequency tolerance of the transceiver is .00015% or 1.5 parts per million as granted in EOTGPDA.

PROPOSED CONDITIONS

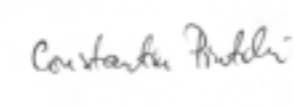
It is proposed to accept the request for the GEMINI/PD, 403-512 MHz Transceiver/Modem/GPS for operation in the band of frequencies previously outlined. The applicant anticipates marketing the device for use in wireless transmission of data.

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. Equipment performance 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 performance measurements were made between Aug 2, 2000 and Aug 11,2000.

CONCLUSION

Given the results of the measurements contained herein, the applicant requests to be applied a Class II Permissive Change for the Certificate EOTGPD to add the two new emission designators 15K6F1D and 16K0F1D to the existent list.



10/26/00

Constantin Pintilei
R&D Test Engineer, Dataradio Inc.

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ANNEXES:

Annex A: Instruction Manual

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.

CLASS II PERMISSIVE CHANGE INFORMATION REQUESTED BY GRANTEE - Rule part 2.1043 (b)(2)

The certification EOTGPDA has been granted to Dataradio Inc for its Gemini/PD radio modem. Gemini/PD is comprised of the Dataradio COR Ltd. (DRL) Mobile Data Platform (MDP) UHF (403 MHz-512MHz) Transceiver with the Dataradio Inc Gemini Modem. Dataradio Inc does the final assembly and markets the Gemini/PD unit. The original certificate has been granted for a 2-level FSK type of modulation scheme (DGMSK) with 8K60, 15K0 and 15K3 F1D emission designators.

The change consists of the addition of a new modulation scheme, 4-level FSK with two new emission designators 15K6 and 16K0 F1D. This modulation permits signaling at a reduced baud rate with improved signal-to -noise (data sensitivity) performance. Only the operating firmware is being changed to produce both 2-level and 4 level FSK modulator signal. There are no hardware changes involved in either the radio or the modem/controller circuits. Also there are no changes in those modules of the firmware that control the transceiver. Therefore a Class II Permissive Change request has been considered.

The characteristics affected 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(g)
They are entirely documented with the current report.

Because this change is implemented in the operating firmware only, there are no change whatsoever occurring in schematics, part list, mechanical assembly, shape, label or any other hardware related issues. A preliminary version of the manual that contains service-related information for 4 level FSK modulation is provided as appendix of the report.

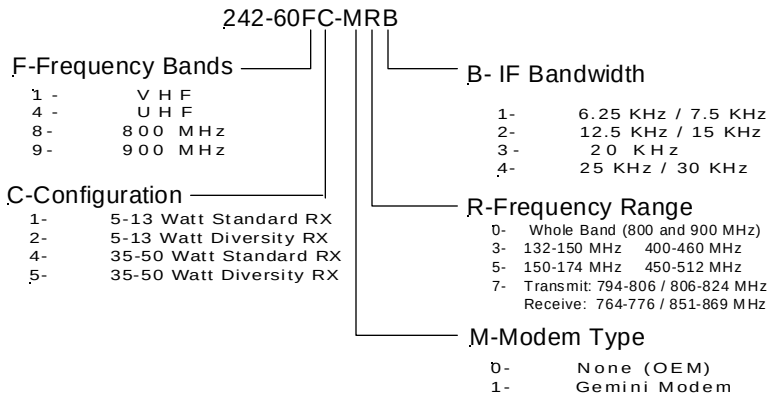
GENERAL INFORMATION ABOUT THE GRANTEE AND CERTIFICATED EQUIPMENT -2.1043 (b)(2)
(as perRule Part Number: 2.1033 (c).(1),(2),(5),(6),(7))

