Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Spectrum Policy:	)	
	)	
Solicitation of Public Comment	)	ET Docket No. 02-135
by the Spectrum Policy Task Force	)	
	)	
	)	

To: The Commission

REPLY COMMENTS OF

Statewide Wireless Network

New York State Office for Technology

State Capitol, ESP

P.O. Box 2062

Albany, New York 12220-0062

February 27, 2003

EXECUTIVE SUMMARY

These Reply Comments from the Statewide Wireless Network, under the New York State Office for Technology (NYS-OFT), continue to present the thoughts and concerns of the State of New York with regards to the Spectrum Policy Task Force (SPTF) Report produced under ET Docket No. 02-135. This Docket represents efforts by the Commission to address the need to improve and enhance its spectrum policies as we continue forward in to the 21st century.

The Spectrum Policy Task Force has provided many excellent recommendations within their Report, but many more need to be adjusted to the needs of Public Safety, who have very unique requirements and extremely limited resources available.

The Commission should approach policy decisions that will impact Public Safety Spectrum allocations with great caution. If the technology to support instantaneous return of spectrum to Public Safety is not completely capable of doing so — and the technology to do this does not currently exist, then the reliability and integrity of Public Safety communications could be breached.

The Task Force's recommendations regarding the shaping of antenna patterns to provide uniform flux density over the service area should be given serious consideration. For designs where data rate requirements are uniform throughout the service area, this would represent a more responsible use of the spectrum, and would eliminate much of the interference that is being addressed in the Commission's Proceeding on 800 MHz Interference.

The Task Force notes that the Commission should consider grouping future allocations based on mutually compatible technical characteristics, and require improvements in the out-of-band interference performance of transmitters and receivers. The State feels that, at a minimum, the FCC should consider grouping allocations for similar designs together (i.e. segregating noise-limited and interference-limited designs).

The State suggests the need for a better metric for the quantification of spectrum efficiency. Care must be taken to ensure that similar quality-of-service metrics are employed when comparing the spectrum efficiencies of different technologies.

The FCC has a significant backlog when it comes to making spectrum available to Public Safety. In terms of establishing priorities in policy making, the Commission is reminded of the PSWAC spectrum recommendations of nearly 7 years ago that remain essentially unmet with useable spectrum.

While new philosophies for spectrum sharing are proposed, Public Safety, having a mission critical communications requirement, seeks retention of the "command and control" philosophy and steadfastly opposes the use of unproven and unavailable technological "solutions" for sharing spectrum. For the reasons cited herein, the concept of "interference temperature" should definitely not be an aspect of future spectrum policy.

The forced migration of Public Safety toward interference-limited designs would be both fiscally-irresponsible and spectrally-inefficient. Public Safety at all levels of government cannot shoulder the additional financial burden that would result from such an ineffectual and ill-conceived policy.

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I. INTRODUCTION

1. These Reply Comments from the Statewide Wireless Network, under the New York State Office for Technology (NYS-OFT), continue to present the thoughts and concerns of the State of New York with regards to the Spectrum Policy Task Force (SPTF) Report produced under ET Docket No. 02-135. This Docket represents efforts by the Commission to address the need to improve and enhance its spectrum policies as we continue forward in to the 21st century. We applaud the Commission for creating a forum to address the changes necessary to such spectrum policies. We sincerely thank those whose hard work and efforts were responsible for the creation of the Report for which we provide comment herein. We also thank those who have provided prior comment on this.

2. The New York State Office for Technology, on behalf of the State of New York, is in the process of procuring a new Statewide Wireless Network (SWN) for State, Federal and Local Governmental entities that operate within New York State's geographic borders. SWN will provide an integrated mobile radio communications network that will be utilized by both Public Safety and Public Service agencies in New York State. It will provide a digital, trunked architecture that offers both voice and data capabilities, and will be used in day-to-day operations, as well as for disaster and emergency situations, to more effectively and efficiently coordinate the deployment of all levels of government resources to such incidents. Also, it will also enhance international coordination along the US/Canadian border, and will play a critical role in supporting the homeland defense efforts within the State of New York.

