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

for the

T881 Exciter module of Tait's T88x 900 MHz base station

modulated with

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

FCC ID: EOTBDD4T881-3
Trade Name: Paragon/PD

August 20, 2002

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.

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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 EOTBDD4T881-3. All changes involved fall under Class II Permissive Change types and they are entirely detailed within the current report.

The certificate EOTBDD4T881-3 has been granted to Dataradio Inc. following a change in ID request from CASTEL0045 for the T881-30 Exciter module of the T88M-XY (see page 6 for part# description) 900 MHz base station manufactured by Tait Electronics Ltd. Dataradio Inc. buys this base station and uses it to build Paragon/PD, a wireless data base station. A base station data link controller feeds the exciter in order to build a digital frequency modulation scheme. Dataradio Inc does the final assembly and markets the finished Paragon/PD unit. The certificate EOTBDD4T881-3 was granted on 08/30/2001 for the following list of emission designators: 9K50F1D and 11K0F3E.

One Class II Permissive type of change is demonstrated with this filing. The change consists of the usage of a broader range of digital FM modulations which require five new emission designators: 10K9, 9K75, 9K58, 10K8 and 10K0F1D. The deviation setting parameter changes along with the baud rate and the pulse-shaping equations in order to achieve the compliance with mask J. 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 transmitter.

EXISTING CONDITIONS

The unit utilized for these occupied bandwidth and mask-compliance measurements was a production sample built from EOTBDD4T881-3 with its firmware used to create the modulation scheme. The deviation parameter was set less such that the frequency spectrum fitted within the requirements of Mask J. The Exciter operates on frequencies ranging from 890.000 MHz to 960.000 MHz. The frequency tolerance of the exciter is .00015% or 1.5 parts per million and the output power is 5W variable down to 1W as granted in EOTBDD4T881-3.

PROPOSED CONDITIONS

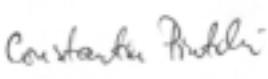
It is proposed to accept the Class II permissive change request for the EOTBDD4T881-3 certificate for operation in the band of frequencies previously outlined. The applicant anticipates marketing the device for use in wireless transmission of data.

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 Mar 14, 2002 and Mar 15,2002.

CONCLUSION

Given the results of the measurements contained herein, the applicant requests to be applied a Class II Permissive Change for the Certificate EOTBDD4T881-3 to add the five new emission designators : 10K9, 9K75, 9K58, 10K8 and 10K0F1D to the existing list .



08/16/02

Constantin Pintilei
R&D Test Engineer, Dataradio Inc.

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ANNEXES:

Annex A: Paragon /PD Instruction Manual version 3.01 preliminary

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 25 Years experience in radio communications

NAME:	**Constantin Pintilei**
TITLE:	R&D Test Engineer
TECHNICAL EDUCATION:	Bachelor of Science Degree in Electronic Engineering specialization Radiotechnique (1993) Technical University of Iasi, Romania
TECHNICAL EXPERIENCE:	Professional Engineer since 2001 8 Years experience in radio frequency measurements.

NAME:	**Sébastien Lafrance**
TITLE:	R&D Technician
TECHNICAL EDUCATION:	College Diploma in Electronics (1996) from Technical College Lionel-Groulx of Ste-Thérèse, Quebec, Canada
TECHNICAL EXPERIENCE:	3 years experience in RF measurements, part of R&D Validation team of Dataradio Inc

Class II Permissive Change Information - Rule part 2.1043 (b)(2)

The certificate EOTBDD4T881 has been granted to Dataradio Inc. following an ID change request from CASTEL0045. The original CASTEL0045 was granted to Tait Electronics Ltd. for its T881-30 Exciter module. It belongs to the T88M-XY (check at the page bottom for part# description) 900 MHz base station. Dataradio Inc. buys this base station and uses it to build Paragon/PD, a base station for wireless data networks. In order to market it under Dataradio logo the change in ID has been asked.

The emission designator list of the certificate has two values, 11K0F3E and 9K50F1D, inherited from the original certificate CASTEL0045 when the change in ID to EOTBDD4T881-3 was granted on 07/23/2001

The current Class II permissive change request asks that following digital modulation schemes comprised of data rates, pulse shaping and deviation index

data rate	Symbol rate	Pulse- shaping filter equation	Deviation	Occupied Bandwidth	Emission designator
8000 bps	8000 bauds	DGMSK BT 0.5, 2FSK	± 2.8 KHz	10080Hz	10K0F1D
9600bps	9600 bauds	DGMSK BT 0.3, 2FSK	± 3.3 KHz	10750Hz	10K8F1D
14400 bps	7200 bauds	SRRC4FSK =0.4, 4FSK	± 3.2 KHz	10830Hz	10K9F1D
16000 bps	8000 bauds	SRRC4FSK =0.4, 4FSK	± 2.8 KHz	9750Hz	9K75F1D
19200 bps	9600 bauds	RC4FSK =0.4, 4FSK	± 2.6 KHz	9583Hz	9K58F1D

are allowed for use in 890-960MHz band. The resulting emission designators may exceed or overlap the existent one (9K50F1D). The compliance is demonstrated for mask 90.210(J) for all the new modulation schemes proposed.

All modulator source signal-related issues as per 2.1033 (c) (4) are explained below on page 9. This Class II permissive change involves the code of the DSP-driven modulation source only, with no change occurring elsewhere in the circuitry.

The characteristics affected are:

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(h)

They are entirely documented with the current report.

