

EXHIBIT 1: Particulars of Operation (Form 442 item 4)

Frequency (MHz)	Power	Emission	Modulation	Bandwidth	Purpose
118.000	Note 1	A3E	Note 2	Note 3	Note 4
121.125	Note 1	A3E	Note 2	Note 3	Note 5
121.150	Note 1	A3E	Note 2	Note 3	Note 5
121.175	Note 1	A3E	Note 2	Note 3	Note 5
121.200	Note 1	A3E	Note 2	Note 3	Note 5
121.225	Note 1	A3E	Note 2	Note 3	Note 5
121.250	Note 1	A3E	Note 2	Note 3	Note 5
123.450	Note 1	A3E	Note 2	Note 3	Note 6
127.325	Note 1	A3E	Note 2	Note 3	Note 4
131.200	Note 1	A3E	Note 2	Note 3	Note 5
131.225	Note 1	A3E	Note 2	Note 3	Note 5
131.250	Note 1	A3E	Note 2	Note 3	Note 5
131.275	Note 1	A3E	Note 2	Note 3	Note 5
131.300	Note 1	A3E	Note 2	Note 3	Note 5
131.325	Note 1	A3E	Note 2	Note 3	Note 5
131.350	Note 1	A3E	Note 2	Note 3	Note 5
136.975	Note 1	A3E	Note 2	Note 3	Note 4

Note 1: Planned maximum carrier R.F. power at the transmitter terminals is 10 watts (mean). Planned maximum effective radiated power from the antenna is 20 watts (mean). Emission is not pulsed.

Note 2: Maximum planned audio modulation is 5 kHz.

Note 3: Necessary bandwidth is 10 kHz, based on 5 kHz maximum planned audio modulation. Planned authorized bandwidth is 25 kHz, based on FCC Part 87 paragraph 87.137.

Note 4: The lowest, middle, and highest channels were selected as representative for performance evaluation.

Note 5: The FAA requires demonstration of adequate isolation between these VHF Com frequencies and GPS receivers. Only ground test is required for this purpose.

Note 6: Flight test frequency, for use with II Morrow-operated station FCC License WND9.

EXHIBIT 2: Experimental Program Description (Form 442 item 10)

(a) Proposed program of research and experimentation including description of equipment and theory of operation.

II Morrow is currently developing an FCC Part 87 VHF Transceiver to the technical requirements of FAA TSO-C37d, TSO-C38d, and TSO-C128 for use as the primary Communications radio installed in FAR Part 23 aircraft, airport ground mobile vehicles, and other aviation services applications. The 760-Channel transceiver and associated power supply, audio I/O and display driver circuits will be completely contained in a single board assembly designed to fit into several planned II Morrow products.

The first product, Model SL40, is expected to be ready to begin FAA & FCC qualification tests in August 1996. The same 760-channel transceiver board will be integrated into the Model SL60 (a combined VHF Comm and GPS navigation receiver unit). An identical or slightly modified transceiver board will be integrated into at least two other aviation products (project-named NP96-C and NP96-GC) with a different display. Integration and qualification of these and other related products are expected to take about one year.

II Morrow Inc. is a wholly owned subsidiary of United Parcel Service of America, Inc., and as such meets the requirements of FCC 5.4 and FCC 87.19. II Morrow currently operates an aviation services station (FCC license WND9) on the flight test frequency of 123.45.

Planned development tests

Two forms of off-air testing are required for type accepting the VHF Com radio for use in the aviation services category (FCC Part 87.171 Station Class MA). They are: Part 2 for "Type Acceptance" with specific requirements listed in Part 87; and, Part 15 for "Unintentional Radiators."

In addition to off-air (type acceptance) tests, II Morrow plans to conduct actual radio transmission tests to verify performance with representative qualified antennas, to demonstrate non-interference with GPS receiver operation, and to demonstrate non-interference with other air and ground vehicle systems.

FCC Part 15 Radio Frequency Devices

Transmitter: FCC Part 15 Subpart C provides spurious emissions requirements for intentional radiators. The conducted emission limits of 15.207 do not apply, since the planned products do not connect to AC mains directly or indirectly. Radiated emissions will be verified to the limits of 15.209 (a) in transmit mode.

