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TEST REPORT ACCREDITED LABORATORIES

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Revision 0

CUSTOMER	Amentum Clean Energy s.r.o. Křenová 184 602 00 Brno
TEST ITEM	Area beneath the 400 kV overhead line and above the 110 kV cable line
TYPE SPECIFICATION	Power evacuation and auxiliary power supply for SMR ETE
TEST SPECIFICATIONS	IP5 (Government Decree No. 291/2015 Coll.; Bulletin of the Ministry of Health of the Czech Republic, Vol. 2017, No. 8; ČSN 33 2040)
TEST RESULTS	A summary of the test results is provided on page 5
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TEST DETAILS

TEST ITEM	Area beneath the 400 kV overhead line and above the 110 kV cable line
TYPE SPECIFICATION	Power evacuation and auxiliary power supply for SMR ETE
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The issue with the highest revision number is always binding and supersedes all previous issues.

THE ACCREDITED LABORATORY TEST REPORT covers test procedures within the scope of accreditation of the EGU HV LABORATORY high-voltage laboratory, which forms an integral part of the Certificate of Accreditation. The test procedures comply with international, regional, or national standards. Any deviations from these normative procedures are clearly identified.

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1 IDENTIFICATION OF THE TEST ITEM

The purpose of the assessment is to verify compliance with the applicable public-health limits for electric and magnetic fields (non-ionizing radiation) under Government Decree No. 291/2015 Coll. and ČSN 33 2040 for the planned construction of a new 1 × 400 kV overhead line and a new 110 kV underground cable line as part of the SMR ETE project. The project comprises a new 110 kV cable line for auxiliary power supply and a new 400 kV single-circuit overhead line for power evacuation as part of the SMR ETE project. The assessment evaluates the effects of electric and magnetic fields where the newly designed lines run in parallel with or cross the existing transmission and distribution systems, particularly the 400 kV and 110 kV lines at the Temelín site.

The assessment method consists of calculating the 50 Hz electromagnetic-field parameters (electric field strength E (kV/m) and magnetic flux density B (μT)). These quantities are used to calculate the modified electric field strength E_{mod} induced in human tissue at a height of 1.8 m above ground for overhead lines and 0.1 m above ground for cable lines (persons lying on the ground are considered). Under Government Decree No. 291/2015 Coll., exposure in the head region must be used as the determining factor. When configuring the circuits for the simulations, the phase sequence resulting in the highest electromagnetic-field levels is normally used. All electromagnetic-field calculations were performed using OVERHEAD software, version 3.1.0.31.

The electromagnetic-field impact assessment complies with the applicable legislation, in particular Act No. 258/2000 Coll., as amended, and Government Decree No. 291/2015 Coll., as amended, as well as the applicable technical standards, such as ČSN 33 2040 and PNE 33 3300, Ed. 3. The calculations were performed in accordance with the Ministry of Health methodology dated July 11, 2017.

2 OVERALL ASSESSMENT (TEST) RESULTS

Tab. 1 Assessment (test) results

Name of the assessed line configuration (cross-section)	Test specification	Result (Statement of conformity)
Parallel routing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) and the 400 kV single-circuit overhead line (power evacuation from SMR ETE)	ČSN 33 2040, Government Decree No. 291/2015 Coll.	PASS
Parallel routing of the 400 kV single-circuit overhead line (power evacuation from SMR ETE) and two 400 kV single-circuit overhead lines (Units 1 and 2)	ČSN 33 2040, Government Decree No. 291/2015 Coll.	PASS
Crossing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) with the 400 kV and 110 kV overhead lines of the existing units	ČSN 33 2040, Government Decree No. 291/2015 Coll.	PASS

Explanatory notes on the superscripts used for test procedures and standards:

- ¹⁾ *The test was performed by an external accredited laboratory.*
- ²⁾ *The test was performed within the flexible scope of accreditation.*
- ³⁾ *The test is outside the scope of accreditation of EGU HV Laboratory.*
- ⁴⁾ *The test procedure or assessment criteria include normative and customer requirements.*

EGU - HV Laboratory applies a binary decision rule:

PASS - *the measurement result is declared satisfactory (conforming) if the measured value falls within the tolerance band (specification)*

FAIL - *the measurement result is declared unsatisfactory (nonconforming) if the measured value falls outside the tolerance band (specification)*

Tab. 2 Summary of numerical results for electric field strength and magnetic flux density (the maximum permissible value specified in ČSN 33 2040 is $E_{max} = 10 \text{ kV/m}$ and $B_{max} = 500 \text{ }\mu\text{T}$)

Assessed configuration	Maximum electric field strength E_{max}	Maximum magnetic flux density B_{max}
Parallel routing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) and the 400 kV single-circuit overhead line (power evacuation from SMR ETE), at a height of 1.8 m above ground	5.31 kV/m	26.9 μT
Parallel routing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) and the 400 kV single-circuit overhead line (power evacuation from SMR ETE), at a height of 0.1 m above ground	5.13 kV/m	51.6 μT
Parallel routing of the 400 kV single-circuit overhead line (power evacuation from SMR ETE) and two 400 kV single-circuit overhead lines (Units 1 and 2), at a height of 1.8 m above ground	5.36 kV/m	25.4 μT
Crossing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) with the 400 kV and 110 kV overhead lines of the existing units, at a height of 1.8 m above ground	5.36 kV/m	35.1 μT
Crossing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) with the 400 kV and 110 kV overhead lines of the existing units, at a height of 0.1 m above ground	5.18 kV/m	63.3 μT

Tab. 3 Summary of numerical results for modified electric field strength (the maximum permissible value specified in Government Decree No. 291/2015 Coll. is $E_{mod} = 0.2 \text{ V/m}$)

Name of the assessed line configuration (cross-section)	Minimum height of the lower phase conductors above ground h_{min} used in the assessment	Maximum modified electric field strength E_{mod}
Parallel routing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) and the 400 kV single-circuit overhead line (power evacuation from SMR ETE), at a height of 1.8 m above ground	12.5 m (400 kV) -1.3 m (110 kV cable)	0.047 V/m
Parallel routing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) and the 400 kV single-circuit overhead line (power evacuation from SMR ETE), at a height of 0.1 m above ground	12.5 m (400 kV) -1.3 m (110 kV cable)	0.045 V/m
Parallel routing of the 400 kV single-circuit overhead line (power evacuation from SMR ETE) and two 400 kV single-circuit overhead lines (Units 1 and 2), at a height of 1.8 m above ground	12.5 m	0.048 V/m
Crossing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) with the 400 kV and 110 kV overhead lines of the existing units, at a height of 1.8 m above ground	12.5 m (400 kV) 7.1 m (110 kV) -1.3 m (110 kV cable)	0.049 V/m
Crossing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) with the 400 kV and 110 kV overhead lines of the existing units, at a height of 0.1 m above ground	12.5 m (400 kV) 7.1 m (110 kV) -1.3 m (110 kV cable)	0.052 V/m

3 REQUIREMENTS OF GOVERNMENT DECREE NO. 291/2015 COLL.

Government Decree No. 291/2015 Coll. (hereinafter “GD 2015”) specifies the maximum permissible values of modified electric field strength E_{mod} in human tissue for electromagnetic-field frequencies from 0 Hz to 10 MHz (and therefore also for 50 Hz):

- $E_{mod} = 1.0$ V/m for employees
- $E_{mod} = 0.2$ V/m for members of the general public in a non-occupational environment

For the purposes of GD 2015, an employee is a person who has undertaken to perform dependent work within a basic employment relationship and is performing that work. For the purposes of GD 2015, a member of the general public is any person who is not an employee.