Part Number of the Tait 800 MHz base station T88M-XY

M	Module Type	X	Freq Range	Y	Channel Bandwidth
1	Exciter (5W)	1	800-880 MHz	0	25 kHz
5	Receiver	2	850-910 MHz	5	12.5 kHz
9	Power Amplifier	3	890-960 MHz		

Part Number of the Paragon/PD 800 MHz data base station BDD4 -88XY PPPS

X	Freq Range	Y	Channel Bandwidth	PPP	Transmitted Power	S	Supply
1	800-880 MHz	0	25 KHz	005	5W	0	12VDC external
2	850-910 MHz	5	12.5 KHz	070	70W	2	dual 120V AC
3	890-960 MHz						

General Information About The Grantee And Certificated Equipment -2.1043 (B)(2)
(as per Rule Part Number: 2.1033 (c).(1),(2),(5),(6),(7)

APPLICANT and GRANTEE	Dataradio Inc., 5500 Royalmount Ave, suite 200, Town of Mount Royal, Quebec, Canada, H4P 1H7
MANUFACTURER:	Tait Electronics Ltd., Burnside Christchurch 5, New Zealand (T88x 900 MHz Base station) DATARADIO Inc., Town of Mount Royal, Quebec, Canada, H4P 1H7 (D212 BDLC and Paragon/PD- final assembly)
MODEL NUMBER:	Paragon/PD
PART NUMBER:	BDD4-88XY PPPS
SERIAL NUMBER (S):	D212 address 1.0 - 4-level FSK BDLC T881-15-0200 s.n 13007133 Exciter module
FCC ID NUMBER:	EOTBDD4T881-3
FCC RULES AND REGS:	FCC Part (s) 90.210
FREQUENCY RANGE:	890 MHz -960 MHz as per EOTBDD4T881-3 certificate
MAXIMUM POWER RATING:	5Watts as per EOTBDD4T881-3 certificate. The output power is adjustable down to 1W.
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
T88x-30	900 MHz Base Station	T88M-XY
D212	Base Data Link Controller (BDLC)	050-03330-00x
Paragon/PD	Assembly	BDD4-88XY PPPS

Data And Characteristics Not Affected By The Change-Rule Part Number: 2.1033 (c)(8),(9),(10),(11),(12),(13),(15),(16)

DC Voltages And Currents Into Final Amplifier (T881)	2.1033(c).(8)
Transmitter Tune Up Procedure	2.1033 (c) (9)
Description Of Circuitry,Schematics and Transistor, Diode, and IC Functions	2.1033 (C)(10)
FCC Label	2.1033 (c) (11)
Internal/External Photographs	2.1033 (c) (12)
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 Characteristics Affected By The Change - Rule Part Number: 2.1033(c) (3),(4),(13),(14)

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

TYPE OF EMISSION: 2.1033(c)(4)

For Class II Permissive Change	data (8000baud, 2FSK)	**10K1F1D**
	(9600baud, 2 FSK)	**10K8F1D**
	(7200baud, 4 FSK)	**10K9F1D**
	(8000baud, 4 FSK)	**9K75F1D**
	(9600baud, 4 FSK)	**9K58F1D**
Previously granted for EOTBDD4T881-3	voice	**11K0F3E**
	data (9600 baud)	**9K50F1D**

DIGITAL MODULATION TECHNIQUES 2.1033 (C)(13)

The D212 Basestation Data Link Controller supports DBA (Dynamic Bandwidth Allocation), a Dataradio proprietary protocol. DBA is a 5:1 TDMA protocol optimized for public utilities and public safety markets. The data stream generated by the protocol controller is converted into digital binary or multi-level frequency shift keying modulating signal by a modem block built upon a CPU and a DSP processor. This digital modulation scheme is produced by the main CPU in conjunction with the DSP processor as follows:

The main CPU processes incoming binary data, applying Forward Error Correction (FEC), interleaving and scrambling, from it, generates an NRZ signal that is fed to the DSP processor for encoding and pulse shaping. The digital processing computes the binary differential and maps the binary stream into a symbol stream. The binary stream is processed either as stream of bits or stream of clusters of multiple-bits as required by binary or multiple level FSK modulation type. The number of levels of the digital symbol stream corresponds to the numbers of levels of NFSK modulation.

The digital symbol signal has further applied a pulse shaping filter through the DSP. The pulse-shaping filter is either in Gaussian or Raised Cosine family and the appropriate equation designs the filter characteristic together with the 3dB cutoff frequency. The equation trim factor, which for Gaussian family is the bandwidth-period product (“BT” factor) and for RC family is the cosine weight “ ”, is set according to the bit rate selected and channel bandwidth as presented in page 6.

The pulse-shaped signal has further applied a amplification constant which adjusts the transmitter deviation level and then is fed to the CODEC for digital to analog conversion. The resulting waveshape 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.

Modulation Characteristic Part 2.1047 (d), 90.209 (b), 90.210(j): Other types of equipment: this equipment is not provided with hardware audio low-pass filters, the filtering is entirely the result of DSP firmware. Hardware-wise, the digital input provided on the Pin 1 of SK200 “micro match to paging board connector” is used for the digital modulation. For the purpose of a digital input the 0-ohm resistor R291 which connects the Audio Low Pass filter to the input of the FM modulator must be removed

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(j)
are provided in next section of this Engineering Report

The following reports have been generated for Class II Permissive Change request for EOTBDD4T881-3 Exciter module. Paragon/PD is comprised of the Tait Electronics Ltd. T88x-30 900 MHz Base station with the Dataradio Inc D212 Base Data Link Controller (BDLC). Dataradio's base station data link controller feed the T881 Exciter with digital modulation and controls all the modulation parameters. Dataradio Inc does final assembly and markets the Paragon/PD unit

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

Bit rate	Symbol rate	Filter equation	Deviation	Occupied Bandwidth 1W	5W	Emission designator
8000 bps	8000 bauds	DGMSK BT 0.5	± 2.8 KHz	10000Hz	10080 Hz	10K0F1D
9600bps	9600 bauds	DGMSK BT 0.3	± 3.5 KHz	10580Hz	10750Hz	10K8F1D
14400 bps	7200 bauds	SRRC4FSK =0.4	± 3.2 KHz	10750Hz	10830Hz	10K9F1D
16000 bps	8000 bauds	SRRC4FSK =0.4	± 2.8 KHz	9750Hz	9583Hz	9K75F1D
19200 bps	9600 bauds	RC4FSK =0.4	± 2.5 KHz	9167Hz	9583Hz	9K58F1D

The measurement theory and set-up explanations follow.

