

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

for the

DATARADIO HiPR -900

Wireless Radio Modem

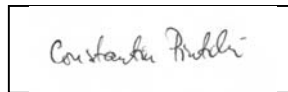
FCC ID: NP4-242-5099-100

Trade Name: HiPR -900

Nov 23, 2006

AFFIDAVIT

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

A rectangular box containing a handwritten signature in cursive script that reads "Constantin Pintilei".

Constantin Pintilei
P.Eng, Dataradio Inc.
OIQ 122420

ENGINEERING STATEMENT

The application consisting of the attached engineering exhibit, associated with the FCC form 731 has been prepared in support to a Class II Permissive Change request for HiPR 900, FCC ID NP4-242-5099-100, on behalf of Dataradio COR, Ltd.

This certificate has been granted to Dataradio COR LTD (DRL) for its HiPR-900 unlicensed frequency hopping spread spectrum (FHSS) radio modem. HiPR-900 is comprised of the DRL 900MHz hopping transceiver with the Dataradio Inc HiPR controller-modem. DRL does the final assembly and markets the HiPR-900 units. At the time of the certification the units two main functions available were Master (Sync generator) and Remote (Sync listener).

The change intends to document the addition of a Store & Forward Repeater function and its incumbent behavioral changes in the network management. This change involving only this functionality addition occurs at the MAC layer, with no change whatsoever occurring in the frequency determining circuitry, maximum power rating or hopping scheme of the HiPR transceiver. The unit with the repeater function enabled will retransmit sync data as a certain percentage of its own data, as further depicted in the engineering exhibit.

EXISTING CONDITIONS

The unit used for the RF spurious measurements was a prototype built from production-grade HiPR transceivers and production HiPR controller-modems running application firmware v.2.00beta which support the Store & Forward Repeater function.

PROPOSED CONDITIONS

Proposition to accept the request for the HiPR-900 Wireless Modem "Store & Forward Repeater" function, operating in the band of frequencies of 902-928 MHz as previously certified. The applicant anticipates marketing the device for use in wireless data transmission over unlicensed radio networks.

PERFORMANCE MEASUREMENTS

Measurements for equal spectral occupancy of the unit having the Repeater function enabled as per 2.1043 (b)(2) were conducted in accordance with the Rules and Regulations Section 2.1041 and Section 15.247 (a).(1). The revisions used were those of Rules Service Co rev.2-176 of July 15, 2006 and rev 15-58 of May 15, 2006. Equipment performance measurements were made in the Dataradio Inc. R&D laboratory located at 5500 Royalmount Ave, in Montreal, Québec, Canada. All measurements were made and recorded by myself or under my direction. The performance measurements were made between Nov 1-10, 2006

CONCLUSION

Given the measurements results contained herein, the applicant requests a Class II Permissive Change to be applied for the Certificate NP4-242-5099-100 for the addition of the Store & Forward Repeater function acceptance.



11/21/2006

Constantin Pintilei,
Dataradio Inc

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QUALIFICATIONS OF ENGINEERING PERSONNEL

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
13 Years experience in radio frequency measurements.

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

The certificate NP4-242-5099-100 has been granted to Dataradio COR LTD (DRL) for its HiPR-900 unlicensed frequency hopping spread spectrum (FHSS) radiomodem. HiPR-900 is comprised of a DRL 900MHz hopping transceiver and a Dataradio Inc HiPR controller-modem. DRL does the final assembly and markets the HiPR-900 units. At the time of the certification the units two main functions available were Master (Sync generator) and Remote (Sync listener).

The change intends to allow the addition of a store & forward Repeater function and its incumbent behavioral change in the network management. The unit with repeater function enabled will retransmit sync data at a certain percentage of its own data, as follows:

The HiPR-900 network maintains network hop timing based on the Master's transmitted sync packets. Through the Remote's internal timing processes, sync can be maintained without receiving every sync packet from the Master for a considerable period of time – making reception of every sync packets in the short term, redundant.

The unit having the Store & Forward Repeater function enabled will receive data during hop dwells and records data packets (using TCP/IP rules), sort data messages to relay, re-packetize and forward them back to the FHSS network. During hop dwells, it will also receive sync type information packets from the Master unit which re-sets the network timing of the unit to the network master sync.

Sync type packets on hop dwells are also repeated according to the internal frequency-hopping plan at the exact same time and frequency as the master. They are evenly distributed across channels with a probability to transmit so that the repeater can maintain itself in sync with the master and transmit enough syncs for the use of other units. The units in range will hear either the master sync or the repeated sync and always maintain hop sync. The units (in range) that hear a collision between the transmitted sync from a Master and Repeater will ignore the collision and use the internal table and existing dwell timing to hop to the next frequency at the exact correct time.

Together, the Repeater will maintain sync with a master, repeat sync and repeat payload data in the same scheme as originally applied for.