APPLICANT/GRANTEE	Dataradio Inc., 5500 Royalmount Ave, suite 200, Town of Mount Royal, Quebec, Canada, H4P 1H7
MANUFACTURER:	Dataradio COR Ltd., Waseca, MN 56093 (MDP Transceiver) DATARADIO Inc., Town of Mount Royal, Quebec, Canada, H4P 1H7 (Gemini- final assembly)
MODEL NUMBER:	GEMINI/PD
PART NUMBER:	GPDD-6045-xyz
SERIAL NUMBER (S):	AAA-prototype 4-level FSK Gemini modem 6045- 10051 - 154 production MDP transceiver
FCC ID NUMBER:	EOTGPDA
FCC RULES AND REGS:	FCC Part (s) 90
FREQUENCY RANGE:	403.000 MHz - 512.000 MHz (406-406.1 MHz software blocked)
MAXIMUM POWER RATING:	50.00 Watts (10-50 watts variable).
NUMBER OF CHANNELS:	16 Channel Modem
INPUT IMPEDANCE:	50 ohms, Nominal
VOLTAGE REQUIREMENTS:	10.9-16.3VDC (13.6 VDC Nominal)

EQUIPMENT IDENTIFICATION:

TRADE NAME	**DESCRIPTION**	**DRI PART NUMBER**
MDP6000	403-520 XCVR	242-604C-MRB
Gemini	Modem	050-03322-00x

DRL Part Number System for MDP:



DATA AND CHARACTHERISTICS NOT AFFECTED BY THE CHANGE - Rule Part Number: 2.1033 (c).(8),(9),(10),(11),(12) ,(15),(16)

DC Voltages And Currents Into Final Amplifier	2.1033(C).(8)
Transmitter Tune Up Procedure	2.1033 C (9)
Description Of Circuitry	2.1033 (C)(10)
Schematics	2.1033 (C)(10)
Transistor, Diode, And IC Functions	2.1033 C (10)
FCC Label	2.1033 C (11)
Photographs	2.1033 C (12)
Data addressing Rule Part Number	2.1033(c) 15, 16: this unit is not designed for the mentioned purposes
Spectrum efficiency standard	90.203 (j) (26.600 bps /25kHz)>(4*4800 bps/4*6.25kHz)
Test results not affected by the change	2.1033C 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 follow:

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)(13)(14)

INSTRUCTION BOOK 2.1033 (c) (3)
Annex A . The attached Installation Guide for the GEMINI/PD Transceiver/Modem/GPS is a preliminary version.

TYPE OF EMISSION: 2.1033(c)(4)

For Class II Permissive Change 4levelFSK 25kHz BW (12800baud, 4 FSK) **15K6F1D**
25kHz BW (9600baud, 4 FSK) **16K0F1D**

Previously granted for EOTGPDA 12.5KHz BW (9600bps) **8K60F1D**
25KHz BW (16.0Kbps) **15K3F1D**
25KHz BW (19.2Kbps) **15K0F1D**

DIGITAL MODULATION TECHNIQUES 2.1033(c).(13)

The Gemini/PD modem generates 2 level Differential Gaussian Frequency Shift Keying (DGFSK) and 4 level Squared Root Raised Cosine Frequency Shift Keying. (SRRC 4FSK). 2-level DGFSK has been granted with the certificate EOTGPDA. This measurement concerns only 4-level SRRC (squared root raised cosine) modulation, its description follows.

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.

This 4-level signaling transmits two information bits per symbol (baud) which yields a bit rate of twice the on-air baud rate, hence the 25.6 kbps references in the Installation Guide correspond to a transmitter baud rate of 12800 baud. That digital signal is digitally filtered (Squared Root Raised Cosine pulse shaping with $\forall$=0.4) by the DSP then fed to the CODEC for digital to analogue conversion. This SRRC4FSK wave shape applied to the FM modulator will then produce a compact RF spectrum, when using proper frequency deviation, to fit inside the restrictive masks inherent to the intended channel bandwidth.

The transmitter deviation level and digital filter cutoff frequency (which is based on the raised cosine filter equation) are set according to the bit rate selected and channel bandwidth as follows:

Bit rate	Baud rate	Square Root Raised Cosine filter's 3dB cut-off frequency	Deviation
25600 b/s	12800bauds	6.4 kHz	± 4.5 kHz
19200 b/s	9600bauds	4.8 KHz	± 5.0 kHz

TEST DATA **2.1033 (c)(14)**
Next section.

TEST DATA Section 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.