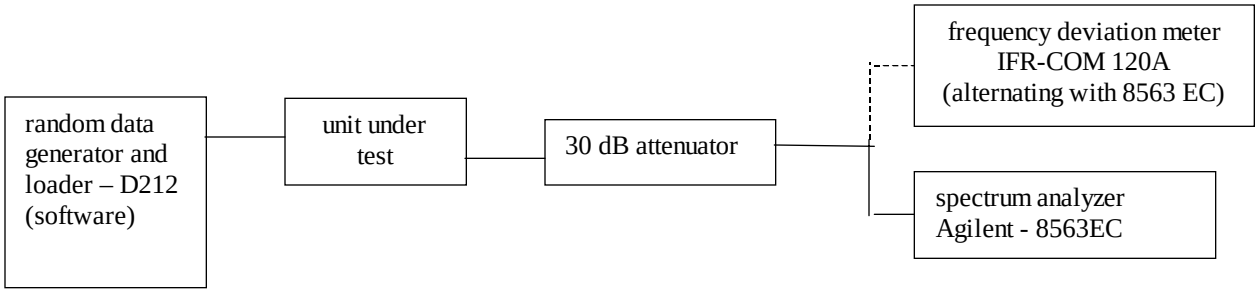
Occupied Bandwidth Measurement

The Occupied Bandwidth measurement option of the instrument (8563EC spectrum analyzer from Agilent) calculates and provides the values used above for the emission designator.

The percentage setting of the measurement has been set to 99% following the definition of the ***Occupied Bandwidth*** "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)

The measurement has been performed during the tests for compliance with mask J, the resulting value was recorded as Occupied Bandwidth. When the values at minimum power level (1W) were different from those at maximum power level (5W), the largest one yielded the emission designator value.

The measurement set-up is:



NAME OF TEST: Transmitter Occupied Bandwidth
Paragon PD at 14400 Bps 4FSK

Compliance of Emission Designator **10K9F1D**

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

MINIMUM STANDARD: Mask J
Sidebands and Spurious [Rule 90.210 (j)]
Authorized Bandwidth = 13.6 kHz [Rule 90.209(b) (5)]

Fo to 2.5 kHz	Attenuation = 0 dB
>2.5 kHz to 6.25 kHz	Attenuation= 53*log(f_d KHz /2.5) dB
>6.25 kHz to 9.5kHz	Attenuation = 103 log (f_d/3.9)dB
>9.5kHz	lesser of 50 + 10*log(P) or 157 log (f_d/5.3) or 70dB

Corner Points:

f_0 to 2.5 kHz	Attenuation = 0 dB
>2.5 kHz to 3.8 kHz	Attenuation= 0 dB to 10 dB
>3.8 kHz to 6.25 KHz	Attenuation = 10 dB to 21 dB
>6.25 kHz to 7.6 KHz	Attenuation = 21 dB to 30 dB
>7.6 kHz to 9.5 KHz	Attenuation = 30 dB to 40 dB
>9.5 kHz to 11.2 KHz	Attenuation = 40 dB to51 dB
>11.2 kHz to 12.3kHz	Attenuation = 51 dB to57 dB
>12.3kHz	Attenuation = minimum 57 dB (5W)

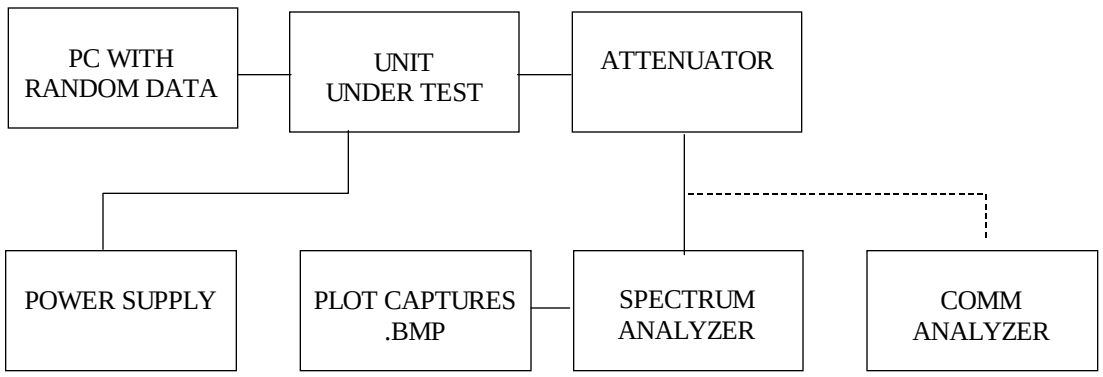
UNIT UNDER TEST s/n 13017540
TEST RESULTS: Meets minimum standard (see data on the following pages)
TEST CONDITIONS: Standard Test Conditions, 25 C
TEST EQUIPMENT: Attenuator, BIRD Model / 100-A-MFN-30 / 30 dB / 50 Watt
DC Power Supply , Astron Model VS-20M
IFR COM-120B
Spectrum Analyzer, Model HP8563E
HP power meter model#E4418B
HP Benchlink -software for plot captures.

PERFORMED BY:

Sébastien Lafrance

Sébastien Lafrance DATE:08/12/2002

TEST SET-UP:



NAME OF TEST: Transmitter Occupied Bandwidth (Continued)
Paragon PD at 14400 bps
In Support of Emission Designator **10K9F1D**

TX Data Test Pattern:

The random data generator function of the BDLC generates a 2047-long bit test sequence. This function is performed with a serial shift register and a exclusive OR two tap gate that implement the polynomial form $X^{10}+X^{8}+1$. The initial value of the register is 7FF.

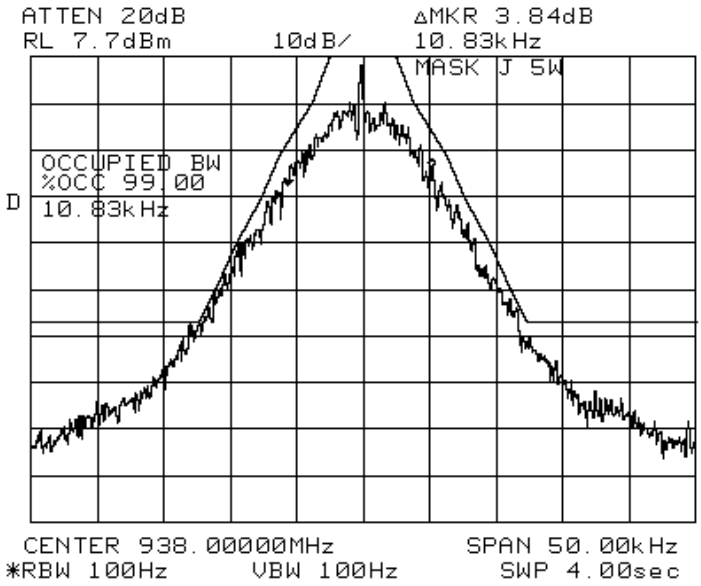
After this, the data follow the digital modulation process described in the Page 9 and the resulting base band signal feed the modulator's input of the Exciter.

