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April 29, 2004

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
236 Massachusetts Avenue, N.E.
Suite 110
Washington, DC 20002

Re: Ex Parte Presentation
In the Matter of Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television Notice of Proposed Rulemaking, MB Docket No. 03-15

Dear Ms. Dortch:

On Wednesday, April 21, 2004, the attached documents were e-mailed to Keith Larson, Mary Beth Murphy and Gordon Godfrey of the Media Bureau, Bruce Franca and Ed Thomas of the Office of Engineering and Technology and Jonathan Cody of Chairman Powell's office.

Pursuant to section 1.1206 of the Commission's rules, one copy of this letter and the accompanying presentation are being filed electronically in the above-referenced docket. Please direct any questions regarding this matter to the undersigned.

Sincerely yours,

Thomas P. Van Wazer

Thomas P. Van Wazer

cc: Jonathan Cody (via e-mail w/o attachments)
Ed Thomas (via e-mail w/o attachments)
Bruce Franca (via e-mail w/o attachments)
Keith Larson (via e-mail w/o attachments)
Mary Beth Murphy (via e-mail w/o attachments)
Gordon Godfrey (via e-mail w/o attachments)

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Van Wazer, Thomas P.

From: Van Wazer, Thomas P.
Sent: Wednesday, April 21, 2004 5:38 AM
To: 'klarson@fcc.gov'; 'gordon.godfrey@fcc.gov'; 'bruce.franca@fcc.gov'
Cc: 'jon.cody@fcc.gov'; 'ed.thomas@fcc.gov'; 'rpepper@fcc.gov'; 'mmurphy@fcc.gov'; 'merrill@mwgrp.com'
Subject: Draft FCC Rule Authorizing the Use of Distributed Transmission Technology -- remote access friendly

Proposed FCC Rule Section 73.6...

Keith, Gordon & Bruce --

I am resending an e-mail I sent on Monday due to remote access problems attaching documents. I discovered this problem in browsing e-mails here in Las Vegas as I gazed at the Eiffel tower. Attached is a draft rule that would authorize the use of Distributed Transmission technology ("DTx"). The draft has been vetted by engineers with broadcast companies, transmitter manufacturers and consulting engineers.

This e-mail provides a summary of the policy issues the FCC must address if it were to authorize DTx and our suggested decisions on those issues with references to the portions of the draft rule implementing our proposal. There are obviously other alternatives to many of these recommendations and we will be willing to discuss/communicate/meet with you about these alternatives as appropriate.

If you have any questions about the draft rule, please call Merrill (908-705-5752) or me (703-304-7393). We are both at the NAB convention and, if you cannot reach us right away, please leave a message, and we will get back to you ASAP. I suggest that you print this e-mail out and refer to it as you read through the draft rule.

As a general matter, the policy decisions proposed below (and rule subsections proposed to implement the policy decisions) are designed to maximize flexibility in the design of a DTx network to enhance the likelihood of providing reliable DTV service to a station's entire market. One other thing is worth noting at the outset -- we recognize that any authorized use of DTx may be further limited for a temporary period by any freeze on DTV changes to facilitate repacking. We still believe DTx will be valuable as it give broadcasters a viable option to a single maximized DTV facility as they build out their already approved service areas or allotments.

1) Primary treatment of service areas covered by distributed transmitters when distributed transmitters provide part of a station's main service. This treatment is critical. Without this protection, no rational broadcaster would use DTx because the coverage of only one of the transmitters would be protected. To recognize this treatment, subsection (e) of the draft rule implements this change. In addition, the rule is proposed as an addition to Part 73 rather than Part 74.

DTx Implementation: As we mentioned in our earlier meeting, Merrill has talked with Bill Meintel about modifying the FCC's de minimis interference program to include distributed transmission networks. While Meintel has indicated that it will take some work, he believes the changes can be made to calculate de minimis interference to/from stations using DTx. We recognize that a supplement to OET 69 would have to be issued to provide for DTx. We are happy to provide a draft of that supplement at an appropriate time. Subsection (f) generally addresses the application of the de minimis rules to/from DTx networks.

In addition, as we mentioned in our meeting last month, the authorization of DTx would require the addition of only one new field in the database that would identify transmitters as part of a distributed transmission network. This change is covered in subsection (h)(4) of the draft rule.

