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

for the

Tait's T85x –3 (480-520MHz) base station

modulated with

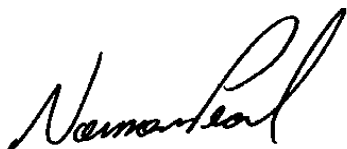**DGMSK digital modulation from Dataradio IVIS Controller option**

**FCC ID: EOTBDD4T85-3
Trade Name: Paragon/PD**

January 27, 2004

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 EOTBDD4T85-3. All changes involved fall under Class II Permissive Change types and they are entirely detailed within the current report.

     The certificate EOTBDD4T85-3 was originally granted to Dataradio for the transmitter of its UHF base station following a change in ID on 02/21/2001. Four more class II permissive changes were subsequently granted (03/30/2001,05/29/2001,01/10/2002 and 01/21/2003) for 4FSK and 8FSK digital modulations. The transmitter is comprised of the Exciter and PA modules, both belonging to the T85M-XY (see page 7 for part# description) UHF base station. Dataradio Inc. buys this UHF base station from Tait Electronics, fits the source for the proposed digital modulation scheme, does the final assembly of transmitter and controller and markets the completed base station.

     The Class II Permissive type of change demonstrated with this filing relates to the emission designator list. The certificate EOTBDD4T85-3 is granted for the following list of emission designators: 10K8 and 15K7F3E, and 14K3, 15K9, 7K17, 8K00, 16K5, 16K7, 14K9, 8K33 F1D. This change asks for the addition of a new digital modulation source that provides DRCFSK with two rates of 9.6kbps and 19.2kbps on 25kHz and 12.5kHz channels. Their associated emission designators yield three new values on the list. For both claims the compliance has been demonstrated for mask 90.210C or D as required. This Class II permissive change involves the modulation source only and it is completely described in the current report.

EXISTING CONDITIONS

     The unit utilized for these occupied bandwidth and mask-compliance measurements was a prototype built from a production EOTBDD4T85-3 and a prototype IVIS controller used to create the modulation scheme. The exciter operates on frequencies ranging from 480.000 MHz to 520.000 MHz. The frequency tolerance of the exciter is .0001% or 1.0 parts per million and the output power of the PA is 100W as granted in EOTBDD4T85-3.

PROPOSED CONDITIONS

     It is proposed to accept the Class II permissive change request for the EOTBDD4T85-3 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. 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 Dec 15, 2003 and Dec 24, 2003.

CONCLUSION

    Given the results of the measurements contained herein, the applicant requests a Class II Permissive Change for the Certificate EOTBDD4T85-3 to accept the use of 15K9F1D as the emission designator for another digital modulation and to add two new emission designators 11K4F1D and 8K84F1D to the existing list for two new proposed digital modulations.

_____01/12/04
Constantin Pintilei
R&D Test Engineer, Dataradio Inc.

TABLE OF CONTENTS

Annex A: Extension of the ParagonPD user Manual: IVIS controller option Technical Leaflet.

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 27 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:	Professional engineer since 2001 10 Years experience in radio frequency measurements.

NAME:	**Dominic Lavoie**
TITLE:	R&D Technician
TECHNICAL EDUCATION:	College Diploma, Electrical Engineering Technician, Telecom option (1998), Technical College CEGEP du Vieux-Montreal, Montreal, Canada
TECHNICAL EXPERIENCE:	6 Years in telecom electronics, of which 4 as Dataradio R&D Technician

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

The certificate EOTBDD4T85-3 was granted to Dataradio Inc. following an ID change request from CASTEL0025. The certificate CASTEL0025 had been granted to Tait Electronics Ltd. for its transmitter comprised of T857 Exciter module and T859 PA module. It belongs to the T85M-XY (see page 7 for part# description) UHF base station. Dataradio Inc. uses this base station to build Paragon/PD, a base station for wireless data networks. In order to market it under Dataradio logo the change in ID was done.

Further, several data speeds using 4-FSK and 8-FSK SRRC digital modulation were granted following three Class II permissive change requests. The emission designator list of the certificate granted on 01/21/2003 has the following values:
- 10K7 and 15K7F3E inherited from the original certificate CASTEL0025 granted on 02/21/2001 following the ID change
- 14K3 and 15K9F1D for 25.6kpbs and 19.2 kbps 4-FSK SRRC digital modulation granted on 03/30/2001following a Class II permissive change request
- 7K50 and 7K00F1D,used for 16.0 and 14.4 kbps 4-FSK SRRC digital modulation granted on 05/29/2001 following a Class II permissive change request.
- 16K5F1D,used for 32.0 kbps 4-FSK RC digital modulation, granted on 01/10/2002 following a Class II permissive change request
- 8K00 and 7K17F1D replaced 7K50 and 7K00F1D used for 16.0 and 14.4 kbps 4-FSK SRRC digital modulation; new values of 16K7, 14K9 and 8K33F1D used for respectively 48.0kbps, 43.2kbps and 21.6kbps at 8-FSK SRRC; the value of 8K00F1D also represents 24.0kbps at 8-FSK SRRC. All were granted on 01/21/2003 following a Class II permissive change request.

