

Dobson Cellular Systems

October 11, 2001

Dobson Cellular Systems (DCS)/ American Cellular Corporation (ACC)
TTY Report – 3rd QTR

Network Infrastructure Software Development

DCS/ACC utilizes TDMA infrastructure from Lucent and Nortel. DCS/ACC relies on these two vendors to complete software development and upgrades. Lucent is ready with it's ECP Release 17 and Nortel will be ready with MTX-10 in Nov. 2001.

Handset Development and Testing Plans

DCS/ACC relies on its handset vendors for the development and testing of TTY capable handsets. Panasonic has replied that two phones, the ProMax and the DuraMax wireless phones do not support TTY, but the Atlas CE and CS models do. Ericsson has replied to DCS that their R300D has successfully completed a full duplex transmission of TTY characters with no errors. Network testing still has to be completed.

Beta Testing and Lab Testing

DCS does not have a lab for testing. Once the TTY software is deployed from Lucent and Nortel we can begin field-testing.

Release and General Availability to Carriers of Network Software

See: Network Infrastructure Software Development above.

Availability to Carriers of Full Acceptance Test Units

DCS/ACC is waiting on commitments from our handset vendors.

Carrier Coordination of Testing with PSAP

DSC/ACC will conduct TTY testing with PSAP's that request. We will also inquire to PSAP's that we have implemented Phase I E911 on their availability to test with us, once the software and handsets become available.

Carrier Testing Activities, Including Field Testing and Consumer End-to-End Testing

DCS/ACC will conduct consumer testing end-to-end once handsets and software become available.

Retail Availability of Necessary Consumer Equipment

Availability is still uncertain. We hope to have a better day and time on the next report.

Geographic Scope of Network Development

Although there can be complications with the availability of handsets and software testing, DCS/ACC remains committed to the June 30, 2002 deadline.

Sincerely,
Sean O'Hara
Special Project Manager
Dobson Cellular Systems

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Sony Ericsson Mobile Communications and Ericsson Inc.
TTY Forum #19 Report
October 10, 2001

This report details the verbal presentation provided by Sony Ericsson and Ericsson Inc (hereafter collectively referred to as "Sony Ericsson") at the September 25th, 2001 TTY Forum 19. The attached report identifies standards status, project status, technical design issues, test status, delivery planning information and contact information.

Sony Ericsson has completed the initial designs that incorporate TTY technology within its products, and many of those products have been released for development testing. In general, the technical feasibility to transport TTY across the digital cellular systems has been proven by initial product testing. Cooperative industry TTY testing is in process. Technical flaws and system integration issues continue to be identified in the development and test processes. The majority of the flaws identified have led to design changes. The process of testing involves a tremendous amount of equipment, planning, documentation, and cooperation among the manufacturers, carriers, 911 PSAP facilities, standards organizations, and governing bodies. Sony Ericsson also continues to monitor Standards Organizations, the ATIS Incubator, and the test results to identify problems associated with operability and interoperability of the TTY systems.

1) Network Infrastructure Development:

TDMA Status:

The development of code for the TDMA network infrastructures was completed on July 31, 2001. Development software testing is complete for TRAB2 products. Regression testing for TRAB3 products is currently being conducted at the Montreal and Raleigh facilities. Lab tests indicate TDMA network products are generating positive test results. Sony Ericsson has implemented the IS-823A approved-balloted versions of standard. In addition, Sony Ericsson has implemented the proposed IS-823B fixes for self echo, false frames, 50 baud errors, and leaky voice frames. Sony Ericsson has not implemented squelch on the network TTY detector. Critical changes to the IS-823 standard for self-echo within the network were addressed in a patch to TRAB 2 products on August 12, 2001. This fix was tested and continued to exhibit problems with certain Mobile and TTY terminal product combinations. Identification of a problem with IS-641 filter has since solved this problem. This problem has been identified to the ATIS Incubator for resolution with the standards bodies. Final regression tests and delivery of redesign of TRAB 3 software was released on September 17th, 2001. Early results of the TRAB 3 test cases are encouraging. The majority of development test cases are complete for TDMA, and the "final development release" is expected shortly.

TDMA Plans:

The TDMA FOA is scheduled for November 01- 12, 2001.

GSM Status:

The development code and products for the CTM circuit pooling node for the GSM network infrastructure were shipped on September 24th, 2001 to Richardson Texas. The CTM Node product includes both hardware and software components, that when combined provide the CTM function for GSM. There have been changes to the technical standards for TTY detection. The current design incorporates TR23.231 bit exact changes dated September 03, 2001, which change the TTY detector from a 5 bit to a 4 bit length. The design also incorporates the July 21 standards changes from July 06 draft documents which move the bearer bit from octet 3a bit 5 to bit 6. These changes were incorporated in the initial development release of the code. The current implementation is to the approved ballot-accepted versions of the 3GPP standards in all other respects. The development hardware and software were delivered to the Richardson test facility on October 01, 2001.

GSM Plans:

The second CTM Node is scheduled to arrive October 10th, 2001. Algorithm verification is scheduled to complete October 15th, 2001. The development code is scheduled to complete by October 31, 2001. The development code release to carrier infrastructure for testing will be November 01, 2001. The development verification testing is scheduled to complete on November 15th, 2001. The system verification test release is expected to be released on November 16th 2001. The system FOS is scheduled for November 16th, 2001.

C DMA Status:

The development of code for the CDMA network infrastructures of the TTY/TTD vocoder enhancement is currently in progress with active simulation and DSP code development. First simulation testing started in September followed by emulator testing and integration testing. Deliveries of development releases of the enhanced vocoder will be tested in Sony Ericsson labs. The delivery of carrier verification test level of product is scheduled to be available in mid-December.

CDMA Plans:

Various lab testing are planned according to the development plan. System level testing is expected to be completed by December 31. System verification test release software will be released to carriers in January, 2001.

2) Handset Development and Testing Plans;

Sony Ericsson terminal products have progressed through the "development stage" and are entering the final stages of "product test stage". The build plan and development testing are complete for all product technologies. Test data is now being generated for CDMA, TDMA, and GSM products. Handsets testing for ATIS test events are in place, and are being supported by both Sony Ericsson and Ericsson. The release of validation products to outside organizations is ongoing.