2) Power and height of distributed transmitters

The proposed rule generally provides that the current limits for main stations should also apply to distributed transmitters. This proposal avoids adding another layer of complexity to the current rules and provides maximum flexibility in designing a DTx network. Before you shriek in horror at the prospect of multiple 1,000 kW transmitters for a single station, please understand that the de minimis interference rules would continue to apply and, as such, it is extremely unlikely that any station in a congested area would be able to operate multiple 1,000 kW facilities. In addition, the capital costs for multiple 1,000 kW facilities are substantial and make it very unlikely that many stations would choose this alternative even if it were available. Rural areas are the most likely places where multiple 1,000 kW facilities would be possible and could be useful. Subsection (d) implements this proposal. There are further limits to height and power noted below.

3) Locations of Distributed Transmitters

In order to provide additional incentives for broadcasters to utilize DTx, the proposed rule allows controlled coverage extensions The proposed rule does this by allowing distributed transmitters to be placed within the larger of (i) a hypothetically maximized DTV service contour (the Reference Service Contour) for the station assuming the use of a single transmitter at the maximum height and power for its channel and location or (ii) the boundary of a station's DMA. These limits are proposed once again to provide maximum flexibility in the design of a DTx network and to ensure that a station is able to provide reliable over-the-air coverage to its entire market, a provision that will enhance the provision of rural service. Subsection (c)(1) implements this proposal.

DMA: this proposal provides maximum flexibility to serve the entire market. It would be limited to situations where more than 50% of the population served by the proposed transmitter is within the station's DMA. This prevents encroachments into adjoining DMAs. The ratio of in-DMA to out-of-DMA need not be 50/50. It could be changed to 60/40, for example. We do not think it should go beyond 75/25 because any larger ratio could be a significant limit on the design of the network and could result in a portion of the DMA not receiving service. Remember as well that this limit would only apply if the size of the DMA was larger than the hypothetically maximized DTV service area. Subsection (c)(2)(b) provides an additional limit on a distributed transmitter's antenna height and power to implement this limit.

Hypothetically maximized facility: Subsection (b) defines a reference point for the purposes of establishing a station's Reference Service Contour and Reference Interference Contour. There are three alternatives to determining a reference point for this purpose set forth in subsection (b)(1) -- (i) the station's reference point in its original allotment: (ii) the reference point of a single transmitter in the station's most recent granted c/p; or (iii) a reference point proposed for the purpose of limiting the placement of distributed transmitters. A station must be able to demonstrate that from this hypothetical reference point it can provide the requisite signal strength to its city of license assuming it utilized the maximum height and power permissible under the rules. We emphasize that these alternative reference points are only used to determine a station's hypothetically maximized facility. It in no way creates a new build-out requirement for stations.

Once the reference point is established for this purpose, the Reference Service Contour is calculated using the maximum height and power provided in Section 73.622(f) using a non-directional antenna. Under this alternative, distributed transmitters must be placed within this hypothetical maximized contour. This limit would only apply if the Reference Service Contour was larger than the station's.

There are two other, independent limits on the placement of distributed transmitters in subsection (c). Subsection (c)(2)(a) provides that the height and power of a distributed transmitter shall be limited such that its interference contour does not exceed the interference contour of the hypothetically maximized facility (the Reference Interference Contour). This provision ensures that no distributed transmission network creates any more interference to an adjoining market than the current rules allow. Subsection (c)(3) requires a distributed transmission network to provide the minimum signal strength to the station's city of license.

Subsection (h) provides licensing procedures designed to implement DTX as noted above.

4) Finally, subsection (i) implements a provision contained in Distributed Transmission candidate standard that I forwarded to you last week. It requires distributed transmitters to transmit a unique identification code buried spread spectrum signal. This requirement will be especially helpful in identifying the source of DTV interference. While we think this provision will be helpful to broadcasters generally, it is not essential to the authorization and implementation of DTx.

I hope this summary is helpful. As I noted above, it was designed to serve as a guide as you review the proposed draft. Please e-mail or call either Merrill or me at the numbers list above. Thanks.

Tom Van Wazer
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Proposed FCC Rule Section 73.626 DTV Distributed Transmission

(a) *General.* (1) Licensees and permittees of digital television (DTV) facilities shall be permitted to license and operate multiple transmitters on the channel assigned to them according to the provisions of this section. Individual transmitters in such groups of transmitters shall be termed 'distributed transmitters,' and the networks in which they operate shall be termed 'distributed transmission networks.' Distributed transmitters in a distributed transmission network shall be synchronized so as to transmit exactly the same data as one another, with emitted symbols identical from transmitter-to-transmitter. Timing of the emissions from different transmitters in a network may be offset from one another in order to permit adjustment of the arrival times of signals from the transmitters in a network at various locations within the network's service area. Delivery of data to the transmitters for transmission may be by any means, including over-the-air relay.

