



Test Report 5/2007

(Updated: Feb, 28, 2008)

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 , part of the
BDP4-800-F-070-2-8 base station

Model SDR-T-001/80

EUT Identification FCC ID: EOTBDP4-EXT8 (proposed)

In Accordance With FCC Part 90 Private Land Mobile Radio Services

Tested By Dataradio Inc.
5500 Royalmount Avenue
Suite 200, TMR, Montreal
Quebec, Canada, H4P 1H7

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Constantin Pintilei

Release Date R&D Rest Engineer, Dataradio Inc
November 21, 2007, revised Feb 28, 2008

Report Summary

These tests were conducted on an equipment sample for the purpose of demonstrating compliance with the band channel restrictions in the 851-869 MHz range, as per FCC Part 90. The tests were performed in accordance with ANSI TIA-603C.

The assessment summary is:

EQUIPMENT UNDER TEST SDR-T-001-80 prototype Exciter, 800 MHz band, 26dBm o/p
 SERIAL NUMBER (S): NA

SPECIFICATIONS: FCC 90 subpart I paragraphs 90.209, 90.210 (masks G, H)

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.

Symbol Rate/channel	Acronym/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 $\alpha=0.4$ 8000Hz	± 2.80 kHz	± 3.59 kHz	G	13670 Hz	13K7F1D
14400 baud/25kHz	SRRC-NFSK $\alpha=0.4$ 7200Hz	± 3.25 kHz	± 3.95 kHz	G	13330 Hz	13K4F1D
8000 baud/12.5kHz	SRRC-NFSK $\alpha=0.4$ 4000Hz	± 2.54 kHz	± 3.53 kHz	H	9667 Hz	10K0F1D

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

Constantin Pintilei

PERFORMED BY:

Constantin Pintilei

DATE: 11/20/07

TEST CONDITIONS:

The standard procedure EIA/TIA 603 C – 2004 paragraph 2.2.11 was followed through the test. That measurement method is similar to the one shown in FCC part 90.210 (o).

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

The tests ran in standard environmental test conditions, at 22°C, 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)

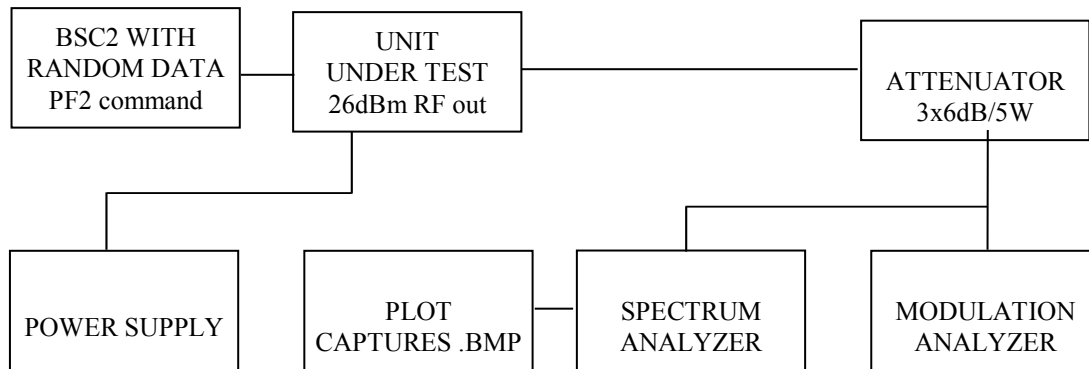
MINIMUM STANDARD: **Mask G**
 Sidebands and Spurious [FCC Rule 90.210 (G)]
 Authorized Bandwidth = 20 kHz [Rule 90.209(b) (5)]
 Fo to 10.0 kHz Attenuation = 0 dB
 >10.0 kHz to 250% Auth BW Attenuation = Lesser of:
 116*log(f_d KHz /6.1) dB,
 50+10log₁₀(P) OR
 70 dB
 >250% Auth BW 43 + 10*log(P)
Corner Points:
 f₀ 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)]
 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.

TEST RESULTS: Meet 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 a 8,388,607 bit pseudo- random pattern. This pattern is generated by the DSP modem using the polynomial $X^{23}+X^5+1$ 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) :

Other types of equipment: the 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)