TDMA Status

TDMA Handsets were delayed due to the significant problems encountered with the TTY standards, the development integration process, and test failures with system elements. Prototype testing revealed problems with the standard, and with TTY devices. Fixes have been incorporated for self-echo, volume level, IS-641 filtering problem, and 50-baud errors. Testing of

these critical fixes provided a 0.6-% maximum (0.25% average) character error rate (CER) when tested with various TTY devices, and configurations, in a static location. Error rates of less than 0.5-% were measured with a -95 dBm RSSI level. Development code was released on September 21, 2001 with critical fixes incorporated in the design. Development tests for TDMA are ongoing. A release development build occurred on September 25th, 2001 for carrier development product testing. Carrier development test units are expected to be available on October 31, 2001.

TDMA Plans

Carrier test units with the final user interface is expected to be available on December 03, 2001. Volume availability is expected March 31, 2001

GSM Status

GSM handsets were delayed due to standards activities not completing until July 21, 2001. Minor changes to standards have had minimal impact to the GSM development schedule. Software development is complete for terminal and CTM box. Handset products in development testing revealed problems with the standard, and with TTY devices. Fixes for TTY detector bit lengths were implemented. TSB 121 level interface testing also required fixes to the TTY product. Development code released September 09, 2001. Carrier Test units availability release September 12th, 2001. GSM development testing provided a 0.5-% maximum (0.18% average) character error rate (CER) when tested for various TTY devices, and configurations, in a static configuration. Error rates of less than 1-% were measured with a -105 dBm RSSI level. Carrier development test units are expected to be available by October 12th, 2001.

GSM Plans

Carrier test units with the final user interface are expected to be available on December 31, 2001. Volume availability is expected on February 20, 2001.

CDMA Status

CDMA Handsets encountered problems in the development integration process with TTY devices. Final handset products are in development test. Prototype testing revealed problems with the standard, and with TTY devices. Fixes for Self-Echo have been implemented. CDMA development testing provided a 0.18-% maximum error rate when tested for various TTY devices, and configurations, in a static configuration. A release development build occurred on September 12th, 2001 for testing on Lucent Infrastructure. Carrier development test units are available. The test was delayed due to the events in September. Final handset user interface for Carrier testing is being finalized.

CDMA Plans

Carrier test units to customer level are expected to be available on November 15, 2001. Volume availability is expected by December 03, 2001.

3) Beta Testing and Lab Testing;

TDMA Infrastructure Beta Testing and Lab Testing

Beta Testing of TDMA software was completed for TRAB 2 software on October 05, 2001. Beta Testing of TDMA software for TRAB 3 is under way and scheduled to complete by October 17th. TDMA Network Infrastructure was tested at the ATIS Incubator Test event September 10 – 14th in Lisle IL. The test for TRAB 2 software produced very favorable test results. While not all tests were completed, those that were, demonstrated a fully functional technology, with a usable error rate.

GSM Infrastructure Beta Testing and Lab Testing

Testing of the initial hardware and software has started. The initial functional testing occurred during August, and performed satisfactorily. The CTM code completed cursory development tests, and was within the 1-% error rate limits. Initial development functional tests were completed on September 24th, 2001. Development testing scheduled for completion November 15th 2001.

CDMA Infrastructure Beta Testing and Lab Testing

CDMA simulation testing is currently underway. CDMA test planning and test case generation is in process.

4) Release and General Availability to Carriers of Network Infrastructure Software;

TDMA Infrastructure GA December 05, 2001

GSM System generally available (GA) with GSM R9.0 (Starting Rollout January 15th, 2002)

CDMA Generally Available with system Release 8.6 (Starting Rollout February 28, 2002)

5) Availability to Carriers of Full Acceptance Test Units;

- *TDMA Handsets December 03, 2001*
- *GSM Handsets and CTM box December 31, 2001*
- *CDMA Handsets November 15, 2001.*
- *TDMA Network Infrastructure October 22, 2001*
- *GSM Network Infrastructure November 16, 2001*
- *CDMA Network Infrastructure dates January 2, 2002.*

6) Efforts Toward Achieving Digital Wireless Solution Compatibility with Enhanced TTY Devices.

Sony Ericsson continues to work very closely with all manufacturers and carriers on the TTY compatibility mandate. Sony Ericsson has taken a leadership position in the debug, test, and isolation of potential customer and user anomalies that have resulted in changes to the product standards and implementation techniques. These include virtual TTY detector implementations for acoustic echo canceller implementations, TTY turbo code anomalies, leaky voice frames, and the IS-641 filter issue. Sony Ericsson will continue to work toward the trouble free first pass implementation of TTY technology for all the digital wireless solution systems.

7) Testing and Deployment Activities

Sony Ericsson is working with the ATIS Incubator, which is taking a leadership position in the test procedures, plans, testing and coordinating carrier testing of TTY technology. The first industry test event tested TDMA Infrastructure for Lucent, and Ericsson, and handset products from multiple manufacturers, including Sony Ericsson. The tests demonstrated the operation, static operation, operation with various TTY devices, calling configurations of mobile to mobile, mobile to landline, and mobile to PSAP. Driving and AMPS tests were also conducted. The tests clearly went along way to validate the technology in an actual operational setting.

- Sony Ericsson has developed tests to support the required testing within the PSAP structure. Sony Ericsson is working with the ATIS Incubator to refine this test process, and participate in generating test results.
- Manufacturers will validate self-operation and compliance under the FCC mandate.
- Additional testing with PSTN to cell, and cell to cell, operation with multiple types of TTY devices, user interface testing, and validation of FCC mandated operations is expected to take place within the ATIS Incubator and in Customer FOA test events.

8) Risks:

At the TTY Forum 19 several manufacturers pointed out risks and concerns with respect to meeting the compliance requirements by the FCC. Currently, Sony Ericsson is working several issues through the ATIS Incubator process. Several of these issues have been in the resolution process since TTY Forum meeting 18. These items include IS-641 filter performance, and leaky voice frame performance of TTY detectors.