(2) Throughout this section, the terms "Reference Service Contour" and "Reference Interference Contour" are used. The Reference Service Contour is the F(50,90) contour at the noise-limited service level defined in §73.622(e) that would be calculated for a transmitter located at the reference point of the station, as defined in paragraph (b) of this section, having the maximum power and antenna height provided in §73.622(f) and operating with a non-directional antenna. The Reference Interference Contour is the F(50,10) contour at the noise-limited service level defined in §73.622(e) minus 15 dB that would be calculated for a transmitter located at the reference point of the station, as defined in paragraph (b) of this section, having the maximum power and antenna height provided in §73.622(f) and operating with a non-directional antenna. The locations of all contours the calculation of which is required by this section shall be determined using the methods described in §73.625(b).

(b) *Reference points for stations employing distributed transmission networks.* (1) For stations included in the initial DTV Table of Allotments and employing distributed transmission networks, the geographic reference point, as used in various interference and other calculations specified in this subpart, and as used in determining the permitted locations for distributed transmitters as specified in paragraph (c) below, shall be: (i) the reference point established for the station in the initial DTV Table of Allotments, (ii) the location of single-transmitter facilities approved in the most recent construction permit, whether or not licensed, or (iii) a reference point for which application is specifically made for purposes of bounding the locations of transmitters in a distributed transmission network, as provided in paragraph (b)(2) of this section.

(2) When application is made by a station on an allotment included in the initial DTV Table of Allotments, or otherwise already having authorization to construct DTV facilities under provisions of this Part, specifically to establish a reference point for a distributed transmission network, the application shall demonstrate that the reference point has been selected so that, if a station were located there having the maximum power and antenna height provided in §73.622(f) and operating with a non-directional antenna, it would provide the required minimum signal level over the principal

community as specified in §73.625(a).

(3) For DTV allotments not included in the initial DTV Table of Allotments, as described in §73.623(d), the minimum geographic spacing requirements of that section and the requirements for minimum signal level over the principal community, as specified in paragraph (b)(2) of this section, shall be met with respect to the locations of any geographic reference points proposed for the employment of distributed transmission networks.

(c) *Distributed transmitter locations and radiated power limitations.* (1) All distributed transmitters in a distributed transmission network shall be physically located within the bounds of: (i) the Reference Service Contour of the distributed transmission network or (ii) the Nielsen Designated Market Area (DMA) of the market in which the station is located. Choice of the Reference Service Contour or the DMA boundary shall be whichever is located farther from the reference point of the station in the direction from the reference point through the location of the distributed transmitter. The boundary of the DMA applicable to each distributed transmitter shall be that which exists at the time of application for a construction permit for that distributed transmitter.

(2) (a) The radiated power of each distributed transmitter shall be limited in each direction so that the farthest extent of its F(50,10) contour, 15 dB below the noise-limited service level specified in §73.622(e)(1), extends no farther from the network's reference point than does the Reference Interference Contour of the distributed transmission network. (b) The radiated power and the antenna pattern of each distributed transmitter situated outside the station's Reference Service Contour shall be further constrained so that 50 percent or greater of the population that it is predicted to serve is located inside the DMA in which its reference point is situated. The population served within and outside the DMA in which the station's reference point is located shall be that predicted to receive a field strength equal to or greater than the noise-limited service level specified in §73.622(e)(1) and shall be determined using the methods of *OET Bulletin No. 69 Revision 1.*

(3) A distributed transmission network shall provide over the entire principal community to be served the minimum field strength required by §73.625(a)(1). Multiple distributed transmitters may be used to provide the required minimum field strength. When more than one transmitter provides the required minimum field strength, the highest field strength from any transmitter in the distributed transmission network predicted to reach each point in the principal community shall be used in making the determination of adequate field strength at that point.

(d) *Distributed transmitter power levels and antenna heights.* The maximum effective radiated power and the maximum antenna height of each distributed transmitter shall be limited to the respective maximums provided in §73.622(f) for the channel on which the station operates and the zone in which the transmitter is located.

(e) *Distributed transmission network service areas.* (1) The service area of a distributed transmission network is the geographic area within the union of the noise-limited F(50,90) contours of all of the distributed transmitters in the network where the signal strength from any distributed transmitter is predicted to exceed the noise-limited service level, as specified in §73.622(e)(1). The noise-limited contour of each distributed transmitter is the area in which the predicted F(50,90) field strength of that transmitter's signal, in dB above 1 microvolt per meter (dBu) as determined using the method in §73.625(b), exceeds the levels specified in §73.622(e)(1). The union of the noise-limited F(50,90) contours is the area encompassed by all of the contours of the individual distributed transmitters taken together (the "distributed transmission network service area").