The following reports have been generated for Class II Permissive Change request for EOTGPDA ,Gemini/PD radio modem. Gemini/PD is comprised of the Dataradio COR Ltd. (DRL) Mobile Data Platform (MDP) UHF (403-512 MHz) Transceiver with the Dataradio Inc Gemini Modem. Dataradio Inc does the final assembly and markets the Gemini/PD unit

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 radiomodem uses digital modulation signals, passing through a Squared Root Raised Cosine ∀=0.4 DSP implemented low-pass filter to an FM transceiver. 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	± 4.5 KHz	15540 Hz	15K6
9600 bauds	± 5.0 KHz	15960 Hz	16K0

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, 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 $N \cong 500$, 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.

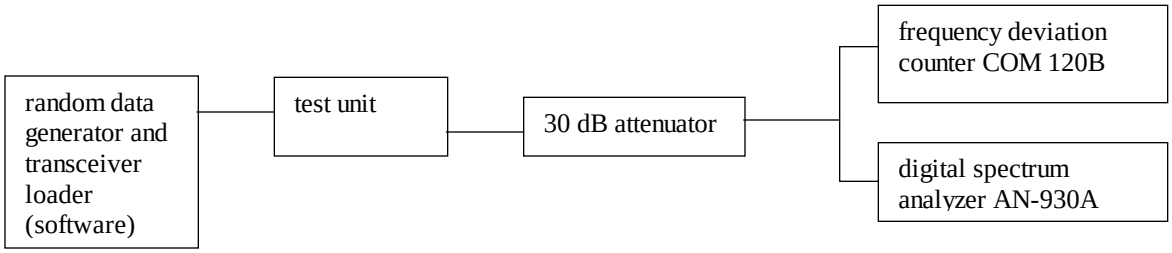
Standard calculation precision is all that is required. The main error factor being the y display resolution is covering calculation precision.

The absolute error for this measurement is -0/+2*)f. 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:
-the 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 every device 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
GEMINI Modem at 12800bauds 4FSK

Mask compliance data in support of Emission Designator **15K6F1D**

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)]

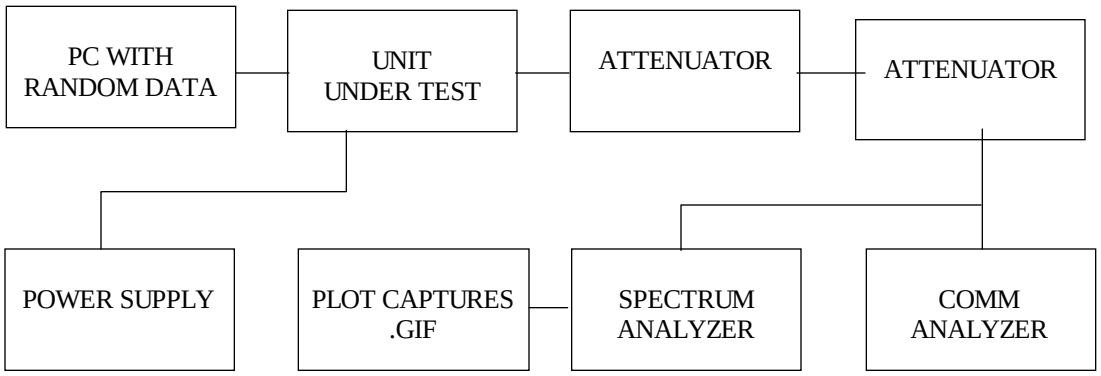
Fo to 5.0 kHz	Attenuation = 0 dB
>5.0 kHz to 10.0 kHz	Attenuation= $83*\log(f_d /5)$ dB
>10.0 kHz to 250% Auth BW	Attenuation = Lesser of: $29*\log(f_d^2 /11)$ dB or 50dB
>250% Auth BW	$43 + 10*\log(P)$ dB
Corner Points:	
Fo to 5.0 kHz	Attenuation = 0 dB
>5.0 kHz to 10.0 kHz	Attenuation= 0 dB to 25 dB
>10.0 kHz to 20 kHz	Attenuation = 27.8 dB to 45.2 dB
>20 kHz to 24 kHz	Attenuation =45.2 dB to 50 dB
>24 kHz to 50kHz	Attenuation =50dB
>250% Authorized BW	Attenuation = 60 dB (50 W), 53 dB (10 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 / 30dB / 5 Watt
DC Power Source, Model Astron VS 20M
Communication Analyzer, Model IFR COM120B (deviation meter)
Spectrum Analyzer, Model HP E4401

PERFORMED BY: Constantin Pintilei DATE: 10/26/00

TEST SET-UP:



NAME OF TEST: Transmitter Occupied Bandwidth (Continued)

GEMINI Modem at 12800 bauds, 4FSK
In Support of Emission Designator **15K6F1D**

MODULATION SOURCE DESCRIPTION:

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 (55 sec). This pattern is applied to the DSP processor data input for encoding and pulse shaping as described above.

