
TITLE	Resolving the comments from AbC		
PROJECTS	Spectral Management, part 2.		
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This contribution gives guidance on how to resolve all comments from the AbC. The comments are taken from 043t21. All comments are reshuffled into the following chapters, to structure the discussions.

Additional comments were received by e-mail from BT (just before the meeting), and they have not yet been sorted out. These comments were intended to become 043t10.

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Uses shortcuts;

EAB=Ericsson
TI=Telcom Italia
SW=Swiscom
DT=Deutsche Telecom
FT=France Telecom
BT=British Telecom

1. Editorial comments

1.1. Editorial comments, easy to solve

These comments are improvement of the text, and require no further discussion. Please check if the next update of the document has covered all remarks well.

EAB2	5.1.1	In the expression 7 of the SNR(f), the signal and the noise typically are frequency dependent i.e. they are PSDs, this is not reflected.	Change in the expression 7.
EAB3	5.1.1	Table 11, power can never have the unit dB	Change in table 7. Delete the word "power". SNR should have the unit dB and the received signal and noise the unit dBm or dBm/Hz.
EAB4	6.1-6.7	In all tables. The Receiver noise should have the unit dBm/Hz.	Change dBm to dBm/Hz for P_{RNO}
TI-2	In the SCOPE, second paragraph, "The technical methods..."	Instead of "calculating" it is better to say "estimating".	Change the word.
TI-14	Section 4.4.3	This section shall have a title similar to 4.4.4, i.e. "Transmitter signal model for ADSL.ECD over ISDN", otherwise it might seem that ADSL.FDD is a special ADSL, while ADSL.ECD is the "ADSL par excellence".	This comment is editorial.
TI-17	Nomenclature and numbering of the "Clusters"	The grouping in "Clusters" might be not clear to new readers unaware of the part 1 of TR 101 830-2. It is not comprehensible for example why SDSL and HDSL must belong to the same cluster. Moreover there is no apparent reason for numbering the "Clusters" starting from 2 instead than 1.	This comment is editorial.
TI-18	Section 5, 1st row	"predicting" is not appropriate, better saying "estimating".	Change the word.
TI-22	Section 5, pag 18, 1st paragraph under Figure 1.	"the following three, flows" à "the following three, flows"	Eliminate the comma. This comment is editorial.
TI-36	Section 6.3, Table 18	The caption contains a reference to the echo suppression which is redundant. The echo suppression shall be included in the implementation loss figure. Do not talk about echo suppression in the document anylonger.	Eliminate the 2nd part of the caption.
SW-14	6.5 and 6.7	ADSL (FDD) Receiver performance models (6.5 and 6.7) The following text must be updated to consider not only the guard band FDD but the adjacent FDD as well. "The model assumes a guard band of 7 tones between up and downstream, and this guard band makes additional modelling of imperfections in echo suppression irrelevant."	
SW-17	2.1 Definitions	<ul style="list-style-type: none"> Insert explanation as note <p>Spectral compatibility: A generic term for the capability of transmission systems to operate in the same cable. The precise definition is application dependent and has to be defined for each group of applications.</p> <p>Spectral compatibility: A generic term for the capability of transmission systems to operate in the same cable.</p> <p><i>Note:</i> The precise definition is application dependent and has to be defined for each group of applications.</p>	
SW-18	2.1 Definitions	<ul style="list-style-type: none"> Insert explanation as note <p>PSD mask: The absolute upper bound of a PSD, measured within a specified resolution band. The purpose of PSD masks is usually to</p>	

		<p>specify maximum PSD levels for stationary signals.</p> <p>PSD mask: The absolute upper bound of a PSD, measured within a specified resolution band.</p> <p><i>Note:</i> The purpose of PSD masks is usually to specify maximum PSD levels for stationary signals.</p>	
SW-19	2.1 Definitions	<ul style="list-style-type: none"> Delete "values of the" and insert explanation as note <p>PSD template: The expected average values of the PSD of a stationary signal. The purpose of PSD templates is usually to perform simulations. The levels are usually below or equal to the associated PSD masks.</p> <p>PSD template: The expected average values of the PSD of a stationary signal.</p> <p><i>Note:</i> The purpose of PSD templates is usually to perform simulations. The levels are usually below or equal to the associated PSD masks.</p>	
SW-20	2.1 Definitions	<ul style="list-style-type: none"> Add "transmit" and insert explanation as note <p>Power back-off: is a generic mechanism to reduce the power. It has many purposes, including the reduction of power consumption, receiver dynamic range, cross talk, etc.</p> <p>Power back-off: is a generic mechanism to reduce the transmit power.</p> <p><i>Note:</i> It has many purposes, including the reduction of power consumption, receiver dynamic range, cross talk, etc.</p>	
SW-21	2.1 Definitions	<ul style="list-style-type: none"> Insert explanation as note <p>Power cut-back: is specific variant of power back-off, used to reduce the dynamic range of the receiver. It is characterized by a frequency independent reduction of the in-band PSD. It is used, for instance, in ADSL and SDSL.</p> <p>Power cut-back: is specific variant of power back-off, used to reduce the dynamic range of the receiver. It is characterized by a frequency independent reduction of the in-band PSD.</p> <p><i>Note:</i> It is used, for instance, in ADSL and SDSL.</p>	
SW-22	2.1 Definitions	<ul style="list-style-type: none"> Refine text "downstream over upstream" and insert explanation as note <p>EC: The abbreviation EC normally means Echo Cancelled. However, within the context of ADSL this abbreviation is used to designate ADSL systems with spectral overlap of downstream over upstream. In this context, the usage of the abbreviation "EC" was only kept for historical reasons. The usage of the echo cancelling technology is not only limited to spectrally overlapped systems, but can also be used by FDD systems.</p> <p>EC: The abbreviation EC normally means Echo Cancelled.</p> <p><i>Note:</i> However, within the context of ADSL this abbreviation is used to designate ADSL systems with spectral overlap of a part of the downstream with upstream. In this context, the usage of the abbreviation "EC" was only kept for historical reasons. The usage of the echo cancelling technology is not only limited to spectrally overlapped systems, but can also be</p>	

		used by FDD systems.	
SW-24	2.2 Abbreviations	Following abbreviations are not referenced: UC, EPL, FSAN	
SW-25	p.2: (keywords):	ISDN instead of IDSN	
SW-26	p.12:	This power back-off (<i>PBO</i>) is equal forBrackets around <i>PBO</i>	
SW-27	p.12:	The SDSL power back-off is described in [5], (ETSI-SDSL, clause 9.2.6): Delete "ETSI-SDSL"	
SW-28	p12: (Expression 4):	...and a threshold loss of $PL_{thres,dB}=6.5$ db, ... replace "db" by dB	
SW-29	p.22: (Table 13) :	The line with model parameter "Data rate" should be deleted as this parameter is not used in clause 5.2.1.	If it is deleted her, check if difference between data rate and line rate is explained well elsewhere in the document
SW-30	p22: : (Table 13) :	A line with model parameter "margin m" should be added.	
SW-31	p.23: (Table 14) :	The line with model parameter "Data rate" should be deleted as this parameter is not used in clause 5.2.2.	
SW-32	p23: : (Table 14) :	A line with model parameter "margin m" should be added.	
SW-33	p.24: (Table 15) :	The line with model parameter "Data rate" should be deleted as this parameter is not used in clause 5.2.3.	
SW-34	p24: : (Table 15) :	A line with model parameter "margin m" should be added.	
SW-36	p25:	Replace "The latter " by "fbd " in Expression 11: Equations of ... <i>data</i> line rate fbd, and a given <i>data</i> symbol rate <i>fsd</i> . The latter <i>fsd</i> excludes all DMT symbols dedicated to synchronisation.	
SW-40	p32:	(Table 21): Replace "ADSL.,FDD over POTS" by "ADSL.FDD over POTS"	
SW-42	p36: (clause 8.3.1):	Replace " Up and downstream " by " Up- and downstream "	
SW-44	Whole document:	Use the same bullets type throughout the document (see e.g. different types in clauses 6.3 and 6.4)	
DT-4	Page 6	"LT-access port (or LT-port for short): is an access port for injecting signals, labelled as labeled by the loop provider ..."	
DT-5	Page 7	„Power back-off: is a generic mechanism to reduce the power.... “ Add the word „transmit“ before the word „power“.	
DT-6	Page 18	„The input block in figure 1 is to evaluates a quantity called effective SNR (Signal to noise Ratio) ...“	

