ITU - Telecommunication Standardization Sector Temporary Document WH-100

STUDY GROUP 15 Original: English

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SOURCE[1]: VOCAL Technologies, Ltd. (USA) (http://www.vocal.com)

TITLE: G.hs: Refined channel probing for G.hs

ABSTRACT

V.8bis-style coding and transactions are proposed as additions to G.hs that would give forth the diagnostics for failed connections between ATU's. The G.hs procedures outlined would support the detection and location of impairments like loading coils, bridge taps and crosstalk among others.

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1. Introduction:

Considering that:

- Telcos need to determine the reasons behind a failed connection preferably without any human interaction between the installer and the end user.
- NACK messages don't have parameters specified for them that may help a given terminal to infer the causes for such a response from the other end.
- Telcos don't fully know the actual conditions of the telephone lines.
- Current telephone trunks carrying T-1, and/or ISDN can cause crosstalk on neighboring ADSL lines.

We propose that when there has been a failed connection, the central office terminal may issue any of the proposed Capabilities Request (CR) messages in order to learn more about the state of the subscriber's line.

2. Gathering information about the state of the subscriber's line:

Companion papers have described techniques for probing and locating loading coils, bridge taps and determination of cross talk interference. These techniques commonly rely on ATU-R services requested through G.hs by the ATU-C. These common services are:

Frequency tone probe generation (there could be probing of several tones at a time)
Frequency level measurement (there could be measurement of several tones at a time)
ATU-R state information
ATU-R symbol recording
ATU-R displayable operator message

The following additions suggest an implementation of these functions.

2.1 New Capabilities Request (CR) message

In particular, Table 18 in NF-044 should have the following elements:

Table 18. Channel Capabilities - {SPar(1)} coding - Octet 1

SPar(1)s	8	7	6	5	4	3	2	1
Network type (Note)	x	x	x	x	x	x	x	1
Access Channel Probe	x	x	x	x	x	x	1	x
Splitter Information-CO	x	x	x	x	x	1	x	x
Splitter Information-Remote	x	x	x	x	1	x	x	x
Frequency Tone Probe	x	x	x	1	x	x	x	x
Frequency Level Inquiry	x	x	1	x	x	x	x	x
Remote Operator Message	x	1	x	x	x	x	x	x
No parameters set in this octet	x	0	0	0	0	0	0	0
NOTE- The use of this bit is under study.								

Table 19?? Channel Capabilities - {SPar(1)} coding - Octet 2

SPar(1)s	8	7	6	5	4	3	2	1
Remote Inquiry	x	x	x	x	x	x	x	1
Remote Recording	x	x	x	x	x	x	1	x
	x	x	x	x	x	1	x	x
	x	x	x	x	1	x	x	x
(to be determined)	x	x	x	1	x	x	x	x
	x	x	1	x	x	x	x	x
	x	1	x	x	x	x	x	x
No parameters set in this octet	x	0	0	0	0	0	0	0

2.2 Additional octets in CR

The new CR message's NPar(2) parameters would be coded as follows:

Table 20?? Frequency Tone Probe - {NPar(2)} coding - Octet 1

NPar(2)s	8	7	6	5	4	3	2	1
Frequency Tone Probe Bin Number - bits 6 - 1 (bits 6 - 1)	x	x	x	x	x	x	x	x

Table 21?? Frequency Tone Probe - {NPar(2)} coding - Octet 2

NPar(2)s	8	7	6	5	4	3	2	1
Frequency Tone Probe Bin Number - bits 9 - 7 (bits 3 - 1)	x	x				x	x	x
Reserved for ITU-T (bits 6 - 4)			x	x	x			

Table 22?? Frequency Tone Probe - {NPar(2)} coding - Octet 3

NPar(2)s	8	7	6	5	4	3	2	1
Frequency Tone Probe Level (-dB relative to max PSD mask) (bits 6 - 1)	x	x	x	x	x	x	x	x

Table 23?? Frequency Level Inquiry - {NPar(2)} coding - Octet 1

NPar(2)s	8	7	6	5	4	3	2	1
Frequency Level Bin Number - bits 6 - 1 (bits 6-1)	x	x	x	x	x	x	x	x

Table 24?? Frequency Level Inquiry - {NPar(2)} coding - Octet 2

NPar(2)s	8	7	6	5	4	3	2	1
Frequency Level Bin Number - bits 9 - 7 (bits 3 - 1)	x	x				x	x	x
Reserved for ITU-T (bits 6 - 4)			x	x	x			

Table 25?? Remote Operator Message - {NPar(2)} coding - Octet 1

NPar(2)s	8	7	6	5	4	3	2	1
Operator message character- bits 6 - 1 (bits 6 - 1)	x	x	x	x	x	x	x	x

Table 26?? Remote Operator Message - {NPar(2)} coding - Octet 2

NPar(2)s	8	7	6	5	4	3	2	1
Operator message character - bits 8-6 (bits 3 - 1)	x	x				x	x	x