This data follows same modulation process as described in Digital Modulation Techniques (page 9) and the resulting base band signal feeds the modulator's input of the transceiver.

For 12800 baud rate the deviation is set to 4.5kHz.

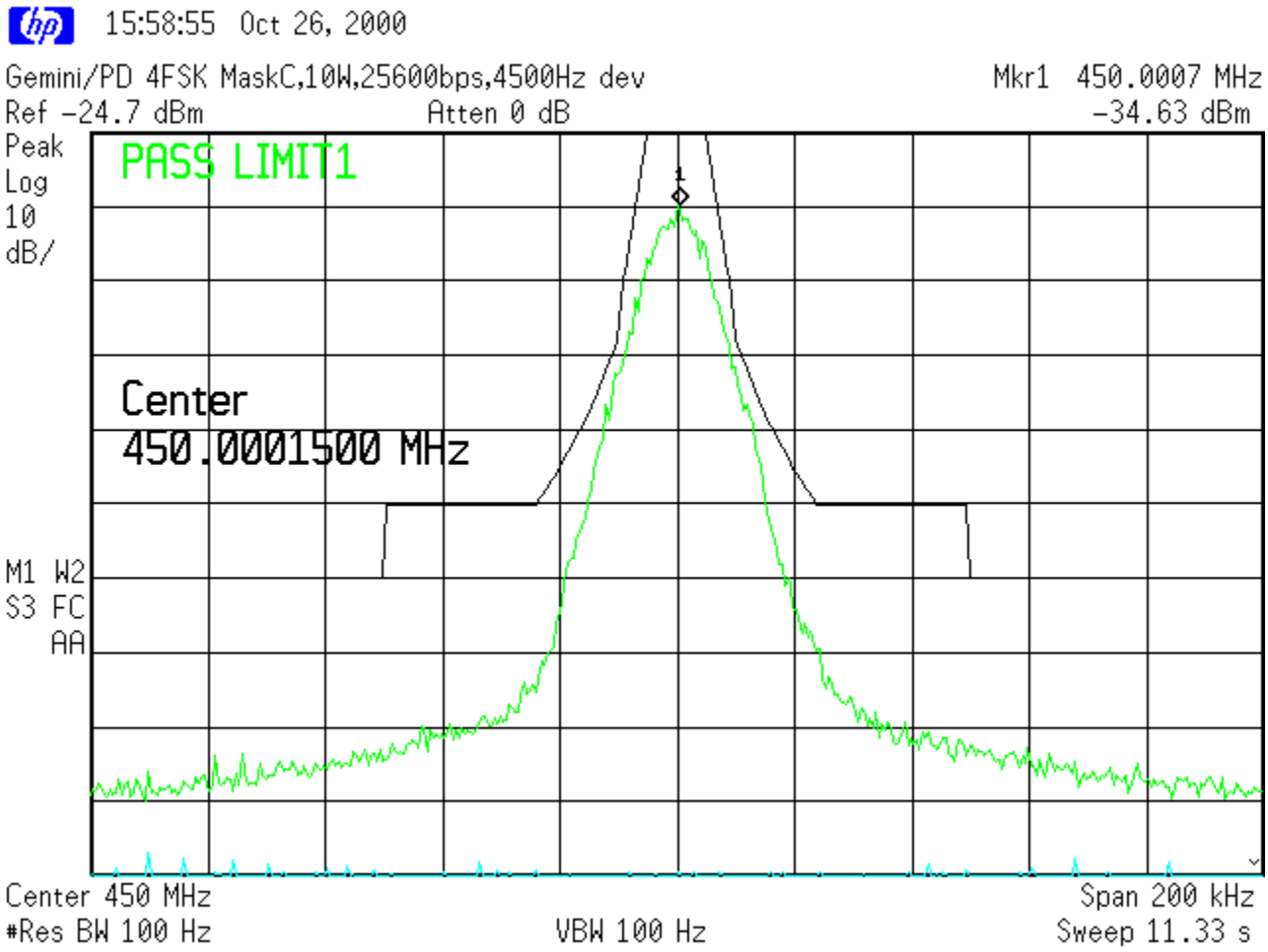
NECESSARY BANDWIDTH (Bn) CALCULATION

See Page 11 for emission designator determination.