This permissive change involves only the above described functionality addition, which occurs on top of the media access control (MAC) layer, with no change whatsoever occurring to the frequency determining circuitry, maximum power rating or hopping scheme of the HiPR transceiver. Therefore a Class II Permissive Change request has been considered.

The characteristic which undergo changes while having this repeater function enabled is: Number of hopping frequencies while unit in repeater mode and only re-transmits sync dwells - 15.247 (a).(1)

During the tests, all of the 51 channels were indeed used by the unit set in Repeater function mode. The test report is available further below in this submission report.

GENERAL INFORMATION

(as per Rule Part Number: 2.1031 (b).(1),(2),(5),(6),(7))

MANUFACTURER/GRANTEE: Dataradio COR Ltd., Waseca, MN 56093
 (HiPR Transceiver and final assembly)
 DATARADIO Inc., Montreal, Qc. Canada, H4P 1H7
 (HiPR modem/controller)

APPLICANT Dataradio Inc., 5500 Royalmount Ave, suite 200,
 Town of Mount Royal (Montreal), Quebec, Canada, H4P 1H7

MODEL NUMBER: HiPR-900

CATALOG NUMBER: 242-5099-100

FCC ID NUMBER: NP4-242-5099-100

RULES AND REGS: FCC Part (s) 15.247

FREQUENCY RANGE: 902.000 MHz – 928.000 MHz

SERIAL NUMBER (S) : MASTER s/n 041106– test support equipment
 Production firmware V1.51 released 10/2006
 REPEATER s/n 042806 – unit under test for Repeater function
 Beta FIRMWARE V.2.0 beta released 11/3/2006

MAXIMUM POWER RATING: 1.00 Watt (.1 to 1-Watt variable)

MODULATION TYPE: 2 / 4-FSK

NUMBER OF HOPPING CHANNELS: 51-Channel, Modem controlled

INPUT IMPEDANCE: 50 ohms, Nominal

VOLTAGE REQUIREMENTS: 10-30 VDC or IEEE 802.3af Power-over-Ethernet (PoE)

EQUIPMENT IDENTIFICATION:

<u>TRADE NAME</u>	<u>DESCRIPTION</u>	<u>DRI PART NUMBER</u>
Transceiver	902-928 MHz RF Transceiver	023-5099-310
HiPR-900	Modem-Controller	255-03453-002
HiPR-900	Radiomodem	242-5099-100

DATA AND CHARACTERISTICS NOT AFFECTED BY THE CHANGE - Rule Part Number: 2.1033 (b), (1), (2), (4),(5),(6),(7),(8),(9),(10),(11),(12)

Manufacturer and applicant:	2.1033(b) (1)
FCC Identifier	2.1033 (b) (2)
Description Of Circuitry	2.1033 (b)(4)
Block and Schematics Diagrams	2.1033 (b)(5)
Photographs	2.1033 (b) (7)
Ancillary Devices	2.1033.(b) (8)
Data addressing Rule Part Number	2.1033(b) (9), (10),(11) and (12): this paragraphs do not apply
Test results not affected by the change	2.1033(b) (6), 2.1041

Test data according to:

Part 15: 15.35, 15.109, 15.111, 15.203, 15.204, 15.207, 15.209, 15.247

and

RF Exposure data according to:

Part 1: 1.1307, 1.1310 and Part 2: 2.1091(b)(d) and 2.1093

as follow:

- Antenna Requirement 15.203
- External Radio Frequency Power Amplifiers and Antenna Modifications 15.204
- Carrier Frequency Separation 15.247 (a)(1)
- 20 dB Bandwidth 15.247 (a)(1)
- System Receiver Input Bandwidth 15.247 (a)(1)
- Time of Occupancy (Dwell Time) 15.247 (a)(1)(i)
- Number of Transmit Frequencies 15.247 (a) (1) (i) – **see note below.**
- Peak Output Power 15.247(b)(2)
- De Facto EIRP Limit 15.247(b)(3)
- Band-edge Compliance of RF Conducted Emissions 15.247 (c)
- Spurious RF Conducted Emissions 15.247 (c)
- Spurious RF Radiated Emissions 15.247(c), 15.209, 15.35(b)
- RF Exposure Compliance Requirements 15.247(i), 1.1307, 1.1310, 2.1091(b)(d), 2.1093
- Antenna Power Conduction Limits for Receivers 15.111
- Spurious RF Radiated Receiver Emissions on Non-radiating Load 15.109
- Conducted Limits (ac Power Line Conducted) 15.207, 15.35(b)

Note: The proposed store & forward Repeater function will enrich the basic Remote unit functionality. Therefore, when there is data to be transmitted from the unit, this will occur as in genuinely Remote function, regardless if this data was first stored in the unit or just presented at the input data ports. In such case the number of transmit frequencies was already proved to be 51 channels.