(2) Within the distributed transmission network service area, service is considered available at locations where the signal strength of any one or more distributed transmitters, as predicted using the terrain dependent Longley-Rice point-to-point propagation model, exceeds the levels specified in §73.622(e)(1). For further information on use of the Longley-Rice propagation model, see *OET Bulletin No. 69 Revision 1* and §73.622(e)(2).

(f) *Interference from and to distributed transmission networks.* (1) Determination of interference from distributed transmission networks to other stations and from other stations to distributed transmission networks, except as specified in paragraphs (f)(2) and (f)(3) of this section, shall follow the requirements specified in §73.623(c). These requirements shall include those with respect to the *de minimis* thresholds of populations that may be affected, the predicted desired-to-undesired (D/U) signal ratios that are the thresholds used for determining interference to exist, the assumed use of directional receiving antennas, application of the Longley-Rice point-to-point propagation model, channel relationships to which the D/U ratios apply, and protection to be afforded Class A stations. The provisions of *OET Bulletin No. 69 Revision 1* and later, which further describe application of the provisions of paragraphs (f)(2) and (f)(3) of this section, also shall apply to the determination of interference from and to distributed transmission networks.

(2) When calculating interference from a distributed transmission network to other stations (whether those other stations use single transmitters or also use distributed transmission networks), the predicted signal levels from the several distributed transmitters in the network shall be aggregated at each geographic location analyzed in the service area of the other station. Aggregation of the predicted signal levels shall include the effects of receiving antenna discrimination individually applied to the signals from each distributed transmitter in the network. Aggregation of the signal levels shall be accomplished by converting the received signal levels to their power equivalent values, summing the power equivalent values received from all transmitters in the network after application of the receiving antenna discrimination attenuation to each, and converting the resulting power equivalent value to the form required to complete the necessary D/U ratio calculation for that location.

(3) When interference is calculated from other stations (whether those other stations

use single transmitters or also use distributed transmission networks) to a distributed transmission network, the geographic points at which interference is analyzed shall be determined for the entire service area of the network defined according to the provisions of paragraph (e)(1) of this section and not for individual distributed transmitters in the network. Interference from each other station shall be determined only once for each geographic point within the service area of the distributed transmission network. In making calculations of the received signal levels at each geographic point in the service area of the distributed transmission network, the receiving antenna at each point analyzed shall be treated as pointing toward the distributed transmitter calculated to deliver the strongest field strength to the particular location. The signal level used for the desired signal in calculations of D/U ratios at each location analyzed within the service area of the distributed transmission network shall be that calculated at each location from the distributed transmitter toward which the receiving antenna there is treated as pointing, without aggregation of the signal levels from the other transmitters in the network.

(g) *Distributed transmitter technical specifications*. (1) While the signals of distributed transmitters in a distributed transmission network are required to be synchronized, as specified in paragraph (a)(1) of this section, there shall be no specific requirement for the relative emission timing of the respective transmitters in the network. Licensees are free to adjust the relative emission timing of their transmitters as necessary to optimize the performance of their networks.

(2) Distributed transmitters shall follow the requirements of §73.622(g) with respect to maintenance of frequency offsets from analog stations operating on the lower adjacent channel.

(3) Distributed transmitters shall comply with the requirements of §73.622(h) with respect to the attenuation of emissions on frequencies outside the authorized channel of operation.

(4) Distributed transmitters shall include a means for individual identification of their signals, notwithstanding the requirement that they be synchronized and carry the same data in their transmissions as all other distributed transmitters in the same distributed transmission network. The means for individual identification of the signals of distributed transmitters shall be inclusion in their emissions of a buried spread spectrum signal having symbols synchronized with the symbols of the primary signal, having the same spectral shape as that of the primary signal, and capable of operating continuously without causing interference to the primary signal. The insertion level of the spread spectrum signal shall be such as not to cause interference with the primary signal during periods of station programming operations; higher levels may be used at other times. The spread spectrum signal shall be capable of carrying an identification code 24 bits in length, which code shall be divided into 12 bits of network identification and 12 bits of transmitter identification information. The spread spectrum code shall not be transmitted during the data field synchronization data segments of the primary signal. The spread spectrum code shall be capable of carrying modulation data at a rate matching the data field rate of the

primary signal by inversion of the code on data field boundaries, and carriage of data of any sort on the identification signal is expressly permitted.