The current Class II permissive change request asks to accept the use of the emission designator 15K9F1D with the modulation 19.2kbps DRCFSK in 25kHz channel. It also asks to append to the emission designator list the 11K4F1D and 8K84F1D values required for 9.6kbps 25kHz channel and 9.6kbps 12.5kHz channel. The modulation scheme proposed is a two level Raised Cosine pulse shaping implemented with switched capacitor filter controlled by the firmware of the module. A detailed description of the modulation source is available in the paragraph of digital modulation techniques in page 9. The compliance with masks C or D respectively is further demonstrated in the test section.

The change above described involves the modulation source only therefore it falls under Class II Permissive Changes type as per 2.1043 (b)(2). No other changes occur elsewhere in the circuitry of the exciter module or of the PA module.

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)(d)

All this Class II permissive change data as per 2.1043 are completely described 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   Dataradio Inc.,
                                               5500 Royalmount Ave, suite 200,
                                               Town of Mount Royal, Quebec, Canada, H4P 1H7

MANUFACTURER: Tait Electronics Ltd., Burnside Christchurch 5, New Zealand
                                                    (T85x UHF Base station)
                                               DATARADIO Inc., Town of Mount Royal, Quebec, Canada, H4P 1H7
                                                    (Paragon/PD with IVIS option- final assembly)

MODEL NUMBER: Paragon/PD

PART NUMBER: BDD4-85XY PPPS

SERIAL NUMBER (S):   IVIS controller– prototype DRCFSK switch/controller firmware 2.11
                                               T857-36-0200 s.n 13017255 Exciter module
                                               T859-30-0005 s.n 731716 PA module

FCC ID NUMBER: EOTBDD4T85-3

FCC RULES AND REGS: FCC Part (s) 22, 90

FREQUENCY RANGE: 480MHz -520 MHz as per EOTBDD4T85-3 certificate

MAXIMUM POWER RATING: 100Watts as per EOTBDD4T85-3 certificate.

NUMBER OF CHANNELS: 1 Channel selectable from 256 channels as per Tait manual

OUTPUT IMPEDANCE: 50 ohms, Nominal

VOLTAGE REQUIREMENTS: 10.9-16.3VDC (13.6 VDC Nominal)

EQUIPMENT IDENTIFICATION:
Part Number of the Tait UHF base station T85M-XY

M	Module Type	X	Freq Range	Y	Channel Bandwidth
7	Exciter (1W)	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						

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
IVIS	Integra VIS Controller Option	option code TBD

Data And Characteristics 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 (T881)   2.1033(c).(8)

Transmitter Tune Up Procedure   2.1033 (c) (9)

Description Of Circuitry, Schematics and   2.1033 (C)(10)
Transistor, Diode, and IC Functions

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

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 IVIS Controller Option leaflet to the Technical Manual for the Paragon/PD data base station Manual. It is a preliminary version.

TYPE OF EMISSION: 2.1033(c)(4)

For Class II Permissive Change Differential Raised Cosine FSK
-emission designators for DRCFSK modulation scheme

25kHz ch. (19.2kbps, DRCFSK)	**15K9F1D**
25kHz ch. (9.6kbps, DRCFSK)	**11K4F1D**
12.5kHz ch. (9.6kbps, DRCFSK)	**8K84F1D**

Previously granted for EOTBDD4T885-1:

25kHz ch voice.	**15K7F3E**
25kHz ch. (25.6kbps, 12800baud, 4 FSK)	**14K3F1D**
25kHz ch. (19.2kbps, 9600baud, 4 FSK)	**15K9F1D**
25kHz ch. (32.0kbps, 16000baud, 4 FSK)	**16K5F1D**
25kHz ch. (48.0kbps, 16000baud, 8 FSK)	**16K7F1D**
25kHz ch. (43.2kbps, 9600baud, 8 FSK)	**14K9F1D**
12.5kHz ch. voice	**10K7F3E**
12.5kHz ch. (16.0kbps, 8000baud, 4 FSK)	**7K17F1D**
12.5kHz ch. (14.4kbps, 7200baud, 4 FSK)	**8K00F1D**
12.5kHz ch. (24.0kbps,8000baud, 8 FSK)	**8K00F1D**
12.5kHz ch. (21.6kbps, 7200baud, 8 FSK)	**8K33F1D**

