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May 13, 2010

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: **WT Docket No. 07-293; IB Docket No. 95-91;**
GEN Docket No. 90-357

Dear Ms. Dortch:

This letter is in response to a recent filing by the WCS Coalition (“WCS”) addressing the subject of out-of-band emissions. There is no merit whatsoever to the letter’s arguments, arguments submitted without support from a qualified engineer. Indeed, WCS has missed the fundamental issue.

The letter argues that Aerospace and Flight Test Radio Coordinating Council (“AFTRCC”) is in error when it has maintained, over the course of many months, that there will be an increase in WCS out-of-band emissions in the flight test telemetry band from the conversion of WCS to average power measurement.

In particular, the letter argues that the

“amount of attenuation must be increased as the power level increases, such that the maximum strength of the signal WCS can emit into the MAT band remains constant, no matter the in-band power level of the WCS signal.”¹

This is true, but misleading, as the WCS filing fails to account properly for a significant reduction in protection levels that does not change with power level, and constitutes a reduction in protection to AMT at all power levels.

¹ *Id.* at 2-3

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The WCS letter goes on to say that “[e]missions still would not be permitted to exceed an absolute value of -13 dBm within the 2360-2370 MHz band or exceed -40 dBm above 2370 MHz (the equivalent of $70 + 10 \log(P)$ attenuation.”²

As explained in the attached Engineering Statement of Daniel G. Jablonski, the letter overlooks the fact that the OOB rules incorporate ratios by which out-of-band power is to be reduced. When proper account is taken of these ratios, there is a “13 dB reduction in the level of protection afforded to AMT telemetry operations versus the existing definition in which peak, rather than average, power is used.”³ Furthermore, the WCS letter fails to take any account of the sensitivity of AMT receivers, and the effects thereon.

* * *

The letter makes a number of other groundless arguments. These include, for example, the notion that AFTRCC in effect accepted the current OOB levels in the WCS Rulemaking (when in fact AFTRCC submitted Comments opposing the rules); the notion that the Commission’s short-lived re-allocation of 2385-2390 MHz represents a template for this proceeding (when there is no comparison between the wealth of information on the specific applications and technology that will be used by WCS, and the record in the 2002 proceeding, a record almost completely absent in the earlier case); and the notion that aerospace should share the burden of “co-existence” when WCS will cause a type of interference (OOB) which no amount of filtering can correct -- not at least if aerospace manufacturers hope to receive any telemetry.

AFTRCC has had only 24 hours to respond to the WCS filing given the impending Sunshine Notice deadline. However, AFTRCC submits that the information provided here is sufficient for the Commission to reject the WCS arguments in the letter and proceed to decision in the manner AFTRCC has urged.

Respectfully submitted,


William K. Keane

*Counsel for Aerospace and Flight Test
Radio Coordinating Council*

² *Id.* at 3.

³ *Id.* at 2.

Duane Morris

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cc: Bruce Gottlieb
David Goldman
John Giusti
Angela Giancarlo
Louis Peraertz
Charles Mathias
Julius Knapp
Ruth Milkman
Mindel De La Torre
Ron Repasi

Engineering Statement

Re: Out-of-Band Interference into Flight Test Ground Receivers operating in the band 2360 – 2390 MHz from WCS Fixed and Mobile Transmitters operating in the band 2345 – 2360 MHz

13 May 2010

This Engineering Statement responds to the assertions by the WCS Coalition to the effect that the peak out-of-band emission level ($OOBE_{(peak)}$) into the AMT band is equal to $43 + 10 \log(P_{average})$. As explained below, changing this “factor” from $43 + 10 \log(P_{peak})$ to $43 + 10 \log(P_{average})$ represents, for a system having a peak-to-average-power ratio (PAPR) of 13 dB, a 13 dB reduction in the attenuation factor specified in the rules. In other words, no matter how WCS presents its argument, a change from peak power measurement in the current rule to average power measurement in the proposed rule introduces a 13 dB loss in protection for flight test telemetry. Details follow.

In its recent ex parte,¹ the WCS Coalition claims:

“AFTRCC would have the Commission believe that measuring maximum in-band power levels for WCS using average power, subject to a 13 dB PAR, will result in a substantial increase in OOB WCS licensees will place in the 2360-2395 MHz band. However, that is not correct –the amount of attenuation must be increased as the power level increases, such that the maximum strength of the signal WCS can emit into the MAT band remains constant, no matter the in-band power level of the WCS signal.”

WCS then goes on to state that “emissions of no greater than an absolute value of -13 dBm are permitted in the 2360-2370 MHz band. That same rules requires WCS licensees to attenuate their OOB above 2370 MHz by at least $70 + 10 \log(p)$, which limits emissions to no greater than -40 dBm above 2370 MHz.”

Several points should be made about this line of argument. These reveal a critical error with the technical claims put forth in the WCS filing.