To determine the modified electric field strength E_{mod} , the electric field strength E induced in tissue by the external electromagnetic field must first be determined. The external electromagnetic field is expressed by the magnetic flux density B^{ext} and electric field strength E^{ext} , and the following relationship applies:

$$E_1 = K_B \cdot \frac{dB^{ext}}{dt} \quad (1)$$

$$E_2 = \frac{\varepsilon_0}{\sigma} \cdot K_E \cdot \frac{dE^{ext}}{dt} \quad (2)$$

$\varepsilon_0 = 8.854 \cdot 10^{-12}$ F·m⁻¹, vacuum permittivity

$\sigma = 0.20$ S·m⁻¹, tissue conductivity

K_B , K_E , exposure coefficients (field distribution, orientation relative to the body, and location on the body)

Under GD 2015, exposure in the head region must be used as the determining factor. To represent the most conservative public-health case, the person's feet are also assumed to be electrically connected to the ground (bare feet on damp ground). The most conservative situation is therefore considered, with the body exposed to a homogeneous magnetic field perpendicular to the chest and a homogeneous electric field directed from the head toward the feet. For the selection of constants, the more conservative filter representing head exposure is used, specifically exposure of the eyes and middle ear ($K_B = 0.05$ m and $K_E = 66$).

Although electric field strength and magnetic flux density are both vector quantities, they are expressed as scalars in the equations. In the general case, vector orientation can be highly complex and depends on the particular distribution of the inducing electric and magnetic fields. The situation can be simplified by considering the most conservative case, in which the contributions from concurrent exposure to electric and magnetic fields are added together.

Exposure assessment is straightforward for a sinusoidal signal. The initial quantity for the magnetic component of the field is the root-mean-square magnetic flux density B_{ef}^{ext} . The magnetic flux density amplitude is then $B_a^{ext} = \sqrt{2} \cdot B_{ef}^{ext}$, and its time derivative, required for substitution into Eq. (1), is:

$$\frac{dB^{ext}}{dt} = 2 \cdot \pi \cdot f \cdot B_a^{ext} \quad (3)$$

where f is the frequency. According to Eq. (1), the electric field strength induced by this magnetic field is ($K_B = 0.05$ m):

$$E_1 = 2 \cdot \sqrt{2} \cdot K_B \cdot \pi \cdot f \cdot B_{ef}^{ext} \quad (4)$$

Similarly, the initial quantity for the electric component of the field is the root-mean-square electric field strength E_{ef}^{ext} . According to Eq. (2), the electric field strength induced by this electric field is derived in the same manner ($K_E = 66$):

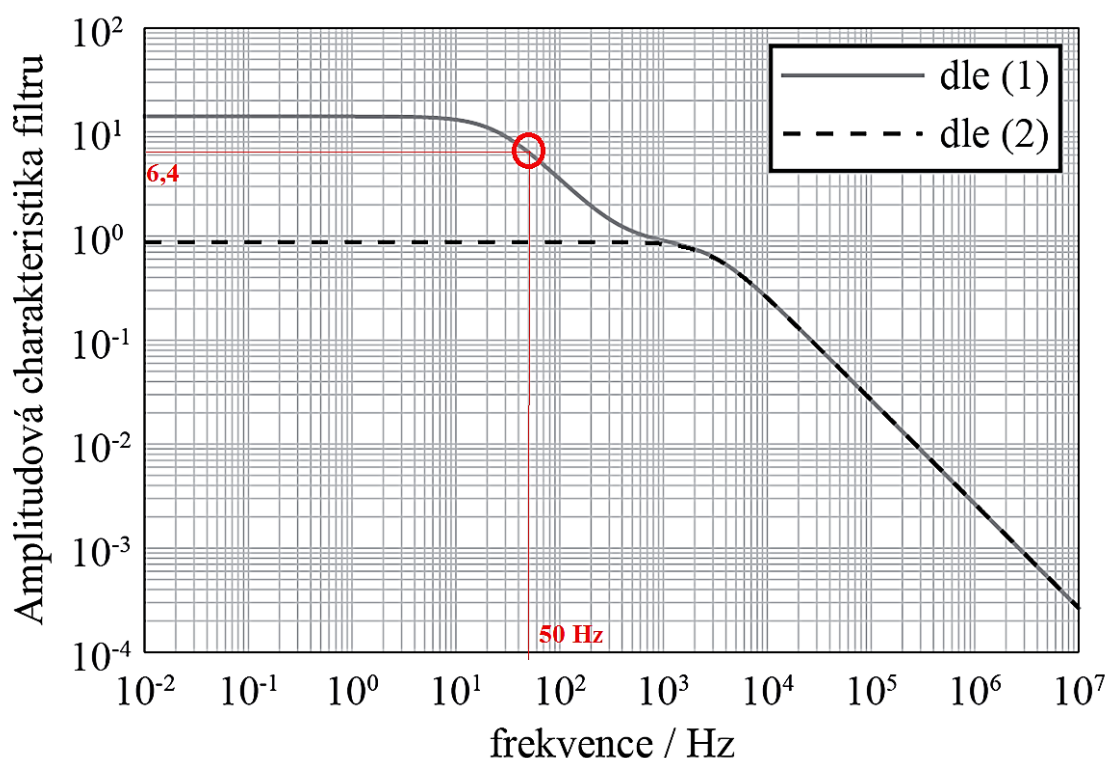
$$E_2 = \frac{\varepsilon_0}{\sigma} \cdot 2 \cdot \sqrt{2} \cdot K_E \cdot \pi \cdot f \cdot E_{ef}^{ext} \quad (5)$$

The combined electric- and magnetic-field exposure then determines the resulting induced electric field strength:

$$E = E_1 + E_2 = 2 \cdot \sqrt{2} \cdot \pi \cdot f \cdot \left(K_B \cdot B_{ef}^{ext} + \frac{\varepsilon_0}{\sigma} \cdot K_E \cdot E_{ef}^{ext} \right) \quad (6)$$

The modified electric field strength E_{mod} is then determined by the induced electric field strength E after it passes through a filter with the frequency response specified in Fig. 1. At 50 Hz, $G(50) = 6.4$, and E_{mod} is therefore determined using the following equation:

$$E_{mod} = 6,4 \cdot E \quad (7)$$



Amplitudová charakteristika filtru	Filter amplitude response
dle (1)	according to (1)
dle (2)	according to (2)
frekvence / Hz	frequency / Hz

Fig. 1 Amplitude-frequency response of the filters used to determine modified electric field strength

At the same time, GD 2015 specifies reference levels for electric field strength E and magnetic flux density B to simplify the assessment of the exposure situation. The reference levels are defined using the quantities E_{ef}^{Limit} and B_{ef}^{Limit} , which, according to the table in GD 2015, have the following values at a frequency of 50 Hz:

- $E_{ef}^{Limit} (50 \text{ Hz}) = 10 \text{ kV/m}$
- $B_{ef}^{Limit} (50 \text{ Hz}) = 1 \text{ mT}$

Compliance with the reference level requires the following criterion to be met using the root-mean-square values of the spatial maxima of electric field strength and magnetic flux density at 50 Hz; the criterion is derived from the more general criterion specified in GD 2015:

$$\frac{E_{ef}^{ext}{}_{max}}{E_{ef}^{Limit}} + \frac{B_{ef}^{ext}{}_{max}}{B_{ef}^{Limit}} \leq H_{lim} \quad (8)$$

The following value applies to the criterion limit coefficient:

- $H_{lim} = 1.0$ for employees
- $H_{lim} = 0.2$ for members of the general public in a non-occupational environment

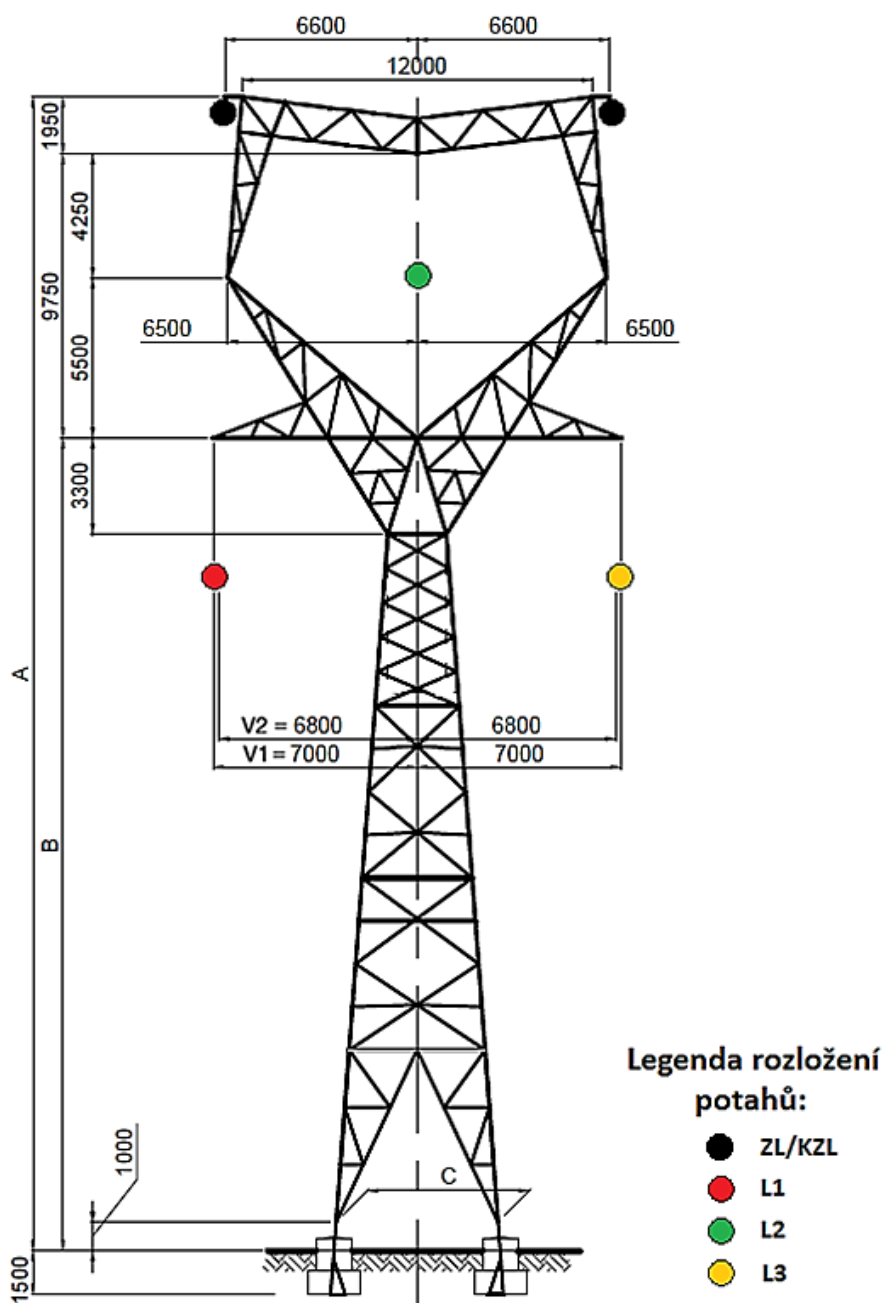
This limit coefficient for members of the general public in a non-occupational environment was used to derive the electric-field-strength and magnetic-flux-density reference limits shown in the calculation graphs below:

- $E_{ef}^{ext}{}_{lim} (50 \text{ Hz}) = 2 \text{ kV/m}$
- $B_{ef}^{ext}{}_{lim} (50 \text{ Hz}) = 0.2 \text{ mT}$

4 PARAMETERS OF THE ASSESSED LINES

4.1 TOWER STRUCTURES

The SMR ETE project envisages Delta 1 × 400 kV towers for the construction of the new power evacuation overhead line, as shown in Fig. 2. A standard minimum phase-conductor height of 12.5 m above ground is assumed for the line.



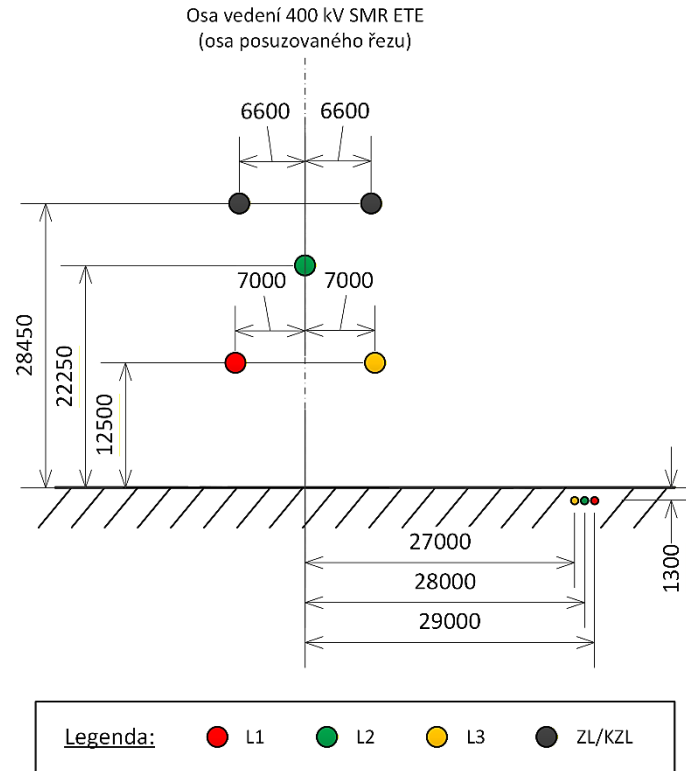
Legenda rozložení potahů:

Circuit arrangement legend:

Fig. 2 Arrangement of a Delta (2023) suspension tower for a 1 × 400 kV line

4.2 ASSESSED PARALLEL ROUTING ARRANGEMENTS

The planned 110 kV underground cable line (auxiliary power supply for SMR ETE) will run in parallel with the planned 400 kV single-circuit overhead line (power evacuation from SMR ETE), which will be carried on Delta 1 × 400 kV towers. The most conservative assessed configuration is shown in Fig. 3.