Receiver: Several interlocking regulations form the basis for FCC Notification (using FCC Verification procedures) of the receiver. Compliance with FCC Part 15, Subpart B Unintentional Radiators is exempted for a "digital device utilized exclusively in any

transportation vehicle including ... aircraft” according to 15.103(a). However, FCC notification is required for “All other receivers subject to Part 15” according to 15.101(a). In 15.101(b), “...receivers that operate (tune) within the frequency range of 30-960 Mhz...are subject to the authorizations shown in paragraph (a)... However, receivers indicated as being subject to notification that are contained within a transceiver, the transmitting portion of which is subject to type acceptance...shall be authorized under the verification procedure.”

Based on these regulations, compliance with Class B spurious radiation limits will be verified in the receive mode by testing in accordance with ANSI C63.4 1992. This is a test of the equipment to verify that unintentional radiation is within acceptable standards when the equipment is in the receive mode. This test will be performed at a distance of 10 meters according to CISPR 22 methods (as allowed by ANSI C63.4), so one test will satisfy both European (EN55022) and FCC specifications. The receiver will be tuned to the center of the VHF Com band during emissions tests. If capability to tune (receive only) to FM Weather stations in the 161 to 163 Mhz band is included in the product, emissions tests will be repeated with the receiver tuned to a representative weather station.

FCC Part 87 Aviation Services & Part 2 Type Acceptance

Testing and data collection for the tests listed in Table 1 will be accomplished in conjunction with testing performed under RTCA DO-186. The test results will be submitted to the FCC for “Type Acceptance” in accordance with Part 2 paragraph 2.901 et. seq.

Table 1 FCC Type Acceptance Testing		
Test	FCC Paragraph	Comments
RF Power Output	2.985	DO-186 2.3.1 & 2.7.2.1
Modulation Characteristics	2.987	DO-186 2.3.3 & 2.7.2.3
Occupied Bandwidth	2.989	DO-186 2.3.7 & 2.7.2.7
Spurious Emissions at Antenna Terminals	2.991	DO-186 2.3.7 & 2.7.2.7
Field Strength of Spurious Radiation	2.993	DO-186 2.3.7 & 2.7.2.7
Frequency Stability	2.995	DO-186 2.3.11 & 2.7.2.11

FCC Part 5 Experimental Radio Service

Under FCC Part 5 paragraph 5.202(g), stations operating in the Experimental Radio Service are licensed to conduct “testing of equipment in connection with production or type approval of such equipment”. Prior to completion of the qualification and type acceptance tests described above, II Morrow plans to test transmission performance of the Model SL40 or related products. As detailed in Form 442 Exhibit 1, transmission tests will be performed: on representative Aviation Services VHF Comm Channels to ensure product quality and subsequent customer satisfaction, on specific channels to demonstrate that VHF Comm operation will not interfere with GPS navigation receivers also installed

in these products, and on representative channels to demonstrate non-interference with other existing air or ground vehicle systems.

(b) The specific objectives sought to be accomplished.

For the II Morrow p/n 415-7002-00 VHF Comm Board assembly:

- (1) Demonstrate acceptable transmission quality on representative channels.
- (2) Demonstrate non-interference with GPS equipment operation.
- (3) Demonstrate performance and non-interference with typical land mobile systems.
- (4) Demonstrate performance and non-interference with typical aircraft systems.

Similar tests will demonstrate performance with the board installed in several II Morrow products.

(c) How the program of experimentation has a reasonable promise of contribution to the development, extension, or utilization of the radio art, or is along line not already investigated.

The product line of VHF Comm radios being developed by II Morrow offer significant benefits to aviation service users in quality, value, and features not currently available.

For example, the receiver allows automatic priority monitoring of a channel (for intermittent transmissions) while otherwise listening continuously to another channel. This feature allows a II Morrow radio operator to keep fully informed on any communications on the Flight Control frequency while he is temporarily listening to information of lesser priority on a Unicom, Flight Test, or other channel. In currently available equipment, this function requires two separate receivers and an audio mixing panel. The relatively costly installation of currently available equipment is still functionally inferior, since the lower priority message interferes with the priority message, requiring operator action to turn down volume or otherwise manually disable the lower priority message. The II Morrow product automatically interrupts the lower priority message with the priority message, reducing operator work-load and ensuring delivery of the priority message.