Preliminarily, it is correct that raising an average power level from one value to another, or raising a peak power from one value to another, brings with it a requirement to raise the corresponding out of band attenuation. Absolute OOB power levels in the AMT band remain fixed despite these changes to the power of the WCS in-band signal.

However, changes in the ratio of peak to average power do not have the same effect. When this ratio is changed, a permanent offset (up to 13 dB as proposed for WCS) is introduced that does not scale with power.

¹ WCS Coalition, WT Docket No.07-293, ex parte filing of May 12, 2010.

Specifically, by changing the rules from peak-to-average power measurement, WCS introduces this offset, which for a peak to average ratio of 13 dB corresponds to a permanent 13 dB reduction in protection to aeronautical mobile telemetry. As stated, this 13 dB offset is unaffected by additional scaling of attenuation as WCS signal power is changed.

In this regard, see Commission Rule 27.53,² quoted below with emphasis added:

§ 27.53 Emission limits.

(a) For operations in the bands 2305–2320 MHz and 2345–2360 MHz, the power of any emission outside the licensee's frequency band(s) of operation **shall be attenuated below the transmitter power (P)** within the licensed band(s) of operation, measured in watts, by the following amounts:

(3) *For fixed, land, mobile, radiolocation land and radiolocation mobile stations:* **By a factor** not less than 70 + 10 log (p) dB on all frequencies below 2300 MHz and on all frequencies above 2370 MHz; and not less than 43 + 10 log (p) dB on all frequencies between 2300 and 2320 MHz and on all frequencies between 2345 and 2370 MHz that are outside the licensed bands of operation;

(7) **The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power;**

The regulations make quite clear that a term such as 43 + 10 log(P), expressed in decibels,³ represents a ratio, or in the terms of FCC rules, a “factor” (cf. para. 3, above).

Note that subsection (7) of the FCC rules, above, makes clear that this is independent of whether one compares peak WCS in-band power to peak WCS out of band power (i.e., OOBE), or if the comparison is between WCS average in-band power to average WCS OOBE. By doing so, the Commission is being quite clear that the rule means:

$$\text{OOBE}_{(\text{peak})} = 43 + 10 \log(P_{\text{peak}})$$

or

$$\text{OOBE}_{(\text{average})} = 43 + 10 \log(P_{\text{average}})$$

However, by no stretch of the imagination do the rules support the notion, put forth in the WCS filing, that

$$\text{OOBE}_{(\text{peak})} = 43 + 10 \log(P_{\text{average}})$$

As noted before, changing this “factor” from 43 + 10 log(P_{peak}) to 43 + 10 log(P_{average}) represents, for the proposed WCS systems, a 13 dB reduction in the attenuation factor specified

² <http://law.justia.com/us/cfr/title47/47-2.0.1.1.6.3.49.4.html>

³ as opposed to dBm – decibels with respect to a milliWatt, for example

in the rules. This translates directly to a 13 dB reduction in the level of protection afforded to AMT telemetry operations versus the existing definition in which peak, rather than average, power is used.

WCS further states:

“Indeed, because the staff has proposed, and the WCS Coalition is prepared to accept, even tighter restrictions on OOB into the MAT band than are currently in place, adoption of the staff proposal will result in less OOB emissions from base station transmitters into the MAT band, not more. That is illustrated by the following table:

MAT BAND	PERMISSIBLE OOB UNDER CURRENT RULE	PERMISSIBLE OOB UNDER STAFF PROPOSAL	IMPROVEMENT
2360-2362.5 MHz	-13 dBm	-13 dBm	--
2362.5-2365 MHz	-13 dBm	-25 dBm	+12 dBm
2365-2367.5 MHz	-13dBm	-40 dBm	+27 dBm
2367.5-2370 MHz	-13dBm	-42 dBm	+29 dBm
Above 2370 MHz	-40 dBm	-45 dBm	+5 dBm

However, when the effect of replacing peak power with average power is properly accounted for, using the OOB levels as “factors” (i.e., dB), and not absolute power levels (i.e., dBm), the rightmost column in the table becomes (for a PAPR of 13 dB):

Degradation

2360-2362.5 MHz +13 dB
 2362.5-2365 MHz +1 dB

Improvement

2365-2367.5 MHz +14 dB (*not 27 dB!*)
 2367.5-2370 MHz +16 dB (*not +29dB!*)

Degradation

Above 2370 MHz 8 dB

Paragraph 7 of 27.53 permits one to compare peak power with peak OOB, or to compare average power with average OOB. Hence, the permissible measurement techniques are indeed independent of PAR. However, this is immaterial to the point at hand -- namely, replacement of peak power with average power reduces protection from WCS out of band emissions by a *factor* of 13 dB.

In conclusion, it must be stressed that peak-to-average power excursions of 13 dB for 100 microseconds will, for a flight test aircraft operating at maximum range based on average interference power, corrupt 500 contiguous bits of telemetry data.

A handwritten signature in brown ink that reads "Daniel G. Jablonski". The signature is written in a cursive style with a prominent loop at the end of the last name.

//Daniel G. Jablonski//