For the deviation measurements on the modulation analyzer an IF filter of 30KHz has been used.

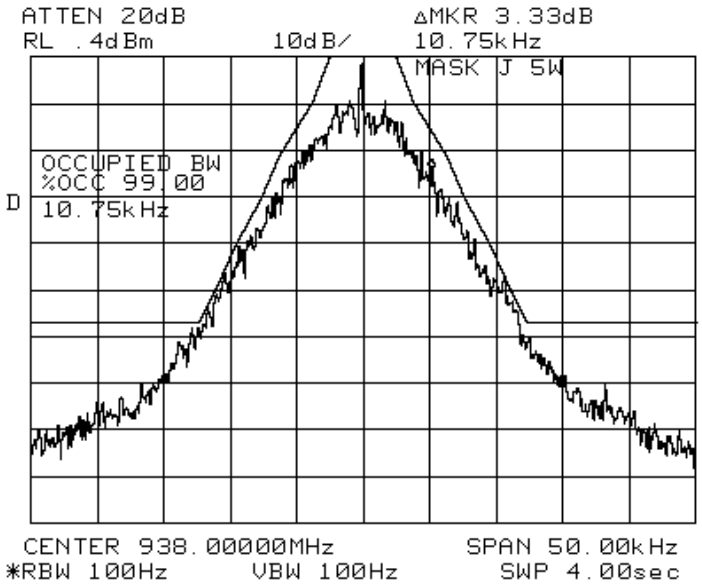
NECESSARY BANDWIDTH (Bn) measurement
See Page 11 for emission designator determination.

The corresponding emission designator prefix for necessary bandwidth = **10K9**
The corresponding deviation for 14400 Bps is 3250KHz
TEST DATA: Refer to the following graphs:

MASK: J , 10K9F1D, 5W
SPECTRUM FOR EMISSION **10K9F1D**
OUTPUT POWER: 5 Watts
14400 bps 4 FSK
PEAK DEVIATION = 3250 Hz
SPAN = 50 kHz



MASK: J, 10K9F1D, 1W
SPECTRUM FOR EMISSION **10K9F1D**
OUTPUT POWER: 1 Watts
14400 bps 4 FSK
PEAK DEVIATION = 3250 Hz
SPAN = 50 kHz



NAME OF TEST: Transmitter Occupied Bandwidth
GEMINI Modem at 16000Bps 4FSK

Compliance of Emission Designator **9K75F1D**

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

MINIMUM STANDARD: Mask J
Sidebands and Spurious [Rule 90.210 (j)]
Authorized Bandwidth = 13.6 kHz [Rule 90.209(b) (5)]

Fo to 2.5 kHz	Attenuation = 0 dB
>2.5 kHz to 6.25 kHz	Attenuation= 53*log(f_d KHz /2.5) dB
>6.25 kHz to 9.5kHz	Attenuation = 103 log (f_d/3.9)dB
>9.5kHz	lesser of 50 + 10*log(P) or 157 log (f_d/5.3) or 70dB

Corner Points:

f_0 to 2.5 kHz	Attenuation = 0 dB
>2.5 kHz to 3.8 kHz	Attenuation= 0 dB to 10 dB
>3.8 kHz to 6.25 KHz	Attenuation = 10 dB to 21 dB
>6.25 kHz to 7.6 KHz	Attenuation = 21 dB to 30 dB
>7.6 kHz to 9.5 KHz	Attenuation = 30 dB to 40 dB
>9.5 kHz to 11.2 KHz	Attenuation = 40 dB to51 dB
>11.2 kHz to 12.3kHz	Attenuation = 51 dB to57 dB
>12.3kHz	Attenuation = minimum 57 dB (5W)

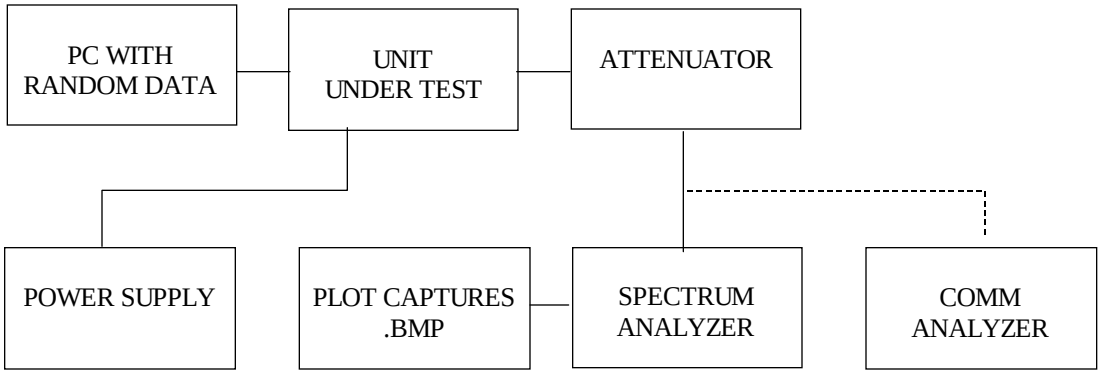
UNIT UNDER TEST s/n 13017540
TEST RESULTS: Meets minimum standard (see data on the following pages)
TEST CONDITIONS: Standard Test Conditions, 25 C
TEST EQUIPMENT: Attenuator, BIRD Model / 100-A-MFN-30 / 30 dB / 50 Watt
DC Power Supply , Astron Model VS-20M
IFR COM-120B
Spectrum Analyzer, Model HP8563E
HP power meter model#E4418B
HP Benchlink -software for plot captures.

PERFORMED BY:

Sébastien Lafrance

Sébastien Lafrance DATE:08/12/2002

TEST SET-UP:



NAME OF TEST: Transmitter Occupied Bandwidth (Continued)
GEMINI Modem at 16000 bps 4FSK
In Support of Emission Designator **9K75KF1D**

TX Data Test Pattern:

The random data generator function of the BDLC generates a 2047-long bit test sequence. This function is performed with a serial shift register and a exclusive OR two tap gate that implement the polynomial form $X^{10}+X^{8}+1$. The initial value of the register is 7FF.

After this, the data follow the digital modulation process described in the Page 9 and the resulting base band signal feed the modulator's input of the Exciter.

