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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of	)	
	)	
Reallocation of the 216-220 MHz,	)	WT Docket No. ~~02-08~~ 02-8
1390-1395 MHz, 1427-1429 MHz,	)	RM-9267
1429-1432 MHz, 1432-1435 MHz,	)	RM-9692
1670-1675 MHz, and 2385-2390 MHz	)	RM-9797
Government Transfer Bands	)	RM-9854
	)	RM-9882

To: The Commission

PETITION FOR PARTIAL RECONSIDERATION

Aerospace and Flight Test Radio Coordinating Council ("AFTRCC"), by its counsel and pursuant to Section 1.106 of the Commission's Rules, hereby seeks partial reconsideration of the Commission's *Report and Order* in the above-captioned proceeding (the "*R&O*" or "*Report and Order*"), FCC 02-152, released May 24, 2002.[1]

In the *R&O* the Commission adopted service rules for the 27 megahertz of spectrum transferred from Government to non-Government use pursuant to the Omnibus Budget Reconciliation Act of 1993 ("OBRA-93") and the Balanced Budget Act of 1997 ("BBA-97").[2] This includes the 1432-1435 MHz and 2385-2390 MHz bands. AFTRCC seeks partial reconsideration of service rules adopted for these bands.

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[1] A summary of the *R&O* was published in the Federal Register on June 20, 2002. 67 FR 41847. This Petition is therefore timely filed.

[2] *See Reallocation of the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands (Report and Order and Memorandum Opinion and Order)*, ET Docket No. 00-221, FCC 01-382, released January 2, 2002 (hereafter "*Reallocation Report and Order*").

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I.

INTRODUCTION

AFTRCC is an association of aerospace companies engaged in the design, development, manufacture and testing of commercial and military aircraft, space vehicles, missiles and weapons systems. Members of AFTRCC include the major U.S. manufacturers of military and commercial aircraft. AFTRCC is also the FCC-recognized Non-Government advisory committee for coordination of flight test frequencies shared by Government and Non-Government users. *See* 47 C.F.R. Section 87.305. AFTRCC works closely with its counterpart Government coordinators in order to ensure prompt, efficient coordination of flight test frequencies. AFTRCC has a long history of participation in spectrum policy issues relative to flight test telemetry and voice frequencies. This includes initiating the private sector efforts which led to the allocation of radio spectrum for aeronautical telemetry in the 1435-1525 MHz and 2360-2390 bands.

Aeronautical telemetry is used to provide critical operational and telecommand data between ground facilities and the aircraft, space vehicle, missile or weapons system under test. In addition to the 1435-1525 MHz band, flight test telemetry is transmitted in the 2360-2385 MHz band (and until January 1, 2007 at a number of sites, up to 2390 MHz).

Flight test communications are critical to U.S. industry's ability to develop and deliver as efficiently as possible aircraft, space vehicles and military equipment. Moreover, flight test telemetry performs a critical safety function: The telemetry link enables ground-based engineers to monitor in real-time conditions aboard the aircraft so as to detect and avert possible threats to the life of the pilot, to neighboring communities, or to major investment in one-of-a-kind prototype aircraft.

AFTRCC filed Comments on March 4, 2002, responding to the Commission's *Notice of Proposed Rule Making*[3] in this proceeding. AFTRCC focused on appropriate rules for avoiding interference to flight test operations in the 1435-1525 MHz and 2360-2385 MHz bands. In particular, AFTRCC requested that the Commission provide interference protection to flight test operations emanating from the 1435-1525 MHz and 2385-2390 MHz bands.

In seeking adjacent band protection AFTRCC explained that

> flight test operations are characterized by a combination of weak signals, wide bandwidths (5 MHz and potentially higher), and high-gain ground receiving antennas. Test aircraft use transmitters with output power levels of 20 watts and less, and operate at ranges up to 200 miles from the telemetry ground stations. Services operating in adjacent transferred bands could have effective output levels orders of magnitude greater than aeronautical telemetry transmitters.

AFTRCC Comments at 4.

AFTRCC specifically urged the Commission to adopt a coordination requirement for commercial operations in the 1432-1435 MHz and 2385-2390 MHz bands as against adjacent band flight test operations.[4] As AFTRCC explained, the potential for interference to flight test operations is dependent on the permitted characteristics for interfering transmitters, including antenna power, antenna height, and intervening terrain. AFTRCC Comments at 6-7. Thus, AFTRCC stated that commercial band operators seeking to locate transmitters within the same coordination zone for protected sites as was specified for in-band operations (i.e., 100 miles),

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[3] FCC 02-15, released February 6, 2002.