The corresponding emission designator prefix for necessary bandwidth = **15K6F1D**
TEST DATA: Refer to the following graphs:

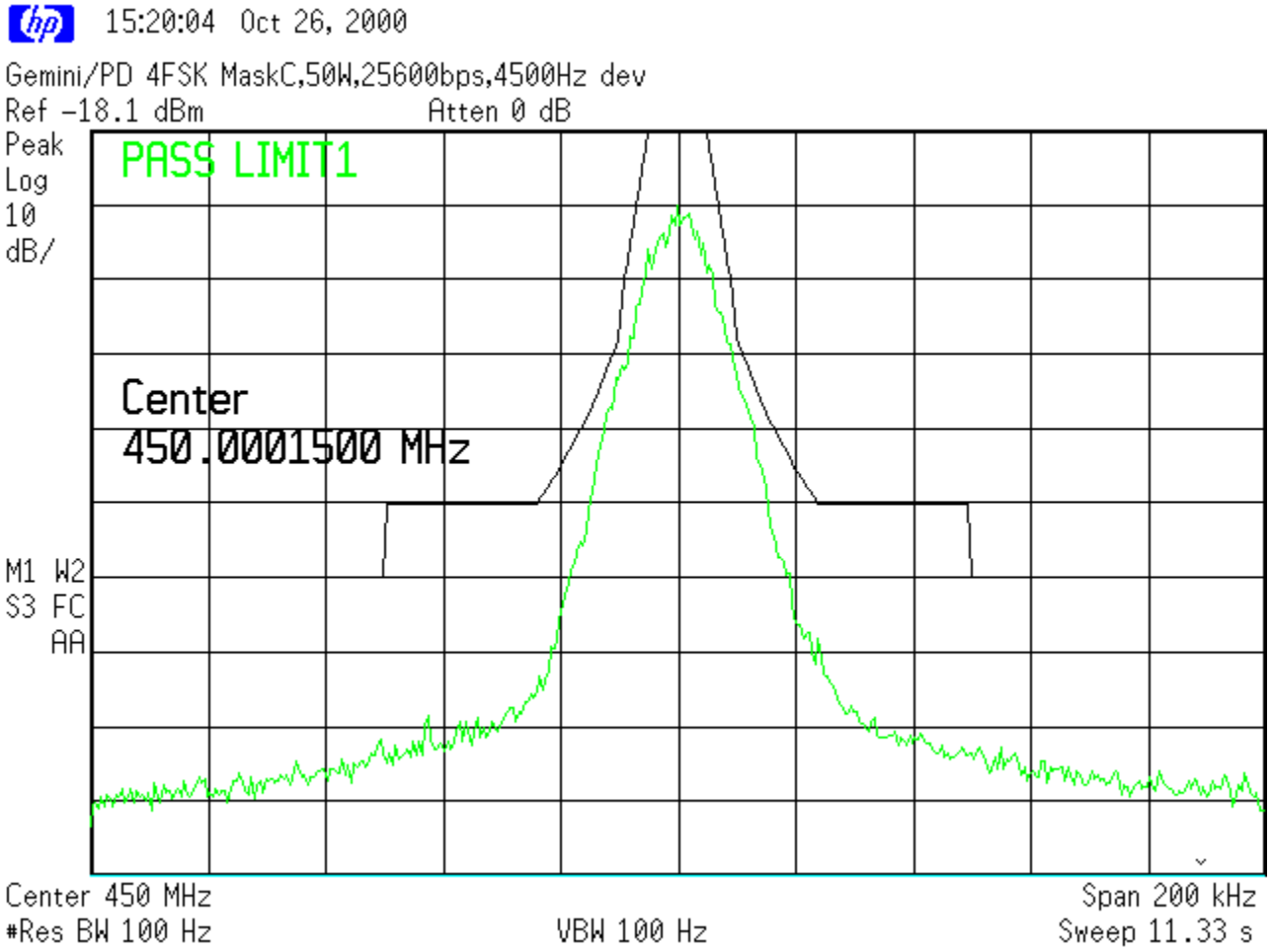
MASK: C , 15K6F1D, 10W

SPECTRUM FOR EMISSION **15K6F1D**
OUTPUT POWER: 10 Watts
12800 bauds 4 level FSK
PEAK DEVIATION = 4500 Hz
SPAN = 200 kHz