The IS-641 filter performance is at the earliest stage of evaluation. Studies of the test data suggest the IS-832 transport behavior is influenced by the Ultratec Compact 1600 TTY unit. Complete assessment and early resolution of this concern is needed to lower the risk posed by these findings. Sony Ericsson is monitoring the results of test data of multiple TTY devices with the TTY standards. Sony Ericsson is currently evaluating and implementing proposed changes for 50 Baud problems with TDMA and CDMA signaling, leaky voice frames of TDMA signaling, CTM TTY detector bit length, TTY detector squelch limits, Ameriphone Q.90 and Ultratec Compact 500 output impedance, and false frame detection. Sony Ericsson is verifying fixes for self-echo, echo suppressor integration, IS-641 filter fixes, and echo suppressor errors in TTY detection.

Critical Work Status:

Several “critical work items” have been in process since the TTY Forum Meeting 18. These items include user intervention, the “TTY mode switch”, and recent changes to the TTY standards.

The acceptance of user intervention, and the TTY switch, in the user interface, has alleviated a significant concern for the wireless industry. At TTY Forum 18, additional user intervention guidelines were proposed with respect to the TTY mode switch. Several carriers have provided functional improvements in TTY control functions. Sony Ericsson has defined a user interface to adhere to these evolving guidelines and is preparing product implementations in each

technology, for carrier and user evaluation. These user interface features will be made available in the carrier approval release versions of the mobile products.

Sony Ericsson continues to develop product changes to react to the changes in TTY ballot standards, test results, and ATIS Incubator issues. Currently there are many reported behavior anomalies in TTY signaling that have required design changes. Although it is evident that additional changes to the code are required, it has been demonstrated that the majority of test cases are passing from repairing the high priority items identified in the development test plans. Products are in the process of releasing these repairs to critical functions. It is expected that these items should not significantly hinder the industry testing, and interoperability testing that is now underway. It may be necessary to make additional changes within the carrier approval test products to incorporate the remainder of the identified problems. For products that have completed the TTY development process a significant schedule risk is incurred if any additional high priority problems are identified. Additionally, each change to the TTY standards and proposed implementation imposes a great risk to the product schedule.

Please feel free to contact either Matt Kaltenbach or Steve Coston if you have any question regarding this report, or wish to contact test or product interfaces. Please contact your local customer interface for product sales and marketing information.

Farmers Cellular Telephone Inc. TTY Report

Farmers Cellular network consist of only one Nortel switch. We offer analog service as well as TDMA digital. Farmers Cellular has purchased the latest software upgrade from Nortel. We remain committed to meeting the FCC's tentative mandate to provide E911 TTY access to our network.. The software to support IS-823 has been delayed, but Nortel's newly-scheduled release date should still allow compliance. Nortel will not support 50-baud TTY for their first release.

Our handset vendor status: Ericsson is on schedule. Motorola has not given an update, and Nokia is on schedule.

Farmers Cellular Telephone, Inc.
TTY Report
October 9, 2001

- Network infrastructure software/hardware development and testing

Farmers Cellular Telephone, Inc.'s ("Farmers Cellular's") network consists of only one Nortel switch. We offer analog service as well as TDMA digital. Farmers Cellular has purchased the latest software upgrade from Nortel. Nortel Networks' development is complete, and product tests have been completed as well. Nortel tested with Panasonic prototypes. (Other handset vendors were not available during Nortel's NBSS10.1 test cycle).

- Handset development and testing plans

Farmers Cellular handset vendor status: Ericsson is on schedule. Motorola has not given an update, and Nokia is on schedule.

- Schedule for deployment of the software/hardware in the Farmers Cellular switches

The minimum baseline software requirement for this feature to be deployed in Farmers Cellular switches is MTX10 or higher. Software is scheduled to be available Week 44 and will be scheduled for deployment on specific Farmers Cellular switches on a market-by-market basis.

- Beta testing and lab testing

Turbocode/ HiSpeed is a proprietary feature on Ultratec/Ameriphone TTY device and is not supported by TDMA standards. If TDMA standards are enhanced to support these devices, Nortel will support this in a future release. However, standards are designed to avoid supporting propriety methods and there is no known effort to standardize the propriety features.

- Release and general availability to carriers of network infrastructure software

Under Nortel's recommendation, Farmers Cellular will engage the chosen TDMA TTY handset vendor during network testing to do interoperability testing with the Nortel Networks solution.

- Plans to test with the Public Safety Community (PSAP's)

Farmers Cellular will schedule this testing with the PSAP centers during its network testing. Farmers Cellular will work with Nortel to identify PSAPs that would be willing to test an end-to-end solution.

- Carrier Testing activities

Testing will begin upon receipt of software.

- Retail Availability

Farmers Cellular is dependent upon the availability of handsets from vendors.

- Geographic scope of network infrastructure deployment

Farmers Cellular will test the four PSAPs in our geographic area when the software is available.

Farmers Cellular remains committed to meeting the FCC's tentative mandate to provide E911 TTY access to our network. The software to support IS-823 has been delayed, but Nortel's newly-scheduled release date should still allow compliance. Nortel will not support 50-baud TTY for their first release.

Midwest Wireless Holdings L.L.C
TTY Status Report
October 8, 2001

Background

Midwest Wireless Holdings L.L.C. is a rural carrier that operates TDMA digital cellular service in its Minnesota, Iowa and Wisconsin markets. Due to the complexity of this issue, Midwest must rely on its switching vendor, Nortel Networks, to provide the necessary switch software, and the capabilities of our two major handset providers, Nokia and Motorola, in order for our company to meet compliance deadlines.

Status

Nortel has announced the general release of MTX10 for November 30, 2001. MTX10 is the base software load that will be 12/31/01 software compliant. Midwest Wireless does not plan to install MTX10 until late 1st or early 2nd qtr. 2002. This will change our earlier prediction of meeting the 12/31/01 software compliance deadline, but should not change our expectations of meeting the June 30, 2002 deployment date.

Respectfully submitted
Gary Christopherson
Midwest Wireless Holdings L.L.C.