SPECTRUM EFFICIENCY STANDARD DATA 90.203 (j)(3)

The IVIS modulation source transmits 19200 bps in 25 kHz channel bandwidth.
This represents 4800*4=19200bps required for 6.25*4=25kHz channel bandwidth
The IVIS modulation source transmits 9600 bps in 12.5 kHz channel bandwidth.
This represents 4800*2=9600bps required for 6.25*2=12.5kHz channel bandwidth

DIGITAL MODULATION TECHNIQUES   2.1033 (c)(13)
        The digital modulation used by the IVIS board modem is DRCFSK (Differential Raised Cosine Frequency Shift Keying). A Modem Controller Unit (MCU) using such type of modulation is divided in three main units. They are:
1. Scrambler,
2. Differential encoder,
3. Waveshape generator.

        We will explain each of those units, starting with the scrambler.

1. Scrambler:
The scrambler converts the data stream to a new one having better characteristics for a FM radio system. The main advantages are:
-It removes the DC component from a DGFSK signal,
-It randomizes the data in such a way to avoid predictable patterns, for example:
00000000, 111111111, 01010101, 00110011, etc.
-It keeps the power spectrum more compact by avoiding sequences like 01010101…
All these functions are performed with a serial shift register and 2 exclusive OR gates which implement a polynomial of form X7+X5-1. The receiver side of the radio modem has a similar descrambler circuit to decode the received scrambled data.

2. Differential encoder:
After data is scrambled, it is encoded with a differential encoder which operates a XOR logical operation between the former bit and the current bit, default state bit being 0.
For example:
From a sequence of 01001011111010001010100010, the differentially encoded data stream is:
                          11011100011100111110011.
The differential encoding makes the modem insensitive to audio polarity inversion of the FM radio system.

3. Pulse shape generator:
The pulse shape generator filters the processed data bits (scrambled and differentially encoded for DRCFSK) to the audio signal that will modulate a FM transmitter. The filter is a switched-capacitor Raised Cosine, its clock input controls the pass band of the filter which is +/-4.8kHz for 9600bps and +/-9.6kHz for 19200bps. After the filter a digital potentiometer allows the adjustment of the amplitude of the audio (base band) signal. This yields the DRCFSK waveshape having a compact spectrum to fit inside FCC Part 90 masks according to the channel bandwidth intended. Both the clock of the switched capacitor filter and the value loaded in the digital potentiometer are controlled by the processor of the MCU.

Furthermore, the MCU generates transmission headers in normal usage and a test pattern for test purposes.

1. Transmission preamble:
Each data transmission begins by sending a 15ms preamble of sinewave (101010…) to synchronize the digital phase looked loop of the receiver modem.
2. Test pattern generator (random data):
The random data generator function of the MCU 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.
3. Tone generator (txon7)
The tone generator of the MCU generates a 1200Hz digital pattern that gets filtered through the pulse-shaping filter. This filtered 1200Hz squared wave provides a reference tone for the deviation adjustment

Modulation Characteristic Part 2.1047 (d), 90.209 (b), 90.210(c): Other types of equipment: this equipment is
     not provided with hardware audio low-pass filters, the filtering is entirely the result of the switched-capacitor
     Raised-Cosine digital filter controlled by firmware in the modulation source.

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(c),(d)
are provided in next section of this Engineering Report
The following reports have been generated for Class II Permissive Change request for EOTBDD4T85-3 Transmitter. Paragon/PD with the option IVIS is comprised of the Tait Electronics Ltd. T85M –3Y UHF Base station with the Dataradio Inc D212 Base Data Link Controller (BDLC) and the Integra VIS controller module (IVIS) option. Dataradio Inc does the changes to fit the transmitter to digital modulation, 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 revA standards.

SECTION 2 - TEST REPORT Rule Part Number: **2.1033 (c)(14)**

NAME OF TEST: Emission Designator

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

For the DRCFSK type of emission,the IVIS option of the Paragon^{PD+} base station was the source of the digital modulation signals. The random signal generator passes the test sequence through a switched capacitor implemented pulse-shaped Raised Cosine filter to feed the FM modulator. The necessary bandwidth calculation for this type of modulation (DRCFSK) is not covered by paragraphs (1), (2) or (3) from 2.202(c), the result exceeding by far the real necessary bandwidth obtained through measurement of the 99% of the occupied bandwidth.