MASK: C, 15K6F1D, 50W

SPECTRUM FOR EMISSION **15K6F1D**
OUTPUT POWER: 50 Watts
12800 bauds 4 level FSK
PEAK DEVIATION = 4500 Hz
SPAN = 200 kHz



NAME OF TEST: Transmitter Occupied Bandwidth
GEMINI Modem at 9600bauds 4FSK

Mask compliance data in support of Emission Designator **16K0F1D**

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

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= $83*\log(f_d/5)$ dB
>10.0 kHz to 250% Auth BW	Attenuation = Lesser of: $29*\log(f_d^2/11)$ dB or 50dB
>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 20 kHz	Attenuation = 27.8 dB to 45.2 dB
>20 kHz to 24 kHz	Attenuation =45.2 dB to 50 dB
>24 kHz to 50kHz	Attenuation =50dB
>250% Authorized BW	Attenuation = 60 dB (50 W), 53 dB (10 W)

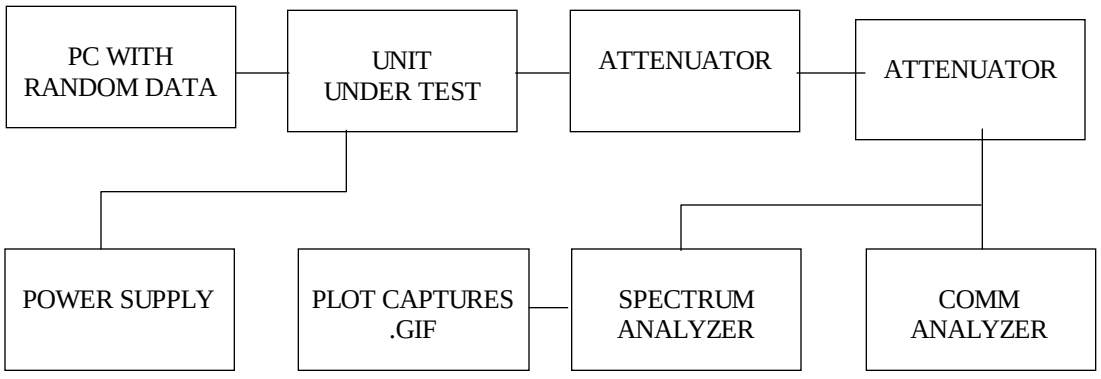
TEST RESULTS: Meets minimum standard (see data on the following pages)

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-30 / 30dB / 5 Watt
DC Power Source, Model Astron VS 20M
Communication Analyzer, Model IFR COM120B (deviation meter)
Spectrum Analyzer, Model HP E4401

PERFORMED BY: Constantin Pintilei DATE: 10/26/00

TEST SET-UP:



NAME OF TEST: Transmitter Occupied Bandwidth (Continued)
GEMINI Modem at 9600 bauds 4FSK
In Support of Emission Designator **16K0F1D**

MODULATION SOURCE DESCRIPTION:

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 (55 sec). This pattern is applied to the DSP processor data input for encoding and pulse shaping as described above.

This data follows same modulation process as described in Digital Modulation Techniques (page 9) and the resulting base band signal feed the modulator's input of the transceiver.

For 9600 baud rate the deviation is set to 5kHz.