3. Consequently, the State of New York has a large stake in the outcome of any current or future spectrum policy decisions, especially where these affect the performance, capability, capacity, cost, or construction timeline of the SWN system. The Spectrum Policy Task Force has provided many excellent recommendations within their Report, but many more need to be adjusted to the needs of Public Safety, who have very unique requirements and extremely limited resources available.

II. KEY ELEMENTS OF SPECTRUM POLICY RECOMMENDATIONS

4. The Task has correctly recommended[1] policies that *"permit broad, highly flexible use within technical parameters of the allocation"*[2]. Such policies would allow for efficient use of the spectrum, without introducing additional interference to incumbent and authorized users. However, the Task Force also recommends that policies that *"permit traditionally narrow services to lease excess capacity to other services*[3]*"* also be considered. In our previous filing we noted that the Commission should approach such policy decisions with great caution, especially with regard to Public Safety Spectrum allocations. Our concern still stands — if the technology to support instantaneous return of spectrum to Public Safety is not completely capable of doing so — and the technology to do this <u>does not</u> currently exist, then the reliability and integrity of Public Safety communications could be breached. This is further discussed in Section IV of this document.

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[1] SPECTRUM POLICY TASK FORCE REPORT, Federal Communications Commission ET Docket No. 02-135, November 2002

[2] *Id.* §IX-A-1 (p.64), as well as §V

[3] *Id.*.

5. In our comments we discussed that an often-overlooked solution to the near-far problem is the shaping of antenna patterns to provide uniform flux density over the service area. We again stress that the Task Force's recommendations regarding this[4] should be given serious consideration. For designs where data rate requirements are uniform throughout the service area, this would represent a more responsible use of the spectrum, and would eliminate much of the interference that is being addressed in the Commission's Proceeding on 800 MHz Interference[5]. Agilent has also noted that the use of adaptive "smart" antennas can not only decrease interference, but also increase spectral efficiency within the coverage area[6]. Given this, we again ask the Commission to consider incentives that facilitate the migration of Land Mobile, Cellular, and Broadcast services to uniform flux operations.

6. The Task Force also notes that the Commission should consider grouping future allocations based on mutually compatible technical characteristics, and require improvements in the out-of-band interference performance of transmitters and receivers so as to reduce the need for such grouping[7]. The State feels that, at a minimum, the FCC should consider grouping allocations for similar designs together (i.e. segregating noise-limited and interference-limited designs). This will reduce interference to noise limited services, and would allow sharper transmitter filters and lower out of band emissions (OOBE) for all services. This

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[4] *Id.* §IX-A-3 (p. 64), as well as § V

[5] WT Docket No. 02-55, " In the Matter of Improving Public Safety Communications in the 800 MHz Band and Consolidating the 900 MHz Industrial/Land Transportation and Business Pool Channels"

[6] p.5, *"Smart antenna technology can increase spectral efficiency by concentrating energy where it can do the most good, and in some cases, directing energy away from where it can create interference (e.g., null steering.)"* SPTF Report COMMENTS OF AGILENT TECHNOLOGIES, INC, January 27, 2003

[7] see 2 §IX-A-6 (p. 64), as well as § V

type of policy decision is currently being examined as the main solution to mitigating inter-service interference at 800 MHz (see footnote 5). Both Motorola and CTIA support the segregation of technologies/designs, with Motorola[8] stating, *"This spectrum management policy would reduce the potential for interference, provide for more efficient use of the spectrum, and limit the need for guard bands. We note that there is widespread support for this approach*" and CTIA adding[9] *"Placing like services in spectrum neighborhoods ... will result in the reduced need for guard bands and other forms of interference protection, thereby saving spectrum resources…".* The State also feels that the reduction of OOBE is a critical need in order to ensure the survival of noise-limited systems, an issue that was examined in great deal in our previous filing and will also be discussed again here in Section V.