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

Necessary Bandwidth Measurement (90.209.(b))
The results of 99% Occupied Bandwidth measurement are:

Bit rate/channel	V_{pp}analog voltage ref	Ref. deviation for 1.2kHz filtered square wave tone	Maximum Digital Deviation	Occupied Bandwidth	Emission designator
9600 bps/25kHz	1.700 V_{pp}	± 4.20 kHz	± 4.80 kHz	11330 Hz	11K4F1D
19200bps/25kHz	1.700 V_{pp}	± 4.19 kHz	± 4.60 kHz	15830 Hz	15K9F1D
9600bps/12.5kHz	1.016 V_{pp}	± 2.82 kHz	± 3.30 kHz	8833 Hz	8K84F1D

The 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 C or D, the highest resulting value was recorded for the Occupied Bandwidth. V_{pp} amplitude of the modulating signal applied to exciter input was measured between input and ground , AC coupled at the output of IVIS.

      The measurement set-up is detailed along with mask compliance test reports.

NAME OF TEST: **Transmitter Occupied Bandwidth**

Test data in support of compliance with Mask 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 = 63 dB (100 W), 56 dB (20 W)
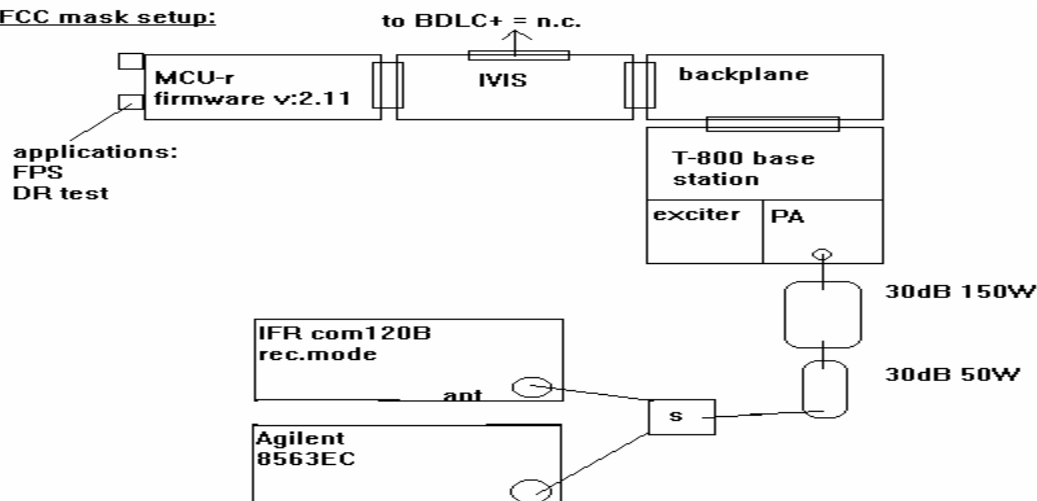
TEST RESULTS: Meets minimum standard (see data on the following pages)

TEST CONDITIONS: Standard Test Conditions, 25 C

TEST EQUIPMENT: Digital pseudo-random sequence generator: board Integra VIS fw 2.11
                    Attenuator, BIRD Model 150-A-MFN-30(30dB/150W) and 50-A-MFN-30(30dB/50W)
                    DC Power Source, Model Tait T808-10-0012 set to 13.8V/25A
                    Communication Analyzer, Model IFR COM120B for Modulation Analyzer
                    Spectrum Analyzer, Model HP(Agilent) 8563EC

PERFORMED BY: _____Dominic Lavoie____   DATE: 12/23/2003
TEST SET-UP:

NAME OF TEST: Transmitter Occupied Bandwidth (Continued)

MODULATION SOURCE DESCRIPTION:(Part 2.1047 (d), 90.209 (b), 90.210(c):

Other types of equipment: the digital modulation input of the exciter bypasses the audio low-pass filter, the filtering is entirely result of the digital modulation source.

TEST PATTERN GENERATOR:
The random data generator function of the MCU 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 follows the DRCFSK digital modulation process described on page 9 and the resulting base band signal feeds the modulator input of the transceiver.

 The modulation source's rates and output voltages are set through the switched capacitor RC pulse shaped filter and digital potentiometer as explained in pages 9,10. The resulting FM deviation was measured using the modulation analyzer of an IFR COM120B with an IF filter of 30KHz .

Snap shots: Refer to the following plots.

