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Response to AT&T's Proposal for Wire Center Trials in the IP Transition Proceeding

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Prepared for Public Knowledge by CTC Technology & Energy

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1. Introduction

AT&T's Proposal for Wire Center Trials,[1] filed in response to the Federal Communications Commission's approval of the company's Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, is an adequate starting point for a proof of concept, but as a trial it is insufficient in its scope, fails to establish test thresholds, and lacks the transparency necessary for adequate peer review and the application of the testing regime to future transitions. Given these shortcomings, the Commission should include elements of AT&T's proposal as an initial building block for a scientifically sound testing approach.

In this response to AT&T's proposal, prepared by the engineers of CTC Technology & Energy on behalf of Public Knowledge, we identify shortcomings in AT&T's proposal and outline specific steps to ameliorate those shortcomings. Our focus is to establish an appropriately stringent testing program, to ensure that the results are replicable, and to ensure that the test results are transparent and publicly available as befits a trial.

[1] "AT&T Proposal for Wire Center Trials," In the Matter of Technology Transitions (GN Docket 13-5) and AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition," February 27, 2014.

2. AT&T's Proposal Lacks Necessary Range in Testing Locations, Depth in Testing Types, and Specificity Regarding Test Result Thresholds

AT&T's proposal to the Commission presents a reasonable framework but exhibits at least three deficiencies. First, it suggests only two test locations for the entire United States. Second, it prescribes an insufficient range of technical tests. And third, it fails to define passing and failing results for those tests. AT&T's selection of a "control group" also requires additional consideration.

Test Locations

AT&T has submitted a "proposal for two trials involving the transition of two wire centers — one rural and one suburban — to all IP services."[2] These two test sites represent just 0.04 percent of AT&T's 4,700 wire centers—and approximately 0.07 percent of AT&T's wireline customers.[3] Based on the recognized standards of scientific sample sizes, these small percentages are insufficient for a trial designed to identify and resolve the full range of issues raised by the TDM-to-IP transition in all of AT&T's wire centers (and, by extension, in all wire centers).

We reiterate here the recommendations we made in our report, "A Brief Assessment of Engineering Issues Related to Trial Testing for IP Transition," prepared for Public Knowledge and filed as part of this proceeding on January 13, 2014:

> Testing should be conducted at a minimum of 100 separate wire centers across the U.S. (together representing approximately 1 percent of the phone lines in the U.S.). Wire centers under test should collectively represent urban and rural environments, large and small service areas, a range of telephone companies, and the range of equipment types and configurations that the telephone company plans to use. If the [Commission's] architecture review indicates that the telephone system is so diverse that 1 percent cannot represent the range of environments in a statistically viable way, then a larger number should be tested.

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[2] "AT&T Proposal for Wire Center Trial," p. 1.

[3] Estimate based on figures cited by AT&T. See: "AT&T to Invest $14 Billion to Significantly Expand Wireless and Wireline Broadband Networks, Support Future IP Data Growth and New Services," News Release, AT&T, Nov. 7, 2012. http://www.att.com/gen/press-room?pid=23506&cdvn=news&newsarticleid=35661

AT&T's proposed rural wire center test site, in Carbon Hill, Alabama, serves an area with "approximately 4,388 living units." In the version of its proposal that has been prepared for public inspection, the company has redacted the actual number of units it currently serves with wireline; we assume that the number served is far less than that total, because AT&T notes that the percentage of units served "underscores the point that many customers already have made the choice, even in rural areas, to transition away from the traditional TDM telephone network and services…."[4]

AT&T proposes to provide living units in Carbon Hill with "wireline and/or wireless broadband services"—but has again redacted the percentage of units it proposes to serve with wireline, making it impossible to judge the efficacy of this small trial.

Even if all of these living units were part of AT&T's wireline trial, however, these 4,388 sites could not possibly stand in for all of rural America, which has a much broader spectrum of geography, topography, population densities, and weather—and which is served by wireline systems of varying ages and which have experienced varying levels of maintenance and updates.