October 10, 2001

Via Electronic Mail and Federal Express

Ed Hall
The Alliance for Telecommunications Industry Solutions
1200 G Street, NW
Suite 500
Washington, DC 20005

Dear Mr. Hall:

Motorola is pleased to submit a status report related to our efforts at attaining TTY compatibility with our digital phones and infrastructure. Motorola is a domestic supplier of cellular handsets in TDMA, CDMA, GSM, and iDEN technologies. We also provide infrastructure equipment in CDMA and iDEN technologies.

We are working closely with our carrier customers to provide them with the equipment necessary to meet the Federal Communications Commission's June 30, 2002 TTY deployment deadline. At this time, we are on track to enable these carriers to meet their obligations.

The attached report is provided to the TTY Forum for its report to the Commission for the third quarter of 2001. Please contact me at the number below if you have any questions.

Regards

Alfred R. Lucas
Vice President and Director
Office of Access Excellence
Motorola
Voice: 561-739-2505
TTY: 561-730-2506

Enclosure

MOTOROLA
TTY COMPATIBILITY DEVELOPMENT STATUS REPORT
3ND Quarter 2001

Product	Standard	Status	Milestones	Progress
CDMA Handset	IS 127-3 IS 733-2	Integration & System Test	IOT: June 2001 UI: October 2001 ROM: December 2001 SA: 1Q 2002	Planning to participate in November ATIS testing with Sprint.
GSM Handset	TS 26.226 TS 26.230 TR 26.231	Integration & System Test	UI: October 2001 IOT: October 2001 ROM: December 2001 SA: 1Q 2002	Mobile to Mobile calls are functional. Optimization activities are on-going. IOT will start in October.
iDEN Handset		Beta in customer's lab	On plan	
TDMA Handset	IS 823-A IS 840-A	Integration & System Test	IOT: September 2001 UI: September 2001 ROM: October 2001 SA: 1Q 2002	Tested at AWS in Naperville, IL using Lucent Infrastructure. Tested both AMPS and TDMA.
CDMA Infrastructure	IS 127-3 IS 733-2	Ready for FOA	Field Testing: Nov 13-15, 2001	Infrastructure software in field has digital TTY support available now. Only handsets are needed to commence FOA.
iDEN Infrastructure		Beta in customer's lab	On plan	

Note: Motorola works with its carrier customers to provide them specific information related to their respective products.

Note: IOT is Inter Op Testing with RAM based parts for Character Error Rate testing
 UI is User Interface testing with HCO / VCO support
 ROM is the availability of ROM based phones. These should be functionally identical to a RAM phone.
 SA is Ship Acceptance of production volume quantities

Al Lucas
 Office of Access Excellence
 Motorola
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Nextel Communications, Inc.
2001 Edmund Halley Drive, Reston, VA 20191



October 10, 2001

Via Electronic Mail and Federal Express

Megan Hayes
The Alliance for Telecommunications Industry Solutions
1200 G Street, NW
Suite 500
Washington, D.C. 20005

Re: Nextel Communications, Inc. Fourth Quarter 2001 Report to the TTY Forum

Dear Ms. Hayes:

Pursuant to the Fourth Report and Order of the Federal Communications Commission ("Commission") in CC Docket No. 94-102,³ Nextel Communications, Inc. ("Nextel") hereby submits this report on the status of its efforts to attain TTY accessibility on Nextel's iDEN handsets and network. Working closely with its vendor, Motorola, Inc. ("Motorola"), Nextel is pleased to report that its TTY accessibility progress continues to move ahead in a timely manner. Pursuant to this schedule, Nextel intends to fulfill the Commission's June 30, 2002 TTY deployment deadline.

Nextel is a provider of digital Commercial Mobile Radio Services using Motorola's iDEN technology. Nextel is one of only three such iDEN providers in the United States. Thus, Nextel has worked with Motorola in the research and development of a TTY compatibility solution for the iDEN product and network. Since the Telecommunications Industry Association ("TIA") approved the Lucent solution for providing TTY accessibility on digital networks, Motorola has invested significant time and resources in creating a solution that will provide the same accessibility on iDEN networks.⁴

Motorola has completed its lab testing of the TTY-capable iDEN handset and network infrastructure. Nextel is now conducting its own lab tests on both the TTY-capable iDEN handset and TTY network infrastructure. At the same time, Nextel is conducting a First Office Application ("FOA") test of the TTY capabilities in one of its markets in California. These FOA field tests, which will likely continue through November, will include users from the hearing-impaired community who will have the opportunity to test their own TTY devices on the Nextel system. Nextel has been working with Gallaudet University to locate potential users for these tests.

Once Nextel completes its testing, assuming no significant roadblocks are uncovered during the testing process, Nextel can initiate full deployment of the TTY upgrades throughout

³ *In the Matter of Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Calling Systems*, Fourth Report and Order, CC Docket No. 94-102, FCC 00-436, released December 14, 2000 ("Fourth R&O").

⁴ *See, e.g.*, Fourth R&O at para. 3.

its nationwide network. As Nextel has previously explained, these modifications will impact the process for encoding the voice channel on iDEN's system. Because such vocoder modifications have the potential to impact voice quality for all Nextel users, these base station controller modifications will require considerable time and attention. At this time, Nextel anticipates completing deployment by the Commission's June 30, 2002 deadline.

Nextel appreciates the opportunity to provide this report to the TTY Forum as part of the forum's quarterly TTY report to the Commission. If you have any questions about this report, please do not hesitate to contact me at 703-433-8315.

Sincerely,

Robert D. Montgomery
Senior Manager – Regulatory Technology Development



NOKIA Americas Standards

Submitted by:

Chris Wallace

V.P. Nokia Americas Standards

FOR EXTERNAL USE

October 10, 2001

Nokia Status Report to TTY Forum #19 – October 2001

Nokia manufactures mobile phones for wireless technologies; AMPS, TDMA, CDMA and GSM; at both 800 and 1900MHz. Some phones are also developed with multiple technologies in an individual handset. Nokia supplies network infrastructure for GSM.

Nokia is currently developing FCC compliant TTY Compatibility in seven new phone programs with specific models having CDMA, TDMA, GSM and AMPS.

Nokia is committed to meet FCC deadlines for digital TTY according to industry standards set and agreed to.