SPECTRUM FOR EMISSION **15K7F1D,** 19200bps, DRCFSK
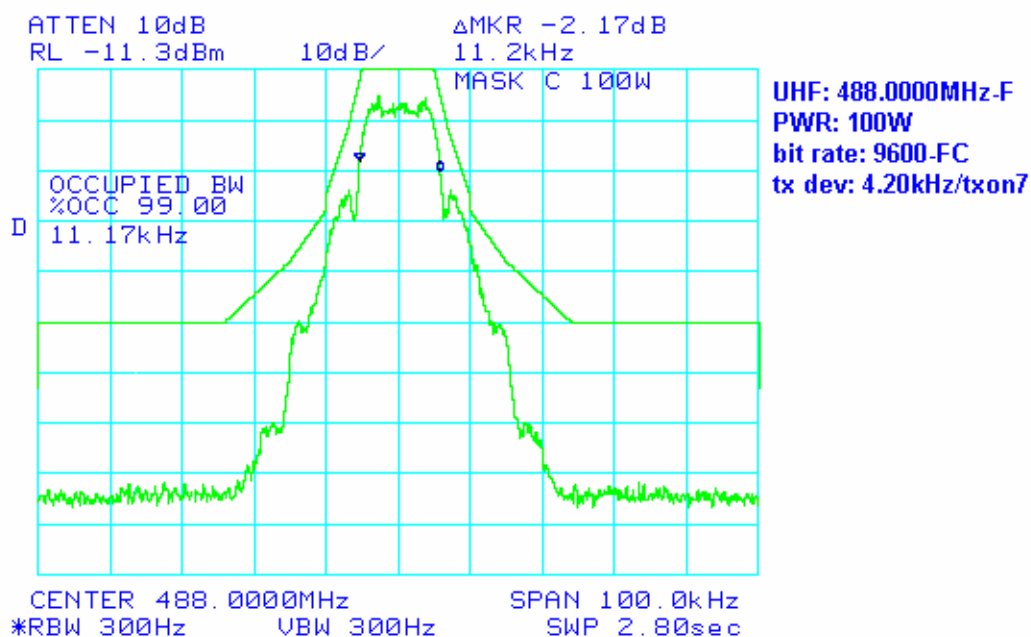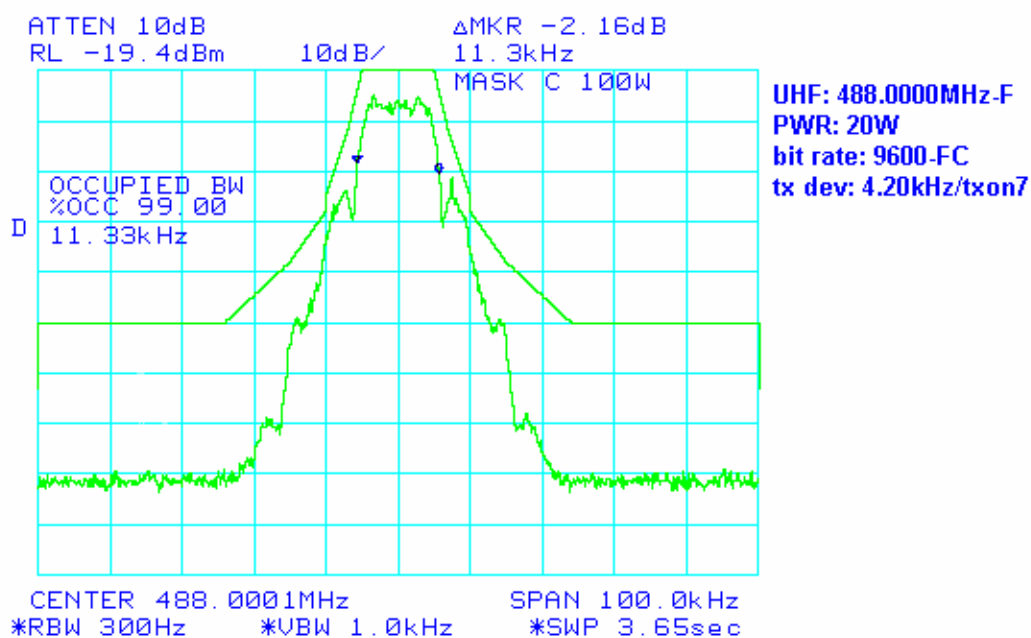PEAK DEVIATION = 4200 Hz, SPAN = 20kHz/div