7. The State also wishes to take the opportunity to again address the need for a better metric for the quantification of spectrum efficiency. In our first filing[10] under this Docket, the State noted that when measuring spectrum efficiency, care must be taken to ensure that similar quality-of-service metrics are employed. For example, one measurement of spectrum efficiency may be the number of voice channels (or voice "slots", "paths", etc) per unit occupied bandwidth. However, care must be taken when comparing the spectrum efficiencies of different technologies to ensure that:

    - The spectrum efficiency must be referenced at similar voice quality levels;

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[8] §II-A, p.7, SPTF Report COMMENTS OF MOTOROLA, INC., January 27, 2003

[9] §II-C, p.8, SPTF Comments of the Cellular Telecommunications and Internet Association, January 27, 2003

[10] §4, FCC Docket 02-135, COMMENTS OF Statewide Wireless Network New York State Office for Technology, July 5, 2002

- The voice quality metric needs to be evaluated using a consistent channel model; and
- The spectrum efficiency must correspond to a consistent level of spectral purity or out-of-band emission (OOBE) level.

8. Alternatively, a measure of spectrum efficiency may be one that measures data rates per unit bandwidth. In this case the data rates must:

- Correspond to only payload data, and not error detection and correction (EDAC), addressing, or media access control (MAC) overheads;
- The data rates must be referenced to either similar corrected BER levels or to error-free reception within a channel model; and
- The spectrum efficiency must correspond to a consistent level of spectral purity or OOBE level(s).

9. In their filing on the SPTF Report, Motorola also makes similar points point[11], stating "*Information must be distributed reliably throughout the area where it is needed without undue degradation. If not, communications must be repeated, leading to inefficient and possibly even unsafe situations. Achieving the highest spectrum efficiency does not necessarily result in the highest operational efficiency.*"

10. In any case, this spectrum efficiency metric must somehow capture the operational requirements of the user. A standard example of this is Public Safety voice communications, which typically load a wide area simultaneously, and require channel resources from multiple sites in order to support the communications of/to <u>each</u> user in a talk group. The efficient designs of such systems work opposite to a cellular design, as the <u>larger</u> the site footprint is, the more <u>efficiently</u> the spectrum is utilized. For this reason, simulcast systems are widely employed by <u>all</u> of the major suppliers of Public Safety Systems. The Commission needs to

[11] §II-D, p.10, SPTF Report COMMENTS OF MOTOROLA, INC., January 27, 2003

understand this, and capture the efficiency of how the spectrum is employed in a "system" relative to the "system's" capacity and loading requirements. The Commission also needs to clearly see that a simpler technology employing simulcast can easily provide more than double the spectrum efficiency of a more advanced modulation that cannot support simulcast[12]. Motorola again concurs[13] with this reasoning, remarking, *"efficiency should be measured by how well spectrum use meets the requirements of spectrum users, i.e., economic efficiency, which is dependent upon operational efficiency as well as spectrum efficiency."*

III. PRIORITIES IN POLICY

11. Several commentors to the SPTF Report remarked that the Commission has a great deal of backlog with regards to facilitating the availability of Spectrum that is already promised to Public Safety. Both Motorola and the Public Safety Wireless Network (PSWN) wrote that the Commission should concentrate on making the 700 MHz band and 4.9 GHz band Public Safety allocations available as soon as possible. Motorola writes *"the spectrum that the Commission has allocated for public safety use since 1996 is still largely inaccessible. The 700 MHz spectrum remains inaccessible for public safety users in half of the major metropolitan markets due to the lingering presence of television incumbents, and the Commission has not established any definitive date when this spectrum will be cleared. Furthermore, the Commission has yet to finalize service rules for the 4.9 GHz band. Motorola urges the Commission to move quickly to make these bands accessible for public*

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[12] A more advanced modulation requires higher signal levels, and is often more sensitive to multipath and intersymbol interference issues.

[13] §II-D, p.10, SPTF Report COMMENTS OF MOTOROLA, INC., January 27, 2003

safety use and to include further allocations for public safety spectrum in a long-range spectrum plan." Similarly, PSWN comments: *"the Public Safety community is still without access to any of the 74 MHz of the spectrum that has been allocated…."* With regard to the Digital Television (DTV) transition, which certainly affects the availability of the 700 MHz allocations, the National Association of Broadcasters (NAB) notes[14], "*The overwhelming regulatory priority in the broadcast bands should be the successful completion of the digital transition*". New York concurs with these concerns, and notes that the availability of these Public Safety bands must become one of the Commission top priorities, especially given that these bands will play a critical role in supporting homeland defense efforts, as well as fighting domestic terrorism.