HARDWARE SOLUTIONS:

Nokia continues to develop mobile handset products to support TTY/TDD Compatibility with TSB-121 three-pin headset functions. Other handset projects will have a built-in 2.5mm jack four-conductor "Stereo" connection in the handset body; with adapting interconnect cables to comply with TIA/EIA TSB-121.

Consumers and the TTY manufacturers must be aware that the quality of connecting cables will be crucial to the performance of this capability. Nokia is also concerned that compliance to the necessary standards is not sufficient to the successful operation of the TTY capability, vis-à-vis TSB-121.

MOBILE TERMINAL SOFTWARE SOLUTIONS:

CDMA IS-127-2 (as of July 2001)

Nokia CDMA Products are developed by Nokia's San Diego facility

Six to eight models are under development for TTY Compatibility.

Lab Testing has occurred with Lucent and Nortel infrastructure with the acceptable results.

Currently scheduling testing with Motorola and Ericsson infrastructure.

TDMA IS-136 / IS-823

Five to seven models are being developed for TTY Compatibility.

Lab testing has occurred with Nortel Infrastructure with the acceptable results.

Lab testing for Lucent and Ericsson is expected in October.

A TDMA handset product, supporting TTY, will be available to test in Q4 2001, generally available Q1 2002

NOKIA

NOKIA Americas Standards

Submitted by:

Chris Wallace

V.P. Nokia Americas Standards

FOR EXTERNAL USE

October 10, 2001

GSM ATIS T1.719 and T1.718, except the TTY detector

At this point, no lab testing has been established with an infrastructure vendor.

A GSM product, supporting TTY, will be available to test in Q1 2002, generally available Q2 2002

More details will be available as these products are commercially announced

Respectfully Submitted By:

Chris Wallace

V.P. Nokia Americas Standards

Douglas W. Neeley
Sr. Technical Standards Eng.

Leo Fitzsimon
Government Affairs
(202) 887-0145

October 10, 2001

CDMA TTY/TDD Regulatory FAQ/RFI

Enclosed is information regarding Nortel Networks' plans to comply with FCC's TTY requirements for CDMA service providers.

- What is the status of TTY/TDD network infrastructure software/hardware development and testing?

Nortel response: Nortel Networks' development and product test is based on current standards: IS-127-2 (EVRC) & IS 733-1(13K Vocoder). New revisions of these standards namely IS-127-3 (EVRC TTY) & IS-733-2 (13K TTY) have been published as of September 2001. Nortel Networks plans to support this new addendum to the standards in 2002. Operators will be able to deploy the Nortel Networks TTY solution based on the current standards IS-733-1, IS127-2 to meet the FCC deadline for implementation. Nortel Networks has completed testing using prototype mobile handsets from only a few vendors, which have shown positive results. Nortel Networks does not anticipate performance issues with any other vendor's handsets once they come available.

- What is Nortel Network's TTY/TDD plans to test and confirm solution performance including additional tests referenced in Sections 20-23 of the FCC 4th Rule and Order 12-14-2000?

Nortel response: Regarding Section 20-23, TurboCode and HiSpeed is each a proprietary feature of TTY device vendors Ultratec and Ameriphone, respectively. Due to the code being proprietary Nortel Networks will not test or support these enhanced solutions. Standards are designed to avoid supporting proprietary methods, and Nortel Networks is not aware of any effort to standardize these proprietary features.

- What are the hardware baseline and software baseline to support CDMA TTY/TDD functionality?

Nortel response:

Regulatory solution required	CDMA HW/SW baseline
TTY/TDD	MTX09 SW (DMS-MTX) NBSS10.1.1 SW (BSS) TTY capable handsets (3 rd party)

- What software baseline must the MTX be running in order to upgrade to MTX10 and/or NBSS10.1.1?

Nortel response: The MTX is required to be running MTX09 in order to upgrade to MTX10 and/or NBSS10.1.1. Nortel Networks has always maintained an allowance for CSP or Communication Services Platform "jumps" from MTX release to MTX release. The MTX has received significant changes due to moving to a multi-processing architecture thus the CSP layer has evolved to CSP14. It is because of this very different CSP14 layer of the MTX10 release that an MTX cannot upgrade safely from MTX08 directly to MTX10.

- What is the Network infrastructure software/hardware planned general availability dates that support the deployment of this regulatory feature?

Nortel response: In order to comply with the FCC's December 31, 2001 requirement for TTY/TDD, Nortel Networks commits to delivering the enabling software as follows:

Software load	CDMA SW general availability
MTX09	Now Available
NBSS10.1 with MTX09	October 12, 2001
MTX10 CDMA	December 7, 2001

Nortel Networks Proprietary and Confidential

- How is the software/hardware for TTY/TTD subscribers provisioned in the network?

Nortel response: The provisioning for TTY must be done the same way as for the voice subscribers.

- What is the schedule for deployment of the software/hardware in the network?

Nortel response: The minimum baseline software requirements for this functionality are given above. For questions related to scheduling its deployment into a carrier's network, please contact Nortel Networks Product Deployment.

- For TTY/TDD what are the plans to work with any wireless carrier to perform end-to-end customer tests, and when will this occur?

Nortel response: The verification process for NBSS 10.1 with the customer began in June 2001. Nortel has recommended that the operator engage their chosen CDMA TTY handset vendor during the verification process or VO process to participate in interoperability testing with the Nortel Networks solution. Nortel Networks recognizes that to date few if any handset vendors have published GA dates for TTY mobile handsets. To Nortel Networks' knowledge, as of October 10, 2001, TTY capable handsets and compatible TTY/TTD devices have not been acquired by any of our service provider VO partners. Despite this fact, Nortel Networks' will not delay the delivery of this software load to all customers planned October 12, 2001. This decision not to delay is driven by the importance of the TTY feature, and the positive results of the TTY/TTD internal testing. The general availability of this SW solution will allow a greater number of our customers to become verification partners. Nortel Networks' forecast for this specific feature's full verification is planned to occur in the mid-October and in the November time frame with two of our lead customers, respectively. Operators are also encouraged to request their handset vendors to test their commercial grade CDMA TTY capable handsets in Nortel's Wireless Interoperability Lab.

All verification activities are dependent upon the availability of commercial grade CDMA TTY/TTD handsets.

- What are Nortel Network's plans to test their own or other vendor handsets with your switch solution?