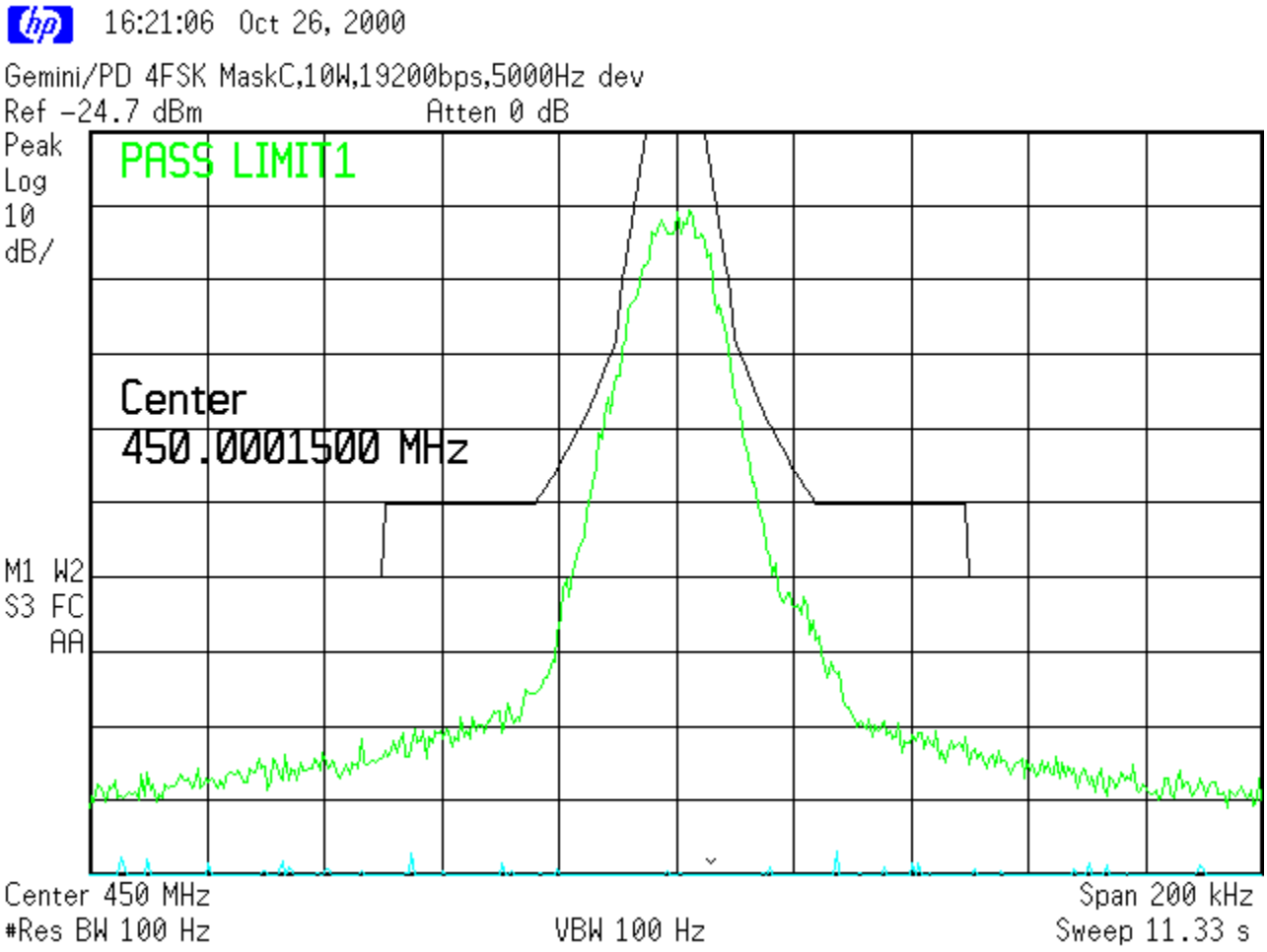
NECESSARY BANDWIDTH (Bn) CALCULATION

See Page 11 for emission designator determination.

The corresponding emission designator prefix for necessary bandwidth = **16K0F1D**
TEST DATA: Refer to the following graphs:

MASK: C, 16K0F1D, 10W

SPECTRUM FOR EMISSION **16K0F1D**
OUTPUT POWER: 10 Watts
9600 bauds, 4 level FSK
PEAK DEVIATION = 5000 Hz
SPAN = 200 kHz



MASK: C , 16K0F1D, 50W

SPECTRUM FOR EMISSION **16K0F1D**
OUTPUT POWER: 50 Watts
9600 bauds, 4 level FSK
PEAK DEVIATION = 5000 Hz
SPAN = 200 kHz