1.2. Editorial comments, needing a proposal first

TI-3	In the SCOPE, third paragraph, second row, "calculations and measurements".	A scenario cannot be identified in "calculations and measurements"...	Review. CLARIFY Word refers to "performance evaluation", and not to "scenario"; so what is the problem? (Come with a proposal) <u>OLD</u> The <i>objective</i> is to provide the technical means for evaluating the performance of xDSL equipment within a chosen scenario, such as calculations and measurements. <u>NEW</u> The <i>objective</i> is to provide
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			the technical means for evaluating the performance of xDSL equipment within a chosen scenario.
TI-9	Section 4.4	A general comment is it should be clearly stated that this section refers to the ADSL1 generation. A not expert person could otherwise misuse the models for the second generation of ADSL.	<p>Insert a sentence that clarifies that.</p> <p>Add reference: The PSD template for modelling the "ADSL over POTS" [1,2] ... NOTE: These models do not apply to ADSL2 over POTS [3]</p> <p>Where [1] refers to the ETSI spec of ADSL, and [2] to G.992.1, and [3] to G.992.3. Do the same for other flavors of ADSL</p>
TI-11	Section 4.4.1	<p>This section shall have a title similar to 4.4.2, i.e. "Transmitter signal model for ADSL.ECD over POTS", otherwise it might seem that ADSL.FDD is a special ADSL, while ADSL.ECD is the "ADSL par excellence".</p> <p>EC ADSL over POTS FDD ADSL over POTS EC ADSL over ISDN FDD ADSL over ISDN</p>	<p>This comment is editorial.</p> <p>Current names consistent with SpM-1. Needs generic ETSI change.</p> <p>Change according to (left), and accept some inconsistency with the current SpM-1</p>
TI-19	Section 5, 1 st paragraph, last sentence "Values like BER 10^{-7}, during a time interval of several minutes, are not uncommon."	What does this sentence mean?	<p>Explain better and make sure that the sentence is acceptable to everybody.</p> <p>Come with a proposal OLD In all cases it assumes that this recovery meets predefined quality criteria such as a maximum BER (Bit Error Ratio). Values like BER<math>10^{-7}</math>, during a time interval of several minutes, are not uncommon. NEW In all cases it assumes that this recovery meets predefined quality criteria such as a maximum better then BER<math>\leq 10^{-7}</math>, (Bit Error Ratio).</p>

1.3. Editorial comments, needing minor discussion

TI-27	Section 6.2, Table 17	Too many TDB in the table make the model unusable.	<p>Resolve the TDBs.</p> <p>This is 100% informative, since the effective gap is specified. It</p>
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			<p>there on explicit request from Adran (and Connexant?) à TM6 to decide; no problem with deleting</p> <p>Ragnar Jonsson will try to find a number, otherwise we delete them form the draft</p>
SW-5	4.3.1	<p>Transmitter signal model for "HDSL.2B1Q" The default parameter for HDSL.2B1Q/2 should be A2 and not D2 as this is the only template that was confirmed by a measurement (see 033t06)</p>	<p>Possible, if additional note identifies something like: that extra filtering is assumed than is not mandatory according to the standards, but that several chips are available that have implemented this extra filtering</p> <p>Agreed as said above</p>
SW-23	2.2 Abbreviations	<p>The references to other clauses should be deleted.</p> <p>CMP Cable Management Plan (see clause 3.1 on definitions) EC Echo Cancelled (see also under EC, in clause 3.1 on definitions) FBL Fractional Bit Loading (see clause 5.2.4 on DMT detection models) GABL Gain adjusted Bit Loading (see clause 5.2.4 on DMT detection models) PBO Power Back-Off (see also clause 3.1 on definitions) PCB Power Cut-Back (see also clause 3.1 on definitions) RBL Rounded Bit Loading (see clause 5.2.4 on DMT detection models) TBL Truncated Bit Loading (see clause 5.2.4 on DMT detection models)</p>	<p>Preference for keeping these reference to the clauses where they are explained/used. à TM6 to decide</p> <p>red parts will be deleted</p>

1.4. Editorial comments, about naming convention

TI-34	Section 6.4	<p>The title of the section should be ADSL.ECD over POTS to be consistent with ADSL.FDD over POTS</p> <p>EC ADSL over POTS FDD ADSL over POTS EC ADSL over ISDN FDD ADSL over ISDN</p>	<p>This comment is editorial.</p> <p>creates inconsistent naming; keep consistent with SpM-1 or change in all ETSI docs à NO CHANGE Change according to (left), and accept some inconsistency with the current SpM-1</p>
TI-35	Section 6.6	<p>The title of the section should be ADSL.ECD over ISDN to be consistent with ADSL.FDD over ISDN</p>	<p>This comment is editorial.</p> <p>creates inconsistent naming; keep consistent with SpM-1 or change in all ETSI docs à NO CHANGE Change according to TI-34, and accept some inconsistency with the current SpM-1</p>
TI-45	Section 8.3, figure 4 and figure 5	<p>It is not clear what the "Background Disturber" stands for in terms of physical phenomenon ("unidentified noise sources"?). If it stands for the internal noise model, clarify.</p>	<p>Clarify or delete.</p> <p>As the text says, it refers to "unidentified noise source". As observed at the victim wire-pair. If they do not exist, put it on zero, however this is the place where "line shared ISDN" noise is "injected" in the scenario. It has nothing to do with "internal receiver noise" since it is 100% external.</p>

			<p>à do not delete, or come with another name</p> <p>Use “background noise” (also in the drawing) with three examples</p> <ul style="list-style-type: none"> (a) from unidentified sources (b) lineshared noise (c) anything else not incorporated in the NEXT and FEXT models <p>Change also “NEXT model” by “NEXT coupling model”, the same for FEXT</p>
SW-35	p24ff: (clause 5.2.4):	replace “tone” by “sub-carrier” in text and in expression 1	<p>à preference for keeping as it is, but TM6 to decide about the full name of the “dimension”</p> <ul style="list-style-type: none"> • [bits/ton/symbol] • [bits/sub-carriers/symbol] <p>keep [bits/ton/symbol] but adds a note that Tone” refers to “sub-carrier”</p>
DT-2	Chapter 8	Generally the words “victim” and “disturber” might be subject for assuming discrimination. We suggest using words like “influencing” and “influenced” or similar neutral terms.	<p>Words like victim and disturber are commonly used; proposed words are to close to provide clarity</p> <p>à preference to keep current terminology, but TM6 to decide</p> <p>keep current terminology, but add the definitions below</p>

Definitions

Victim modem: a modem, subjected to interference (such as cross talk from all other modems connected to other wire pairs in the same cable) that is being studied in a spectral management analysis. This term is intended solely as a technical term, defined within the context of these studies, and is not intended to imply any negative judgement.

Victim wire pair: a wire pair, subjected to interference (such as cross talk from all other modems connected to other wire pairs in the same cable) that is being studied in a spectral management analysis. This term is intended solely as a technical term, defined within the context of these studies, and is not intended to imply any negative judgement.

Disturber: a source of interference in spectral management studies coupled to the victim wire pair. This term is intended solely as a technical term, defined within the context of these studies, and is not intended to imply any negative judgement.

Disturbing wire pair: a wire pair carrying a signal from a modem identified as a disturbing modem. This term is intended solely as a technical term, defined within the context of these studies, and is not intended to imply any negative judgement.

1.5. Editorial comments, about structure in clause 5

The structure of clause starts with a flow diagram, how all building blocks are tied together, followed by one or more models fore each individual building block
The comments below propose to skip the flow diagram and to start describing an input block with only “internal noise” on board (the most simple and restrictive model).
Such a model is described is clause 5.1.1, so it is unclear to the Rapporteur what will improve if all context is removed from the document.