[4] Licensees in the 2385-2390 MHz band are required to coordinate their proposed operations with in-band flight test operations which will continue at 26 sites on a primary basis until January 1, 2007. *See Reallocation of the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands (Report and Order and Memorandum Opinion and Order)*, ET Docket No. 00-221, FCC 01-382, released January 2, 2002 ("*Reallocation Report and Order*") at para. 71.

should be required to coordinate with AFTRCC in advance, specifying the proposed operating parameters. That notice should also include a determination of the power flux density (pfd) expected at the telemetry receive site. In this regard, AFTRCC referenced relevant internationally-accepted standards for protection of flight test telemetry, in particular, International Telecommunications Union Recommendation ITU-R Rec. M.1459. Rec. M.1459 specifies a protection level of -181 dBW/m^2/4 KHz. AFTRCC Comments at 5.

The Commission's *Report and Order* adopted various Rules and policies for the 1432-1435 MHz and 2385-2390 MHz bands. Insofar as those Rules and policies are pertinent to this Petition, the *R&O* included the following determinations.

First, the Commission denied AFTRCC's proposal for adjacent band coordination. Although the Commission "recognize[d] the importance of aeronautical flight test telemetry," it stated that an adjacent band coordination requirement for licensees in the 1432-1435 MHz and 2385-2390 MHz bands "would be onerous and potentially harmful to the viability of operations in these bands overall." *R&O* at para. 177. The Commission stated its further belief that "the more appropriate approach" is to provide adjacent band interference protection "only to the extent that such radiation exceeds the limits on out-of-band emissions established for that service." *Ibid.*

Second, the Commission limited out-of-band emissions ("OOBE") for both the 1432-1435 MHz and 2385-2390 MHz bands to 43 + 10 log(p) dB below the in-band transmitter power (p). Compliance with this standard is to be based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent (1%) of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth. *R&O* at paras. 127, 131.

Third, the Commission adopted power limits for operations in the 1432-1435 MHz and 2385-2390 MHz bands of 2000 watts EIRP for fixed transmitters and 4 watts EIRP for mobile units. In the 2385-2390 MHz band, the 4 watt EIRP limit also applies to aeronautical mobile units. *R&O* at paras. 137, 138. There are no antenna height limits. *Ibid.*

This Petition has followed.

II.

DISCUSSION

A. The OOBE Rule Does Not Adequately Protect Flight Testing

The OOBE rule does not adequately protect flight test operations under a range of likely scenarios involving the power levels permitted for 1432-1435 MHz and 2385-2390 MHz commercial operations.

Attached hereto is an Engineering Statement from Daniel J. Jablonski of the Johns Hopkins University Applied Physics Lab explaining the situation. As Dr. Jablonski observes, use of the OOBE rule could lead to 1432-1435/2385-2390 MHz signal levels well in excess of the level required to protect telemetry receivers – and this could occur many miles from the interfering transmitters. This is particularly the case with directional transmitting antennas since the OOBE rule does not account for transmit gain.

For example, in the case of a fixed transmitter operating directionally at the limit of 2000 watts EIRP, out-of-band signals greater than –181 $dBW/m^2/4$ KHz could be produced over 100 miles away, yet still be in compliance with the OOBE rule. Of course, there would not be a line of sight transmission path between the fixed transmitter and the telemetry receiver at this distance. Taking this into account, a safe and reasonable coordination distance for the adjacent

band case should be the same 100 mile radius around the protected sites which is applicable for 2385-2390 MHz in-band coordination.[5]

B. The Failure to Adequately Protect Flight Testing Is Contrary to Administrative Law.

The *Report and Order's* rationales for rejecting adjacent band coordination fail the test of reasoned decision-making.

The *Report and Order* rejected AFTRCC's request essentially for four reasons: (1) the adjacent band coordination proposal "would be onerous and potentially harmful to the viability of operations in these bands [1432-1435 MHz and 2385-2390 MHz] overall"; (2) "the existing coordination procedures, which require coordination of in-band 2385-2390 MHz operations within 160 kilometers (100 miles) of each flight test site, is adequate protection ..."; (3) "the more appropriate approach is to afford aeronautical flight test telemetry operations protections from adjacent-based interference only to the extent that such radiation exceeds the limits on out-of-band emissions established for that [sic] service"; and (4) "[b]ecause there are a limited number of sites where aeronautical flight test operations may arise, we believe that such operations can be accommodated on a case-by-case basis." Id. at para. 177. None of these holds water.