Table 27?? Remote Inquiry Message - {NPar(2)} coding

NPar(2)s	8	7	6	5	4	3	2	1
C-REVEILLE parameters request (bit 1)	x	x	x	x	x	x	x	1
C-XXX (to be determined)	x	x	x	x	x	x	1	x
	x	x	x	x	x	1	x	x
	x	x	x	x	1	x	x	x
	x	x	x	1	x	x	x	x
	x	x	1	x	x	x	x	x
No parameters set in this octect	x	x	0	0	0	0	0	0

Table 28?? Remote Recording Message - {NPar(2)} coding

NPar(2)s	8	7	6	5	4	3	2	1
C-ECT recording request (bit 1)	x	x	x	x	x	x	x	1
C-XXX (to be determined)	x	x	x	x	x	x	1	x
	x	x	x	x	x	1	x	x
	x	x	x	x	1	x	x	x
	x	x	x	1	x	x	x	x
	x	x	1	x	x	x	x	x
No parameters set in this octect	x	x	0	0	0	0	0	0

2.3 Additional octets in CL

In addition to those parameter similar to CR, the following parameters are used to indicate the responding terminal's observations.

Table 29?? Frequency Level Inquiry Response- {NPar(2)} coding - Octet 1

NPar(2)s	8	7	6	5	4	3	2	1
Frequency Level Bin Number - bits 6 - 1 (bits 6 - 1)	x	x	x	x	x	x	x	x

Table 30?? Frequency Level Inquiry Response - {NPar(2)} coding - Octet 2

NPar(2)s	8	7	6	5	4	3	2	1
Frequency Level Bin Number - bits 9 - 7 (bits 3 - 1)	x	x				x	x	x
Reserved for ITU-T (bits 6 - 4)			x	x	x			

Table 31?? Frequency Level Inquiry Response - {NPar(2)} coding - Octet 3

NPar(2)s	8	7	6	5	4	3	2	1
Observed Frequency Level (-dB relative to max PSD mask) (bits 6 - 1)	x	x	x	x	x	x	x	x

Table 32?? Remote Inquiry Response - {SPar(2)} coding

SPar(2)s	8	7	6	5	4	3	2	1
C-REVEILLE parameters request (bit 1)	x	x	x	x	x	x	x	1
C-XXX (to be determined)	x	x	x	x	x	x	1	x
	x	x	x	x	x	1	x	x
	x	x	x	x	1	x	x	x
	x	x	x	1	x	x	x	x
	x	x	1	x	x	x	x	x
No parameters set in this octect	x	x	0	0	0	0	0	0

Table 33?? Remote Inquiry Response for C-REVEILLE - {NPar(3)} coding - Octet 1

NPar(3)s	8	7	6	5	4	3	2	1
Frequency Deviation	x	x	x	x	x	x	x	x

Table 34?? Remote Inquiry Response for C-REVEILLE - {NPar(3)} coding - Octet 2

NPar(3)s	8	7	6	5	4	3	2	1
Frequency Jitter	x	x	x	x	x	x	x	x

Table 35?? Remote Inquiry Response for C-REVEILLE - {NPar(3)} coding - Octet 3

NPar(3)s	8	7	6	5	4	3	2	1
(others)	x	x	x	x	x	x	x	x

Table 36?? Remote Recording Response - {SPar(2)} coding

SPar(2)s	8	7	6	5	4	3	2	1
C-ECT recording request (bit 1)	x	x	x	x	x	x	x	1
C-XXX (to be determined)	x	x	x	x	x	x	1	x
	x	x	x	x	x	1	x	x
	x	x	x	x	1	x	x	x
	x	x	x	1	x	x	x	x
	x	x	1	x	x	x	x	x
No parameters set in this octect	x	x	0	0	0	0	0	0

Table 37?? Remote Recording Response for C-ECT - {NPar(3)} coding - Octet 1

NPar(3)s	8	7	6	5	4	3	2	1
Frequency Domain Sampling	x	x	x	x	x	x	x	1
Time Domain Sampling	x	x	x	x	x	x	1	x
Reserved for ITU-T	x	x	x	x	x	1	x	x
Number of Symbols Sampled bits 3-1 (bits 6 - 4)	x	x	x	x	x			

Table 38?? Remote Recording Response for C-ECT - {NPar(3)} coding - Octet 2

NPar(3)s	8	7	6	5	4	3	2	1
Number of Symbols Sampled bits 9 - 4 (bits 6 - 1)	x	x	x	x	x	x	x	x

Table 39?? Remote Recording Response for C-ECT - {NPar(3)} coding - Octet 3

NPar(3)s	8	7	6	5	4	3	2	1
Frequency Domain Coefficient per Symbol	x	x	x	x	x	x	x	x

Table 40?? Remote Recording Response for C-ECT - {NPar(3)} coding - Octets 4-n

NPar(3)s	8	7	6	5	4	3	2	1
Frequency Domain Coefficient Samples	x	x	x	x	x	x	x	x

3. Summary:

We recommend the G.hs provisions for the determination of the condition of the subscriber's line. It could assist a telco in expediting an xDSL installation.

1. Agenda Item: G.hs.

2. Expectations: The committee accept as a whole the text suggested in Chapter 2 as addition to the working text for G.hs.