



Data processing of electronic notifications concerning the requirements for the planning exercise - Validation procedures

This paper provides a summary of the validation performed by BR's software to electronic notices submitted by administrations in order to make sure that the input data is complete and correct for further running of the RRC planning exercise software.

The validation process implemented in "Dval_BCBT_Dig" is sub-divided into three main modules as follows:

- Validation of the file structure (as defined in the CR/215):
 - Each notification file must contain a <HEAD> section followed by ONE or MANY <NOTICE> section(s) and end with a <TAIL> section.
 - Each section must start with a beginning tag (i.e.: <NOTICE>) and end with an end tag (i.e.: </NOTICE>).
 - Sub-sections are only allowed within the <NOTICE> section.
 - Sub-sections are treated the same way as sections, which means that it must start with a beginning tag and end with an end-tag.

- Basic data validation: Validation of the **keys**, the length of the data **value** and the data **type**.
 - Lines starting with character strings other than <, t_ or rrc_ are not processed.
 - Lines containing data should start with a valid key string followed by an equal sign and subsequently the value assigned to the notified key.

- Exhaustive data Validation. Checks for:
 - Duplicate keys;
 - Values within the defined range (ref. FM/TV validation rules plus RRC-04 decisions);
 - Presence of mandatory keys (as defined in the CR 215 Annex 2-6);
 - Validity of administrations and geographical areas codes.
 - Validity of geographical coordinates vis-à-vis the IDWM.

Implementation details

The three validation modules are coded in module "RRC04Validation.bas".

The module contains the following functions:

- **CheckNoticeFormat:** with the validation of the file structure
- **ValidateNtc:** with basic validation
- **BEndValidateNtc:** with exhaustive data validation

Each of these modules call specific functions as detailed in the following tables.

1- Validation of the file structure - *CheckNoticeFormat*

VB Module	Function	Reference Document	Remarks
RRC04Validation	checkSectionFormat	CR 215	

2- Basic data validation - *validateNtc*

VB Module	Function	Key	Validation rule	Reference Document	Remarks
ValReadSectionFromFile	valReadHeadSection	t_adm	Char(3) and No Integers	CR 215	
		t_email_addr	Char(50)		
		t_char_set	(Accepted key no validation)		
	valReadNoticeSection	t_notice_type	[DS1,DT1,DS2,DT2,DA1]		
		t_d_adm_ntc	[yyyy-mm-dd]		
		t_fragment	[RC06]		
		t_action	[ADD, MODIFY, SUPPRESS]		
		t_adm_ref_id	Char(20) and No double space		
		t_trg_adm_ref_id	Char(20) and No double space		
		t_ctry	Char(3) and No integers		
		t_site_name	Char(30) and No double space		
		t_long	DDMMSS or DDDMM 0 < DDD <180; 0 < MM <60 0 < SS <60		
		t_lat	DDMMSS or DDMM 0 < DD <90; 0 < MM <60 0 < SS <60		
		t_polar	[H, V, M, U]		
		t_erp_h_dbw	Numeric value		
		t_erp_v_dbw	Numeric value		
t_hgt_agl	Numeric value				

		t_site_alt	Integer value		
		t_eff_hgtmax	Integer value		
		rrc_ant_dir	[N, ND]		
		rrc_sys_var	Char(2) where [A,B,C,D,E,F] ∈ Char(1) [1,2,3,5,7] ∈ Char(2)	CR 215 + Corrigendum1	
		rrc_nb_carr	[2K, 8K]	CR 215	
		rrc_guard_interval	[4, 8, 16, 32]		
		rrc_rx_mode	[F, B, A, M]		
		rrc_ref_plan_cfg	Char(4)		
		rrc_typ_ref_netwk	Char(3)		
		rrc_sfn_id	Char(30)		
		rrc_sfn_tx_tim	Integer max 4 digits		
		rrc_adm_allot_id	Char(20)		
		rrc_spect_mask	Char(1)		
		rrc_conv_freq_assgn	Numeric value		
		rrc_conv_long	DDMMSS or DDMM 0 < DDD <180; 0 < MM <60 0 < SS <60		
		rrc_conv_lat	DDMMSS or DDMM 0 < DD <90; 0 < MM <60 0 < SS <60		
		rrc_freq_block	Char(30)		
		rrc_channel	Char(30)		
		rrc_allot_name	Char(30) and No double space		
		rrc_geo_area	Char(3) and No integer		
		rrc_nb_sub_areas	Numeric value		
		rrc_contour_id	Integer and maximum 4 digits		
		rrc_nb_test_pts	Integer and maximum 2 digits		
	valReadPointSection	rrc_long	DDMMSS or DDMM 0 < DDD <180 ; 0 < MM <60 0 < SS <60		
		rrc_lat	DDMMSS or DDMM 0 < DD <90;		