In reverse order, reason number (4) is meaningless in practical terms: To say that "such operations can be accommodated as a case-by-case basis" says nothing about whose responsibility it is to do the "accommodat[ing]." Since the interfering transmitter is the 1432-1435/2385-2390 MHz unit, and the victim flight testing, this leaves flight testing without any

[5] Dr. Jablonski's concerns were in effect presaged by NTIA which four years ago raised concerns about adjacent band interference into flight testing from operations in transferred bands. See *Spectrum Reallocation Report, Response to Title II of the Balanced Budget Act of 1997*, NTIA Special Publication 98-36, February 1998, at 46.

protection at all. While this may provide another way of stating a result the agency determined to reach, it is irrational as a basis for deciding not to grant flight test operations the requested protection.

Reasons (3) and (2) fare no better analytically. Reason (3) (flight testing is only entitled to the level of protection granted in the rules) begs the question: Obviously, no service is entitled to a level of protection greater than that established by the agency. But the issue is not whether flight testing is entitled to a level of protection not recognized by Commission Rule or policy. The issue is whether the level established here is lawful.

Reason (2) is equally fallacious: The fact that the agency established a coordination zone for flight test operations conducted "in-band" with commercial operations at 2385-2390 MHz is not germane to the issue of adjacent band coordination (it is even less relevant to interference emanating out of 1432-1435 MHz), and therefore has no logical connection to rejection of the AFTRCC coordination requirement proposal.

Finally, that leaves reason (1), i.e. the observation that adjacent band coordination would be too "onerous" or threaten the commercial viability of 1432-1435/2385-2390 MHz operations if based on the in-band (or co-channel) coordination criterion of 100 miles. Id. at para. 177. This notion is both unsupported -- and unsupportable.

First of all, the Commission adopted a 100 mile coordination zone for the in-band case. There was no suggestion by the Commission that this level of coordination places any meaningful burden at all on the wireless service, much less an undue burden.

Second, frequency coordination is routinely required in wireless services, and has never been viewed, per se, as unusually burdensome: Were it otherwise, much of the Commission's

regulatory framework for wireless services -- which framework frequently depends upon frequency coordination -- might be viewed as unfounded.[6]

Third, the responsibility associated with adjacent band coordination must be balanced against the costs and disruption to the 1432-1435/2385-2390 MHz operator and its customers associated with attempts to resolve flight test interference complaints after-the-fact. The Commission itself has recognized through hard experience the advantages to correcting in-band interference via prior coordination -- as opposed to waiting until the interference horse is out of the transmitter barn -- in the very *Report and Order* at issue. See id. at para. 174 (prior coordination "facilitates the resolution of potential interference problems before an application is formally filed").

Thus, even from the standpoint of the 1432-1435/2385-2390 MHz operator, adjacent band coordination makes more sense than reliance on post hoc attempts at resolution. But even if it be conceded for the sake of argument that prior coordination entails responsibilities an operator otherwise would not have, the public interest requires that those responsibilities be weighed against the extraordinary costs and risks that 1432-1435/2385-2390 MHz interference entails for flight testing. Viewed in this light, the public interest calculus is clearly in favor of coordination as proposed.

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[6] Frequency coordination would be particularly straightforward here given the finite, well-defined areas requiring protection, on the one hand, and the very limited number of licensees at 1432-1435 and 2385-2390 MHz for which coordination would be required, on the other hand. Only one nationwide license is to be issued for 2385-2390 MHz; only two licenses for each of the six Economic Area Groupings contemplated for 1432-1435/1392-1395 MHz (a number of which are likely to be band managers well familiar with the use of coordination to protect adjacent band, safety-related communications such as with the 700 MHz Guard Bands). For example, the two DARS licensees, Sirius and XM Satellite Radio, were able to readily achieve coordination for 2.3 GHz DARS terrestrial repeaters with flight test operations.