è keep the text as it is now, or come with a FULL text proposal

Creation of SP39 Restructuring clause 5, Rosaria Persico TI

TI-20	Section 5 – General comment	<p>A general comment on this section and section 5.1 is that it is not correct to define a receiver model which does not include “internal noise”. It does not seem to have so much sense to define a model with the echo coupling block and not to say that there are other sources of noise in the receiver, <u>which are unavoidable</u>.</p> <p>This no-sense is even more evident because:</p> <ul style="list-style-type: none"> Ø At the end of page 18, the causes of the internal receiver noise are roughly explained (“On the other hand, all analog receiver electronics produce shot noise and thermal noise,...”) and the reader understands very well that it is not possible to avoid internal noise. Ø Moreover at the very beginning, in Section 5, 2nd paragraph, 2nd row, the sentence in brackets makes the reader understand that both infinite echo canceling and zero internal receiver noise are IDEAL conditions. So why including echo canceling and excluding internal noise at this stage??! <p>Another comment here is that in Section 5, 2nd paragraph, 2nd row, there is mention to the “internal receiver noise” without explaining what this noise is.</p>	<p>Review section 5 talking about internal noise of the receiver, possibly including among the sources also the echo coupling.</p> <p>It is a flow diagram, not restrictive to the most simple receiver model. (see comment in TI-21) Proposal: NO CHANGE, or TI to come a literal text proposal for the intro + section 5.1</p>
TI-21	Section 5, Figure 1 and description of the figure	<p>We do not agree to have a different section (such as section 5.1.1 “First order input model”) to model a transceiver with “internal receiver noise” because every receiver has internal noise. Since, at this stage, in the model the <i>echo coupling</i> block already appears, it should immediately appear the <u>internal receiver noise</u> as well and the echo coupling block should be represented as a source of the internal noise.</p> <p>Notice that, once this is done, the echo coupling block will have an ideal definition, as the internal noise of the receiver cannot be turned off. So consider reviewing the definition of the echo coupling block in section 5.</p>	<p>Review section 5 talking about internal noise of the receiver, possibly including among the sources also the echo coupling.</p> <p>The concentration of all imperfections in a single virtual “receiver noise source” is a simplification that does not cover the general case. There are many more advanced models, but only the simplest one (“first order”) has been agreed. Therefore this split-up Proposal: NO CHANGE</p>
TI-24	Section 5.1 and section 5.1.1	<p>Consider reviewing these sections in light of the comments above. Possible merging with the main section (section 5) should be considered.</p>	<p>Review together with section 5.</p> <p>(see previous comment in TI-21)</p>
TI-25	Section 5.3	<p>Is it so important to have this section, considering what is written on page 19, 2nd paragraph (“The echo coupling block is optional...” etc.)? The internal noise model of the receiver should include the noise due to echo coupling: therefore, describing the overall internal noise (which is more correct and complete), one can avoid to show the echo coupling model.</p> <p>Possibly one can use the echo coupling model to build the internal noise model of the receiver: but in principle it should not appear in the document, as this could be misleading. Only the internal noise models should be described (as done in tables 17-23) and given the right importance/weight here.</p>	<p>Since the internal receiver noise models are included, Section 5.3 does not have any value and can be withdrawn.</p> <p>Note: if there is particular affection to the echo coupling model, consider making this section become a sub-section of the section that describes the generic receiver performance model (the reviewed section 5), with theoretical value only.</p> <p>come with consistent text proposal for section 5. (see previous comment in TI-21)</p>
TI-23	Section 5, pag 18, 2 nd bullet, 2 nd sentence	<p>The sentence “crosstalk from internal disturbers connected to the same cable” is unclear. Is the meaning of this sentence “crosstalk from disturbers belonging to the same cable”?</p> <p>If yes, the word “internal” is not appropriate here, as we are talking about the transceiver, whereas the disturbers belong to the cable not to the transceiver. Make at least an example of “external disturbers” that cause “ingress noise”.</p> <p>Mention the “internal noise” of the receiver and say that it may be modeled with a Gaussian noise, additional to PRN. Make this clear in the figure as</p>	<p>Improve the sentence and modify Figure 1, merging it with Figure 2 somehow.</p> <p>Don’t understand the problem. Come with “improved” text</p>

	well.	
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1.6. Editorial comments, about the benchmark behind a performance model

These comments are about text that is to indicate what kind of performance “class” s predicted by a model. The precise wording may be improved, as long as it gives some guidance to the underlying benchmark. This to enable more then one model

- Benchmark 1: “minimal performance”. Such a model predicts a performance of a modem that can pass the ETSI requirements, but is not significantly better then these requirements
- Benchmark 2: “optimistic model”. Such a model predicts a performance of a modem that is sometimes (or always) significantly better then the minimum reach requirements

The comments below are proposing to prevent such a distinction, but the demand for “optimistic” models requires an approach that enable different performance classes.

—> It makes sense to improve the text that should refer to the benchmark, but deleting it all is not a good idea. Come with a text proposal

TI-28	Section 6.3, 3 rd paragraph.	<p>There is no reason for the sentence: “The parameter values, used in the receiver performance model for ETSI compliant SDSL, are summarized in table 18”. One can simply say that those summarized in table 18 are parameters values in part based on SDSL spec, in part based on theory and real implementations.</p> <p>More in general, it is not so fundamental that this document says how an “ETSI compliant xDSL system” can be simulated. Within TM6, we all know that ETSI ADSL performance requirements are not as stringent as SDSL performance requirements. However outside TM6 not all know that. Therefore, if we give to a third part guidelines how to simulate an ETSI compliant modem, we run into the risk that wrong conclusion are retrieved, based on “ETSI compliance” alibi.</p> <p>The SDSL ETSI performance requirements are slightly optimistic. Telecom Italia has found in laboratory results on existing real SDSL systems that do not achieve those performances for a couple of dBs in margin.</p> <p>On the contrary, the ADSL ETSI performance requirements are quite pessimistic with respect to performances found on real systems: these can be up to 600 m better.</p> <p>Now, the document TR 101 830-2 does not give any indication about how pessimistic or optimistic the receiver models (those for retrieving ETSI performance) are with respect to real systems performances. So either we align all the receiver models to the same level of “pessimism/optimism”, or we do not say anything about the ETSI compliance of the models, as this properties could be misused to draw wrong conclusions (e.g. deployment rules).</p> <p>In general, the scope of this document is not explaining how the xDSL performance requirements included in the various ETSI specifications have been calculated: on the contrary, in the “Scope” of this document it is written “The models in this document are intended to provide a reasonable estimate of real-world performance...”. Therefore this document should do better than previous models used to fix the ETSI performance requirements of various xDSL systems.</p>	<p>Eliminate the sentence.</p> <p>↗ TM6 to decide</p>
TI-29	Section 6.2, page 29, 3 rd paragraph	<p>There is no reason for the sentence: “The parameter values, used in the receiver performance model for ETSI compliant HDSL.CAP, are summarized in table 17”.</p> <p>The same reasons as in comment 29 apply.</p>	<p>Eliminate the sentence.</p> <p>↗ Same as with TI-28</p>

TI-30	Section 6.4, page 31, 1 st paragraph	There is no reason for the sentence: "The parameter values, used in the receiver performance model for ETSI compliant ADSL over POTS, are summarized in table 19". The same reasons as in comment 29 apply.	Eliminate the sentence. à Same as with TI-28
TI-31	Section 6.5, page 31, 3 st paragraph	There is no reason for the sentence: "The parameter values, used in the receiver performance model for ETSI compliant ADSL.FDD over POTS, are summarized in table 20". The same reasons as in comment 29 apply.	Eliminate the sentence à Same as with TI-28
TI-32	Section 6.6, page 33, 3 st paragraph	There is no reason for the sentence: "The parameter values, used in the receiver performance model for ETSI compliant ADSL over ISDN, are summarized in table 22". The same reasons as in comment 29 apply.	Eliminate the sentence. à Same as with TI-28
TI-33	Section 6.7, page 34, 3 st paragraph	There is no reason for the sentence: "The parameter values, used in the receiver performance model for ETSI compliant ADSL.FDD over ISDN, are summarized in table 23". The same reasons as in comment 29 apply.	Eliminate the sentence. à Same as with TI-28
SW-37	p28:	Delete line as there is twice the same information given: The parameter values specified in table 17 of the succeeding clause. The parameter values, used in the receiver performance model for ETSI compliant HDSL-CAP, are summarized in table 17.	à TM6 to decided
SW-38	p29:	Delete line as there is twice the same information given: The parameter values specified in table 18 of the succeeding clause. The parameter values, used in the receiver performance model for ETSI compliant SDSL, are summarized in table 18.	Same as with SW-37
SW-39	p30/31:	Delete line as there is twice the same information given: The parameter values specified in table 19 of the succeeding clause. The parameter values, used in the receiver performance model for ETSI compliant "ADSL over POTS" modems, are summarized in table 19	Same as with SW-37
SW-41	p33:	Delete line as there is twice the same information given: The parameter values specified in table 22 of the succeeding clause. The parameter values, used in the receiver performance model for ETSI compliant "ADSL over ISDN" modems, are summarized in table 22.	Same as with SW-37

Proposed resolution:

Many delegates expressed a strong preference for a single model for each xDSL variant. If this can be achieved, then a reference to some benchmark becomes less relevant, and the proposed phrases can be deleted from the current draft. Ragnar Jonsson will champion the agreement of a more appropriate model.