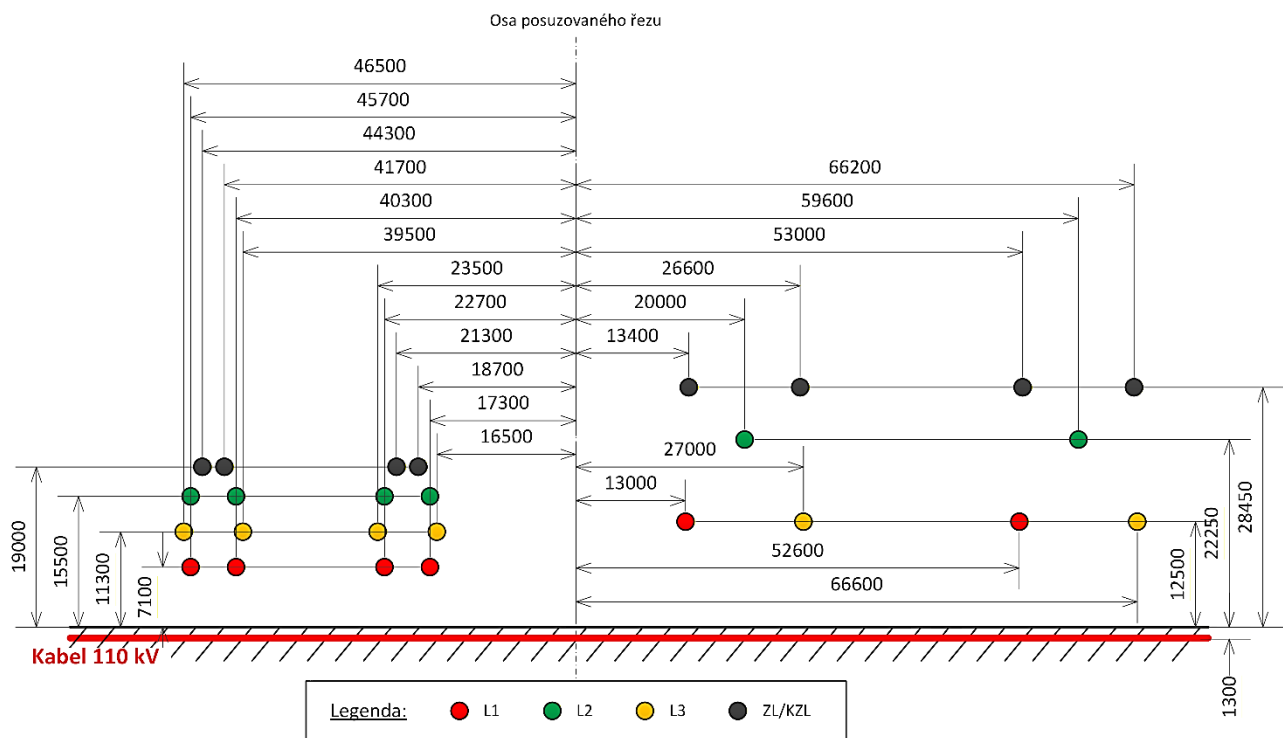
Osa vedení 400 kV SMR ETE (osa posuzovaného řezu)	Axis of the 400 kV SMR ETE line (axis of the assessed cross-section)
Legenda:	Legend:

Fig. 3 Assessed parallel routing of the planned 110 kV underground cable line (auxiliary power supply for SMR ETE) and the planned Delta 1 × 400 kV overhead line (power evacuation from SMR ETE)

The planned 400 kV single-circuit overhead line (power evacuation from SMR ETE) will also run in parallel with the existing 400 kV single-circuit overhead lines (power evacuation from Units 1 and 2). All parallel lines use Delta 1 × 400 kV tower structures. A cross-section of the assessed parallel routing is shown in Fig. 4. The minimum height of the lower phase conductors above ground is 12.5 m for all 400 kV lines.

4.3 ASSESSED CROSSING

The planned 110 kV underground cable line (auxiliary power supply for SMR ETE) will cross the 400 kV Delta 1 × 400 kV single-circuit overhead lines (power evacuation from Units 1 and 2) and the 110 kV Soudek 2 × 110 kV overhead line (auxiliary power supply for Units 1 and 2). According to the supporting information for upgrading the 110 kV overhead line, each circuit of the 110 kV overhead line will be routed in duplicate (connected in parallel) on Soudek 2 × 110 kV tower structures at the crossing. A cross-section of the assessed crossing is shown in Fig. 5. For the assessment, all lines in the assessed cross-section were assumed to be operating at maximum current and voltage loading, representing the most conservative condition in terms of electromagnetic-field effects.



Osa posuzovaného řezu	Axis of the assessed cross-section
Kabel 110 kV	110 kV cable
Legenda	Legend

Fig. 5 Cross-section at the crossing of the 110 kV cable line (auxiliary power supply for SMR ETE) with two Delta 1 × 400 kV lines (to the right of the cross-section axis) and two 110 kV Soudek 2 × 110 kV lines (to the left of the cross-section axis)

4.4 CONDUCTOR PARAMETERS

For the 110 kV cable line, the electric field of each phase is effectively shielded by the grounded conductive screen of that phase; consequently, only magnetic-field effects are considered (the electric field strength is negligible). If operating currents were induced in the cable screens, the current flowing in the screens would reduce the magnetic field around the cable. For simplicity, the calculations assumed the most conservative condition in terms of magnetic-field effects: no induced current flows in the screens to reduce the effect of the cable's magnetic field on its surroundings.

The conductor parameters for the planned 110 kV underground cable line (auxiliary power supply for SMR ETE) and for the planned 400 kV single-circuit overhead line (power evacuation from SMR ETE) are provided in Tab. 4 and Tab. 5. The conductor parameters for the 400 kV overhead lines of Units 1 and 2 are provided in Tab. 6. The conductor parameters for the 110 kV overhead lines of Units 1 and 2 at the planned crossing are provided in Tab. 7.

Tab. 4 Parameters of the 110 kV auxiliary-power-supply cable for SMR ETE, three single-core screened cables

Conductor cross-sectional area (mm ²)	Rated voltage (kV)	Rated current (A)	Cable conductor diameter (mm)	Cable conductor material	DC resistance (at 20 °C) (Ω/km)	Minimum burial depth (m)
1 × 400	123	410	23.0	Al	0.0778	1.3

Tab. 5 Conductor parameters of the 400 kV overhead power evacuation line for SMR ETE

Parameters	Type	Conductor diameter (mm)	DC resistance (at 20 °C) (Ω/km)	Total cross-sectional area (mm ²)	Total current-carrying capacity of the system (A)
Phase conductors	3 × 434-AL1/56-ST1A	28.8	0.0666	490.6	1,800
Earth wire (EW)	1 × 185-AL4/43-ST6C	19.6	0.1805	227.8	-
Combined earth wire (CEW)	1 × AL3/A20SA 203/70	22.1	0.1640	272.8	-

Tab. 6 Conductor parameters of the 400 kV overhead lines of Units 1 and 2

Parameters	Type	Conductor diameter (mm)	DC resistance (at 20 °C) (Ω/km)	Total cross-sectional area (mm ²)	Total current-carrying capacity of the system (A)
Phase conductors	3 × 434-AL1/56-ST1A	28.8	0.0666	490.6	1,800
Earth wire (EW)	1 × 185-AL4/43-ST6C	19.6	0.1805	227.8	-
Combined earth wire (CEW)	1 × AL3/A20SA 203/70	22.1	0.1640	272.8	-

Tab. 7 Conductor parameters of the 110 kV overhead lines of Units 1 and 2

Parameters	Type	Conductor diameter (mm)	DC resistance (at 20 °C) (Ω/km)	Total cross-sectional area (mm ²)	Total current-carrying capacity of
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					the system (A)
Phase conductors	1 × 679-AL1/86-ST1A	36.0	0.0426	764.5	400
Earth wire (EW)	1 × 185-AL4/43-ST6C	19.6	0.1805	227.8	-
Combined earth wire (CEW)	1 × AL4/A20SA 195/42	20.7	0.1718	236.9	-

5 CALCULATION ERRORS IN OVERHEAD SOFTWARE

OVERHEAD software version 3.1.0.31, used to assess the electromagnetic-field exposure limits, was validated using Wolfram Mathematica and COMSOL Multiphysics. The validation forms part of Internal Report No. Int_1/23 dated August 29, 2023.