Interference to flight test telemetry corrupts the data being collected and, if serious enough, can require re-flying an entire mission. Flight testing is a complex and sizeable undertaking often involving scores of technical personnel, banks of equipment distributed around the range, chase planes, emergency vehicles, and the like. If a test flight or a portion thereof has to be re-flown due to interference to the telemetry stream, this entails major costs for the operator. These costs are further increased if, due to spectrum congestion or other factors, the flight can not be immediately re-scheduled, or the re-scheduled flight must bump some other flight. In short, there is no comparison between the potential costs of missed communications to flight test operations versus that of the typical CMRS call.

More importantly, however, are the safety risks to the aircrews and persons on the ground. Telemetry serves as a real-time link between the pilot and ground engineers. During critical flight test maneuvers, engineers continuously monitor key flight data sensors such as strain gauges, temperature and pressure gauges, vibration monitors and the like. In the event of an anomaly, these engineers (who have "hot," that is, open mikes to the pilots) are able to immediately warn the pilot to abort the test before a catastrophic failure occurs. Interference to communications like this is completely unacceptable.

The Commission has long recognized the safety-of-life implications to flight test telemetry. "[F]light test, telemetry, and telecommand operations are vital to the U.S. aerospace industry to produce, deliver, and operate safe and efficient aircraft and space vehicles.... [I]nterference to these operations ... threaten[s] safety of life and property."[7]

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[7] *Inquiry Relating to Preparation for the International Telecommunications Union World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum*, 5 FCC Rcd 6046, 6061 (1990).

Judged in this light, the *Report and Order*'s reliance on a one-size-fits-all OOBE rule, and its failure to consider the consequences for flight testing, is completely out of place. Which is to say that the *Report and Order* lacks the essential foundation for lawful decision-making. As the Court of Appeals has said, administrative agencies must give "reasoned consideration to all ... the material facts and issues". *Greater Boston Television Corporation v. FCC*, 444 F.2d 841, 851-852 (D.C. Cir. 1970). This the *Report and Order* failed to do.

III.

CONCLUSIONS

For the reasons stated, the Commission should adopt the proposed adjacent band coordination requirement for commercial operations in 1432-1435 and 2385-2390 MHz in order to ensure a proper level of protection for critical flight test telemetry communications.

Respectfully submitted,

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Technical Analysis of the Need for an Adjacent Band Coordination Requirement for Commercial Operations in the Bands 1432 – 1435 MHz and 2385 – 2390 MHz

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21 July 2002

This statement addresses the recent Report and Order concerning reallocation of the 1432 – 1435 MHz, 2385 – 2390 MHz, and related "Government Transfer Bands".[1] Specifically, the analysis addresses whether commercial operations in bands adjacent to those currently used for flight test telemetry should be coordinated with flight test operators. As discussed below, out-of-band emissions from the bands 1432 – 1435 MHz and 2385 – 2390 MHz will adversely affect flight test telemetry operations in the bands 1435 – 1525 MHz and 2360 – 2385 MHz.

Background

The relative distances and power levels involved are critical to analysis of this issue. Flight test aircraft utilize transmitters with output power levels of 20 watts and less, and operate at ranges of up to 200 miles from the telemetry ground stations. Terrestrial transmitters in this portion of the spectrum, on the other hand, can have effective output levels of several kilowatts, as discussed below, with the potential for operation in close proximity to flight test ground stations. Furthermore, flight test ground stations use high gain tracking antennas with directivities as high as 41 dBi. This is 39 dB higher than a typical omnidirectional antenna used on a low power handset, and 26 dB higher than a typical directional antenna used on, for example, a cell phone base station tower.

Protection requirements for flight test telemetry operations are defined in International Telecommunications Union Recommendation ITU-R M.1459. Although this Recommendation deals with interference to flight test telemetry from satellites at 1452 – 1525 MHz and 2310 – 2360 MHz, its analyses and conclusions apply to the entirety of the flight test bands and to interference from all sources.

For low elevation angles α between flight test ground stations and the test aircraft that are transmitting telemetry signals, ITU-R M.1459 specifies maximum interference levels to be

[1] FCC Report and Order 02-152, 24 May 2002, regarding ET Docket #00-221.

-181 dB(W/m^2) per 4 kHz from 1452 – 1525 MHz, $0 < \alpha < 4$ degrees

and

-180 dB(W/m^2) per 4 kHz from 2310 – 2360 MHz, $0 < \alpha < 2$ degrees

The pfd levels cited above represent the total interference seen by a flight test ground system from all interferors that are within the field of view of the ground site receive antenna. Also, these protection levels depend on the elevation angle α, and become less severe as this angle increases.