However it results in models for ADSL.FDD modems that significantly outperforms the minimum requirements from the ETSI reach requirements. KPN worries about a potential misuse of this "discrepancy" and prefers to have some explanation in the text (e.g. a note) that identifies that ETSI requirements are minimum requirement, and that the SpM models are estimating expected performance in the field. Other members are worried about the opposite, because an additional note that explicitly highlights this could create confusion about the scope of the technical report. There is no resolution yet on how to deal with that.

1.7. Editorial comments, about cross talk modelling

TI-46	Section 8.3, figure	The two figures here are the same: one is enough	This is an editorial comment.
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	4 and figure 5	and the references to LT and NT could be replaced accordingly with Local_Tx, Remote_Tx or similar ones.	What is wrong with being very explicit in the difference between evaluating the NT noise and the LT noise. à do not delete; no change KEEP as it is
TI-47	Section 8.3.2.1	As "FSAN combination method" it is intended only the sum method here described with $K_n=1/0.6$. The sentence "Values ranging between $K_n=1/0.6$ and $K_n=1/0.8$ have been observed in practice" has not been ever empirically demonstrated. $K_n=1/0.6$ is the only value for which the famous $\log(n^{0.6})$ law holds as a particular case. The $\log(n^{0.6})$ law has been empirically proven.	Delete the generalization of the FSAN method and restrict the description of the method to the value of $K_n=1/0.6$. $K_n=1.0.6$ is an empirical value and cable specific. The "$\log(n^{0.6})$ rule is not a law but an empirical rule of thumb For dutch cables, KPN/TNO observed higher values (0.7-0.8), The explanation can be found in the tiny details of the statistic distribution of coupling values among all disturbing wires. à keep $K_n=0.6$ as a default value, but be not too restrictive. If a particular study requires another values, the simulator has to specify it explicitly TM6 agrees to: <ul style="list-style-type: none"> • Use the text in 043w20 • Add the note in option A in 043w23r1 • Keep the current text on output impedances
TI-48	Section 8.3.3.1	Expression 15: in Hfext the term (f/f0) shall be squared.	This is an editorial comment. CLARIFY, because I think it is not wrong. If it appears to be wrong then the ETSI VDSL/SDSL/ADSL standards are all using wrong numbers, (including ATIS-SpM) à NO CHANGE formulas are correct
TI-49	Section 8.3.3.1	Expression 15: why not mentioning the typical constant values for K_{xn} and K_{xf} (50 and 45 dB)? They are mentioned in all the xDSL ETSI specifications. Besides that, one could add some words that say that there are cables with much worse/better coupling factors than these, and the simulation results critically depend on the values assumed for these constants.	Explain that K_{xn} and K_{xf} play a big role. CLARIFY. Of course these numbers play a big role, but their values are quite cable specific. For dutch cables other values apply. It should be specified explicitly for each scenario. ETSI has done many studies with 50 and 45 dB, but that will not mean that all studies has to use that value à NO CHANGE Add something: like K are cable specific. Values that are commonly used for European studies, not dedicated to a specific cable, are 45 and 50
SW-43	p38/39	if no other models are planned, there is no need to introduce a new numbering hierarchy such as 8.3.2.1 and 8.3.3.1 and the titles of 8.8.2 and 8.3.3 can be set to singular.	Keep current text, be not to restrictive at this point, because the FSAN sum is not the only cumulation approach.

			(e.g statistical methods of Jack Douglass, and I have seen other methods as well) à keep current text, since it is not wrong no change
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2. Technical comments

2.1. Line shared ISDN noise

SW-4	General	Missing ISDN template for line-sharing with ADSL. There should be at least one other template for ISDN when sharing the same line with ADSL (with splitter) as it is used e.g. in NESP (New European Spectrum Platform), see [1], [2], [3]	So far not agreed by TM6, although values are propose à TM6 to agree on values, captured in the living list Marco Löfelholz will champion the generation of two template, one for 2B1Q and one for MMS43 ISDN, Johannes Binkofski wil assist with dedicated filter curves
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2.2. PSD template of HDSL

SW-6	4.3.1	Out-of-band values in Table 2 for HDSL.2B1Q/1 and HDSL.2B1Q/3 should be equivalent to HDSL.2B1Q/2 and set to -133dBm/Hz.	TM6 to decide Use -133dBm/Hz for all three versions of HDSL.2B1Q
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3. Missing issues

It is true that many issues are still missing. The objective of the current SpM-2 document is to publish what we have, and to upgrade from that. It was not the objective to keep SpM-2 hidden for the rest of the world, until TM6 has finished all work (2007?, 2008? Or never?)
It makes sense to add all kinds of disclaimers,

à TD6 have to make (again) a fundamental choice on this: Publishing in steps, publishing it over several years, or skip the entire project if most of the input should come from a single operator.

3.1. PSD template of ADSL near 1.1 MHz: Fx-value

Come with proposals

à TD33 contains a proposal for solving values for "Fx"

this is input for SP2-5.2. Infineon, Ericsson, Alcatel will check these numbers, in order to have this issue solved, hopefully at the next meeting

Vendors are asked to do out-of-band measurements as well

EAB1	4.4.1-4.5	The fx value creates confusion,	Define fx or remove it
TI-10	Section 4.4.1, table 5	The fx value is fundamental and should be not left "TBD".	Find a good value for fx. Study point 2-5.2 is to be championed by Rosaria Persico from TI
TI-12	Section 4.4.2, Table 6 and Table 7, right side	The fx value is fundamental and should be not left "TBD".	Find a good value for fx. Study point 2-5.2 is to be

			championed by Rosaria Persico from TI
TI-13	Section 4.4.3, Table 8	The fx value is fundamental and should be not left "TBD".	Find a good value for fx. Studypoint 2-5.2 is to be championed by Rosaria Persico from TI
TI-15	Section 4.4.4, Table 9 and Table 10	The fx value is fundamental and should be not left "TBD".	Find a good value for fx. Studypoint 2-5.2 is to be championed by Rosaria Persico from TI
SW-9	4.4	Cluster 4 transmitter signal models For simulation purposes it is important that the value fx in Tables 5-10 is known. A decision has to be made before publication.	