The difference for the proposed Repeater function gets noticed when the unit with this function enabled re-transmits sync-driven dwells, which is genuinely a Repeater transmission. For this kind of dwells the number of transmit frequencies was tested again to verify its compliance, as described in next page.


DATA AND CHARACTERISTICS AFFECTED BY THE CHANGE - Rule Part Number: 2.1033(b) (3),(6)

Instruction book 2.1033 (b) (3)

In order to accommodate the Store & Forward Repeater function, the 1st set-up wizard screen (ref. User Manual page 29) is going to have added a “Repeater “ option. Since the unit adjustments for “Repeater” function are the same as the ones for “Remote” function, that change is the only one required to user manual. Page 29 will be going to be changed as the below sample page:

4.5 Setup Wizard (Bridge Mode)

Four pages of the quick setup wizard have buttons to “Apply your changes” or to “Cancel your changes” during the setup process. Once all five pages are done, use the “Save Config” and the “Reset Unit” buttons to make parameter settings permanent.

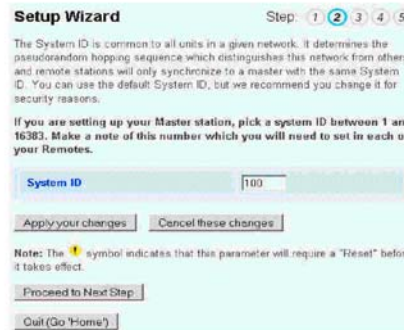
If a change is made to any parameter marked:  you will need to do a “Save Config” and a “Reset Unit”.

4.5.1 Procedure

1. Select “Setup Wizard” on the top-level menu list, or click the link on the “Attention” sub-window (Figure 12) above.
2. Step one: (Figure 13) of the Setup Wizard, read the on-screen instructions. Once the Operating mode is selected, click Apply Your Changes. Wait for the Progress bar activity to stop (right side of the Status bar). Click on Proceed to Next Step. If no change is made to the Operating mode, click on Proceed to Next Step.
3. Step two: (Figure 14) of the Setup Wizard, read the on-screen instructions. Once the System ID is entered, click Apply Your Changes. Wait for the Progress bar activity to stop (right side of the Status bar). Click on Proceed to Next Step. If no change is made to the System ID dialog box, click on Proceed to Next Step.



Figure 13 - Setup Wizard - Page One



Figure

re 14 - Setup Wizard - Page Two

Test data according to: 2.1033 (b) (6), 15.247 (a)(1)
Characteristic re-tested: Number of transmit frequencies

The only difference for the proposed Repeater function that gets noticed is when the unit with Repeater function enabled re-transmits sync type packets on transmit dwells. Sync type packets on hop dwells are also repeated according to the internal frequency-hopping plan at the exact same time and frequency as the master. They are evenly distributed across channels with a probability to transmit so that the repeater can maintain itself in sync with the master and transmit enough syncs for the use of other units.

This is genuinely a Repeater transmission. For this kind of dwells the number of transmit frequencies was tested again to verify its compliance and it was found compliant as the unit covered all the 51 channels. The test report follows on next pages.

Test Report: Number Of Transmit Frequencies When Unit In Repeater Mode And Only R-Transmits Sync Dwells

The test report has been generated for FCC Certification of the Dataradio 902-928 MHz wireless modem, part number 242-5099-100

RULE PART NUMBER: 15.247 (a) (1) (i),

MINIMUM STANDARD: If the 20 dB BW of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies; if the 20 dB BW of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies..

TEST RESULTS: 51 channels. Meets minimum standard (see data on the following page)

TEST CONDITIONS: Standard Test Conditions, 25 C
Measurements were conducted following the procedures set forth in the TIA/EIA-603 and FCC Part 15 standards for RF conducted measurement at antenna terminals

TEST PROCEDURE: Conducted peak-hold power measurement. The RF band from 902 – 928 MHz has a 500kHz guard band on each end and the remaining spectrum (902.5-927.5MHz) is used for hopping. These frequencies are divided into 51 (500kHz) channels.