IV. SPECTRUM USAGE MODEL RECOMMENDATIONS

12. According to the Task Force, the Commission should expand the use of both the exclusive rights and commons models, and move away from command-and-control models (with limited exceptions)[15]. Furthermore, the SPTF states that there should be a rules transition from legacy command-and-control bands to more flexible rules (to the maximum extent possible), with only limited exceptions. The State understands that these models might serve to allow more innovation and spectrum availability, but notes that the "limited exceptions" should specifically encompass all Public Safety Operations. The Task Force recommends that (the FCC) "continue to dedicate some spectrum on a command-and-control basis for

[14] p.3, SPTF Report Filing, JOINT COMMENTS OF THE ASSOCIATION FOR MAXIMUM SERVICE TELEVISION, INC. AND THE NATIONAL ASSOCIATION OF BROADCASTERS, January 27, 2003

[15] *Id.* §IX-D-23,24 (p. 65), as well as §VII

Public Safety use"[16], but the State firmly believes that the command and control model should be applied consistently across all Public Safety spectrum allocations, not just "some".

13. Other commentors have expressed similar views, and many in fact have directly spoken to the need to provide additional Command & Control allocations for Public Safety. Motorola writes[17] that *"despite these recent Commission actions, public safety is not yet in any better position from an operational perspective than they were when the PSWAC recommendations were submitted in 1996"*[18], and[19] *"Motorola does not agree with the Task Force's implicit suggestion that the existing allocations of public safety spectrum are sufficient and thus no further allocations of dedicated spectrum are necessary. Instead, the Task Force suggests that public safety users obtain access to additional spectrum through alternative methods, such as spectrum auctions, easements during times of emergency, or a priority access mechanism. In Motorola's view, none of these alternatives are an acceptable alternative to additional allocations of dedicated spectrum."* APCO adds[20] that "*Additional allocations will be needed, and those allocations should be pursuant to the command and control model, for the very same reason that the model must continue to apply to current applications"*. TIA also concurs[21], with *"...as part of the proposed 5-10 year review of spectrum use, the*

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[16] *Id.* §IX-D-26 (p. 65), also §VII

[17] §IV-B, p.17, SPTF Report COMMENTS OF MOTOROLA, INC., January 27, 2003

[18] The 24 MHz of Pubic Safety spectrum at 700 MHz meets part of the need for 97.5 MHz of spectrum below 3 GHz that was identified in 1996 by the Public Safety Wireless Advisory Committee in their final report to the Commission and the National Telecommunications and Information Administration (NTIA), who had chartered the Committee to identify Public Safety spectrum needs.

[19] *Id.* p.21

[20] p.3, SPTF Report COMMENTS OF APCO, January 27, 2003

[21] §II-3, p.13, SPTF Report, COMMENTS OF THE TELECOMMUNICATIONS INDUSTRY ASSOCIATION, January 27, 2003

Commission should develop a plan for meeting the PSWAC requirements". New York agrees wholeheartedly with these comments; additional and dedicated Public Safety allocations must be provided for the support of Public Safety operations. We further note that nearly seven years have past since the PSWAC Report has been provided to the Commission - yet only a small fraction of the identified critical spectrum need has been made universally available to Public Safety thus far.

14. An interesting concept brought forward by the Task Force is that the Commission could address additional Public Safety needs through alternative "safety valve" mechanisms in order to increase the capacity of Public Safety systems during emergency situations[22]. In our previous comments we noted that even if this were to be realized, it should not replace the need for Public Safety to maintain capacity reserves for emergency situations. We are especially concerned that there is no guarantee that technologies[23] which could enable enhanced spectrum easement rights (based upon Public Safety priority) can effective shift such spectrum quickly enough so as not to limit Public Safety's response time to, or communications capabilities during, an incident. APCO[24] notes similar concerns and asserts that with regards to these enabling technologies *"...public safety personnel shall not and cannot be the guinea pigs".*