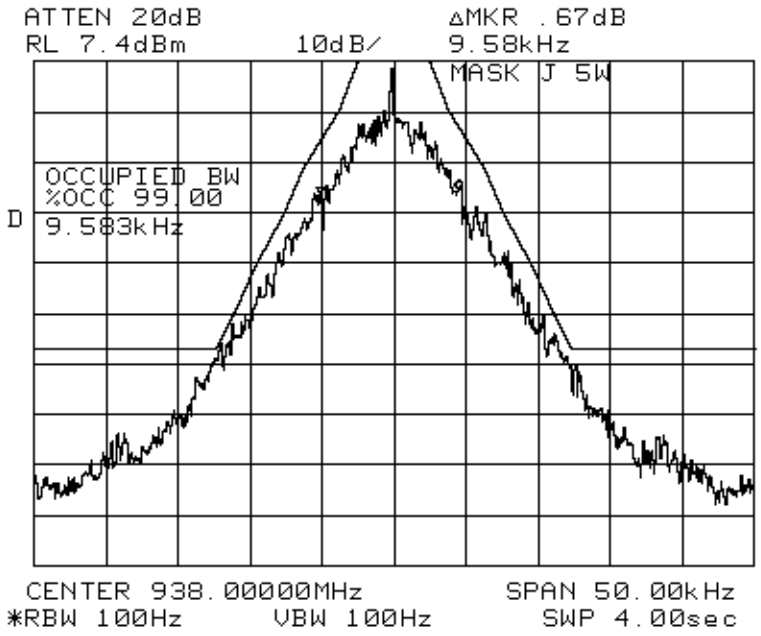
For the deviation measurements on the modulation analyzer an IF filter of 30KHz has been used.

NECESSARY BANDWIDTH (Bn) measurement

See Page 11 for emission designator determination.

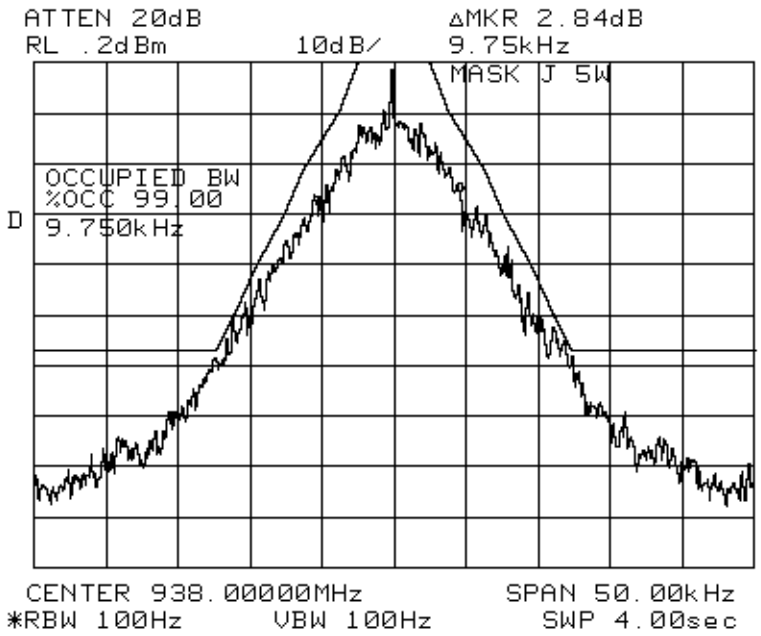
The corresponding emission designator prefix for necessary bandwidth = **9K75**
The corresponding deviation for 16000 bps is 2.77 KHz
TEST DATA: Refer to the following graphs:

MASK: J, 9K75F1D, 5W
SPECTRUM FOR EMISSION **9K75F1D**
OUTPUT POWER: 5 Watts
16000 bps SRRC4FSK
PEAK DEVIATION = 2770 Hz
SPAN = 50 kHz



MASK: J, 9K75F1D, 1W

SPECTRUM FOR EMISSION **9K75F1D**
OUTPUT POWER: 1 Watts
16000 bps SRRC4FSK
PEAK DEVIATION = 2770 Hz
SPAN = 50 kHz



NAME OF TEST: Transmitter Occupied Bandwidth
Paragon PD at 19200 bps 4FSK

Compliance of Emission Designator **9K58F1D**

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

MINIMUM STANDARD: Mask J
Sidebands and Spurious [Rule 90.210 (j)]
Authorized Bandwidth = 13.6 kHz [Rule 90.209(b) (5)]

Fo to 2.5 kHz	Attenuation = 0 dB
>2.5 kHz to 6.25 kHz	Attenuation= 53*log(f_d KHz /2.5) dB
>6.25 kHz to 9.5kHz	Attenuation = 103 log (f_d/3.9)dB
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Corner Points:

f_0 to 2.5 kHz	Attenuation = 0 dB
>2.5 kHz to 3.8 kHz	Attenuation= 0 dB to 10 dB
>3.8 kHz to 6.25 KHz	Attenuation = 10 dB to 21 dB
>6.25 kHz to 7.6 KHz	Attenuation = 21 dB to 30 dB
>7.6 kHz to 9.5 KHz	Attenuation = 30 dB to 40 dB
>9.5 kHz to 11.2 KHz	Attenuation = 40 dB to 51 dB
>11.2 kHz to 12.3kHz	Attenuation = 51 dB to 57 dB
>12.3kHz	Attenuation = minimum 57 dB (5W)

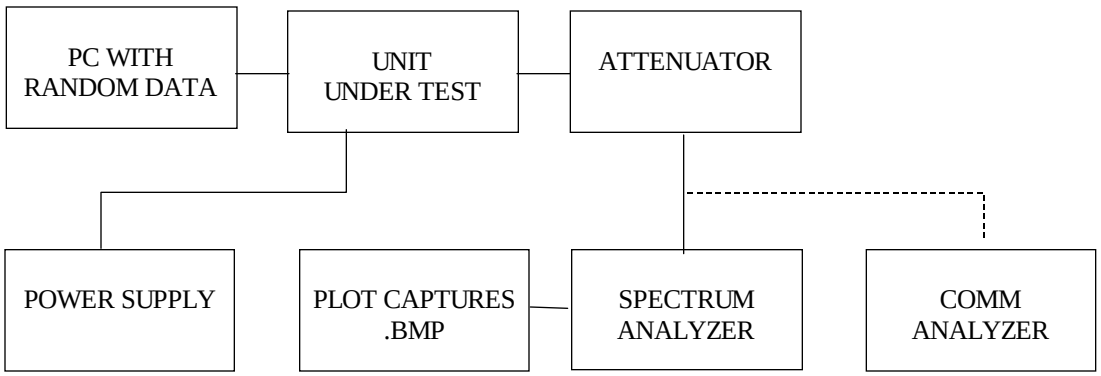
UNIT UNDER TEST s/n 13017540
TEST RESULTS: Meets minimum standard (see data on the following pages)
TEST CONDITIONS: Standard Test Conditions, 25 C
TEST EQUIPMENT: Attenuator, BIRD Model / 100-A-MFN-30 / 30 dB / 50 Watt
DC Power Supply , Astron Model VS-20M
IFR COM-120B
Spectrum Analyzer, Model HP8563E
HP power meter model#E4418B
HP Benchlink -software for plot captures.