The validation confirmed that OVERHEAD software is suitable for use and established the following errors:

- The electric-field calculation error δ_E is less than 0.001 %.
- The magnetic-field calculation error δ_B is less than 6 %.

These are the maximum possible relative errors incorporated into the overall assessment of the numerical simulations when calculating modified electric field strength (see Eqs. (6) and (7)). The assessment therefore also includes calculation of the absolute and relative error of the resulting modified electric field strength using the following equations:

$$\Delta_{Emod} = 6,4 \cdot (\delta_B \cdot E_1 + \delta_E \cdot E_2) \quad (9)$$

$$\delta_{Emod} = (\Delta_{Emod}/E_{mod}) \cdot 100 \quad (10)$$

6 CALCULATION RESULTS

6.1 PARALLEL ROUTING OF THE 110 KV UNDERGROUND CABLE LINES (AUXILIARY POWER SUPPLY FOR SMR ETE) AND THE 400 KV SINGLE-CIRCUIT OVERHEAD LINE (POWER EVACUATION FROM SMR ETE)

The root-mean-square electric field strength and magnetic flux density profiles in the cross-section of the assessed parallel routing at a height of 1.8 m above ground are plotted in Fig. 6 and Fig. 7. The profile of modified electric field strength in human tissue at a height of 1.8 m above ground is plotted in Fig. 8. The root-mean-square electric field strength and magnetic flux density profiles in the cross-section of the assessed line crossing at a height of 0.1 m above ground are plotted in Fig. 9 and Fig. 10. The profile of modified electric field strength in human tissue at a height of 0.1 m above ground is plotted in Fig. 11. These profiles are shown in relation to the reference levels specified in GD 2015 for members of the general public in a non-occupational environment. The calculation results and the assessment of the electric-field-strength and magnetic-flux-density reference levels are summarized for a height of 1.8 m above ground in Tab. 8 and for a height of 0.1 m above ground in Tab. 9.

Statement of conformity:

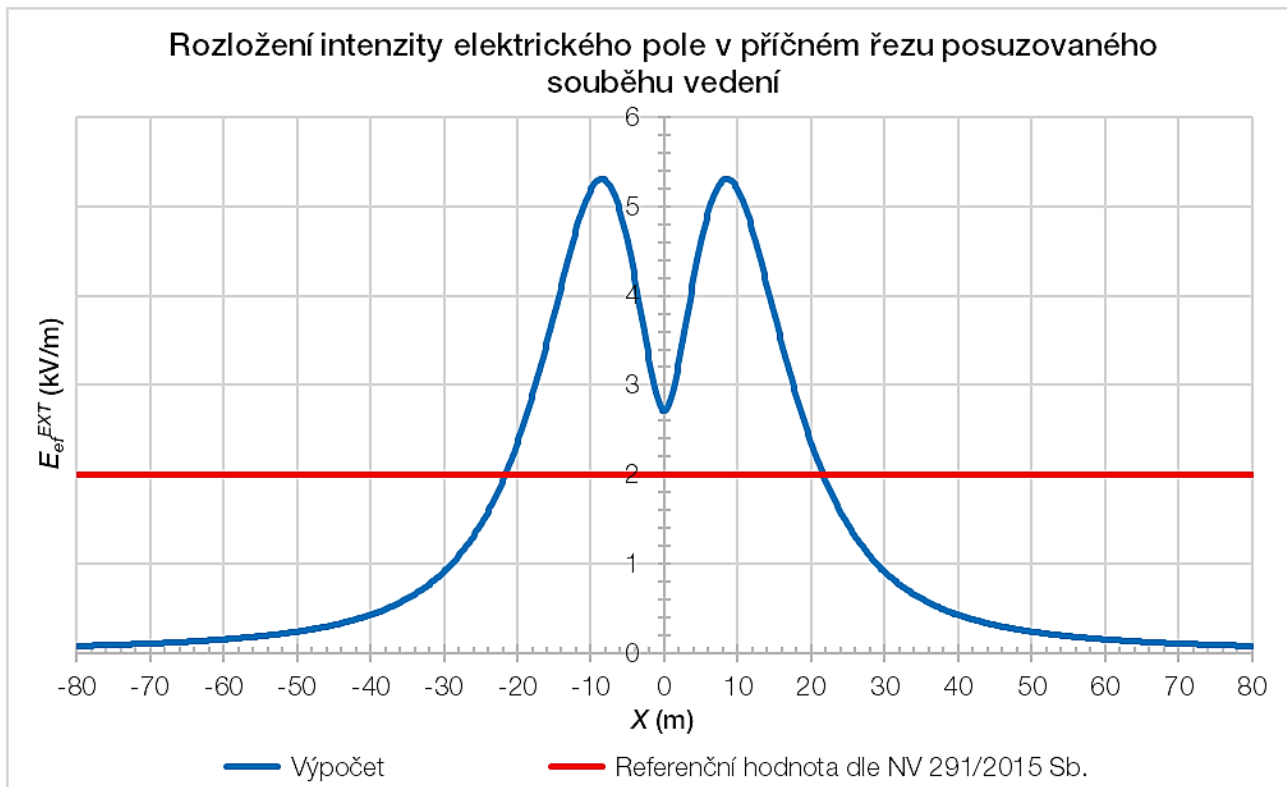
The planned parallel routing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) and the Delta 400 kV single-circuit overhead line (power evacuation from SMR ETE) complies with the requirements of GD 2015 for members of the general public in a non-occupational environment and ČSN 33 2040, "Electrical engineering regulations. Protection against the effects of 50 Hz electromagnetic fields in areas affected by electric power system equipment."

Tab. 8 Calculation results and assessment of the reference levels for E and B at a height of 1.8 m above ground

$B_{ef}^{EXT_{max}}$ (μT)	$E_{ef}^{EXT_{max}}$ (kV/m)	H (-)	H_{lim} (-)	$H \leq H_{lim}$	$E_{mod_{max}}$ (V/m)	ΔE_{mod} (mV/m)	δE_{mod} (%)
26.87	5.31	0.56	0.2	NO	0.047	0.23	0.49