15. Other commentors clearly share similar concerns. Motorola eschews the concept of Public Safety leasing additional capacity during crises, again noting *"The primary method of*

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[22] *Id.* §IX-D-27 (p. 66), also §VII

[23] Also see the Cognitive Radio discussion in Section V of that Response

[24] p.3, SPTF Report COMMENTS OF APCO, January 27, 2003

meeting the spectrum needs of public safety users must continue to be through the dedication of appropriate and sufficient spectrum for public safety use", and adding that *"These options, however, fail to address the reality that the very times public safety needs the greatest communications capacity often coincide with the times when commercial system capacity needs are also at a peak point. If, in fact, commercial systems have such extra capacity during these times, then the spectrum could have been reallocated to dedicated public safety"*. Furthermore, with regards to the market acquisition aspect of such policy, TIA[25] adds *"TIA does not agree that access to additional narrowband spectrum for public safety communications should be made through market acquisition. Public safety requirements for additional spectrum should be reviewed and appropriate actions planned on a periodic basis."* This is also supported by PSWN, who writes[26] *"By requiring public safety to bid on spectrum or upgrade equipment to met new interference protection standards and increased signal strength requirements, the taxpayer will ultimately have to pay the price in lieu of the private and commercial providers that use the spectrum for profit."*

16. We are wary of any possible policy that allows Public Safety to lease spectrum to commercial services during low capacity requirement periods[27]. This could set a precedent such that Public Safety could in fact be regulated under an Exclusive Use model, which might ultimately lead to a situation where Public Safety's capabilities could be reduced due to technology limitations in the spectrum easement control mechanisms. This is also addressed

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[25] §II-3, p.12, SPTF Report, COMMENTS OF THE TELECOMMUNICATIONS INDUSTRY ASSOCIATION, January 27, 2003

[26] *Summary*, p.iii, SPTF Report COMMENTS OF Public Safety Wireless Network Program, January 27, 2003

[27] see footnote 16, also at § IX-D-28 (p. 66)

by APCO[28] with "*...the potential for leasing public safety spectrum capacity is probably much less than the task force perceives"*, and by PSWN[29] who notes "*The potential temptation for less affluent communities' police, fire and rescue, and other public safety providers to lease spectrum that they may not need a[t a] given moment to respond to emergencies…is a recipe for disaster"*.

17. In fact many commented that there is a basic flaw in much of these types of policy recommendations; and that the traffic patterns, which the SPTF feels Public Safety operates under, are misleading. APCO[30] notes, *"...it is an oversimplification to assume that all public safety systems operate with peaks and valleys of use."* PSWN[31] provides further comment on this, adding, *"[with regards to a study in the initial filing of the New York Statewide Wireless Network] the SPTF ignores this conclusion and recommends that the excess spectrum be leased, completely mischaracterizing the results of the study."* PSWN is correct here; this study has been mischaracterized, and actually shows an unacceptable grade of service (GOS) on the channel that was being investigated. The loading levels shown indicate that there was an 85% probability of blocking on incoming calls during the peak periods, representing extremely heavy traffic loading (almost unsustainable for a single conventional voice channel).

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[28] p.3, SPTF Report COMMENTS OF APCO, January 27, 2003

[29] *para.7,* p.6, SPTF Report COMMENTS OF Public Safety Wireless Network Program, January 27, 2003

[30] p.3, SPTF Report COMMENTS OF APCO, January 27, 2003

[31] *para.6,* p.5, SPTF Report COMMENTS OF Public Safety Wireless Network Program, January 27, 2003

V. INTERFERENCE AVOIDANCE RECOMMENDATIONS

18. Some of the most far-reaching recommendations that are put forth by the Task Force deal with interference avoidance and mitigation. While there are many recommendations that would improve the use of the radiocommunications spectrum, there are many whose consistent theme signifies a trend toward some disturbing policy shifts. As previously noted, while the State agrees with many of the SPTF Report recommendations, we also *disagree* with many - especially those regarding interference issues and policy changes. These represent a disturbing trend toward moving Public Safety communications systems to interference-limited designs, a trend that has serious ramifications.