(h) *Distributed transmitter licensing procedures.* (1) An application for the first distributed transmitter in a distributed transmission network shall specify the reference point to be used for the network. Choices for the reference point shall be: (i) the location of the reference site included in the initial DTV Table of Allotments, (ii) the location of the site included on the most recently approved construction permit for the station, or (iii) a new proposed reference point. In the cases of the locations of the initial reference site and of the site of the most recently approved construction permit, the use of the requested reference point shall be approved automatically. In the case of a request for a new reference point, the use of the requested reference point shall be approved upon a showing that it meets the criteria established in paragraph (b)(2) of this section.

(2) Either an existing licensed transmitter or an approved construction permit facility may be converted to a distributed transmitter in a distributed transmission network. If such a transmitter is to be used in a distributed transmission network, it shall be the first distributed transmitter for which application shall be made. Such a transmitter need not be located at the reference point of the distributed transmission network. Application for conversion of an existing licensed transmitter or an approved construction permit facility to a distributed transmitter shall be granted automatically. If an existing licensed transmitter is not to be used as part of a distributed transmission network, its operation must be ceased when the first distributed transmitter in the distributed transmission network begins regular operation. Operation of an existing licensed transmitter that is not to become part of a distributed transmission network may continue during periods of testing of the distributed transmission network so long as both the existing licensed transmitter and the distributed transmission network are not operated at the same time.

(3) An application for a new distributed transmitter shall include the network identifier assigned to the associated distributed transmission network according to the provisions of paragraph (h)(4) of this section, unless the transmitter is the first distributed transmitter in the network. In the case of the first distributed transmitter in a distributed transmission network, the Commission shall assign the network identifier according to the provisions of paragraph (h)(4) of this section. In addition, the application shall include all the information required to be supplied for a single-transmitter facility with the following exceptions and additions: (i) The application shall contain a certification that the location of the proposed distributed transmitter meets the requirements of paragraph (c)(1) of this section. (ii) The application shall contain a certification that the 26 dBu F(50,10) contour of the proposed distributed transmitter meets the requirements of paragraph (c)(2) of this section. (iii) The application shall contain a showing that the distributed transmission network, with the inclusion of the proposed distributed transmitter, meets the interference analysis requirements of paragraphs (f)(1) and (f)(2) of this section. It is permissible to provide one interference showing including all of the distributed transmitters then planned for a distributed transmission network, so long as the distributed transmitter

covered by the application as well as all previously applied for or existing distributed transmitters are included in the analysis. If it is planned to delete any distributed transmitters from a distributed transmission network, the required showing may show the interference analysis of the network as it will exist after completion of the proposed changes.

(4) Upon granting the first application for a construction permit for a distributed transmitter in a new distributed transmission network, the Commission shall assign a network identifier code to be used in identification of the transmitters in that network, as provided by paragraph (g)(4) of this section. The network identifier code shall be 12 bits in length and shall be expressed as the characters "0x" followed by three hexadecimal characters. Assignment of network identifier codes shall be made in order starting from value 0x000. The 12-bit length of the network identifier code allows for 4,096 network identifier code assignments. Since uniqueness of the network identifier code is only required on a channel-by-channel basis, should the 4,096 codes initially available all be assigned, then assignment of codes shall continue on an individual channel basis, with uniqueness of assigned codes maintained on each channel.

(5) A transmitter identifier code unique within its distributed transmission network shall be assigned to each distributed transmitter as provided in paragraph (g)(4) of this section. The transmitter identifier code shall be 12 bits in length and shall be expressed as the characters "0x" followed by three hexadecimal characters. The 12-bit length of the transmitter identifier code allows for 4,096 transmitter identifier code assignments within each network. Assignment of transmitter identifier codes shall be made in accordance with requests from applicants included in construction permit applications so long as the values requested are unused in the network in which the proposed distributed transmitters will operate. Existing single transmitters converted to distributed transmitters and automatically granted such a conversion, as provided in paragraph (h)(2) of this section, shall be assigned the transmitter identification code value 0x000. When a distributed transmitter is deleted from a network, its transmitter identification code shall not be reused unless a distributed transmitter is reestablished at the same geographic coordinates, in which case reassignment of the same transmitter identification code shall be permitted.

(i) *Distributed transmitter identification.* (1) Distributed transmitters operating as part of a distributed transmission network shall be identified by insertion of the buried spread spectrum signal described in paragraph (g)(4) of this section. The spread spectrum signal shall carry the code for network identification assigned according to paragraph (h)(4) of this section and the code for transmitter identification assigned according to paragraph (h)(5) of this section.