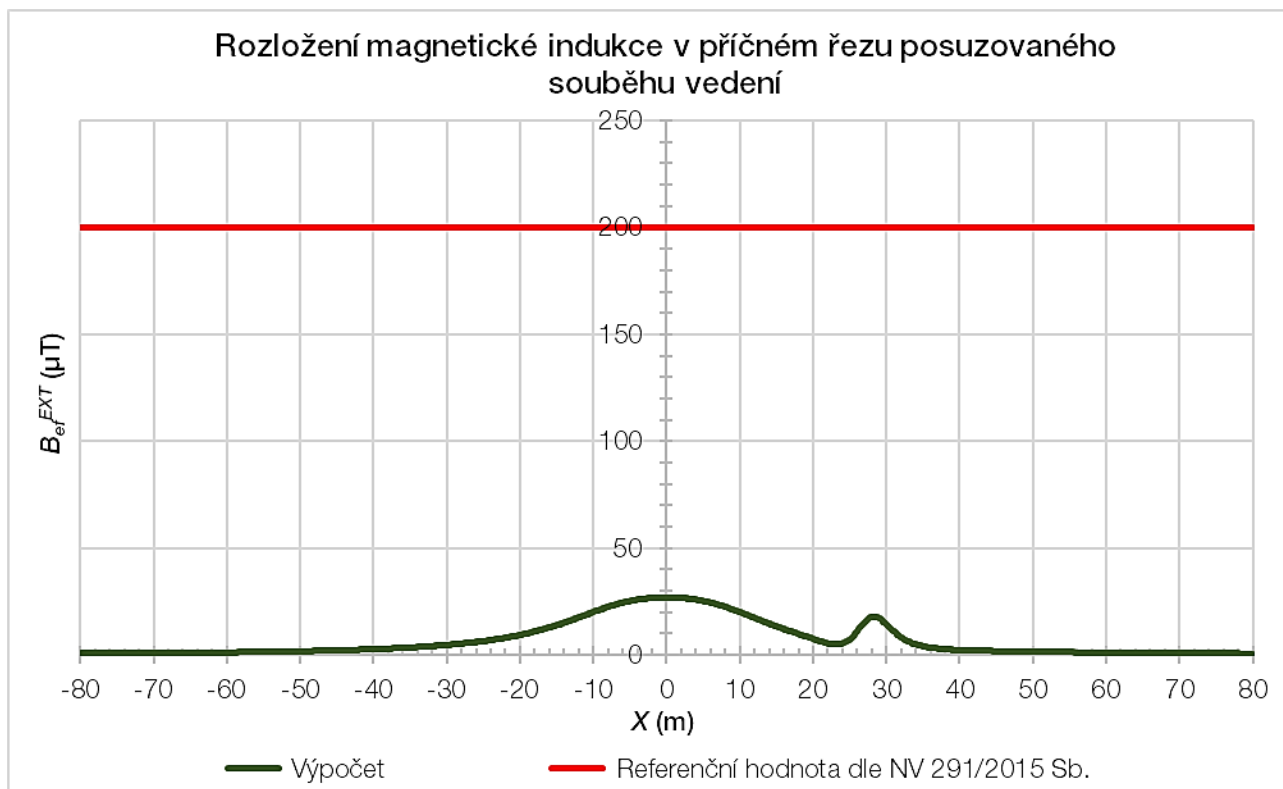
Tab. 9 Calculation results and assessment of the reference levels for E and B at a height of 0.1 m above ground

$B_{ef}^{EXT_{max}}$ (μT)	$E_{ef}^{EXT_{max}}$ (kV/m)	H (-)	H_{lim} (-)	$H \leq H_{lim}$	$E_{mod_{max}}$ (V/m)	ΔE_{mod} (mV/m)	δE_{mod} (%)
51.57	5.13	0.56	0.2	NO	0.045	0.44	0.97



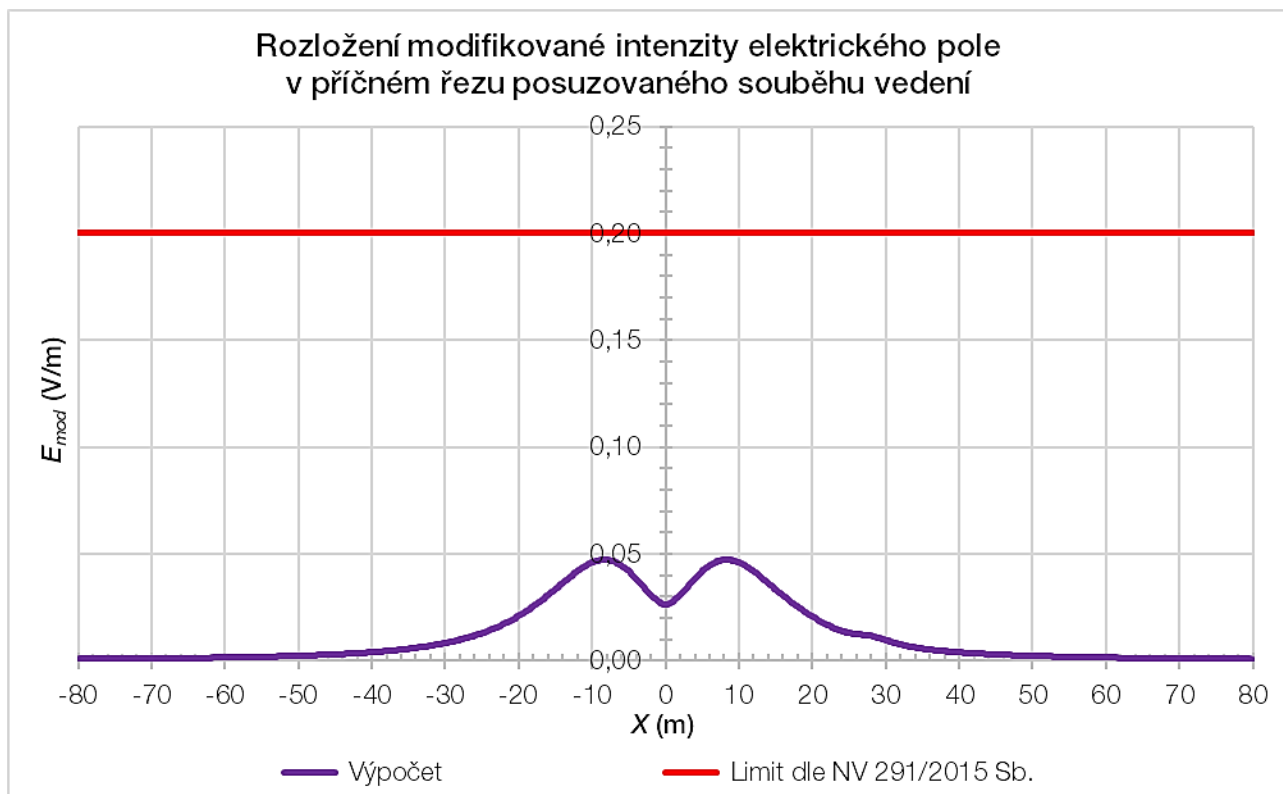
Rozložení intenzity elektrického pole v příčném řezu posuzovaného souběhu vedení	Electric field strength distribution in the cross-section of the assessed parallel routing
Výpočet	Calculation
Referenční hodnota dle NV 291/2015 Sb.	Reference level under GD 291/2015 Coll.

Fig. 6 Electric field strength at a height of 1.8 m above ground as a function of distance from the axis of the assessed parallel routing