19. The Task Force has introduced a new concept, the so-called "interference temperature"[32], to quantify acceptable levels of interference as a long-term objective. The State feels that this concept, while interesting, does not translate well into Public Safety operations because is assumes an interference limited environment, which already has been shown to result in harmful loss of Public Safety communications. The concept is based upon the premise that the environment is interference limited, with interference pockets distributed in the three primary dimensions (i.e. time, space, and frequency), and would allow operation of unlicensed devices co-channel with Public safety.

20. In general, the concept of interference temperature has received a tremendous response from those providing comment. Most of these comments felt that the interference temperature concept is ill conceived, or should not have a place in future spectrum policy. Comments

[32] see 1 §IX-B-9 (p. 64) and §VI

such as these came from many parties including ITA[33], Agilent[34], Lucent Technologies[35], Motorola[36], CTIA[37], Lockheed Martin[38], Cingular[39], TIA[40] PSWN[41], and AT&T Wireless[42], and they are much too voluminous to list here in their entirety.

21. Many commentors also expressed concern about the logistics of obtaining and applying interference temperature measurements. Agilent notes that "*The interference thermometer concept may prove to be incompatible with some smart-antenna technologies because the radiation pattern cannot be predicted at all points in space in a multipath environment"* and that *"The accuracy of interference metrics, such as interference temperature, should be defined. Greater accuracy may result in more expensive receivers, but lack of accuracy may limit spectrum efficiency…Multipath and flat fading may inherently limit the accuracy of interference thermometers, especially if the interference thermometer does not employ diversity antennas".* Motorola comments *".. the estimation of the impact of a non-primary user's emissions will be difficult to assess by either the non-primary user or a third-party*

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[33] §III-B (p.10-11), SPTF Report Filing Comments of the Industrial Telecommunications Association, Inc., January 27, 2003

[34] p.6, SPTF Report Filing COMMENTS OF AGILENT TECHNOLOGIES, INC., January 27, 2003

[35] p.3, Lucent SPTF Report Filing, January 27, 2003

[36] §II-A (p.14), II-C (p.9), and Appendix (p.A-1), SPTF Report COMMENTS OF MOTOROLA, INC., January 27, 2003

[37] §III (p.11), SPTF Report Filing COMMENTS OF THE CELLULAR TELECOMMUNICATIONS AND INTERNET ASSOCIATION, January 27, 2003

[38] §IV (p.8)SPTF Report Filing, COMMENTS OF LOCKHEED MARTIN CORPORATION, January 27, 2003

[39] §II (p.18), II-B (p.24), and II-C (p.28), SPTF Report Filing COMMENTS OF CINGULAR WIRELESS LLC, January 27, 2003

[40] §I (p.3), SPTF Report Filing COMMENTS OF THE TELECOMMUNICATIONS INDUSTRY ASSOCIATION, January 27, 2003

[41] para.14, p.9, SPTF Report Filing, Public Safety Wireless Network , January 27, 2003

[42] §II (p.9), and II-A (p.10), SPTF Report Filing, COMMENTS OF AT&T WIRELESS SERVICES, INC., January 27, 2003

monitoring network…any interference temperature cap would need to be structured in such a way to minimize the impact on primary users with regard to system deployment, coverage area, information throughput, signal quality, and all aspects of their radio architecture complexity." Given this, that State feels even more certain that the application of an interference temperature metric would be a dangerous undertaking.

22. There also has been much concern expressed as to the enforceability of any Policy that utilizes the "interference temperature" concept. Lockheed Martin[43] especially noted this issue, commenting that *"...the proposed interference temperature model raises numerous enforcement concerns…"* and *" the Task Force's proposal avoids the fundamental question of how the Commission will police harmful interference in the context of "interference temperature" ... an underlay scenario raises the questions of how the Commission will identify which transmitters exceed the interference temperature and how these identified transmitters can be compelled to remedy harmful interference. It is unclear that, as a practical matter, an entire category of unlicensed users can be identified and then made to remedy, as a group, the fact that the interference temperature was exceeded. This highlights the fact that the underlay of unlicensed uses does not allow any actual remedial action by the Commission".* These are very valid points, which clearly show that the concept of interference temperature should definitely not be an aspect of future spectrum policy.