Nortel response: Nortel Networks provides only infrastructure for wireless networks. Nortel Networks does not provide mobile handsets. Even though the infrastructure software is scheduled in advance of the Dec 31, 2001 FCC requirement, commercial handset general availability dates have not been scheduled by handset vendors. Nortel Networks recommends that the operator engage its handset vendor(s) in order to respond to the FCC regarding commercially available handset.

Operators are encouraged to request their handset vendors to test their commercial grade CDMA TTY capable handsets in Nortel's Wireless Interoperability Lab.

Please contact Cher Bruce for scheduling TTY testing in the Nortel Networks Wireless Interoperability Lab, where testing is based on current published standards (Phone: 972-684-2299; Fax: 972-684-3881; csbruce@nortelnetworks.com)

- **Contacts:**

Product Marketing	MTX10/NBSS10.1 SW	Kurt Raaflaub	ESN 445-2971
Product Management	CDMA TTY/TDD	Maniam P	ESN 445-7203
Regulatory	E911Ph2&TTY/TDD	Charles Spann	(903) 852-6798
Product Deployment	CDMA NBSS SW	Mark Schwarzer	ESN 445-5851

October 10, 2001

TDMA TTY/TDD Regulatory FAQ/RFI

Enclosed is information regarding Nortel Networks' plans to comply with the FCC's TTY requirements for TDMA service providers.

- What is the status of TTY/TDD network infrastructure software/hardware development and testing?

Nortel response: Nortel Networks' TDMA TTY/TDD functionality is compliant to IS-823 (TTY/TDD Extension to TIA/EIA 136-410 Enhanced Full Rate Speech Codec) for the EFRC Codec. The development and product testing are complete and system verification is being performed. Nortel Networks has tested this feature with alpha/beta handsets from a few major vendors, which have all shown positive results. We anticipate receiving handsets containing commercial software from major vendors shortly and will conduct testing with those handsets.

Nortel Networks plans to support new and evolved standards in next year's software releases. Operators will be able to deploy the Nortel Networks TTY solution i.e. MTX10, which is based on the current IS-823A standard, to meet the FCC deadline for implementation pending the availability of the stable commercial grade handsets from at least two vendors. At this point the TTY feature in MTX10 is being termed a "prep" feature due to the unavailability of commercial grade handsets.

- What is Nortel Network's TTY/TDD plans to test and confirm solution performance including additional tests referenced in Sections 20-23 of the FCC 4th Rule and Order 12-14-2000?

Nortel response: Regarding Section 20-23, TurboCode and HiSpeed is each a proprietary feature of TTY device vendors Ultratec and Ameriphone, respectively. If TDMA standards are enhanced to support these devices, Nortel will support this in a future release. Standards are designed to avoid supporting proprietary methods, and Nortel Networks is not aware of any effort to standardize these proprietary features.

- What are the hardware baseline and software baseline to support TDMA TTY/TDD functionality?

Nortel response:

Regulatory solution required	TDMA HW/SW baseline
TTY/TDD	EDSPM SW for the ICP; MTX10 SW for the DMS-MTX TTY capable handsets (3 rd party)

- What software baseline must the MTX be running in order to upgrade to MTX10?

Nortel response: The MTX is required to be running MTX09 in order to upgrade to MTX10. Nortel Networks has always maintained an allowance for CSP or Communication Services Platform "jumps" from MTX release to MTX release. The MTX has received significant changes due to moving to a multi-processing architecture thus the CSP layer has evolved to CSP14. It is because of this very different CSP14 layer of the MTX10 release that an MTX cannot upgrade safely from MTX08 directly to MTX10.

- What is the Network infrastructure software/hardware planned general availability dates that support the deployment of this regulatory feature?

Nortel response: In order to comply with the FCC's December 31, 2001 requirement for TTY/TDD, Nortel Networks commits to delivering the enabling software as follows:

Nortel Networks Proprietary and Confidential

Software load	TDMA SW general availability
MTX09	Today
MTX10 TDMA	November 30, 2001*

* Nortel Networks is reviewing the possibility of MTX10 software becoming generally available to all our customers on November 9, 2001.

- For TTY/TDD what are the plans to work with any wireless carrier to perform end-to-end customer tests, and when will this occur?

Nortel response: The verification process for MTX10 with the customer began in August 2001. Nortel has recommended that the operator engage their chosen TDMA TTY handset vendor during the verification process or VO process to participate in interoperability testing with the Nortel Networks solution. Nortel Networks recognizes that to date few if any handset vendors have published GA dates for TTY mobile handsets. To Nortel Networks knowledge, as of October 10, 2001 TTY capable handsets and compatible TTY/TDD devices have not been acquired by any of our service provider VO partners. Despite this fact, Nortel Networks' will not delay, but improve the delivery forecast of this software load for three weeks earlier than the planned November 30, 2001 GA date. This decision not to delay, but accelerate is driven by the importance of the TTY feature, and the positive results of the TTY/TDD internal testing. This early availability of the solutions will allow a greater number of our customers to become verification partners.

Nortel Networks' forecast for this specific feature's full verification is planned to occur with our existing lead or verification partners in the November time frame.

Operators are encouraged to request their handset vendors to test their commercial-grade TDMA TTY capable handsets in Nortel's Wireless Interoperability Lab.

All verification activities are dependent upon the availability of commercial-grade TDMA TTY/TDD handsets.

- What are Nortel Network's plans to test their own or other vendor handsets with your switch solution?

Nortel response: Nortel Networks provides only infrastructure for wireless networks. Nortel Networks does not provide mobile handsets. Even though the infrastructure software is scheduled in advance of the Dec 31, 2001 FCC requirement, commercial handset general availability dates have not been scheduled by handset vendors. Nortel Networks recommends that the operator engage its handset vendor(s) in order to respond to the FCC regarding handset availability.

Operators are encouraged to request their handset vendors to test their commercial grade TDMA TTY capable handsets in Nortel's Wireless Interoperability Lab.