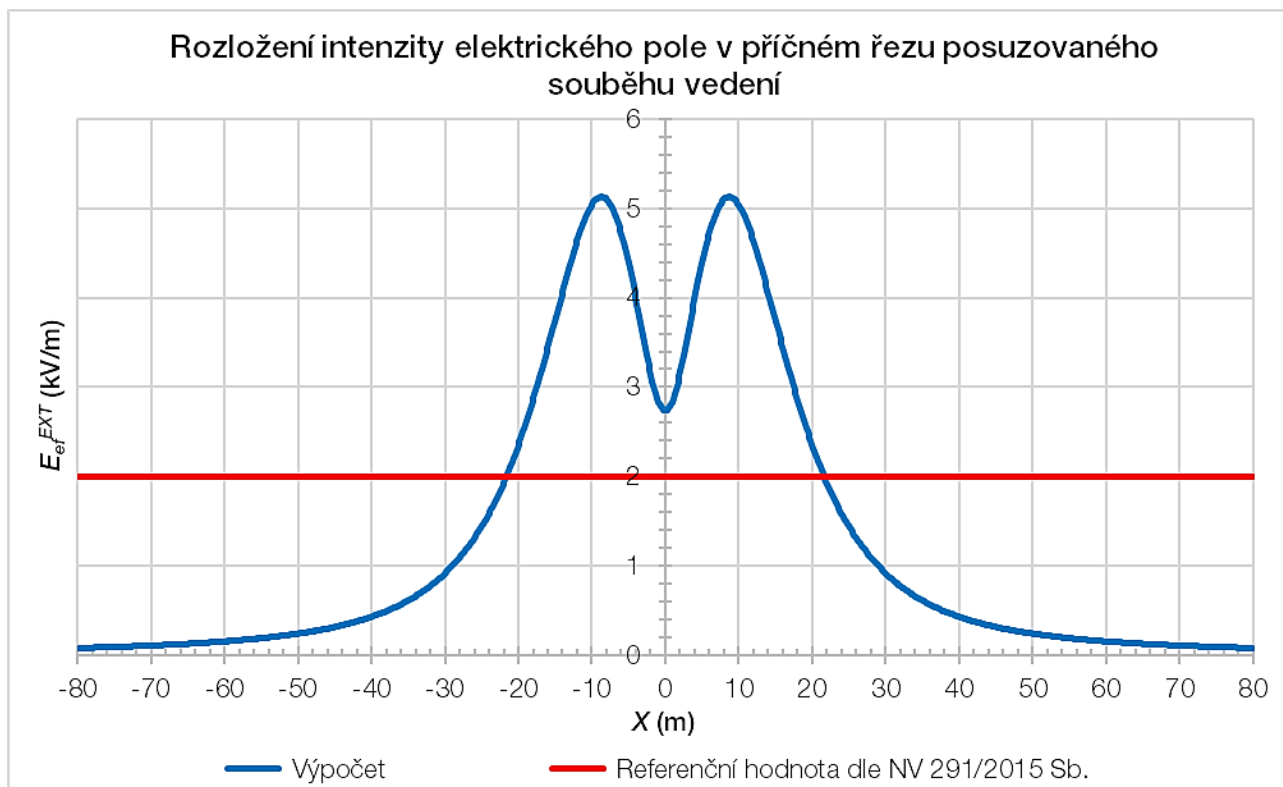
Rozložení magnetické indukce v příčném řezu posuzovaného souběhu vedení	Magnetic flux density distribution in the cross-section of the assessed parallel routing
Výpočet	Calculation
Referenční hodnota dle NV 291/2015 Sb.	Reference level under GD 291/2015 Coll.

Fig. 7 Magnetic flux density at a height of 1.8 m above ground as a function of distance from the axis of the assessed parallel routing



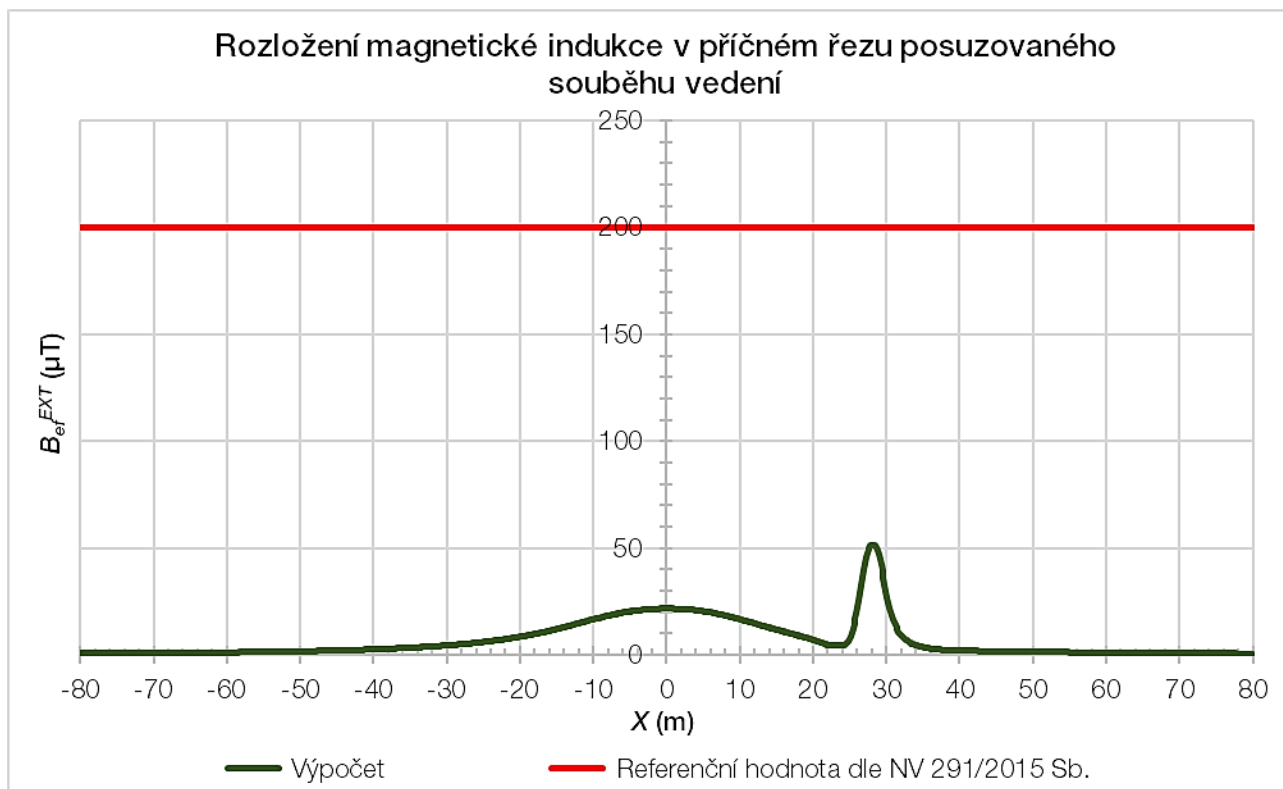
Rozložení modifikované intenzity elektrického pole v příčném řezu posuzovaného souběhu vedení	Modified electric field strength distribution in the cross-section of the assessed parallel routing
Výpočet	Calculation
Limit dle NV 291/2015 Sb.	Limit under GD 291/2015 Coll.

Fig. 8 Modified electric field strength at a height of 1.8 m above ground as a function of distance from the axis of the assessed parallel routing