3.2. Missing PSD templates

TI-4	Section 4 – General comment on the whole section.	The templates herein are not consistent with each other. Some of them are quite realistic and have been accurately checked with real measurements. Some others are based on masks and therefore are by far pessimistic. This comment relates especially to the out-of-band content: for example, the HDSL.2B1Q/2 out-of-band has been verified and the template looks realistic, but the SDSL out-of-band is not realistic at all: because of that, it might seem that a new generation system (SDSL) behaves much worse than an old system, which is a paradox. Whatever a not expert person tries to simulate using these models, the risk is that they might come to wrong conclusions.	Improve all the PSD templates and bring them to the same status in terms of being realistic. The out-of-band should be realistic up to 30 MHz, because the models must be in the condition to be used also for the on going VDSL2 simulation work. come with contributions
TI-5	Section 4.2.1, table 1	Is the Pfloor_dBm/Hz value realistic?	Point us a document that shows that. It is based on the template in the ISDN standard. If that one is wrong, come with a contribution and propose a better value SP31 Out of band values of ISDN/2B1q – Bernd Heise, Inf
TI-6	Section 4.2.2	The section is empty.	If exists, the section must be filled. Subject of studypoint SP2-17 come with contributions (DTAG proposal not yet mature according to DTAG) change status to PA
TI-7	Section about HDSL.CAP signal model, Table 3	The table on the right is empty.	Either cancel or fill it. come with contributions delete empty table on HDSL.CAP/1
TI-8	Section about SDSL signal model	Document 041116 shows that e.g. at a bit rate of 2048kb/s the described template for frequencies >500kHz is too pessimistic. A better template is needed otherwise the SDSL might risk to appear a worse disturber compared to HDSL.	Improve the SDSL signal model template. come with contributions SP-32 Out of band template for SDSL, Michael Horvat, inf
TI-16	Section 4.5.1	At this point in time, with the increasing interest in VDSL2, it is fundamental to fill this section as well. TS 101 270-1 contains the PSD templates for VDSL1 and it is not a big effort to include them in this section. Of course, the templates should be checked though, to see if they are realistic.	Fill this section before publication. come with contributions SP-33 VDSL templates based on ETSI standard, Danny Van Bruyssel, Alc
SW-1	General	Inconsistency of out-of-band PSD between	Come with a contribution

		<p>different xDSLs in chap 4 Out-of-band PSD should be based on real measurements. It is expected that the values for all xDSL technologies are similar. So far only the out-of-band PSD part of HDSL.2B1Q/2 has been verified by measurements and has adequate values for the template. There is no reason why the template of the "old" HDSL.2B1Q/2 should have much better out-of-band values than all the other xDSLs, this means that the out-of-band values of most xDSL are far too pessimistic. The templates must have realistic values for all frequencies up to at least 12 MHz¹. If not, an unaware simulator could draw wrong conclusions about the impact of xDSL systems with too pessimistic templates on other xDSL systems (especially VDSL).</p>	<p>SP34 ADSL out of band template; Danny Van Bruyssel, Alc</p>
SW-7	4.3.2	<p>Transmitter signal model for "HDSL.CAP" As HDSL.CAP/2 is not based on measurements the values for HDSL.CAP/1 could be deduced the same way from the specification as well, instead of being left for further study. But the right way would be for both HDSL.CAP variants to deduce the template from good quality measurements.</p>	<p>Is based on the spec in the standard. The envelope power meets</p> <p>à come with contributions</p> <p>Delete empty table + SP35 Out of band for HDSL.CAP/2, Marc Laeser, Schmid Telecom</p>
SW-8	4.3.3	<p>Transmitter signal model for "SDSL" Measurements (see 041t16) show that e.g. at a bit rate of 2048kb/s the described template for frequencies >500kHz is much too pessimistic. A better template is needed. Otherwise the SDSL might risk to appear as a bigger disturber as it really is.</p>	<p>à come with contributions</p> <p>see SP32</p>

3.3. Performance model of ADSL

EAB5	6.5,6.7	Table 20,23. Implementation loss too high.	<p>Implementation loss number should be reinvestigated.</p> <p>Come with another benchmark and extract from that a model à come with contributions</p> <p>replace SP23+SP24 by new SP36 ADSL.FDD performance model (over POTS & over ISDN), Ragnar Jonsson, Con</p>
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3.4. Missing Performance models

TI-26	Section 6.1: Receiver performance model for HDSL.2B1Q.	<p>HDSL is an old system for which it not conceivable a "for further study" here! During the work on the NESP (see 033t04r2, 034w11r1 and 033w07), we have agreed on a particular HDSL.2B1Q receiver model, which could be used as a basis for a model to include in this spec.</p>	<p>Include a HDSL.2B1Q receiver model.</p> <p>Refered contributions do not contain this model, and refer consistently back to SpM-2 document, except for a few missing numbers. Come with contributions</p> <p>SP37, Collecting the missing numbers from NESP</p>
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¹ Considering the efforts made to define VDSL2 band plans for >12 MHz, it is now very important to extend the out-of-band definitions up to 30 MHz.

			contributions. Andres Thöny, SW
TI-37	Sections 6.4, 6.5, 6.6 and 6.7, Tables 19, 20, 22 and 23, row "Receiver noise"	An (apparently) better receiver noise model for ADSL is described in 021t31. It has been also recently acknowledged in 034t05. However this model probably needs a generalization, because there is a value fixed in it (4 km) that in principle should be cable dependent. The internal receiver noise models need to be discussed more in depth for all the ADSL flavors. In any case, the ADSL receiver noise models used to achieve the ADSL performance requirements currently included in TS 101 388 are different from those included in the current TR 101 830-2 draft: therefore the sentences mentioned above "The parameters values, used in the receiver model for ETSI compliant ADSL.... modems, are summarized..." cannot be true. Moreover, in those sentences, the network topology is not specified and consequently it is not said in which conditions those performance requirements can be retrieved.	Use a more accurate receiver noise model for all ADSL flavors. Current models are extracted from ETSI reach requirements, that are based on 021t31. Some details are left hidden in that TD, and the added complexity has never been proposed in full detail to TM6 Even simplifications of that model were not accepted by TM6 (see living list, second order model in 5.1.2). If model in 021t31 is more "accurate", according to what benchmark is it better? à come with contributions see SP36
TI-38	Sections 6.4, 6.5, 6.6 and 6.7, Tables 19, 20, 22 and 23, row "Minimum bit-loading"	The minimum bit loading is left TBD for ADSL FDD variants and is fixed at 2 for ECD variants. This is not conceivable: all the variants should be specified with the same level of details. Moreover there are existing ADSL implementations where values less than 2 are commonly used. The note on page 32 seems to suggest that the right value for the minimum bit loading is between 1.5 and 2. Therefore, it seems reasonable to try to fix this number: the uncertainty is only 0.5.	Resolve the uncertainties about the minimum bit loading for <u>all</u> the ADSL variants. à come with contributions see SP36
TI-39	Sections 6.4, 6.5, 6.6 and 6.7, Tables 19, 20, 22 and 23, row "Maximum bit-loading"	The minimum bit loading is left TBD for ADSL FDD variants and is fixed at 15 for ECD variants. This is not conceivable: all the variants should be specified with the same level of details.	Resolve the uncertainties about the maximum bit loading for all the ADSL variants. à come with contributions see SP36
TI-40	Sections 6.4, 6.5, 6.6 and 6.7 – General comment	The ADSL receiver models should be tuned with real measurements results. A benchmarking work would be useful here. We could ask for help DSL Forum, where a similar work has been done.	Realize consistency among the various ADSL receiver models. They should be optimistic or pessimistic at the same level as the SDSL and other systems model. à come with contributions see SP36
TI-41	Section 6.8	This section should be filled with a model. The model used to compute the VDSL performances included in the current version of TS 101-270-1 (as informative appendix) could be used as basis. It is important at this point in time to have a common VDSL receiver model to make simulations on VDSL2.	Find a performance model for VDSL à come with contributions postpone until VDSL has made more progress
SW-10	4.5.1 and 6.8	Transmitter signal and Receiver performance models for "VDSL" (4.5.1 and 6.8) All transmitter and receiver performance models for VDSL should be well characterised in the document. This is important for objective comparison between the different xDSL technologies and their variants.	à come with contributions postpone until VDSL has made more progress
SW-11	6.4-6.7	Bit-loading in ADSL receiver performance models (6.4 – 6.7) There is no reason why the minimum and maximum bitloading of the ADSL (EC) is specified as 2 and 15 and for ADSL (FDD) these values are set to TBD. This should be made consistent for all 4 variants of ADSL by defining the correct values.	à come with contributions See SP36
SW-12	4.5.1 and 6.8	Transmitter signal and Receiver performance models for "VDSL" (4.5.1 and 6.8) All transmitter and receiver performance models for	à come with contributions postpone until VDSL has made

		VDSL should be well characterised in the document. This is important for objective comparison between the different xDSL technologies and their variants.	more progress
SW-13	6.4 – 6.7	ADSL Receiver performance models (6.4 – 6.7) The benchmarking against the performance requirements from ETSI TS 101 388 is not a good choice, as it is a much too pessimistic approach. There should be a benchmarking against real modems. One way could be to do a benchmark with e.g. a number (say 4) of real modems of an ADSL variant and take the average of the received values for the model. With such an approach it is to hope that better values for the implementation loss can be received and that the badly needed consistency between the ADSL variants can be obtained.	à come with contributions See SP36

