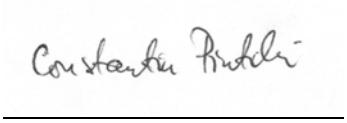
Test Report 4/2007

Applicant	Dataradio Inc., a Calamp Company 5500 Royalmount Avenue Suite 200, TMR, Montreal Quebec, Canada, H4P 1H7
EUT catalog number	SDR-T-001-80 – Exciter module of the BDP4-800-F-070-2-8 basestation
Model	SDR-T-001/80
EUT Identification (FCC, IC, other)	FCC ID: EOTBDP4-EXT8 (proposed) Industry Canada: 773A-BDP4-EXT8 (proposed)
In Accordance With (main references)	FCC Part 90 Private Land Mobile Radio Services RSS 119 issue 9
Tested By	R&D of Dataradio Inc 5500 Royalmount Avenue Suite 200, TMR, Montreal Quebec, Canada, H4P 1H7
Document #/pages	156-90000-905 / 14 pages
Authorized By	Constantin Pintilei  R&D Rest Engineer, Dataradio Inc
Release Date	November 21, 2007

Report Summary

These tests were condusted on a sample of equipment for the purpose of demonstrating compliance with the restrictions of the channels in the band of 851-869MHz, as defined in the rules of either FCC Part 90 or Canada's RSS 119 issue 9 at the testing date. The tests were performed in accordance with ANSI TIA-603 C.

The assessment summary is:

EQUIPMENT UNDER TEST Prototype Exciter 26dBm 800 MHz band SDR-T-001-80
SERIAL NUMBER (S): NA

SPECIFICATIONS: FCC 90 subpart I paragraphs 90.209, 90.210 (masks G, H), RSS 119 issue 9 paragraph 5.8 masks G, D

COMPLAINCE STATUS: **Compliant**

EXCLUSIONS: None

NON-COMPLAINCES: None

TEST RESULTS SUMMARY The modulation's pulse shaping filter is a Square-Root Raised Cosine related to the symbol rate. There are 4,8 and 16-Level FSK options for each symbol rate.

Symb. rate/ channel	Acronyms/ factor / 3dB cutoff freq	Deviation set on 1kHz tone (dev meter)	Maximum Deviation on random data pattern	Limit mask	99% Occupied Bandwidth	Emission designator
16000 baud/ 25kHz	SRRC-NFSK α=0.4 8000Hz	± 2.78 kHz	± 3.59 kHz	G	13670 Hz	13K7F1D
14400 baud/ 25kHz	SRRC-NFSK α=0.4 7200Hz	±3.25 kHz	± 3.95 kHz	G	13330 Hz	13K4F1D
8000 baud/ 12.5kHz	SRRC-NFSK α=0.4 4000Hz	±2.52kHz	± 3.42kHz	H	10000 Hz	10K0F1D
8000 baud/ 12.5kHz	SRRC-NFSK α=0.4 4000Hz	±1.64kHz	± 2.45kHz	D	8167 Hz	8K2F1D

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

PERFORMED BY: Constantin Pintilei DATE: 11/20/07

TEST CONDITIONS:

The procedure shown in EIA/TIA 603 C – 2004 paragraph 2.2.11 was the standard procedure followed through the test. This measurement method is similar to the one shown in FCC part 90.210 (o) or in Canada's RSS 119 issue 9 paragraph 4.2.

The reference instrument, Agilent's spectrum analyzer 8563EC, has enabled both options regarding the Limit Line Testing software and the Channel Power over BW measurement software .

The test ran in standard environmental test conditions, at 22^0C, 30-50% RH.