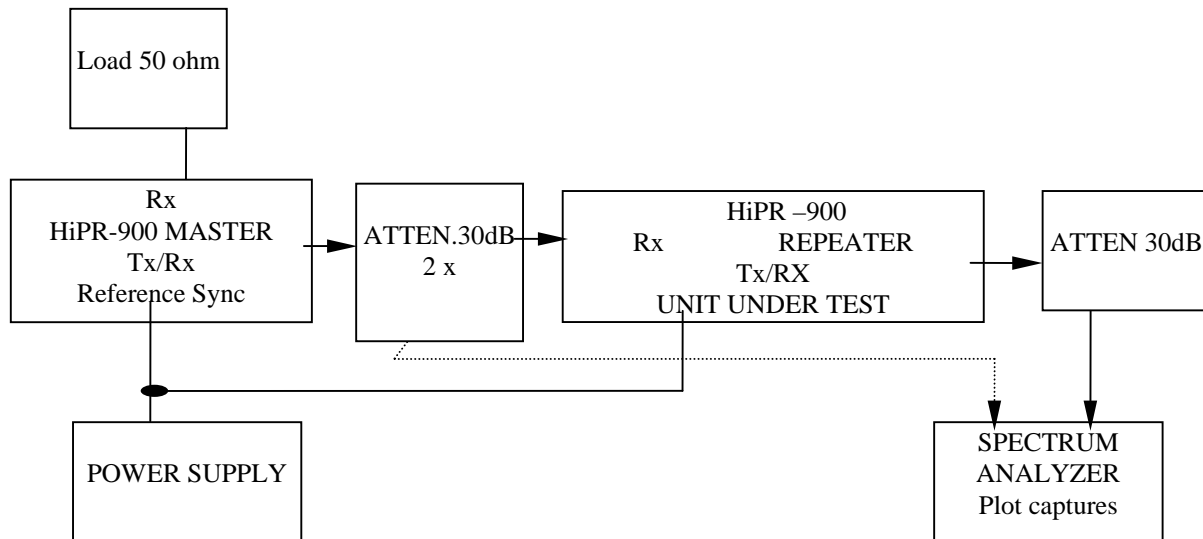
TEST EQUIPMENT: Attenuator, MECA Model /600-30-3 / 30 dB / 1 Watt – 3pcs
Attenuator, Pasternak Model PE7015-6/ 6dB/5W – at the input of the analyzer
DC Power Source, Model Astron VS-20M
Spectrum Analyzer, Model E4401B.
50Ω Load, cables, adapters

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PERFORMED BY: _____ Date: 11/14/06

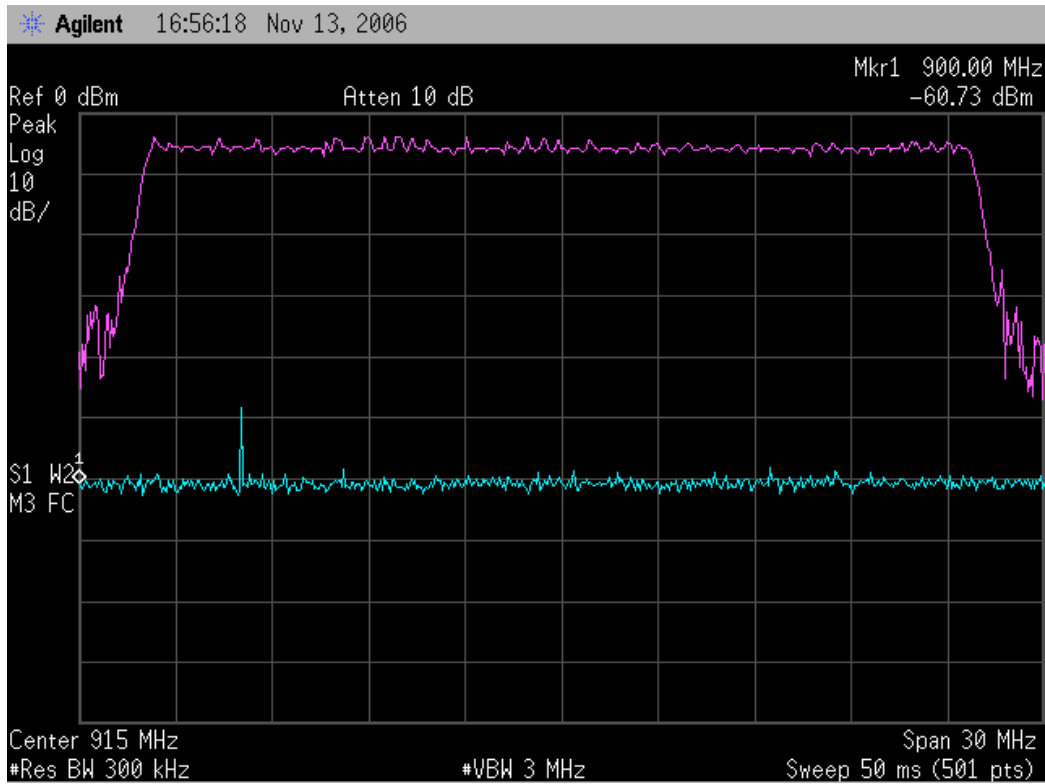
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TEST SETUP:



PLOT CAPTURES:

Master unit reference spectrum occupancy



Unit in Repeater mode, no data condition; peak hold for 50minutes, 51 channels across 902.5-927.5MHz