Plot 1:MASK C, 15K9F1D
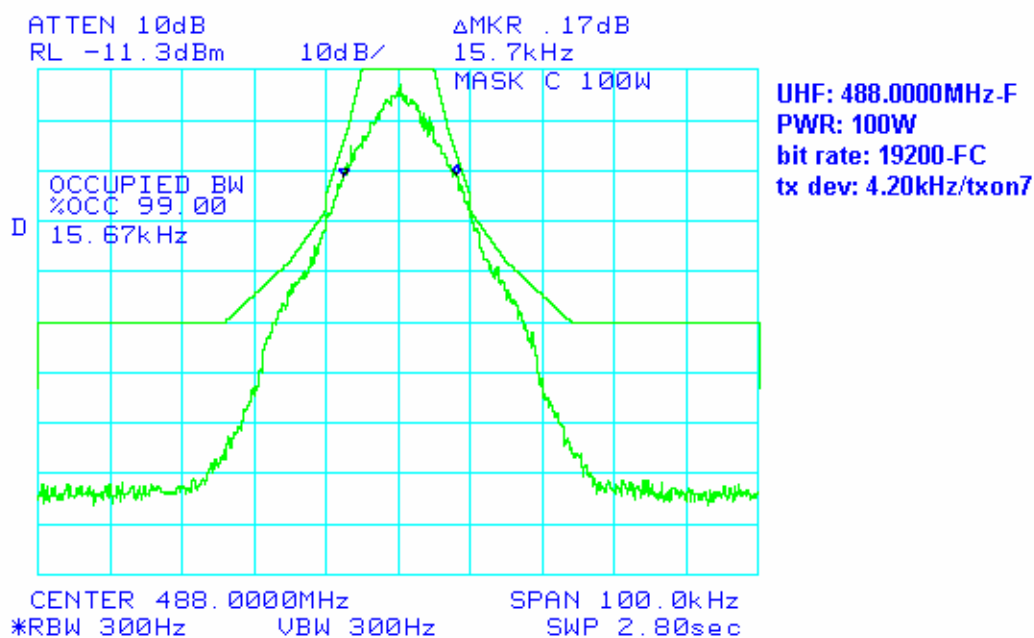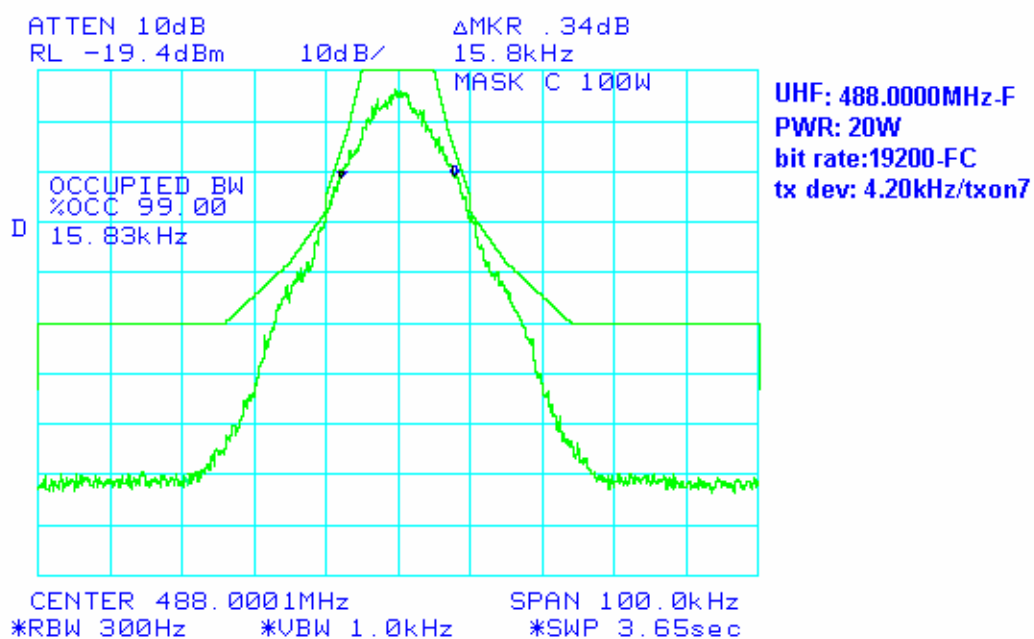
SPECTRUM FOR EMISSION **11K4F1D,** 9600bps, DRCFSK
PEAK DEVIATION = 4200 Hz, SPAN = 20kHz/div

Plot 2:MASK C, 11K4F1D


```
ATTEN 10dB                    ΔMKR −2.16dB
RL −19.4dBm      10dB/        11.3kHz
                              MASK C 100W

OCCUPIED BW
%OCC 99.00
D  11.33kHz

CENTER 488.0001MHz            SPAN 100.0kHz
*RBW 300Hz       *VBW 1.0kHz  *SWP 3.65sec
```