3.5. Missing references to loops of interest

TI-42	Section 7.1	This section is empty. A lot of material is available though.	Fill the section. To what extent? What to select out of many material. à come with contributions SP38 Collecting public available cable models, Marko Löffelholz, DTAG
SW-15	7.1	Summary of test loop models There should be more information in this clause than the sentence below, since for simulation purposes it is important to have all possible details. There is sufficient material available from the NESP investigations, even the reasoning why TP100 was chosen. "This section is for further study, and is intended to refer to various cable models, being published in several documents"	à come with contributions See SP38

3.6. Other missing

TI-1	In the SCOPE of the document (page 5), first paragraph, where it says "These methods enable..."	At the status of the document these methods do not enable to achieve any result, as the document is full of "TBD" and "for further study". On the contrary, if used as it stands, the document might bring to wrong conclusions: some models (for example PSD templates and receiver models, the network topology models) are actually not accurate enough or not complete.	Bring the draft to a better status, resolving TBD and "for further study", so that the document cannot be misused. come with contributions SP39 Restructuring clause 5, Rosaria Persico TI
TI-43	Section 8.1	The section is in empty, so of no value. The way we would like to structure this section is describing the real typical networks, highlighting they have a tree topology. Then we would describe the two-node and the multi-node topologies, as simplified models. The warning about the two-node topology that is currently in the 2 nd paragraph of section 8.3, should be given immediately to the reader, and so it should be moved here. The reader should immediately understand that the two-node topology is not appropriate to develop deployment rules (at least for ADSL and VDSL, where the FEXT generally plays a big role) and <u>should be urged to use the multi-node topology for simulations.</u>	Complete this section. It is there on explicit request of TI, but TI never can with any text proposal à come with a text proposal SP40 Text for clause 8.1-8.3, Rosaria Persico TI
TI-44	Section 8.2	This section is empty and it is not clear what it is about.	Fill the section or delete it. It is there on explicit request of

			<p>TI, but TI neve can with any text proposal à come with a text proposal or delete it; TM6 to decide see SP40</p>
TI-50	Section 8.4	<p>This section is empty. Some material is available in 033w07. If this section is left for further study, not expert or malicious simulators could build wrong or cunning deployment rules using a two-node topology model, which is the only one developed in the spec.</p>	<p>Fill absolutely the section and guide the reader to understand it is much better than the two-node topology. à come with contributions SP41, Compiling available text for multi-node xtalk, Michael Horvat, Inf</p>
TI-51	Section 9	<p>This section is empty. A lot of material is available related to the NESP.</p>	<p>Fill the section. à come with contributions leave unsolved for a while, until the underlying models have been agreed, however see SP42</p>
SW-2	General	<p>Too many "TBD"s. Throughout the whole document there are too many "TBDs" for a published version of good quality.</p>	<p>à come with contributions covered by various SP</p>
SW-3	General	<p>Too many "left for further study". There are too many "left for further study" in the document even if material is available (see e.g. below in 1.10 and 1.11).</p>	<p>à come with contributions covered by various SP</p>
SW-16	9	<p>Examples of evaluating various scenarios The outcome and the philosophy of NESP (New European Spectrum Platform) would be an ideal example to demonstrate the use of this document. A lot of information is already available in several TDs. This information should be included, replacing the sentence below. "This chapter has left for further study, and is intended to show how the models in this document can be used to perform spectral management studies."</p>	<p>à come with contributions leave unsolved for a while, until the underlying models have been agreed, however SP42 Describing the scenarios (without calculation results) identified within NESP, Andres Thöny, SW</p>
DT-1	Scope	<p>The scope lists some content which is not yet covered or covered only partly by the document itself. Deutsche Telekom feels that this includes important issues which are vital for the applicability of the present document. This issues include</p> <ul style="list-style-type: none"> • Measurements as technical mean for performance evaluations • Cable characteristics/Cable models: references to the existing models, incorporation of potential new models under development are missing • Extended Crosstalk models (multi node) are still for further study • Examples for specifying configurations and conditions for the application of this document <p>Deutsche Telekom feels that an unambiguous description of the way how performance evaluations are to be done (important for reproducible results) is not fully given using this document in the present shape.</p>	<p>à come with contributions DTAG will discuss potential chapter on measurement, otherwise delete from scope SP43 Revising scope, or inclusion of chapter dedicated to measurements. Marko Löffelholz, DTAG See SP38 See SP41 See SP42</p>
DT-3	8.3	<p>A recommendation of and reference to the multi node crosstalk models (8.4) leads to the statement "for further study" which gives an impression of an incomplete document.</p>	<p>à come with contributions See SP41</p>
FT1		<p>Establishing spectral management rules on metallic access networks seems to be a very complex/sensitive problem. Such TR 101 830-2 draft could have a very significant impact on future xDSL systems to be deployed/not deployed, then on European operator's deployment strategy (CLECs sans ILECs) together with broadband services definition for final customers.</p>	<p>à come with contributions See the various SP created above</p>

		<p>In order to <u>avoid wrong conclusions when using this document</u>, we really do think that this draft requires to be improved and to be completed before publication.</p> <p>We need mainly:</p> <ul style="list-style-type: none"> • to resolve a lot of "TBD" and "for further study" paragraphs or items , • to improve/modify most of the PSD templates (i.e. "out of band" Power Spectral Density's consistency...) <p>to resolve the inconsistency around the existing pessimistic and optimistic receiver models for ETSI performance requirements : the models in our draft are expected (as mentioned in paragraph 1: Scope) "to provide a reasonable estimate of real-world performance" . Significant risks of confusion/misunderstanding (and so wrong conclusions for field deployment), specially for non ETSI TM6 participants readers, still remain.</p>	
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4. Unsorted comments

Just before the meeting, additional comments from BT were received by rapporteur, and these comments have not been elaborated/sorted yet. Most of them are editorial in nature, and NOT accompanied by a "no" vote from BT.

[Suggestion: for the time-being keep them for information, and BT to highlight the technical issues that require discussion within TM6.](#)

[Most of it is editorial, or allocated to SPs; complete by off-line discussion between Rapporteur and BT](#)

4.1. BT's Comments 1

Reviewer – [John MacDonald](#)

Page	Section	Location	Editorial/Technical	Description
11	4.3.1	Table 2	Technical	Why do the noise floors for the three different types of HDSL system vary so much ?? Suggest using a common value, say – 120dBm/Hz ??
11	4.3.3	Paragraph 1	Technical	Define UC-PAM.
13	4.4.1	Table 5	Technical	If f_x is not defined, how can it have a PSD value ??
13 - 17	Various	Tables	Technical	Tables 5 to 8 use an approximation (\approx) to denote the result of the Δf product whereas Tables 9 and 10 use an equals ($=$) to denote the same result. Keep terminology consistent, equals preferred as the value of Δf is defined.
14	4.4.2	Table 6	Technical	If f_x is not defined, how can it have a PSD value ??
14	4.4.2	Table 7	Technical	If f_x is not defined, how can it have a PSD value ??
15	4.4.3	Table 8	Technical	If f_x is not defined, how can it have a PSD value ??
16	4.4.4	Table 9	Technical	If f_x is not defined, how can it have a PSD value ??
17	4.4.4	Table 10	Technical	If f_x is not defined, how can it have a PSD value ??
20	5.1.1	Expression 7	Technical	Make use of brackets in denominator of Noise offset format equation (i.e. $(P_{RN} \times m) + P_{RND}$).
28	6.2	First paragraph	Technical	Clarify which ETSI specification the reach is referring to.
32	6.5	Note	Technical	Add reference to ADSL specification (ETSI or

				ITU-T ???)
39	8.3.3.1	Expression 15	Technical	Is the frequency term in the Fext model correct ??
9, 10, 13, 17	4.2, 4.3, 4.4, 4.5	Headings	Technical	Define what Cluster 2, Cluster 3, Cluster 4 and Cluster 5 are ?? Maybe include this in definitions (Section 3.1).
13, 14, 15, 16, 17	4.4.1 – 4.4.4	Table 5 – Table 10	Technical	Define what k1, k2, k3 and k4 are.