23. The Task Force also recommends (in no uncertain terms) that the Commission migrate to interference-limited policies[44], where the "interference temperature" concept should form the

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[43] SPTF Report Filing, Lockheed Martin § IV, p.7, January 27, 2003

[44] *Id.* § IX-B-13 (p. 65) and § VI

basis for better defining interference rights[45]. There are many reasons that this trend towards interference-limited policies is harmful to Public Safety allocations:

- These interference-limited designs require higher signal levels in order to provide reliable communications[46]
- These high signal requirements directly reduce the reception range from the transmitter for reliable communications[47]
- This range reduction directly increases the siting requirements (and costs) of Public Safety systems.[48]
- This siting increase indirectly limits the available capacity for Public Safety systems[49]

24. In fact, there were many commentors who also felt that either raising the noise floor or increasing interference levels would lead to spectrum waste. CTIA[50] noted that *"...newer technologies...may be more susceptible to noise at a particular threshold, instead of less."* Nokia commented *"Any increase in the noise floor will reduce the overall capacity of the spectrum, even reducing the capacity of the newly introduced device or system that is causing the rise in noise."* Lucent[51] elaborated on this same point, writing, *"Although third generation technologies may better accommodate some types of noise, they are still subject to the adverse impacts of interference...The presence of additional sources of noise, such as*

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[45] *Id.* §IX-B-21 (p. 65) and § VI

[46] Appendix A-(B), SPTF Report Comments, NYS-OFT, January 27, 2003

[47] *Id.* Appendix A-(C)

[48] *Id.* Appendix A-(D)

[49] *Id.* Appendix A-(E)

[50] §III (p.12), SPTF Report Filing COMMENTS OF THE CELLULAR TELECOMMUNICATIONS AND INTERNET ASSOCIATION, January 27, 2003

that caused by out of band energy from interferers in adjacent spectrum, or from systems operating in the same spectrum as the victim system, necessarily degrades the signal to noise ratio and impacts the call quality of the victim system. Absent the ability to control the level of such interference within the interfering system, resolution may require action within the victim system, such as a reduction in noise power generated by multiple system users. The effect of external interference may, therefore, result in the need to reduce system capacity. Alternatively, if it is necessary to maintain capacity, the presence of external noise could be accommodated through a reduction in cell coverage[52]*."* There are others that note the dangers of interference-limited designs, and the side effects and pitfalls that accompany such operations. ITA[53] writes that *"communications made in a "worst case" or "absolute interference" environment, without the margin for additional random interference, could lead to dangerous situations that jeopardize the safety of the public."* PSWN[54] also expresses concern with regard to increased taxpayer burdens, adding, *" By requiring public safety to bid on spectrum or upgrade equipment to met new interference protection standards and increased signal strength requirements, the taxpayer will ultimately have to pay the price in lieu of the private and commercial providers that use the spectrum for profit."* It is clear that generating policy that requires a movement toward interference limited operations is counter-

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[51] p.3-4, SPTF Report Filing of Lucent Technologies, January 27, 2003

[52] Lucent also adds that: *"Although a quantitative assessment of the impact of external noise is subject to specific scenarios and system values (e.g., propagation slope, receiver noise figure and sensitivity), the study offers examples, based upon given assumptions, that indicate the impact could be significant. The study suggests that if system capacity is to remain constant, the effect of an external noise power of -109 dBm - equal to the assumed receiver noise floor of -109 dBm - will demand a 30% cell coverage reduction. A second example shows that if the strategy is to maintain cell size, external noise equal to the receiver noise floor of -109 dBm demands a capacity loss of 82%."*

[53] §III -B (p.10) SPTF Report Filing, Comments of the Industrial Telecommunications Association, Inc., January 27, 2003

[54] Summary, p.iii, SPTF Report Filing, Public Safety Wireless Network , January 27, 2003

productive in many cases, and dangerous with regards to Public Safety and other mission-critical communications.