For the anticipated commercial operations in the bands 1432 – 1435 MHz and 2385 – 2390 MHz, the FCC proposes the standard out-of-band emissions limit of

43 + 10log(p) dBW per 1 MHz bandwidth,

which corresponds to an absolute out-of-band power level of $10^{-4.3}$ Watts per MHz, measured at the output terminals of the transmitter or power amplifier used by the commercial operator(s). Note that this level is independent of a transmitter's in-band power level, but does not account for the effects of the directive gain of the antenna to which the transmitter is connected.

EIRP levels allowed for commercial operations in the bands 1432 – 1435 MHz and 2385 – 2390 MHz are up to 4 Watts for mobile operation, and 2 kw for fixed based transmitters.

Under many circumstances, airborne, land mobile, and fixed site transmitters operating in one or another of the bands 1432 – 1435 MHz and 2385 – 2390 MHz will be in view of flight test ground stations. Airborne transmitters at 2385 – 2390 MHz will be visible at ranges of hundreds of miles, depending on the altitude of the airborne platform. Land mobile transmitters will also be an issue, despite their limited line of sight range (relative to the airborne case). Of even more concern, high power fixed site transmitters can be located on towers or at other locations of relatively high elevation. Their combination of high EIRP and deliberately optimized long distance visibility create conditions that are conducive to significant interference, even at long distances.

Hence, it is important to consider the circumstances for all three cases: *land mobile*, *airborne*, and *fixed-site*, under which out-of-band interference to flight test operations will be a problem.

Discussion

With respect to the protection levels given in Recommendation ITU-R M.1459, it is straightforward to compute the separation distance under which out-of-band transmissions from airborne transmitters in the band 2385 – 2390 MHz exceed the levels

required to protect flight test telemetry operations. Normalizing the protection levels to the 1 MHz bandwidth used in the out-of-band limit, the protection level given above for flight test increases by 24 dB,

$$-156 \text{ dB(W/m}^2\text{) per MHz}$$

Using the standard inverse r^2 law, a 4 Watt airborne transmitter with an ideal omni-directional antenna will have its out-of-band emissions of $10^{-4.3}$ W/MHz decrease to this level at a distance r of 126 km.

For two antennas located at heights h_1 and h_2 above the local surface of the earth, the maximum line-of-sight range between them is given by

$$D = (2h_1)^{.5} + (2h_2)^{.5}$$

where D is in miles and h is in feet.

For a ground station flight test telemetry antenna with h_1 equal to a nominal value[2] of 20 feet, the line of sight distance D = 126 km = 79 miles is achieved for aircraft flying at altitudes of 2600 feet or higher. Even small general aviation aircraft routinely fly this high above the ground.

Thus, out-of-band emissions from airborne transmitters in the band 2385 – 2390 MHz can be expected to be a routine source of interference that will compromise the effectiveness and safety of flight test operations conducted in the adjacent bands.

For the case of land mobile transmitters, line of sight visibility is of course more limited. Signal attenuation due to ground propagation effects can also be considerable. With the land mobile antenna at a height of 6 feet above the ground, the line of sight distance is reduced to 9.8 miles, or 16 km. The relative signal improvement gained by reducing the antenna separation from 126 km to 16 km is 18 dB. Under many circumstances, attenuation due to terrain and/or foliage blockage is unlikely to create a compensating 18 dB of loss, which is what would be required in order to reduce interference levels to those stipulated in Recommendation M.1459. Moreover, flight test ground sites can be located in areas of ranges in which operation of considerable numbers of land mobile transmitters within close proximity is not only possible but is likely. At some flight test ranges, for example, the ground site antennas are located a mile or less from security perimeters beyond which civilian access and activity are unrestricted.

Fixed site, high power transmitters in the transfer bands of interest pose another problem. Since the out-of-band emission level adopted in the Report and Order does not account for antenna gain, the out-of-band power flux density levels of these fixed base transmitters could be quite high. Suppose, for example, a 4 Watt transmitter that satisfies the $10^{-4.3}$ W limit specified above is connected to an antenna with a directional gain of 27

[2] Flight test receive antennas are typically located on platforms or earthen berms to reduce blockage due to foliage or low structures.

dB. This will increase the EIRP to the 2000 watts permitted under the Report and Order for a fixed site transmitter. However, the out-of-band power level, per MHz, will also have increased 27 dB, while still satisfying the Commission's out-of-band power rule of 43 + 10log(p), as measured at the transmitter terminals.