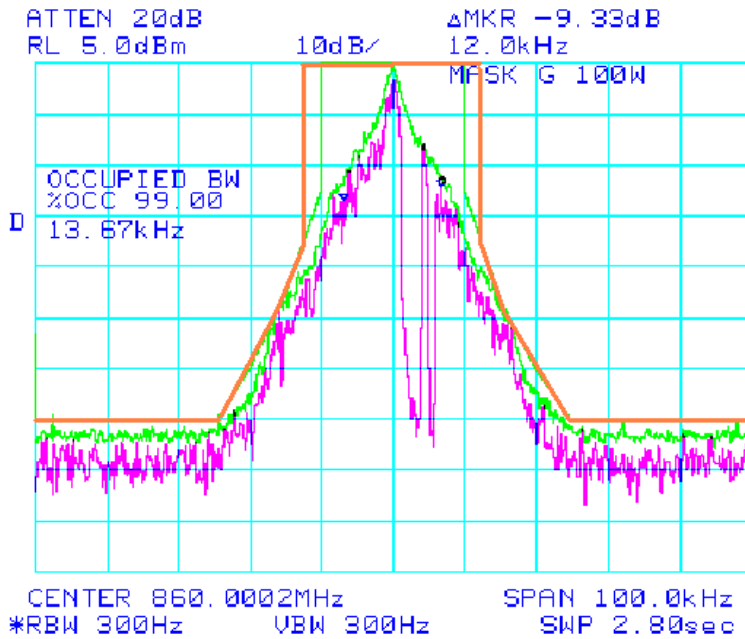
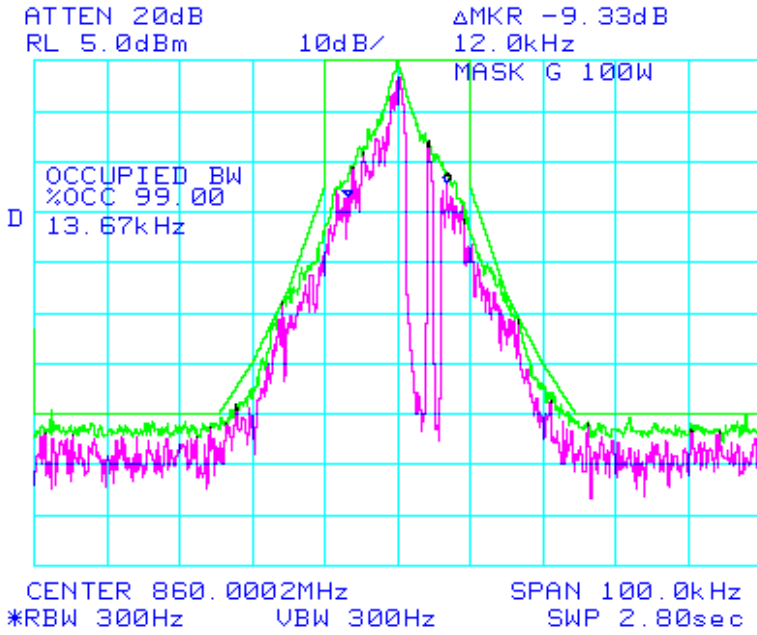
The 99% occupied bandwidth RF plot captures follows.

Mask G

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

16FSK yields 64kbps, 8FSK yields 48kbps, 4FSK yields 32kbps

- red: current trace,
- green: peak hold trace over minimum 20 sweeps,
- green: restrictions of the Mask G limit
- orange: restrictions of the EA 90.691mask limits (overlaid on second copy of same trace)

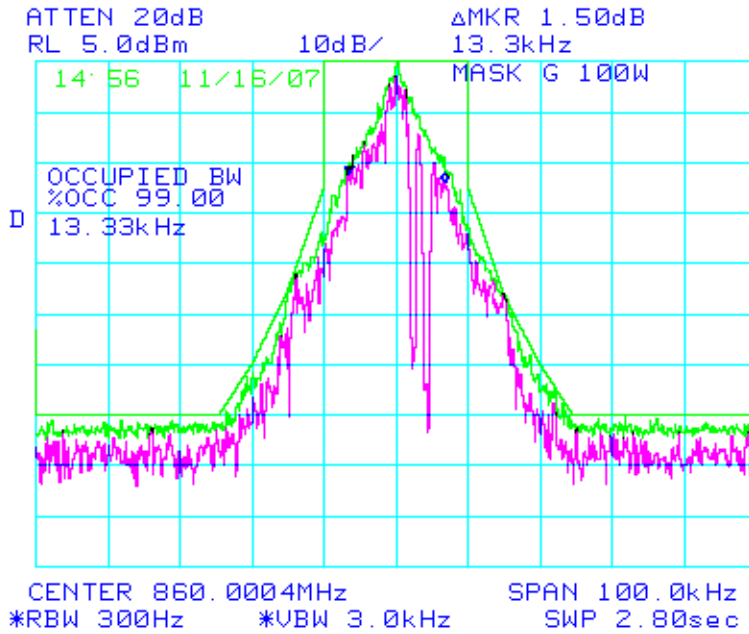


Mask G

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

16FSK yields 57.6kbps, 8FSK yields 43.2kbps, 4FSK yields 28.8kbps

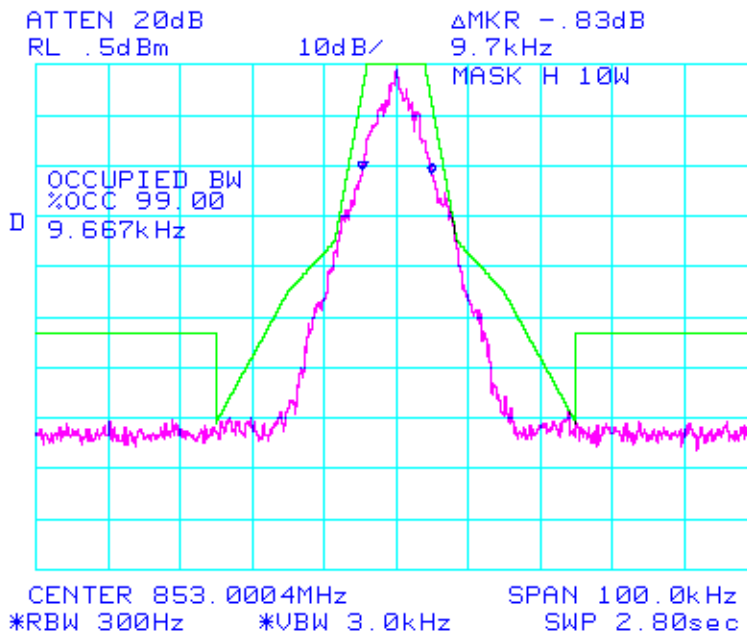
- red: current trace,
- green: peak hold trace over minimum 20 sweeps,
- green: restrictions of the mask G limit



Mask H (updated on February 28,2008)
8000baud rate, 2.54 kHz reference deviation on 1000Hz tone

16FSK yields 32kbps, 8FSK yields 24kbps, 4FSK yields 16kbps

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



P4-800-NPSPAC

Tx freq:853MHz
baud rate:8000
bit rate:16000
modulation:4fsk
Tx deviation:2k54

mask H 10W

20 traces = 0fail