25. Based upon the concepts presented here, the forced migration of Public Safety into interference-limited designs would be both fiscally irresponsible and spectrally wasteful. Public Safety cannot shoulder the burden of costly policy shifts in a time where it is called upon to do more with less. Furthermore, pushing Public Safety into these types of designs would work against the intent of the policy itself; in other words, spectrum efficiency would be reduced, not enhanced[55].

VI. PROMOTING ACCESS TO SPECTRUM RECOMMENDATIONS

26. In considering methods to promote access to spectrum, the Task Force considered methods for enabling additional spectrum access for unlicensed devices. These methods included newer coordination techniques such as the use of band mangers, and opportunistic/dynamic use of existing bands through the use of technologies such as cognitive radios to find "white space" in existing bands.

27. As far as cognitive radios and related technologies are concerned, the State closely follows the activities of both the Software Defined Radio Forum and the Department of Defense with regard to these technologies. Although they hold great promise, these technologies are not currently able to provide reliable interference-free operations or opportunities for the sharing of dedicated Public Safety bands. Furthermore, it appears that unless omnipresent and

[55] As clearly Illustrated in the Appendices of the previous Comments from NYS-OFT

interconnected real-time sensor networks are in place over an entire service area, these may never be able to provide interference free operations.[56] Motorola agrees[57], commenting "*the opportunistic or dynamic secondary use of licensed spectrum — through either cognitive radio techniques to find "spectrum holes" in exclusive use bands, or the use of protocols that enable a secondary user to vacate spectrum if a primary user commences operation presents numerous problems and at best are merely theoretical concepts at this time"*, and[58] "*…the opportunistic or dynamic use of spectrum holes will be difficult."* TIA also cautions[59] *"... the Commission must recognize that many of the technologies cited (e.g., opportunistic devices, software defined radios that are completely agile in terms of operating frequencies, bandwidths, and modulation formats, and ultra wide band radios) are not likely to be ready for commercial availability for some time."* Finally, with regards to the already encumbered DTV transition process NAB[60] adds *"Injecting additional uses of already crowded broadcast spectrum will obstruct and burden the transition, draining its momentum."*

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[56] also see *A White Paper on The Exploitation of "Spectrum Holes",* Motorola, October 28, 2002

[57] §V-B, p.27, SPTF Report COMMENTS OF MOTOROLA, INC., January 27, 2003

[58] *Id.*

[59] §I, p.3, SPTF Report, COMMENTS OF THE TELECOMMUNICATIONS INDUSTRY ASSOCIATION, January 27, 2003

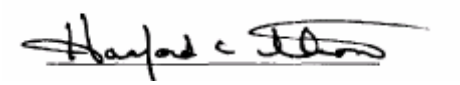
[60] p.3, SPTF Report Filing, JOINT COMMENTS OF THE ASSOCIATION FOR MAXIMUM SERVICE TELEVISION, INC. AND THE NATIONAL ASSOCIATION OF BROADCASTERS, January 27, 2003

VII. CONCLUSION

28. We again applaud the Commission for creating a forum to address the changes necessary to such spectrum policies, and sincerely thank those whose hard work and efforts were responsible for the creation of the Report and prior comments for which we have provided comment. The State of New York has a large stake in the outcome of any current or future spectrum policy decisions, especially where these affect the performance, capability, capacity, cost, or construction timeline of the SWN system. The Spectrum Policy Task Force has provided many excellent recommendations within their Report, but many more need to be adjusted to meet the needs of Public Safety, who have very unique requirements and extremely limited resources available.

29. In summary, we note that the State is concerned that policy changes may be effected, including those that that allow for sharing of Public Safety spectrum, and those that might further lead to interference and resource contention in the event of a crisis. The State must also be clear that the forced migration of Public Safety toward interference-limited designs would be both fiscally-irresponsible and spectrally-inefficient, and that Public Safety at all levels of government cannot shoulder the additional financial burden that would result from such an ineffectual and ill-conceived policy.

Respectfully Submitted,



Hanford C. Thomas, Director February 27, 2003

Statewide Wireless Network
New York State Office for Technology -
State Capitol, ESP
P.O. Box 2062
Albany, New York 12220-0062

(518) 443-2041