			0 < MM <60 0 < SS <60		
	valReadCoordSection	t_adm	Char(3) and No integer		
	valReadAntHgtSection	t_eff_hgt@azm0 to t_eff_hgt@azm350	Numeric value		
	valReadAntDiag_HSection	t_attn@azm0 to t_attn@azm350	Numeric value		
	valReadAntDiag_VSection	t_attn@azm0 to t_attn@azm350	Numeric value		
	valReadTailSection	t_num_notices	Integer value		Number of notices notified in this field should be the same as the number of notice read

3- Exhaustive data Validation – *bEndValidateNtc*

VB Module	Function	Key	Validation rule	Reference Document	Remarks
ReadSectionsFromFile	readHeadSection	t_adm	Check for duplicates	CR 215	
		t_email_addr			
readNtcsFromFileValid	validHeadSection	t_adm	Valid notifying administration and Mandatory		
ReadSectionsFromFile	readNoticeSection	t_notice_type	Check for duplicates		
		t_d_adm_ntc			
		t_fragment			
		t_action			
		t_adm_ref_id			
		t_trg_adm_ref_id			
		t_ctry			
		t_site_name			
		t_long			
		t_lat			
		t_polar			
		t_erp_h_dbw			
		t_erp_v_dbw			
		t_hgt_agl			
		t_site_alt			
		t_eff_hgtmax			
		rrc_ant_dir			
		rrc_sys_var			

		rrc_nb_carr			
		rrc_guard_interval			
		rrc_rx_mode			
		rrc_ref_plan_cfg			
		rrc_typ_ref_netwk			
		rrc_sfn_id			
		rrc_sfn_tx_tim			
		rrc_adm_allot_id			
		rrc_spect_mask			
		rrc_conv_freq_assgn			
		rrc_conv_long			
		rrc_conv_lat			
		rrc_freq_block			
		rrc_channel			
		rrc_allot_name			
		rrc_geo_area			
		rrc_nb_sub_areas			
		rrc_contour_id			
		rrc_nb_test_pts			
	readPointSection	rrc_long			Within the POINT sub-section there can be only one rrc_long and rrc_lat. However, it is possible to have many POINT sub-section
		rrc_lat			
	readCoordSection	t_adm	Not more than 12 administrations		
	readAnthgtSection	t_eff_hgt@azm0 to t_eff_hgt@azm350	Not more than 36 values at 10 ° interval		
	readaAntDiag_HSection	t_attn@azm0 to t_attn@azm350	Not more than 36 values at 10 ° interval		
	readaAntDiag_VSection	t_attn@azm0 to t_attn@azm350	Not more than 36 values at 10 ° interval		
RRC04Validation	validateRange	t_erp_h_dbw	If DS1 or DT1 then 17 < value < 53		Range values Given by Rackov. Indicate reference from RRC-04 report
		t_erp_v_dbw	If DS1 or DT1 then 17 < value < 53		
		t_hgt_agl	If DS1 or DT1 then 0 < value < 500		
		t_site_alt	If DS1 or DT1 then -1000 < value < 8850		

		t_eff_hgtmax	If DS1 or DT1 then -3000 < value < 3000		
		rrc_ref_plan_cfg	If DS1 or DS2 then [RPC4, RPC5] If DT1 or DT2 then [RPC1, RPC2, RPC3]	CR 215	
		rrc_typ_ref_netwk	If DS2 then [RN5, RN6] If DT2 then [RN1, RN2, RN3, RN4]		
		rrc_spect_mask	If DS1 then [1, 2, 3] If DT1 then [N, S]	CR 215 + Corrigendum1	
		rrc_conv_freq_assgn	If DT1 or DT2 then [174, 230] or [470, 860]	CR 215	
		rrc_freq_block	If DS1 or DS2 then Each value is that the first 2 characters are between [5,12] and the third character is either [A, B, C, D]		
		rrc_channel	If DT1 or DT2 then Under study		
		rrc_nb_sub_areas	If DS2 or DT2 then [1, 9]		
		rrc_nb_test_pts	If DA1 then [3, 99]		
	validateRangAntHgt	<ANT_HGT>	If DS1 or DT1 then The 36 values should within this range -3000 < value < 3000		
	validateMandatory	t_notice_type	Mandatory	CR 215	
		t_fragment			
		t_ctry			
	validateNtcDST_1	t_action			For DS1 and DT1
		t_adm_ref_id			
		t_trg_adm_ref_id	If t_action = MODIFY or SUPPRESS		
		t_site_name			
		t_long			
		t_lat			
		t_polar			
		t_hgt_agl			
		t_site_alt			