UHF: 488.0000MHz-F
PWR: 20W
bit rate: 9600-FC
tx dev: 4.20kHz/txon7


```
ATTEN 10dB                    ΔMKR −2.17dB
RL −11.3dBm      10dB/        11.2kHz
                              MASK C 100W

OCCUPIED BW
%OCC 99.00
D  11.17kHz

CENTER 488.0000MHz            SPAN 100.0kHz
*RBW 300Hz       VBW 300Hz    SWP 2.80sec
```

UHF: 488.0000MHz-F
PWR: 100W
bit rate: 9600-FC
tx dev: 4.20kHz/txon7

Test data in support of compliance with Mask D

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

MINIMUM STANDARD: Mask D
                           Sidebands and Spurious [Rule 90.210 (d)]
                           Authorized Bandwidth = 11.25 kHz [Rule 90.209(b) (5)]
                           Fo to 5.625 kHz   Attenuation = 0 dB
                           >5.625 kHz to 12.5 kHz   Attenuation= 7.27(f_d -2.88kHz) dB
                           >12.5 kHz   Lesser of [50 + 10*log(P)] dB or 70dB
                           Corner Points:
                           Fo to 5.625 kHz   Attenuation = 0 dB
                           >5.625 kHz to 12.5 kHz   Attenuation= 20 dB to 70 dB
                           >12.5 kHz   Attenuation =70dB (100W), 63dB (20W)
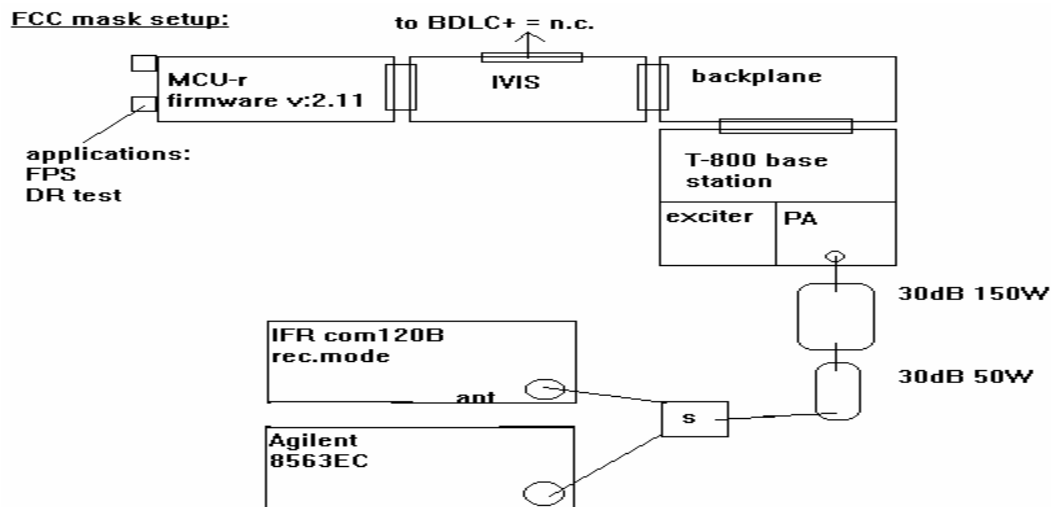
TEST RESULTS: Meets minimum standard (see data on the following pages)

TEST CONDITIONS: Standard Test Conditions, 25 C

TEST EQUIPMENT: Digital pseudo-random sequence generator: board Integra VIS fw 2.11
                      Attenuator, BIRD Model 150-A-MFN-30(30dB/150W) and 50-A-MFN-30(30dB/50W)
                      DC Power Source, Model Tait T808-10-0012 set to 13.8V/25A
                      Communication Analyzer, Model IFR COM120B for Modulation Analyzer
                      Spectrum Analyzer, Model HP(Agilent) 8563EC

PERFORMED BY: _____Dominic Lavoie_____   DATE: 12/22/2003
TEST SET-UP:

NAME OF TEST: Transmitter Occupied Bandwidth (Continued)

MODULATION SOURCE DESCRIPTION:(Part 2.1047 (d), 90.209 (b), 90.210(c):

Other types of equipment: the digital modulation input of the exciter bypasses the audio low-pass filter, the filtering is entirely result of the digital modulation source.

TEST PATTERN GENERATOR:
The random data generator function of the MCU 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 follows the DRCFSK digital modulation process described on page 9 and the resulting base band signal feeds the modulator input of the transceiver.