Increasing the transmitted out-of-band power by 27 dB increases the protection radius significantly. Every 6 dB increase in unwanted power requires the protection radius to be doubled. For example, a 24 dB increase in power requires a factor of 16 increase in the required protection radius.

For the case here, the worst-case 27 dB increase in out-of-band emissions when using a high gain antenna with a low power transmitter would raise the protection radius from 126 km to more than 2000 km. Obviously, in this situation the interfering source will be well over the horizon, and out of sight. Thus, the pertinent question is what the line of sight limit for a nominal fixed site base station will be. This cannot be known at the present time since, among other things, an analysis must include both the effects of locating the transmitter antenna on a tower, and/or taking advantage of local terrain features, e.g., placing the transmitter on top of a hill or mountain. Nonetheless, we do know that such antennas would likely be located at relatively high elevations. As one example, near Albuquerque, NM, the site of a flight test facility, many commercial antennas are located on Sandia Peak, which is several thousand feet above the surrounding terrain and affords a huge line of sight distance.

Existing coordination requirements for in-band interference at these frequencies generally stipulate a coordination radius of 100 miles, or 160 km. At this distance, line of sight visibility between the fixed site transmitter and a flight test antenna 20 feet above the ground would exist for a transmitter height of 4387 feet. This leads to the reasonable conclusion that for high power, fixed site transmitters, there is also a need for adjacent band coordination.

Summary and Conclusions

Given the large protection radii derived above, it is useful to summarize why flight test telemetry systems require such stringent protection levels. Unlike commercial systems, such as cell phones, that operate near these bands, flight test ground stations use extremely high gain tracking antennas. Gains of 20 - 40 dBi for parabolic tracking antennas at flight test ranges are common. These are ~17 - 37 dB higher than the omni-directional antennas used for cell-phones, for example. This increased sensitivity can have the effect of neutralizing the 43 + 10 log(p) dB out-of-band roll-off specified in the Report and Order.

It is also important to note that because of range safety and other requirements unique to flight test operations, flight test systems typically have signal acquisition, link availability, reliability, drop-out, and bit error rate requirements that are much more stringent than those of other spectrum users.

This certainly need not preclude commercial use of the transfer bands. Rather, it means that adjacent band coordination is necessary and appropriate. (In this regard, note that such coordination has proven eminently workable as between the Digital Audio Radio Service licensees, on the one hand, and flight testing, on the other hand.)

Daniel G. Jablonski-

Dr. Daniel G. Jablonski is a member of the Principal Professional Staff at the Johns Hopkins University Applied Physics Laboratory. He has Bachelor's and Master's Degrees in Electrical Engineering, a Ph.D. in Physics, and over 25 years experience in microwave engineering. He is a licensed Professional Engineer in the State of Maryland.

DECLARATION

I, Gerald J. Zanatta, hereby declare as follows:

I am the Director of Flight Test Engineering for Boeing Company, Seattle WA. My department is responsible for managing and supporting the test flights of all commercial aircraft wherein telemetry is required. I have been engaged in flight testing for thirty seven years.

This Declaration is supplied in connection with a Petition for Reconsideration being filed by Aerospace and Flight Test Radio Coordinating Council ("AFTRCC") of which Boeing is a member.

Flight test telemetry is a vital part of the flight test process. Using telemetry signals test engineers on the ground monitor in real-time all critical parameters required for a safe and successful flight test. These include parameters such as airspeed, altitude, critical component temperatures, systems pressures, strains on the airframe, and aircraft control surface positions. These parameters serve as the basis for approving movement to the next progressive test condition.

The telemetry interface between the flight crew and the ground crew ensures safe and efficient testing of the aircraft and its components. The primary concern is one of safety of the test crew and test aircraft. When one considers the amount of time and cost in building the aircraft, instrumenting it for flight test, the fact that the production of subsequent models is running concurrent with the flight test program, and that airline customers have plans to introduce the model to the public, the efficiency and safety of the test program involves an enormous investment. The integrity of the telemetry link is vital to the success of the Boeing Company and our industry.

For the foregoing reasons, the FCC should adopt the adjacent band frequency coordination recommended by AFTRCC. In doing so, the Commission will provide a proper measure of safety for flight testing.

Executed under penalty of perjury this 22nd day of July, 2002.

Gerald J. Zanatta