TEST EQUIPMENT:

Equipment	Manufacturer	Model	Asset #	Last cal	Next Cal
Notch filter	Sinclair	NA	R&D Notch	CBT	-
DC Power Supply	Astron	VS-20M	s/n 97010044	CBT	-
Modulation meter	IFR	COM-120B	DR637	05/2007	05/2008
Spectrum Analyzer	Agilent	E4401B	DR624	11/2006	11/2007
Spectrum Analyzer	Agilent	8563EC	DR231	09/2007	09/2008
Communication Analyzer	IFR	COM-120B	DR637	05/2007	05/2008
Network Analyzer	Agilent	8714ES	s/n US40501280	11/2006	11/2007
RMS clamp multimeter	EXTECH Instruments	380947	DR328	CNRNB	-

CBT- Calibration before test
CNRNB – Calibration not required , New Batteries

NAME OF TEST: Occupied bandwidth and Mask compliance data

RULE PART NUMBER: FCC 2.201, 2.202, 2.1041, 2.1049 (h), 90.209 (b)(5), 90.210 (g), 90.201(h)
RSS Gen paragraph 4.6.1, RSS 119 issue9 paragraphs 4.2.1, 4.2.2, 5.5, 5.8

MINIMUM STANDARD:

Mask G

Sidebands and Spurious [FCC Rule 90.210 (G), RSS 119 5.8.6 mask G]
Authorized Bandwidth = 20 kHz [Rule 90.209(b) (5), RSS119 paragraph 5.5]

Fo to 10.0 kHz	Attenuation = 0 dB
>10.0 kHz to 250% Auth BW	Attenuation = Lesser of: 116*log(f_d KHz /6.1) dB, 50+10log$_{10}$(P) OR 70 dB
>250% Auth BW	43 + 10*log(P)

Corner Points:

f_0 to 10.0 kHz	Attenuation = 0 dB
>10.0 kHz to 25.0 KHz	Attenuation = 25 dB to 70 dB
>25.0 kHz to 50kHz	Attenuation = 70dB (minimum 57dB -5W)
>250% Auth BW	Attenuation = 50 dB (minimum 50 dB -5 W)

Mask H

Sidebands and Spurious [FCC Rule 90.210 (h)]
Authorized Bandwidth = 20 kHz [Rule 90.209(b) (5), RSS119 paragraph 5.5]

Fo to 4.0 kHz	Attenuation = 0 dB
>4.0 kHz to 8.5 kHz	Attenuation= 107*log(f_d /4) dB
>8.5 kHz to 15 kHz	Attenuation= 40.5*log(f_d /1.16) dB
>15 kHz to 25kHz	Attenuation = 116*log(f_d /6.1) dB
>25kHz	43 + 10*log(P) dB

Corner Points:

Fo to 4.0 kHz	Attenuation = 0 dB
>4.0 kHz to 8.5 kHz	Attenuation= 0 dB to 35 dB
>8.5 kHz to 15 kHz	Attenuation = 35 dB to 45 dB
>15 kHz to 25 kHz	Attenuation =45 dB to 71 dB
>25 kHz	Attenuation =53dB (10W-generic limit)

The limits would read 43dB for 1W and 50dB for 5W output.

Mask D

Sidebands and Spurious [RSS119 issue 9 Paragraph 5.8.3 (d)]
Authorized Bandwidth = 11.25 kHz [RSS119 issue 9 paragraph 5.5]

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

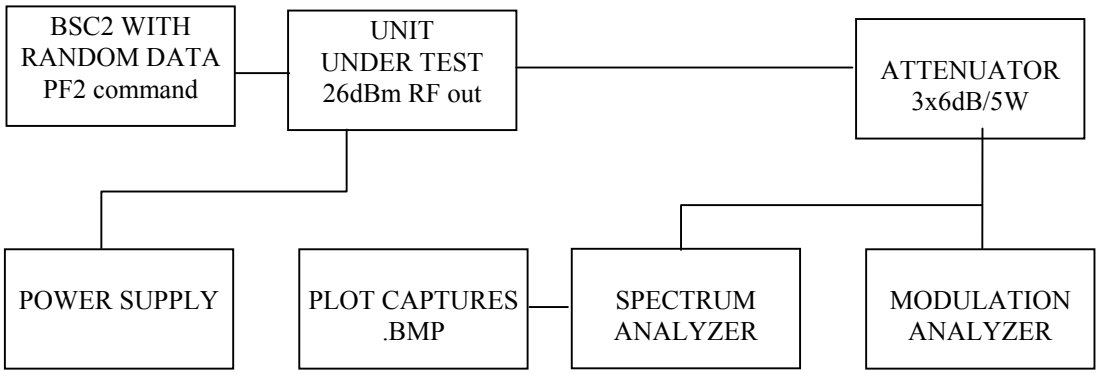
Corner Points:

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 = 66dB (40W)

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

TEST EQUIPMENT: Attenuator, Pasternak Model/ PE7015-6 / 6 dB / 5 Watt
2 way Splitter MiniCircuits model ZFSC-2-4
DC Power Source, Model Astron VS20M
Modulation source from base station controller model Dataradio BDP4-BSC2
Communication Analyzer, Model IFR COM120B for Modulation Analyzer
Spectrum Analyzer, Model Agilent 8563EC

TEST SET_UP



MODULATION TEST DATA PATTERN DESCRIPTION

The transmit "test data" pattern command produces an 8,388,607 bit pseudo- random pattern. This pattern is generated by the DSP using the polynomial X23+X5+1 form and a 23-bit shift register with an initial value of 1. The 8,388,607 bit sequence is repeated thereafter as long is necessary to complete the test duration. This pattern is applied to the DSP modulator for mapping to 16-FSK and pulse shaping . For further details on modulation source description please refer to the related file.

MODULATION CHARACTERISTIC FCC Part 2.1047 (d), 90.209 (b), 90.210(c) IC RSS 119 paragraph 5.5.8 :

Other types of equipment: this equipment is not provided with hardware audio low-pass filters, the filtering is entirely the result of the DSP-based digital filter controlled by firmware in the modulation source.

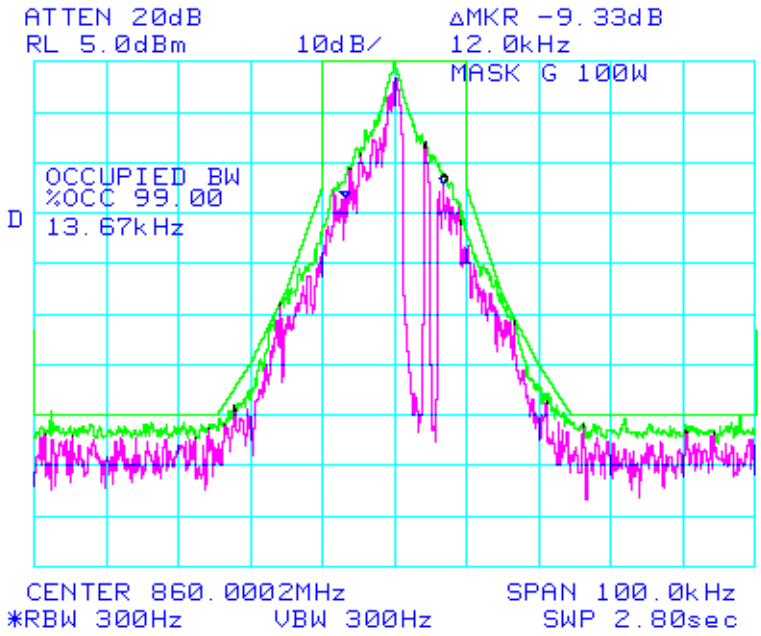
NECESSARY BANDWIDTH MEASUREMENT (FCC part 90.209.(B), IC RSS GEN paragraph 4.6.1)

The plot captures for 99% occupied bandwidth at each of the bit and baud rates shown in the table above follow. Because this document is deemed confidential, the 16FSK plot captures are also shown in the test report document.