Please contact Gerry Chaparro for scheduling TTY testing in the Nortel Networks Wireless Interoperability Lab, where testing is based on current published standards (Phone: 972-684-4622; Fax: 972-684-3881; <mailto:chaparro@nortelnetworks.com>)

- **Contacts:**

Product Marketing	MTX10 SW	Kurt Raaflaub	ESN 445-2971	
Product Management		TDMA TTY/TDD	Syed Zaidi	ESN 444-0403
Regulatory		E911Ph2&TTY/TDD	Charles Spann	(903) 852-6798
Product Deployment		TDMA MTX SW	Shawn Moffat	ESN 444-4293

Customer Response Template TTY/911 for GSM Systems
Date: 10-10-01 Version: TTYGSM001

Nortel Networks Solution Status- Oct. 10th, 2001:

Nortel Networks will deliver TTY functionality in two phases. The first phase will deliver a transcoder solution for the BSCe3 since this solution was approved first by the standardization bodies. The second phase will deliver a transcoder solution with circuit pooling (the recent Change Request) for the BSCe3 and BSC2G.

Phase I Status:

This phase I will support TTY in all the codecs at the BSCe3/TCUe3. Circuit pooling is not supported.

Hardware Requirement: BSC e3/TCUe3
Software Requirement: BSS V13.2 or greater. NSS 13.0
Development Status: Completed September 2001

Test Status: Internal Testing with handsets and TTY devices began September 2001. One problem has been found that appears to be associated with TTY device non-compliance to TCB121. First customer test is planned to start in November 2001.

Concerns:

1. TTY handsets and devices used in internal testing are not in final form. Manufactures have identified changes they will make during or after Nortel's testing. So we don't know the impact of the changes to the TTY functionality solution stability or interoperability with these handsets/devices.
2. We are concerned that there may be problems with other TTY handsets/devices that we have not tested.

Phase II Status:

The software changes required to support Circuit Pooling would be available for field test by beginning of the second quarter 2002. This solution will be implemented on BSCe3 and BSC2G and a patch to NSS 13.

Hardware Requirement: Either BSCe3/TCUe3 or BSC/TCU2G
Software Requirement: A patch is needed to BSS V13.2, and a patch is also needed to NSS13

Concerns:

1. The introduction of the circuit pooling solution at such a late point in the design development, combined with the emphasis on a solution delivery in 2001, is resulting in a multiple test effort to support a two-phase solution delivery.
2. The circuit pooling solution has been undergoing design changes, which is evident by the recent bit location change from Bit 5 to 6 and bit length change. Any additional changes will add further delays to the availability of the circuit pooling solution.

Pine Belt Cellular, Inc.
3984 County Road 32
P. O. Box 279
Arlington, Alabama 36722

TTY Report – October 11, 2001

Pine Belt Cellular, Inc. is completely reliant upon its vendors to implement the TTY solutions in its handsets and network. Pine Belt does not have the ability to independently verify the release dates of the solutions that will be provided by the vendors.

1.) Network infrastructure software development:

Lucent Technologies, our switch and infrastructure manufacturer is aware of the TTY requirements. Our understanding is that Lucent is currently working on software solutions at this time. Pine Belt is dependent upon Lucent providing these solutions.

2) Handset development and testing plans:

Pine Belt Cellular uses handsets made by a number of manufacturers. The manufacturers most predominantly used by Pine Belt are Motorola, Nokia, and Kyocera. Pine Belt will stay abreast of the developments by these manufacturers so when TTY solutions are made available, we will be able to provide these units to our customers as soon as possible.

3) Beta testing and lab testing:

Pine Belt Cellular will begin testing TTY compatible equipment as soon as both our handset and infrastructure manufacturers provide solutions to us.

4) Release and general availability to carriers of network infrastructure software

Pine Belt Cellular is awaiting updated reports of software availability from switching and infrastructure vendors.

5) Availability to carriers of full acceptance test units:

Pine Belt Cellular is awaiting software and hardware availability from switching, infrastructure, and handset vendors.

6) Efforts toward achieving digital wireless solution compatibility with enhanced TTY devices:

Pine Belt Cellular remains dependent upon the availability of vendor provided solutions to meet the FCC's tentatively mandated timeline (12-31-01) to provide E911 TTY access to our networks.

7) Carrier coordination of testing with PSAP:

This testing target date is dependent upon solutions provided by network infrastructure vendors and handset vendors.

8) Carrier testing activities, including field testing, consumer end-to-end testing, and other necessary tests:

Testing will begin immediately upon receipt of software and hardware. Pine Belt Cellular is dependent upon network infrastructure vendor solutions.

9) Retail availability of necessary consumer equipment:

Pine Belt Cellular is dependent upon the availability of handsets from vendors. No firm commitment has been received at this time from handset vendors.

10) Geographic scope of network infrastructure deployment:

Pine Belt Cellular service area: Alabama RSA3B2 & BTA415

SpectraCom, Inc. d.b.a PYXIS Communications
TTY Report
Monday, October 08, 2001

PYXIS Communications uses CDMA technology to provide digital wireless service in all of our markets. PYXIS Communications is completely reliant upon its vendors to implement the TTY solution in its handsets and network.

Infrastructure Vendor Status

Nortel is PYXIS' infrastructure provider. We did not receive an updated response from Nortel in time to make this filing. Their response from our previous filing in April and July 2001 was as follows:

Nortel Network Solution Set

The Nortel Network software solution is in release MTX-10, scheduled for general availability week 44, 2001.

Development and Testing

Lab testing has not identified problems – in house testing has been done with one handset. Lack of availability of CDMA test handsets prevented testing of a wider range of subscriber apparatus.

Product Time Line

MTX-10, scheduled for general availability week 44, 2001, supporting code for the IS-127-2 & IS-733-1 standards, and at least one function of the code relating to the future IS-127-3 & IS-733-2 standards.

Issues and Concerns

- The changes to CDMA TTY/911 code, and the coming standard change has created much difficulty to design solutions to a “moving target”.
- The FCC's date for carriers to acquire TTY/911 equipment is December 31, 2001; a standard change is expected in April 2001. There is not sufficient time between April and December to fully evaluate all changes, and incorporate all proposed changes in software that customers will have in December
- Some proposed changes are more important than others. Manufacturers can incorporate important changes without incorporating all. It is not known how different equipment using different mixes of equipment will interoperate
- Nortel Networks believes standards must be “locked down” for equipment developers to design to a common target for initial equipment deployment. Future changes in initial equipment standards should provide time developing a stable and fixed second round design target
- Industry solutions only support Baudette 45.5 TTY transmissions, propriety TTY transmissions, and European Baudot 50 is not supported.