Page	Section	Location	Editorial/Technical	Description
ALL		Equations	Editorial	Change "Expression" to "Equation" and update text accordingly throughout.
ALL			Editorial	A US English dictionary has been used to spell check this document, hence it is full of American spellings (summarized, etc). Suggest re-running it through a UK English spell checker.
1			Editorial	Draft status needs to be changed to Issue.
1			Editorial	Month changed from July to July.
1			Editorial	Remove strike-through from old address lines.
1			Editorial	Remove reference to old address.
6			Editorial	Include date of G.992.1 in Ref [8].
6	3.1	Access Port	Editorial	Change "where to inject signals" to "where signals are injected".
6	3.1	LT-access Port	Editorial	Remove "as labelled".
7	3.1	Signal margin	Editorial	Change "does no longer meet" to "no longer meets".
7	3.1	Noise margin	Editorial	Change "does no longer meet" to "no longer meets".
7	3.1	Cable fill	Editorial	Change "connected transmission techniques" to "transmission techniques connected".
7	3.1	Signal Category	Editorial	Change "ETSI-TR-101-830-1" to "ETSI TR 101 380-1" to reflect reference [1] on page 5.
8	3.2	LT-port	Editorial	LT-port refers to the "central office side" whereas the definition on page 6 refers to the "telecommunications exchange". Keep one common terminology.
8	3.2	SNR	Editorial	Change "ration" to "ratio".
8	3.2	2B1Q	Editorial	Change "Quaternary" to "Quaternary".
10	4.2.1	Paragraph 1	Editorial	Change "in case 2 nd order" to "in the case where 2 nd order".
10	4.3.1	Paragraph 2	Editorial	Change "used filter characteristics" to "filter characteristics used".
11	4.3.2	Paragraph 1	Editorial	Table 3 does not contain any break frequencies for HDSL.CAP/1.
11	4.3.2	Paragraph 1	Editorial	Change "template" to "templates".
11	4.3.2	Paragraph 1	Editorial	Add a period (.) after [4].
12	4.3.3	Power back-off	Editorial	Change "The transmitter signal" to "The SDSL transmitter signal".
12	4.3.3	Power back-off	Editorial	Add EPL to the list of definitions in Section 3.2.
12	4.3.3	Power back-off	Editorial	Change "Mark this" to "It should be noted that this".
12	4.3.3	Expression 4	Editorial	Change "db" to "dB".
12	4.3.3	Expression 4	Editorial	Remove equals signs (=) from inside large brackets.
13	4.4.1	Paragraph 1, last sentence	Editorial	Change "equals" to "R _s =".
13	4.4.1	Power cut back	Editorial	Change "(7...18)" to "(7 through 18)".
13	4.4.1	Power cut back	Editorial	Change "specified expression" to "specified in equation".
13	4.4.1	Expression 5	Editorial	Remove equals signs (=) from inside large brackets.
14	4.4.2	Both bullets	Editorial	Change "up" to "upstream".
14	4.4.2	First bullet	Editorial	Change last sentence to "7 sub-carriers are left unused to enable this guard band to be implemented".
14	4.4.2	Paragraph 2, last sentence	Editorial	Change "equals" to "R _s =".

15	4.4.2	Power cut back heading	Editorial	Change "Power cutback" to "Power cut back".
15	4.4.3	Paragraph 1, last sentence	Editorial	Change "equals" to " $R_s =$ ".
15	4.4.3	Table 8	Editorial	Change "686" to "686k".
15	4.4.3	Power cut back	Editorial	Change "(36...47)" to "(36 through 47)".
15	4.4.3	Power cut back heading	Editorial	Change "Power cutback" to "Power cut back".
15	4.4.3	Power cut back, 2 nd paragraph	Editorial	Change "specified expression" to "specified in equation".
16	4.4.3	Expression 6	Editorial	Remove equals signs (=) from inside large brackets.
16	4.4.4	Table 9	Editorial	Change "686" to "686k".
16	4.4.4	Both bullets	Editorial	Change "up" to "upstream".
16	4.4.4	First bullet	Editorial	Change last sentence to "7 sub-carriers are left unused to enable this guard band to be implemented".
16	4.4.4	Paragraph 2, last sentence	Editorial	Change "equals" to " $R_s =$ ".
16	4.4.4	Table 9	Editorial	Change "686" to "686k".
17	5	Second paragraph	Editorial	Change "max" to "maximum".
17	5	Second paragraph	Editorial	Change "quantities like" to "the".
17	5	First bullet	Editorial	Remove underlining from "independent".
17	5	Second bullet	Editorial	Change "at specified" to "at a specified".
17	4.4.4	Table 10	Editorial	Change "686" to "686k".
17	4.4.4	Power cut back heading	Editorial	Change "Power cutback" to "Power cut back".
18	5	First paragraph after Figure 1	Editorial	Remove comma after "three".
18	5	Final paragraph	Editorial	Remove "is to" from first sentence.
18	5	Final paragraph	Editorial	Change "echo and thus" to "echo thus".
18	5	Final paragraph	Editorial	Change "analog" to "analogue".
18	5	Final paragraph	Editorial	Change "has often been" to "has been".
19	5	Second paragraph	Editorial	Change "distinct" to "distinguish"
19	5	Third paragraph	Editorial	Change first sentence to "This section details (sub)models for the afore mentioned blocks"
19	5.1.1	First paragraph	Editorial	Change "This input model is quite a" to "This is a".
19	5.1	First paragraph	Editorial	Change "With this" to "By using this".
19	5.1	First paragraph	Editorial	Remove underlining from "increases" and "decreases".
20	5.1.1	First paragraph	Editorial	Remove ", and it has been specified" from first sentence.
20	5.1.1	First paragraph and Table 11	Editorial	Change "involved" to "associated"
21	5.2	On Output	Editorial	Change "appropriated" to "appropriate".
21	5.2	On Output	Editorial	Remove underlining from "increase" and "decrease".
21	5.2	Note	Editorial	Change "then" to "than" in the last sentence.
22	5.2.1	Table 13	Editorial	Change "center" to "centre".
22	5.2.1	Second bullet	Editorial	Change (0...30%) to (0 to 30%).
23	5.2.2	Second bullet	Editorial	Change (0...30%) to (0 to 30%).
23	5.2.2	Third bullet	Editorial	Add spaces before and after "=" signs.
24	5.2.3	Second bullet	Editorial	Change (0...30%) to (0 to 30%).
25	5.2.4	Bit-loading algorithm	Editorial	Remove "do" from the first sentence of the second paragraph
25	5.2.4	Third bullet	Editorial	Change "sub-carrier k a" to "sub-carrier k with a"
25	5.2.4	First paragraph after bullets	Editorial	Change "all over this document" to "in this document".
25	5.2.4	SNR-Gap	Editorial	Remove "the above" from the first sentence.
26	5.2.4	Table 16	Editorial	Change "Involved" to "Associated"
27	5.3.1	Bullet 1	Editorial	Remove "as" from second sentence.
27	5.3.1	Bullet 2	Editorial	Change first sentence to "... representing the

				termination impedance that causes the hybrid to be perfectly balanced.”.
27	5.2.4	Bullet 2, second sentence	Editorial	Change “them” to “these” and “carrying” to “carry”
27	5.2.4	Bullet 6	Editorial	Add ($\Delta f = 4.3125$ kHz) to end of sentence.
28	6	First sentence	Editorial	Change “the previous chapter” to “section”.
28	6.2	Last paragraph	Editorial	Change “used CAP/QAM-detection model” to “CAP/QAM-detection model used”.
29	6.3	First sentence	Editorial	Change “is capable for” to “is capable of”.
29	6.3	Second sentence	Editorial	Change “then” to “than” – this occurs twice in this sentence.
29	6.3	Second last paragraph	Editorial	Change “Part of them” to “Some of these”.
29	6.3	Last paragraph	Editorial	Change “used PAM-detection model” to “PAM-detection model used”.
31	6.4	First sentence	Editorial	Change “Parts of them” to “Some of these”.
31	6.5	Second paragraph	Editorial	Change “Parts of them” to “Some of these”.
33	6.6	Third paragraph	Editorial	Change “Parts of them” to “Some of these”.
34	6.7	Third paragraph	Editorial	Change “Parts of them” to “Some of these”.
35	8	First Paragraph	Editorial	Refers to the “central office” whereas the definition on page 6 refers to the “telecommunications exchange”. Keep one common terminology.
35	8.3.1	Last paragraph	Editorial	Change “summarizes” to “summarise”.
37	8.3.1	First paragraph	Editorial	Change “causes” to “means”.
38	8.3.2.1	Second paragraph	Editorial	Change “that’s” to “that”.
39	8.3.4	First paragraph	Editorial	Change “impedance will change” to “impedance change”.