		t_eff_hgtmax			
		rrc_ant_dir			
		t_erp_h_dbw	If rrc_ant_dir = D and t_polar = H or t_polar = M then Mandatory		
		t_erp_v_dbw	If rrc_ant_dir = D and t_polar = V or t_polar = M then Mandatory		
	hasAllAntDiagrVValues	t_attn@azm0 to t_attn@azm350	If rrc_ant_dir = D and t_polar = V or t_polar = M then Mandatory		
	hasAllAntDiagrHValues	t_attn@azm0 to t_attn@azm350	If rrc_ant_dir = D and t_polar = H or t_polar = M then Mandatory		
	hasAnyAntDiagrHValues hasAnyAntDiagrVValues	t_attn@azm0 to t_attn@azm350	If rrc_ant_dir = ND then None of the values should be present in <ANT_DIAGR_V> and/or<ANT_DIAGR_H>		
		rrc_ref_plan_cfg	If DS1 then Mandatory Elseif DT1 then Mandatory if rrc_sys_var, rrc_nb_carr, rrc_guard_interval and rrc_rx_mode NOT provided		
		rrc_sys_var	If DT1 and rrc_ref_plan_cfg NOT provided		
		rrc_nb_carr	If DT1 and rrc_ref_plan_cfg NOT provided		
		rrc_guard_interval	If DT1 and rrc_ref_plan_cfg NOT provided		
		rrc_rx_mode	If DT1 and rrc_ref_plan_cfg NOT provided		
		rrc_sfn_id	If rrc_sfn_tx_tim is provided then Mandatory		
		rrc_sfn_tx_tim	If rrc_sfn_id is provided		

		rrc_conv_freq_assgn	then Mandatory If DT1 then If one of the conversion parameters is provided then all three should be provided.		
		rrc_conv_long	If DT1 then If one of the conversion parameters is provided then all three should be provided.		
		rrc_conv_lat	If DT1 then If one of the conversion parameters is provided then all three should be provided.		
	validateNtcDST_2	t_action			For DS2 and DT2
		t_adm_ref_id			
		t_trg_adm_ref_id	If t_action = MODIFY or SUPPRESS		
		t_polar			
		rrc_typ_ref_netwk			
		rrc_ref_plan_cfg	If DS2 then Mandatory Elseif DT2 then Mandatory if rrc_sys_var, rrc_nb_carr, rrc_guard_interval and rrc_rx_mode NOT provided		
		rrc_sys_var	If DT2 and rrc_ref_plan_cfg NOT provided		
		rrc_nb_carr	If DT2 and rrc_ref_plan_cfg NOT provided		
		rrc_guard_interval	If DT2 and rrc_ref_plan_cfg NOT provided		
		rrc_rx_mode	If DT2 and rrc_ref_plan_cfg NOT provided		

		rrc_allot_name			
		rrc_geo_area	If rrc_nb_sub_areas Not provided		
		rrc_nb_sub_areas	If rrc_geo_area Not provided		
		rrc_contour_id	If rrc_nb_sub_areas is provided		
	validateNtcDA_1	rrc_contour_id	Mandatory		
		rrc_nb_test_pts			
		rrc_long	For each test point a corresponding coordinate should be provided		
		rrc_lat	For each test point a corresponding coordinate should be provided		
readNtcsFromFileValid	validNoticeSection	t_etry	Valid geographical area for the RRC04	List Botha	
		t_long	If DS1 or DT1 then check the coordinates vis-à-vis IDWM. If the coordinates indicate a point in another country or in the sea, the distance should be less than 10km.	FM/TV validation rules	The tolerance of 10km derives from the accuracy of BR's IDWM (FM/TV validation rules)
		t_lat			
		rrc_conv_long	If DT1 or DT2 then as above		
		rrc_conv_lat	If DT1 or DT2 then as above		
		rrc_geo_area	If DS2 or DT2 then check if the geographical area is valid	List Botha	
		t_adm	If DS1 or DT1 or DS2 or DT2 then if <COORDINATION> section is provided, check that the administration are valid	List Botha	

		rrc_long	If DA1 then check the coordinates vis-à-vis IDWM. If the coordinates indicate a point in another country or in the sea, the distance should be less than 10km.	FM/TV validation rules	The tolerance of 10km has been derived from the accuracy of the IDWM
		rrc_lat			