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SUBJECT: Line Quality Standards - POTS Service
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PROCEDURE FOR: Distribution Services (Field Technicians & MAs)
INFORMATION FOR: TDC Course Development
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(This letter defines Line Quality standards and consolidates information from WT 89-15-04 & WT 85-01-29, please remove these letters from your Update binders.)

The purpose of this letter is to define the Line Quality standards for basic POTS service (Plain Ordinary Telephone Service, 1FR, 1MB, Centrex), and the procedures for resolving a Line Quality problem either on an installation or repair visit.

Line Quality Standards are more commonly known to us under the following terms:

Circuit Loss	C.O. Voltage
Noise	Loop Current
Power Influence	Ringer Equivalency
Balance	Ringing Voltage

Line Quality tests are required to insure that our Network Line meets FCC Registration requirements and National Standards for the Public Switched Telephone Network.

Also, by performing Line Quality tests, Wisconsin Bell can confirm that the POTS service is suitable for the proper operation of customer registered equipment.

LINE QUALITY VERIFICATION

The following procedure should be used when a customer reports that their equipment does not function properly (dial-up data, touch tone dial, switch hook function, ringer etc.) or the customer/vendor requests that the service have a specific line quality value:

- 1) Insure that the line is free of physical faults.
- 2) Insure that line quality standards are met.

Listed below are the Line Quality standards:

RINGERS

- 1) Ringer equivalency cannot exceed 5.0.
 - a) If exceeding 5.0, customer must replace CPE with lower equivalency, remove CPE to stay within limits or install ringing relay equipment.
 - b) If not exceeding 5.0, WBI must insure that loop does not exceed maximum resistance (1300 ohms) and circuit loss (-8.5 dB) value. A loop makeup modification may be required, contact OSPE.
 - c) If loop makeup cannot be changed to required resistance/circuit loss values, the last alternative is installation of a 28A isolator or 603A extender.

NOTE: Test ringer function with known working telephone (Loaner set) or volt meter to insure that ringing voltage is present.

RINGING VOLTAGE

- 1) Minimum ringing voltage is 40 Volts rms and maximum is 130 Volts rms.
 - a) Measure with a VOM in the AC function and 200 volt range.

LOOP CURRENT

- 1) Minimum of 20 ma. (Off Hook & During Dialing).
- 2) Maximum of 63.25 ma. when using a termination with 430 ohms of resistance, such as the Wilcom 136B test set. The Wilcom test set simulates maximum telephone set resistance (400 ohms) and inside wire resistance (30 ohms) to duplicate the "worst" case CPE termination.

Note: CPE may offer less than 400 ohms resistance and could draw more than 63.25 ma. This condition is a function of the CPE as designed by the manufacturer.

- 3) Loop current should be tested as follows:
 - a) Using a Wilcom test set (or equivalent) with CPE disconnected.
 - Loop Current should measure between 20 and 63.25 ma.

C.O. VOLTAGE

- 1) Maximum of 52.5 and minimum of 8.6 volts DC.
 - a) Measure voltage with a VOM (DC function), CPE on-hook.

CIRCUIT LOSS

- 1) Between 0 and -8.5 dB.
 - a) Measure loss with a Wilcom 136B test set (or equivalent).

NOISE

- 1) Objective is 20 dBrnc or less. Readings between 21 & 30 dBrnc are marginal, the service will work but resolution action must be scheduled to achieve objective.
 - a) Measure with a Wilcom 136B test set (or equivalent).

POWER INFLUENCE

- 1) Objective is between 70 & 80 dBrnC. Readings between 80 & 90 are marginal, the service will work but resolution action must be scheduled to achieve objective.
 - a) Measure with a Wilcom 136B test set (or equivalent).

BALANCE

- 1) Objective is 60 dB or more.
 - a) Balance = Power Influence minus Noise.
 - b) Balance under 60 is generally acceptable if BOTH noise and power influence are in the objective range.

NOISE TESTING PROCEDURES

Field Technicians should take the four Wilcom 136B transmission/noise tests on all inward line orders and service affecting trouble reports. Reference material for "136B" transmission/noise testing can be found in the "Residence Transmission and Noise Testing Program Administrative Guide", BSP 644-000-000, and in the Technician Handbook. Attachment 1 describes DSOC & Field Technician procedures to resolve transmission/noise problems.

RESOLUTION ACTIVITY

Normally the Field Technician will resolve the Noise, Transmission or Line Quality problem on site. But in some instances it may not be possible due to another department's involvement or the need for a specifically trained Field Technician.

When the problem cannot be resolved on site, the Field Technician will inform the DSOC with the status. A designated Manager in the DSOC will be responsible to resolve the problem, which may include referral to another work function, coordination with the Field Manager, follow up and possibly escalation.

Field Technician Procedures:

- 1) Record readings on service order/trouble ticket and M-137.
- 2) If problem is cleared on site, close out work order.
- 3) If problem is not cleared on site and line is not OOS:
 - a) Inform DSOC of situation
 - b) Have DSOC issue Employee report
 - c) Prepare Form M6262 for a Construction item or Form 6275 for an OSPE itemAttach the M-137 to the M6262 and 6275
- 4) If problem is not cleared on site and line is OOS:
 - a) DSOC Manager must escalate resolution
- 5) DSOC Manager should follow up on M6262 and 6275 via Hazardous Maintenance Report log and Outside Plant Replacement & Rehabilitation Request Report.
- 6) Problems that involve the Central Office forces should be referred using existing procedures.

NOISE SURVEY PROCEDURE

Quarterly, our Transmission Engineering Dept. randomly tests POTS lines in various COs for noise (Approximately 200 lines are sampled).

Those lines that have noise levels greater than 20 dBrnc are referred to the DSOC for resolution. The DSOC should follow the "Noise Testing " procedure discussed above to resolve the troubles.


R. E. Brown

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Attachment

WILCOM 136B OVERVIEW