PERFORMED BY:

Sébastien Lafrance

Sébastien Lafrance DATE:08/12/2002

TEST SET-UP:



NAME OF TEST: Transmitter Occupied Bandwidth (Continued)
Paragon PD at 19200 bps 4FSK
In Support of Emission Designator **9K58F1D**

TX Data Test Pattern:

The random data generator function of the BDLC generates a 2047-long bit test sequence. This function is performed with a serial shift register and a exclusive OR two tap gate that implement the polynomial form $X^{10}+X^{8}+1$. The initial value of the register is 7FF.

After this, the data follow the digital modulation process described in the Page 9 and the resulting base band signal feed the modulator's input of the Exciter.

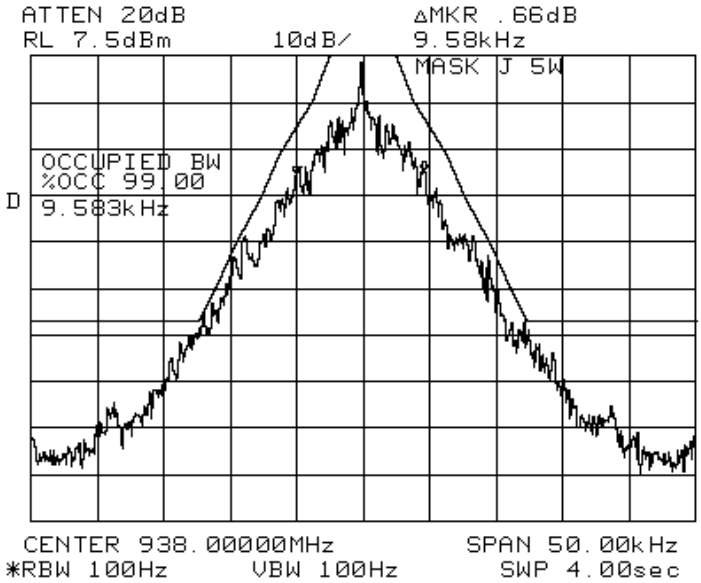
For the deviation measurements on the modulation analyzer an IF filter of 30KHz has been used.

NECESSARY BANDWIDTH (Bn) measurement

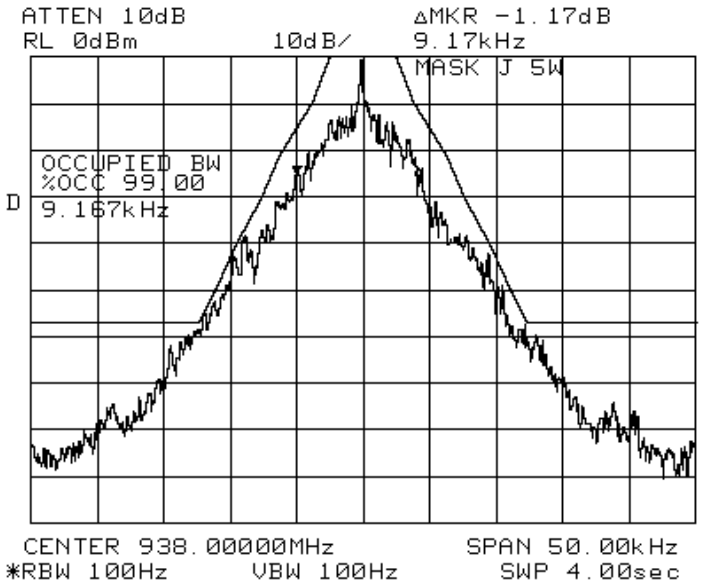
See Page 11 for emission designator determination.

The corresponding emission designator prefix for necessary bandwidth = **9K58**
The corresponding deviation for 19200 Bps is 2600 Hz
TEST DATA: Refer to the following graphs:

MASK: J , 9K58F1D, 5W
SPECTRUM FOR EMISSION **9K58F1D**
OUTPUT POWER: 5 Watts
19200 bps 4 FSK
PEAK DEVIATION = 2600 Hz
SPAN = 50 kHz



MASK: J, 9K58F1D, 1W
SPECTRUM FOR EMISSION **9K58F1D**
OUTPUT POWER: 1 Watts
19200 bps 4 FSK
PEAK DEVIATION = 2600 Hz
SPAN = 50 KHz



NAME OF TEST: Transmitter Occupied Bandwidth
Paragon PD at 9600 bps DGMSK

Compliance of Emission Designator **10K8F1D**

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

MINIMUM STANDARD: Mask J
Sidebands and Spurious [Rule 90.210 (j)]
Authorized Bandwidth = 13.6 kHz [Rule 90.209(b) (5)]

Fo to 2.5 kHz	Attenuation = 0 dB
>2.5 kHz to 6.25 kHz	Attenuation= 53*log(f_d KHz /2.5) dB
>6.25 kHz to 9.5kHz	Attenuation = 103 log (f_d/3.9)dB
>9.5kHz	lesser of 50 + 10*log(P) or 157 log (f_d/5.3) or 70dB

Corner Points:

f_0 to 2.5 kHz	Attenuation = 0 dB
>2.5 kHz to 3.8 kHz	Attenuation= 0 dB to 10 dB
>3.8 kHz to 6.25 KHz	Attenuation = 10 dB to 21 dB
>6.25 kHz to 7.6 KHz	Attenuation = 21 dB to 30 dB
>7.6 kHz to 9.5 KHz	Attenuation = 30 dB to 40 dB
>9.5 kHz to 11.2 KHz	Attenuation = 40 dB to 51 dB
>11.2 kHz to 12.3kHz	Attenuation = 51 dB to 57 dB
>12.3kHz	Attenuation = minimum 57 dB (5W)