Mask G
16000baud rate, 2.80 kHz reference deviation on 1000Hz tone

16FSK yield 64kbps, 8FSK yield 48kbps, 4FSK yiels 32kbps

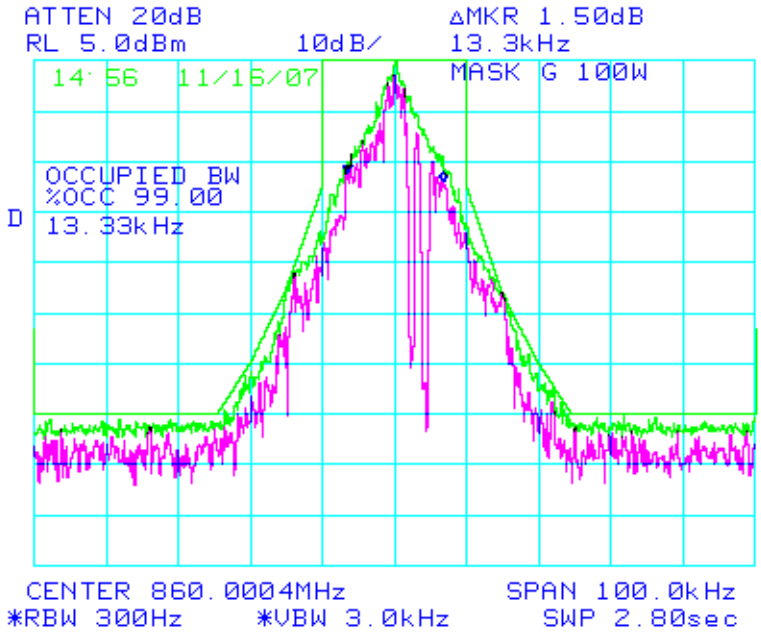
–red-current trace,
-green – peak hold trace over minimum 20sweeps,
-green – restrictions of the mask G limit



Mask G
14400baud rate, 3.25 kHz reference deviation on 1000Hz tone

16FSK yield 57.6kbps, 8FSK yield 43.2kbps, 4FSK yiels 28.8kbps

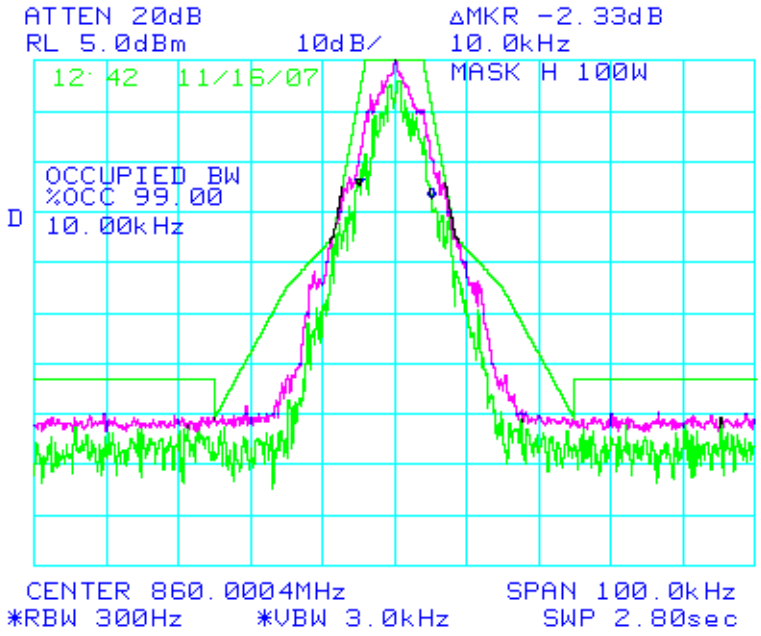
–red-current trace,
-green – peak hold trace over minimum 20sweeps,
-green – restrictions of the mask G limit



Mask H
8000baud rate, 2.52 kHz reference deviation on 1000Hz tone

16FSK yield 32kbps, 8FSK yield 24kbps, 4FSK yiels 16kbps

–green-current trace,
-red – peak hold trace over minimum 20sweeps,
-green – restrictions of the mask H limit



Mask D
8000baud rate, 1.64 kHz reference deviation on 1000Hz tone

16FSK yield 32kbps, 8FSK yield 24kbps, 4FSK yiels 16kbps

–green-current trace,
-red – peak hold trace over minimum 20sweeps,
-green – restrictions of the mask D limit