4.2. BT’s Comments 2

Reviewer – Rob Kirkby

Pg	Para	Editorial/ Technical	Description
5	1 under §1 “Scope”	Editorial	“... for studying the impact on xDSL performance (...) in noisy cables when changing ...” it isn’t the cables which are noisy, cable faults excepted. Perhaps this would be better: “... for studying the impact of noise on xDSL performance (...)when changing ...”
6	LT-access port under §3.1 “Scope”	Typo	“...,labelled as labelled by ...” the author meant “..., labelled by ...”
6	NT-access port under §3.1 “Definitions”	Editorial & technical	“..., labelled by the loop provider as ...” (i) ‘labelled’ probably the wrong word. ‘designated’ perhaps (ii) in the UK choice of access points is not in the loop provider’s gift. (iii) the document is about modelling, not real networks, so it’s the simulator who chooses <i>everything</i> , including what ports go where I suggest (here and throughout) “..., designated as ...”
7	Deployment Rule under §3.1 “Definitions”	typo	“...and proprietary for each individual ...” should be “...and proprietary to each individual ...”
7	Spectral management under §3.1 “Definitions”	technical	“● Spectral policing to ensure network integrity” should be “● Spectral policing to enforce compliance with access rules”
7	Power back-off under §3.1 “Definitions”	editorial	“... to reduce the power.” should specify which power “... to reduce the transmitter’s output power.”

Pg	Para	Editorial/ Technical	Description
8	SNR under §3.2 "Abbreviations"	sp	"Signal to Noise Ratio"
8	2B1Q under §3.2 "Abbreviations"	sp	"2-Binary, 1-Quaternary"
8	2B1Q under §3.2 "Abbreviations"	technical	"(Special variant of a 4-level PAM line code)" the modulation is the same, 2B1Q is how its used. Try "(use of 4-level PAM to carry two bits per pulse)" (if he particularly wants to say that PAM is a line code, he should do it where he expands the abbreviation PAM)
9	2B1Q under §4.1 "Generic transmitter signal model"	technical	"The output ..., is uncorrelated with any other transmitter signal, ..." A real modem always has some signal redundancy, related to synchronization. In some modems (e.g. ADSL with its pilot tones and framing) this produces actual correlation – both between modems and in autocorrelation, as spectral lines. (Data is however not correlated, except for ADSL's autocorrelation due to cyclic prefix). I suppose the author means to neglect this for modelling purposes, and I think he should say so. So I suggest "The output voltage of this source is random in nature (as a function of time), is uncorrelated with any other transmitter signal , and occupies a relatively broad spectrum. <u>Correlation between transmitters is taken to be negligible. The autocorrelation properties of a transmitter's signals are taken to be adequately represented by a PSD template.</u> "
18	Last para on page under §5	Typo	"... figure 1 is to evaluates a quantity ..."
18	3 rd bullet point below figure 1 under §5	technical	"When the hybrid of the transceiver is unbalanced due to mismatched termination impedances (of the cable), then a portion (P_{RE}) of the transmitted signal (P_{TS}) will leak into the receiver and is identified as echo." According to this definition of echo all reflections are ascribed to mismatched termination impedance, including those due to gauge changes along the length of the line. This is wrong – although ascribing them to an imperfect balance impedance [Z_b in figure 3] would be formally correct (if unusual). I would suggest something like "No hybrid is perfect, so a portion (P_{RE}) of the transmitted signal (P_{TS}) will leak into the receiver and is identified as echo. Usually most of this is due to mismatch between the termination impedance presented by the transceiver and the near end of the wire pair; gauge changes along the wire pair also contribute echo."
19	Para 2 on page Is under §5	Typo, grammar	"Simple (first order) models for the input block cannot distinct between receiver imperfection originated from echo and from other causes." suggest "Simple (first order) models for the input block cannot distinguish between echo due to receiver imperfections and from other causes."
19	Para 2 on page Is under §5	editorial	"... does not cover the related imperfections." It is not clear whether 'cover' means 'deal with' or 'suffer from'. Guessing a meaning, I suggest replacing the whole paragraph thus: "The <u>echo-coupling block</u> is optional. It is to be included only if the transceiver of interest performs EC. A model which does not have this block is simpler, but the receiver performance is worse (as happens in real transceivers)."
21	2 nd para after table 12 Is under §5.2	typo	"... when more appropriate)."
21	2 nd para after table 12 Is under §5.2	editorial	"This margin parameter is a dominant measure for ..." doesn't work for me. Try "This margin parameter is the main measure for ..." or "This margin parameter is an important measure for ..."
22	2 nd bullet point after table 13 Is under §5.2.1	typo	"... usually higher then <u>than</u> the ..."
23	3 rd bullet point after table 14 Is under §5.2.2	editorial	IMHO the relationship between oversampling rate and N_L , N_H values should be discussed.
23	1 st para under §5.2.3	typo	"... is equivalent with to solving ..."
25	1 st bullet point under expression 12	typo	"... is unpractical-impractical to implement."

Pg	Para	Editorial/ Technical	Description
22 23	Following expressions 9, 10	Editorial	The analysis of (effective) SNR gap is repetitious, and would perhaps be better done once in section §5.2.1, and only cite the values of Γ_{linecode} , Γ_{coding} , Γ_{impl} , under the individual linecodes.
35	2 nd para under §8	technical	<p>“These approximations may be adequate for situations above for instance 1km in which the fanout of the wires can be ignored.”</p> <p>(i) provides no real guidance to the reader as to when this simplification is appropriate</p> <p>(ii) I don't think it is ever appropriate in practise</p> <p>(iii) secondary next can also be significant and should be mentioned as another contra-indicator for this simplification</p> <p>I propose replacement text</p> <p>“This approximation is computationally convenient but is generally inadequate to represent the real world. For example it will conceal effects due to fan out of the wires, secondary NEXT, and PBO.”</p>
35	2 nd para under §8	technical	<p>“These approximations may be adequate for situations above for instance 1km in which the fanout of the wires can be ignored.”</p> <p>(i) provides no real guidance to the reader as to when this simplification is appropriate</p> <p>(ii) I don't think it is ever appropriate in practise</p> <p>(iii) secondary next can also be significant and should be mentioned as another contra-indicator for this simplification</p> <p>I propose replacement text</p> <p>“This approximation is computationally convenient but is generally inadequate to represent the real world. For example it will conceal effects due to fan out of the wires, secondary NEXT, and PBO.”</p>
35	2 nd para under §8	technical	<p>“These approximations may be adequate for situations above for instance 1km in which the fanout of the wires can be ignored.”</p> <p>(i) provides no real guidance to the reader as to when this simplification is appropriate</p> <p>(ii) I don't think it is ever appropriate in practise</p> <p>(iii) secondary next can also be significant and should be mentioned as another contra-indicator for this simplification</p> <p>I propose replacement text</p> <p>“This approximation is computationally convenient but is generally inadequate to represent the real world. For example it will conceal effects due to fan out of the wires, secondary NEXT, and PBO.”</p>
36	1 st bullet point under §8.3.1	technical	<p>“This is because the cumulation from different disturbers cannot be modelled by a simple linear power sum of all individual disturbers. Since each wire pair couples at a different ratio to the victim wire pair, the cumulation requires some weighted power sum that accounts for the statistical distribution of all involved cross talk coupling ratios”</p> <p>(i) that's not the reason. Its because we address a near-worst-case value</p> <p>(ii) if we wanted to address the mean power case then a linear sum (N^1) would be appropriate².</p> <p>(ii) a weighted power sum would still be linear</p> <p>I propose replacement text</p> <p>“This is because we are in general interested in a near worst case bound of crosstalk level, so the cumulant is not linear. (The obvious linear sum of powers is appropriate only for the mean power level case).”</p>

² Exercise to the reader : prove it from conservation of energy J