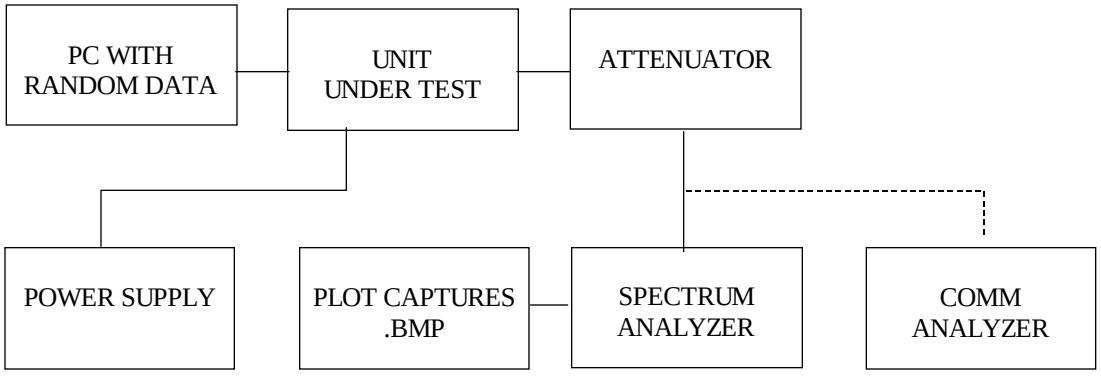
UNIT UNDER TEST s/n 13017540
TEST RESULTS: Meets minimum standard (see data on the following pages)
TEST CONDITIONS: Standard Test Conditions, 25 C
TEST EQUIPMENT: Attenuator, BIRD Model / 100-A-MFN-30 / 30 dB / 50 Watt
DC Power Supply , Astron Model VS-20M
IFR COM-120B
Spectrum Analyzer, Model HP8563E
HP power meter model#E4418B
HP Benchlink -software for plot captures.

PERFORMED BY:

Sébastien Lafrance

Sébastien Lafrance DATE:08/12/2002

TEST SET-UP:



NAME OF TEST: Transmitter Occupied Bandwidth (Continued)
Paragon PD at 9600 bps DGMSK
In Support of Emission Designator **10K8F1D**

TX Data Test Pattern:

The random data generator function of the BDLC generates a 2047-long bit test sequence. This function is performed with a serial shift register and a exclusive OR two tap gate that implement the polynomial form $X^{10}+X^{8}+1$. The initial value of the register is 7FF.

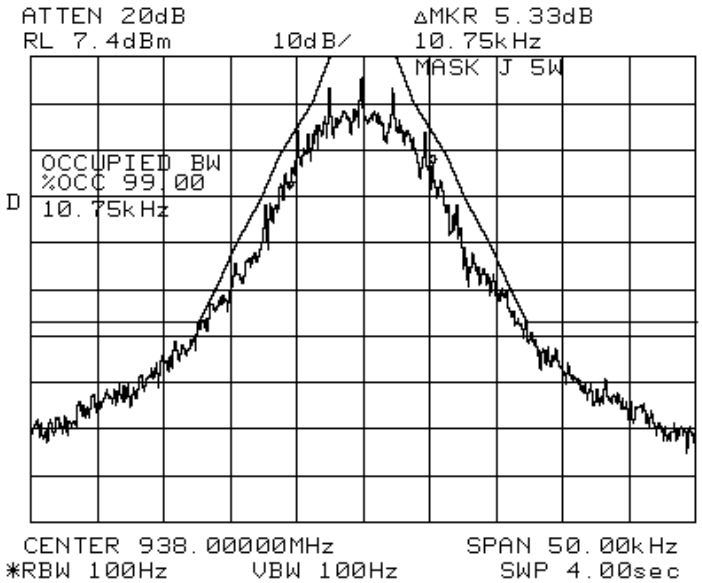
After this, the data follow the digital modulation process described in the Page 9 and the resulting base band signal feed the modulator's input of the Exciter.

For the deviation measurements on the modulation analyzer an IF filter of 30KHz has been used.

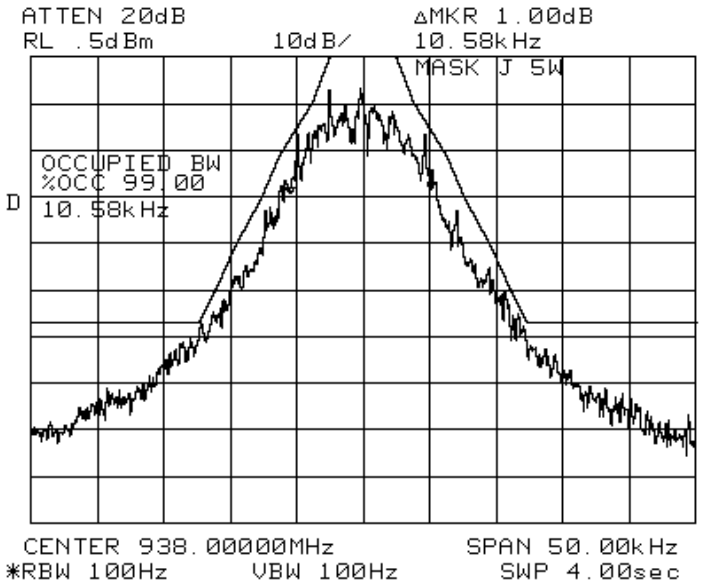
NECESSARY BANDWIDTH (Bn) measurement
See Page 11 for emission designator determination.