 The modulation source's rates and output voltages are set through the switched capacitor RC pulse shaped filter and digital potentiometer as explained in pages 9,10. The resulting FM deviation was measured using the modulation analyzer of an IFR COM120B with an IF filter of 30KHz .
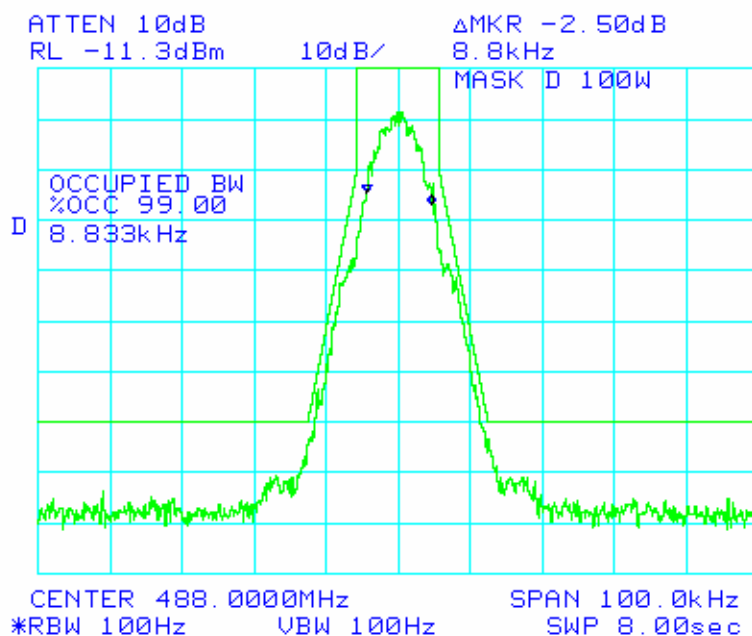
Snap shots: Refer to the following plots.

SPECTRUM FOR EMISSION **8K84F1D,** 9600bps, DRCFSK
PEAK DEVIATION = 2850 Hz, SPAN = 10kHz/div

Plot 3:MASK D, 8K84F1D
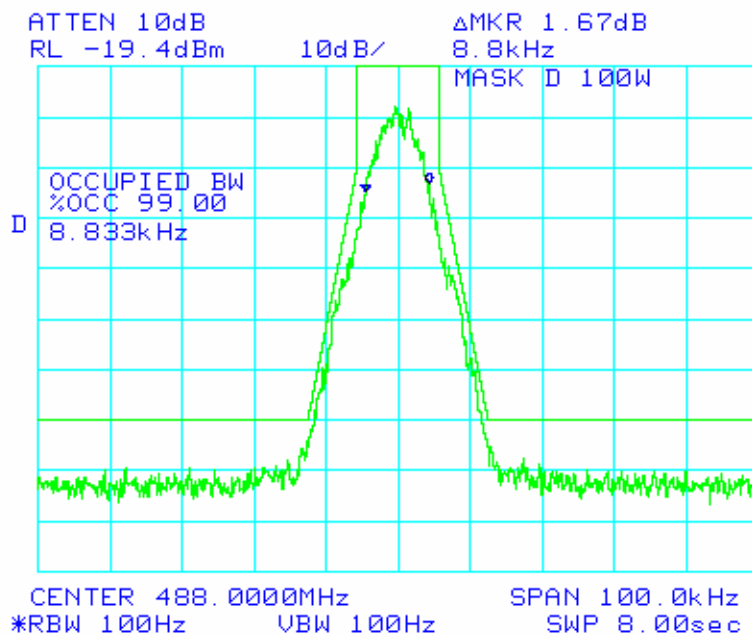
Annex A LIST OF THE TEST EQUIPMENT:

Equipment	Manufacturer and model	serial number	inventory
Digital pseudo-random sequence generator	Dataradio IVIS controller/switch option of Paragon^{PD} UHF Base station	NA	R&D-Distributech demo
Attenuator 30 dB / 150 Watt	BIRD Model / 150-A-MFN-30	NA	DR962
Attenuator 30 dB / 50 Watt	BIRD Model / 50-A-MFN-30	NA	DR998
Communication Analyzer (used for Modulation Analyzer)	IFR COM120B	500008432	DR611
Spectrum Analyzer	HP(Agilent) 8563EC	4103A01135	DR231
DC Power Source 13.8V 25A	Tait T808-10-0012 from the T800 base station assembly	13073482	NA – R&D
DC Power Source 13.8V 15A	Tait T807-10-0012 from the T800 base station assembly	13072356	NA – R&D
Oscilloscope	HP 54645D – Mega Zoom digital mixed signal osciloscope	US38060758	DR222