Similarly, the proposed suburban wire center test site—Kings Point, in Palm Beach County, Florida—is not an adequate proxy for all suburban wire centers nationwide (we note also that urban wire centers, with their unique service characteristics, are not contemplated at all by AT&T's proposal). AT&T has again redacted the percentage of the 49,712 living units in Kings Point that it proposes to serve with wireline broadband services under this trial, making it impossible to judge the merit of this test even based on that limited number of test subjects. And the company's argument that "70 percent of [the metropolitan area's] population is over 50 years of age," too, does not give credence to the notion that this test site can represent all of the TDM-to-IP transition issues that might affect "older Americans."[5]

We suggest that testing the two wire centers constitutes an acceptable first step only—a proof of concept—to demonstrate some of the possibilities of carrying out the transition in this manner and to begin to identify issues posed by the migration.

We suggest that the proof of concept be followed with a trial of the size we suggested earlier in order to gather more valid results and incorporate issues that may be caused in a wider range

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[4] Ibid, p. 13 – 14.
[5] Ibid, p. 14 – 15.

of environments—environments including urban and thinly populated communities, cold weather, mountains, desert, and others not represented in the proof. The environments should also include the full spectrum of existing phone systems—aerial and underground, old and new, fiber-rich and fiber-poor—and a wider range of demographics.

Test Types

AT&T's response outlines only two technical parameters that the company would test: "blocked or dropped calls" and network outages.[6] These defects represent different versions of the same issue (that is, a customer's complete inability to connect a call); measuring only this one issue, however important, would fail to capture a whole range of network attributes that contribute to the subscriber's experience. In other words, capturing data on the number of total call failures may be valuable as a single data point, but measuring a much broader range of performance indicators is essential to determining whether the IP transition presents an acceptable replacement for TDM wire centers at this time.

These tests will not, for example, capture the experience of a subscriber whose call has been connected but who is experiencing an unacceptable level of noise on the line. Similarly, a call that is merely connected still represents a failure if there are problems related to call routing, customer premises equipment, sound quality, or volume.

As a starting point, we believe the testing regime and reported test results should capture parameters including:[7]

1. Network capacity
2. Call quality
3. Device interoperability
4. Service for the deaf and disabled
5. System availability
6. PSAP and 9-1-1
7. Cybersecurity
8. Call persistence
9. Call functionality

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[6] "AT&T Trial Operating Plan," Section 6.5.4, Quarterly Defects Per Million (DPM) Report (at 54) and Section 6.5.6, Quarterly IP Network Outage Report (at 55).

[7] These are the parameters we put forth in our report, "A Brief Assessment of Engineering Issues Related to Trial Testing for IP Transition," prepared for Public Knowledge and filed as part of this proceeding on January 13, 2014.

10. Wireline coverage

We reiterate these parameters because, especially in light of AT&T's proposal, we strongly recommend that the Commission require a broad and effective trial.

Test Results

Further, merely positing testing parameters is not, in itself, sufficient. AT&T should also be proposing what it believes to be appropriate pass/fail thresholds for each test. This shortcoming compounds the inadequacy of AT&T's proposed measures of call completion and network outages; merely measuring these occurrences—or any other defects—does nothing to establish whether the results are acceptable.

Establishing standards for test results is a typical aspect of the Commission's trials. The Office of Engineering and Technology (OET) maintains a series of measurement procedures for parties "making measurements to show compliance with the FCC rules."[8] Similarly, any number of established engineering testing standards could be legitimately applied here.

The Commission should require a revised proposal from AT&T that includes a defensible and scientifically sound basis for proposing pass/fail thresholds—just as the company assuredly applies to its internal testing prior to product roll-out. These thresholds, if deemed acceptable, should then be applied to all of the testing that the Commission establishes as the minimum requirement for these trials. In the absence of such thresholds, the purpose of the initial round of tests must be to determine how different levels of performance correspond to different thresholds—and those levels should then become the Commission's standards.

Control Group

Assuming that the testing regime captures a sufficient range of parameters, that the test locations are sufficient in number and distribution, and that the test results are measured against an established standard, a successful trial will also require a proper control group.