The corresponding emission designator prefix for necessary bandwidth = **10K8**
The corresponding deviation for 9600 Bps is 3.35 KHz
TEST DATA: Refer to the following graphs:

MASK: J , 10K8F1D, 5W
SPECTRUM FOR EMISSION **10K8F1D**
OUTPUT POWER: 5 Watts
9600 bps DGMSK
PEAK DEVIATION = 3350 Hz
SPAN = 50 kHz



MASK: J, 10K8F1D, 1W
SPECTRUM FOR EMISSION **10K8F1D**
OUTPUT POWER: 1 Watts
9600 bps DGMSK
PEAK DEVIATION = 3350 Hz
SPAN = 50 kHz



NAME OF TEST: Transmitter Occupied Bandwidth
GEMINI Modem at 8000Bps DGMSK

Compliance of Emission Designator **10K1F1D**

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

MINIMUM STANDARD: Mask J
Sidebands and Spurious [Rule 90.210 (j)]
Authorized Bandwidth = 13.6 kHz [Rule 90.209(b) (5)]

Fo to 2.5 kHz	Attenuation = 0 dB
>2.5 kHz to 6.25 kHz	Attenuation= 53*log(f_d KHz /2.5) dB
>6.25 kHz to 9.5kHz	Attenuation = 103 log (f_d/3.9)dB
>9.5kHz	lesser of 50 + 10*log(P) or 157 log (f_d/5.3) or 70dB
Corner Points:	
f_0 to 2.5 kHz	Attenuation = 0 dB
>2.5 kHz to 3.8 kHz	Attenuation= 0 dB to 10 dB
>3.8 kHz to 6.25 KHz	Attenuation = 10 dB to 21 dB
>6.25 kHz to 7.6 KHz	Attenuation = 21 dB to 30 dB
>7.6 kHz to 9.5 KHz	Attenuation = 30 dB to 40 dB
>9.5 kHz to 11.2 KHz	Attenuation = 40 dB to51 dB
>11.2 kHz to 12.3kHz	Attenuation = 51 dB to57 dB
>12.3kHz	Attenuation = minimum 57 dB (5W)

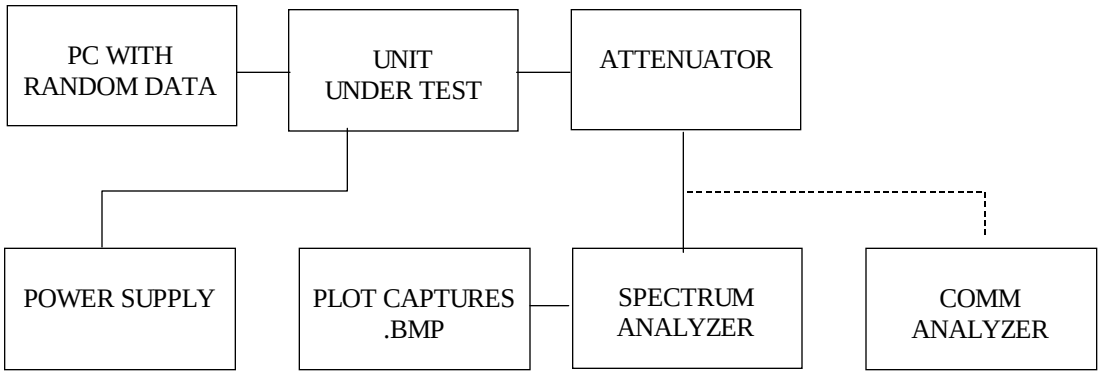
UNIT UNDER TEST s/n 13017540
TEST RESULTS: Meets minimum standard (see data on the following pages)
TEST CONDITIONS: Standard Test Conditions, 25 C
TEST EQUIPMENT: Attenuator, BIRD Model / 100-A-MFN-30 / 30 dB / 50 Watt
DC Power Supply , Astron Model VS-20M
IFR COM-120B
Spectrum Analyzer, Model HP8563E
HP power meter model#E4418B
HP Benchlink -software for plot captures.

PERFORMED BY:

Sébastien Lafrance

Sébastien Lafrance DATE:08/12/2002

TEST SET-UP:



NAME OF TEST: Transmitter Occupied Bandwidth (Continued)
GEMINI Modem at 8000 bps DGMSK
In Support of Emission Designator **10K1F1D**

TX Data Test Pattern:

The random data generator function of the BDLC generates a 2047-long bit test sequence. This function is performed with a serial shift register and a exclusive OR two tap gate that implement the polynomial form $X^{10}+X^{8}+1$. The initial value of the register is 7FF.

After this, the data follow the digital modulation process described in the Page 9 and the resulting base band signal feed the modulator's input of the Exciter.

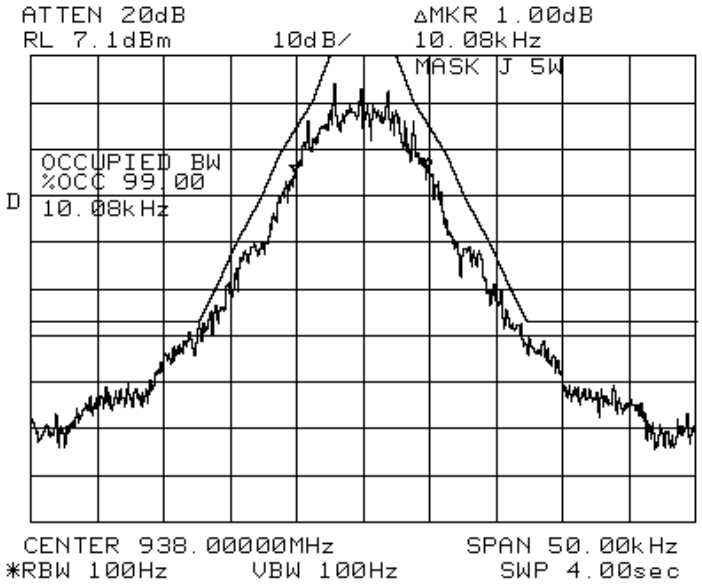
For the deviation measurements on the modulation analyzer an IF filter of 30KHz has been used.

NECESSARY BANDWIDTH (Bn) measurement

See Page 11 for emission designator determination.

The corresponding emission designator prefix for necessary bandwidth = **10K1**
The corresponding deviation for 8000 is 2.98 KHz
TEST DATA: Refer to the following graphs:

MASK: J , 10K1F1D, 5W
SPECTRUM FOR EMISSION **10K1F1D**
OUTPUT POWER: 5 Watts
8000 bps DGMSK
PEAK DEVIATION = 3000 Hz
SPAN = 50 kHz



MASK: J, 10K1F1D, 1W
SPECTRUM FOR EMISSION **10K1F1D**
OUTPUT POWER: 1 Watts
8000 bps DGMSK
PEAK DEVIATION = 3000 Hz
SPAN = 50 kHz