- Ericsson has filed a Report Number 47 with ATIS that identifies a test failure where the Voice Recognition function is incompatible with the existing TTY Detector. It is not clear if the recent Lucent code change will cure this problem, or if the problem applies to Nortel Network equipment and software.

Handset Vendor Status

KYOCERA Response:

According to engineering Kyocera has plans to implement TTY into our 2002 product road map.

Motorola response:

No update/response has been received from Motorola.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of:)
)
Revision of the Commission's Rules)
To Ensure Compatibility with)
Enhanced 911 Emergency Calling Systems) CC Docket 94-102
)
Third Reporting)
)
To: The Commission)

QWEST WIRELESS, LLC AND TW WIRELESS, LLC'S THIRD QUARTER 2001
REPORTING TO BE FILED THROUGH TTY FORUM

Pursuant to the Commission's Fourth Report and Order, dated December 14, 2000, in the CC Docket referred to above, Qwest Wireless, LLC and TW Wireless, LLC⁵ (collectively, "Qwest") hereby submit their third report to the TTY Forum for compilation and timely filing with the Commission.

1. Network Infrastructure Software Development

In its Lucent markets, Qwest continues to be on track for timely hardware and software installation before the end of the year. At the present time, Qwest is actively upgrading its PHV2 protocol handlers to PHV4 protocol handlers. The PHV4 will be TTY compatible through a software feature.

In its Ericsson/Nortel markets, also referred to as PCSAN markets, however, Qwest continues to face delay with respect to installation of the necessary software upgrade C-RAN 8.6. Ericsson notified Qwest that FOA release of C-RAN 8.6 is tentatively scheduled for January 15, 2002. Commercial release is scheduled for February 15, 2002. Qwest will receive the upgrade at the commercial release date. Qwest will be able to begin testing in those markets by April 2002. Qwest still expects to meet the final deadline for complete TTY 911 compatibility in all of its markets by June 30, 2002.

2. Handset Development and Testing Plans
No updates from last reporting.

⁵ Qwest Wireless, LLC, together with TW Wireless, LLC, a joint venture in which Qwest Wireless, LLC holds a majority equity and sole controlling ownership interest, provide broadband PCS services in a number of markets. This filing is submitted on behalf of both Qwest Wireless, LLC and TW Wireless, LLC.

3. Beta Testing and Lab Testing

No updates since last report.

4. Release and General Availability to Carriers of Network Infrastructure Software.

See answer to question 1.

5. Availability to Carriers of Full Acceptance Test Units

No updates since last report.

6. Efforts Towards Achieving Digital Wireless Solution Compatibility With Enhanced TTY Devises

No updates since last report.

7. Carrier Coordination of Testing with PSAPS.

No updates since last report.

8. Carrier Testing Activities

No updates since last report.

9. Retail Availability of Necessary Consumer Equipment

No updates since last report.

10. Geographic Scope of Network Infrastructure Deployment.

No updates since last report. *See also* answer to question 10.

Respectfully Submitted:

/S/ Floy H. Jeffares

Floy H. Jeffares, Manager, Policy and Law

TTY Forum #19 Carrier Status Report

October 10, 2001

Rural Cellular Corporation for itself and its affiliates (collectively "RCC")

1. Network Infrastructure Software Development

TDMA Networks: RCC utilizes TDMA infrastructure from Lucent, Ericsson and Nortel. RCC is relying on these three infrastructure vendors to complete software development.

GSM Network: RCC is currently evaluating options for TTY support over GSM.

2. Handset Development and Testing Plans

RCC is relying on its handset vendors for the development and testing of TTY capable handsets. Once handsets are available for testing, RCC will perform field tests in accordance with the Loeber and Walsh test plan submitted to the TTY Forum.

3. Beta Testing and Lab Testing

Once TTY capable software is in place and handsets are available, RCC will begin field tests.

4. Release and General Availability to Carriers of Network Software

RCC's infrastructure vendors have stated that the software releases to support TTY capability should be available by December 2001.

5. Availability to Carriers of Full Acceptance Test Units

RCC is waiting for commitments from its handset vendors for the date that they will have full acceptance test units available.

6. Efforts Towards Achieving Digital Wireless Solution Compatibility with Enhanced TTY Devices

RCC is working with its vendors and now with the TTY Forum to achieve a standard to support enhanced TTY devices.

7. Carrier Coordination of Testing with PSAP

RCC will conduct TTY testing with any PSAP that requests testing.

8. Carrier Testing Activities, Including Field Testing and Consumer End-To-End Testing

RCC will conduct consumer end-to-end testing after acceptable handsets and infrastructure software upgrades are in place and tested.

9. Retail Availability of Necessary Consumer Equipment

Retail availability is uncertain at this time.

10. Geographic Scope of Network Deployment

RCC is proceeding on a path that assumes it will be able to meet a June 30, 2002 deployment deadline.

Siemens TTY Report October 15th, 2001

Siemens is investing a significant amount of effort in order to comply with the FCC requirement to support E911 calls made from TTY devices on wireless digital networks. The status provided below is based on the currently available TTY/CTM standards and assumes no changes to these standards.

Network Implementation

Siemens is currently developing a BSS based TTY solution. This is a "Transcoder Pooling" solution now referred to as "CTM circuit pooling solution". This solution may be implemented as an external network element on the A- interface or integrated within the TRAU. The Siemens solution will not impact the existing vocoders already deployed and supported by Siemens.

Siemens expects the first prototype units (including the necessary hardware and software) to be available for internal testing in December 2001. Following these tests the Siemens prototype solution will be made available to the wireless operators for network and interoperability testing. This will allow sufficient time for the network integration testing required to meet the in service date of June 2002.

Handsets Implementation

Siemens Handset group will support TTY in 2002. Siemens will support TTY/CTM via an accessory cable and the handset will support the GSM bearer bit capability for signaling from the handset to the network.

Respectfully submitted,
Ilan Vardi
Siemens