AT&T's proposal for selecting control groups is acceptable, with some caveats. The company proposes the following: "For each trial wire center, AT&T will select a nearby wire center to

[8] "Measurement Procedures," Office of Engineering and Technology, Federal Communications Commission. http://transition.fcc.gov/oet/ea/eameasurements.html.

serve as a 'control group' to ensure that both the trial and control wire centers are subject to similar weather conditions, traffic congestion, and other network-effecting events."[9]

Ideally, the control group and the trial group would be in the same wire center. If they are not in the same wire center, then the control group wire center should be in the same region—the same city or county—as the trial wire center, and all of the important technical and demographic characteristics of the control wire center must clearly be the same as the trial wire center. These characteristics would include:

1) Similar age of plant (both in range and average)
2) Similar length of loop
3) Similar level of aggregation with digital loop carriers
4) Similar penetration of fiber
5) Similar breakdown between single-family homes and multi-dwelling units, and between residential and business connections
6) Similar number of passings served
7) Similar level of staff training

[9] "AT&T Trial Operating Plan," Section 6.5.4, Quarterly Defects Per Million (DPM) Report (at 54)

3. IP Transition Testing Requires Expert Agency or Third-Party Involvement

The second deficiency in AT&T's response is the lack of expert agency involvement. AT&T proposes a testing scenario in which it is solely responsible for testing, analysis, interpretation, and reporting of results. The testing and certification process must be broader than that. It should include the involvement of the Commission as the expert agency—or some other independent third party that can act as the Commission's agent in certifying the results.

At a basic level, the members of the public who are under test must be able to submit their legitimate complaints to the Commission or the third party, just as local cable subscribers have recourse under their local government's franchise agreements to submit complaints about service deficiencies. Those complaints should become part of the public file related to the network operations, and should be available for review and analysis.

The availability of complete details on each complaint filed by a test subject is an important point here. AT&T proposes the following:

> "AT&T will provide a summary of trial-specific customer issues. Data will be collected from: direct customer input to trial-specific web sites, calls to AT&T customer care centers and issues identified by AT&T field representatives having customer contact. AT&T will classify issues in a way that is reflective of the type of issues customers are describing, such as: accessibility, product availability or product performance."[10]

In our experience, however, nuanced customer complaints and even positive feedback that are filtered through a provider's analysis are typically truncated and homogenized to the point of irrelevance; in a trial designed to capture the intricacies of customer experience with IP technology in a whole range of applications and settings, bundling all customer comments together in overly broad categories could render those "customer issue reports" useless.

The purpose of these trials is to inform the Commission's decision about how to handle the transition. This will require a suitable control group and an independent entity empowered to pass judgment on the test results. For any test that is objectively determinable, the Commission or its independent agent, with input from the public and adequate data, must be able to decide whether a variation in the test results is significant enough that it constitutes an impairment.

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[10] "AT&T Trial Operating Plan," Section 6.5.3, Quarterly Customer Issues Report (at 53).

4. Commission Must Ensure Transparency of Testing and Peer Review of Results

The third deficiency in AT&T's response is that it fails to commit to either transparency in the testing or the availability of the test results for peer review. Accordingly, we recommend that, once the Commission has established an adequate range of testing to be conducted, it establish a report format for all data to be collected. As in other aspects of this testing proposal, we look forward to AT&T's recommendations on the reporting requirements.

The testing data should then be available to others in the industry and public so the results can be reviewed, the testing refined, and the entire process applied to the important task of developing a nationwide strategy for IP transition.

Because this is a test, not a product launch, transparency of the collection process and transparency of data is essential. The testing regimen must not be guided by concerns over a competitor getting access to AT&T's data; rather, it must be treated as a scientific test—one in which a broader community of stakeholders must be able to evaluate the testing process and validate the results.

If the process is in fact a scientific test, it should include:

- A question or purpose (e.g., will the proposed systems reliably transition the functionality of the legacy phone system with the same or improved performance?),
- A hypothesis (e.g., the proposed system will accomplish the digital transition within the framework required by the FCC),
- A prediction (e.g., the tests, when conducted in particular customer locations, will provide the following results within the following tolerances),
- A detailed step-by-step procedure,
- A tabulation and archiving of data in raw form (without cleaning or eliminating data that is not consistent), and
- An analysis of the data.

Third parties should be able to participate in or observe the tests, have access to the raw data, and be able to understand the analysis well enough to replicate the tests and the results.

Consistency with scientific method and transparency of the process will enable the public to have confidence in the process, will identify the main challenges in the migration as it proceeds, and will provide guidance to the many telecommunications operators who will need to make the transition.