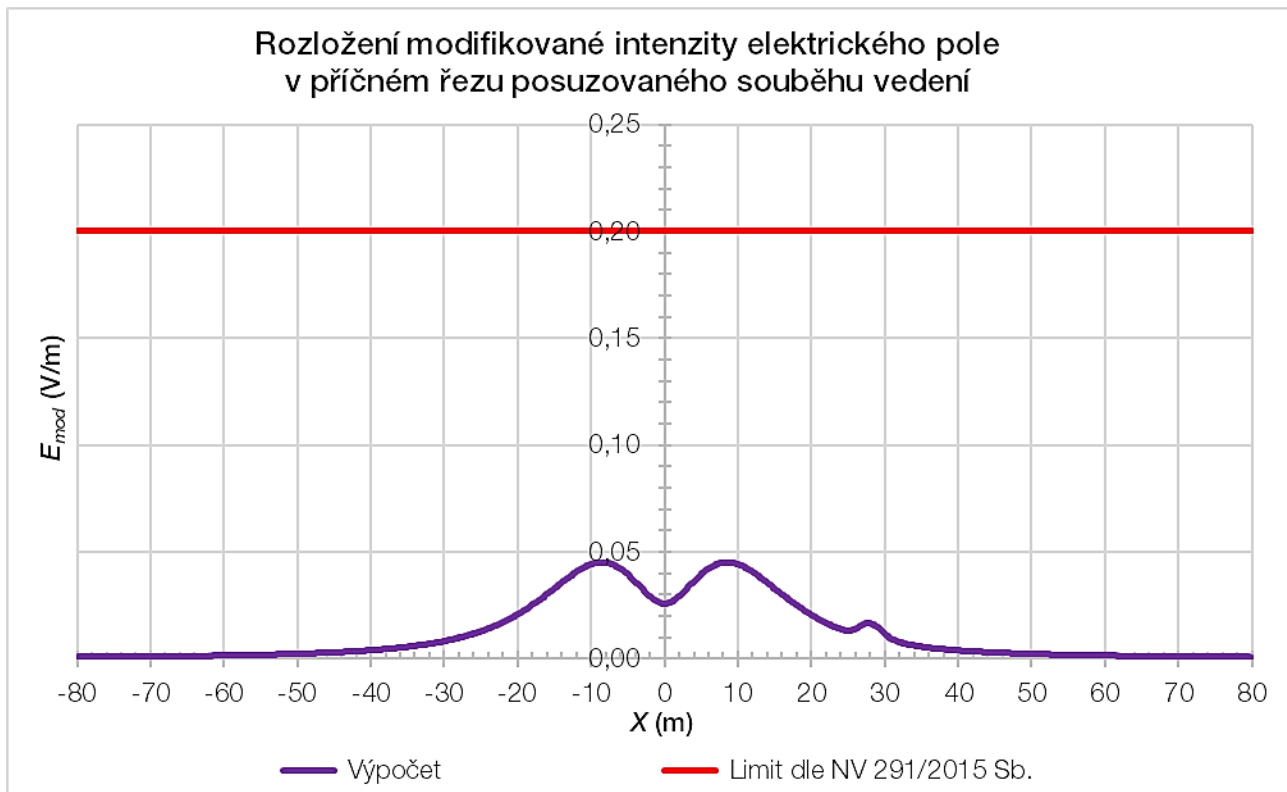
Rozložení intenzity elektrického pole v příčném řezu posuzovaného souběhu vedení	Electric field strength distribution in the cross-section of the assessed parallel routing
Výpočet	Calculation
Referenční hodnota dle NV 291/2015 Sb.	Reference level under GD 291/2015 Coll.

Fig. 9 Electric field strength at a height of 0.1 m above ground as a function of distance from the axis of the assessed parallel routing



Rozložení magnetické indukce v příčném řezu posuzovaného souběhu vedení	Magnetic flux density distribution in the cross-section of the assessed parallel routing
Výpočet	Calculation
Referenční hodnota dle NV 291/2015 Sb.	Reference level under GD 291/2015 Coll.

Fig. 10 Magnetic flux density at a height of 0.1 m above ground as a function of distance from the axis of the assessed parallel routing



Rozložení modifikované intenzity elektrického pole v příčném řezu posuzovaného souběhu vedení	Modified electric field strength distribution in the cross-section of the assessed parallel routing
Výpočet	Calculation
Limit dle NV 291/2015 Sb.	Limit under GD 291/2015 Coll.

Fig. 11 Modified electric field strength at a height of 0.1 m above ground as a function of distance from the axis of the assessed parallel routing

6.2 PARALLEL ROUTING OF THE 400 KV SINGLE-CIRCUIT OVERHEAD LINE (POWER EVACUATION FROM SMR ETE) AND TWO 400 KV SINGLE-CIRCUIT OVERHEAD LINES (UNITS 1 AND 2)

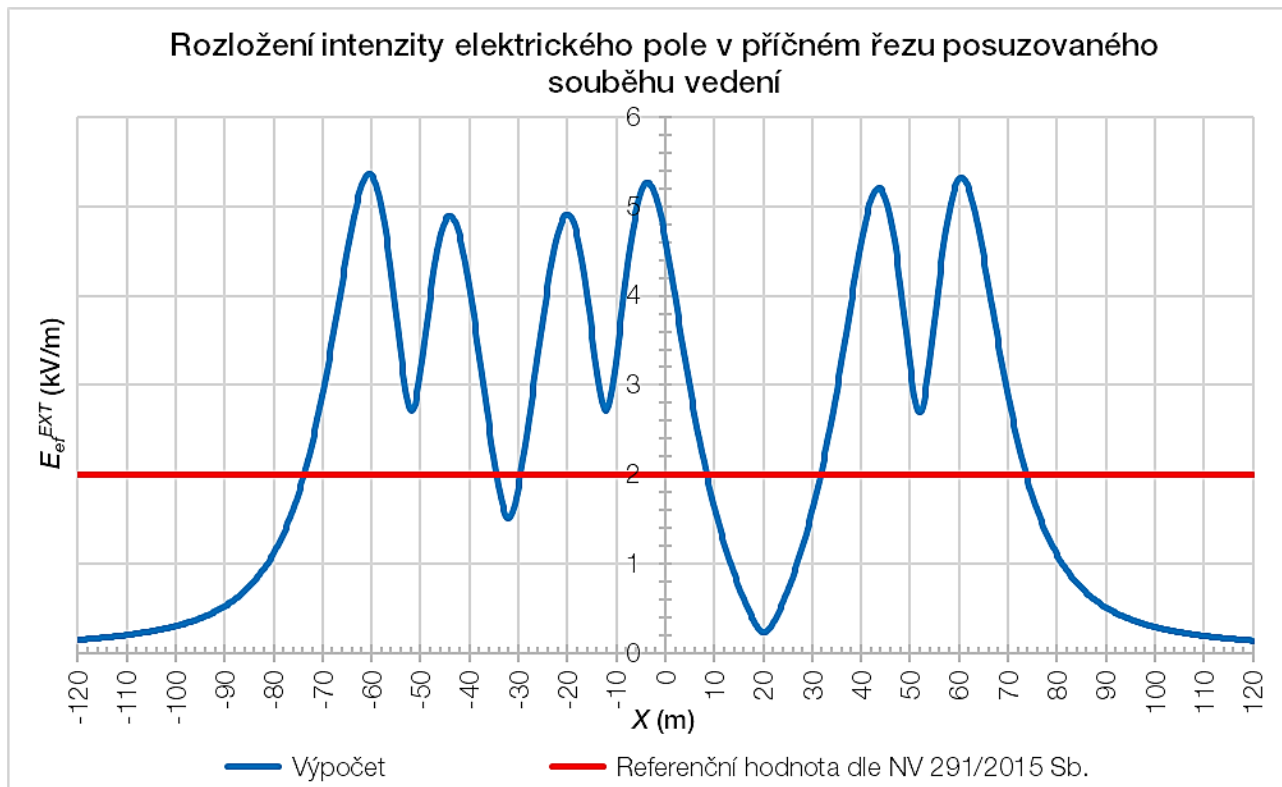
The root-mean-square electric field strength and magnetic flux density profiles in the cross-section of the assessed parallel routing at a height of 1.8 m above ground are plotted in Fig. 12 and Fig. 13. The profile of modified electric field strength in human tissue at a height of 1.8 m above ground is plotted in Fig. 14. These profiles are shown in relation to the reference levels specified in GD 2015 for members of the general public in a non-occupational environment. The calculation results and the assessment of the electric-field-strength and magnetic-flux-density reference levels are summarized in Tab. 10.

Statement of conformity:

The planned parallel routing of the Delta 400 kV single-circuit overhead line (power evacuation from SMR ETE) and two Delta 400 kV single-circuit overhead lines (Units 1 and 2) complies with the requirements of Government Decree No. 291/2015 Coll. for members of the general public in a non-occupational environment and ČSN 33 2040, "Electrical engineering regulations. Protection against the effects of 50 Hz electromagnetic fields in areas affected by electric power system equipment."

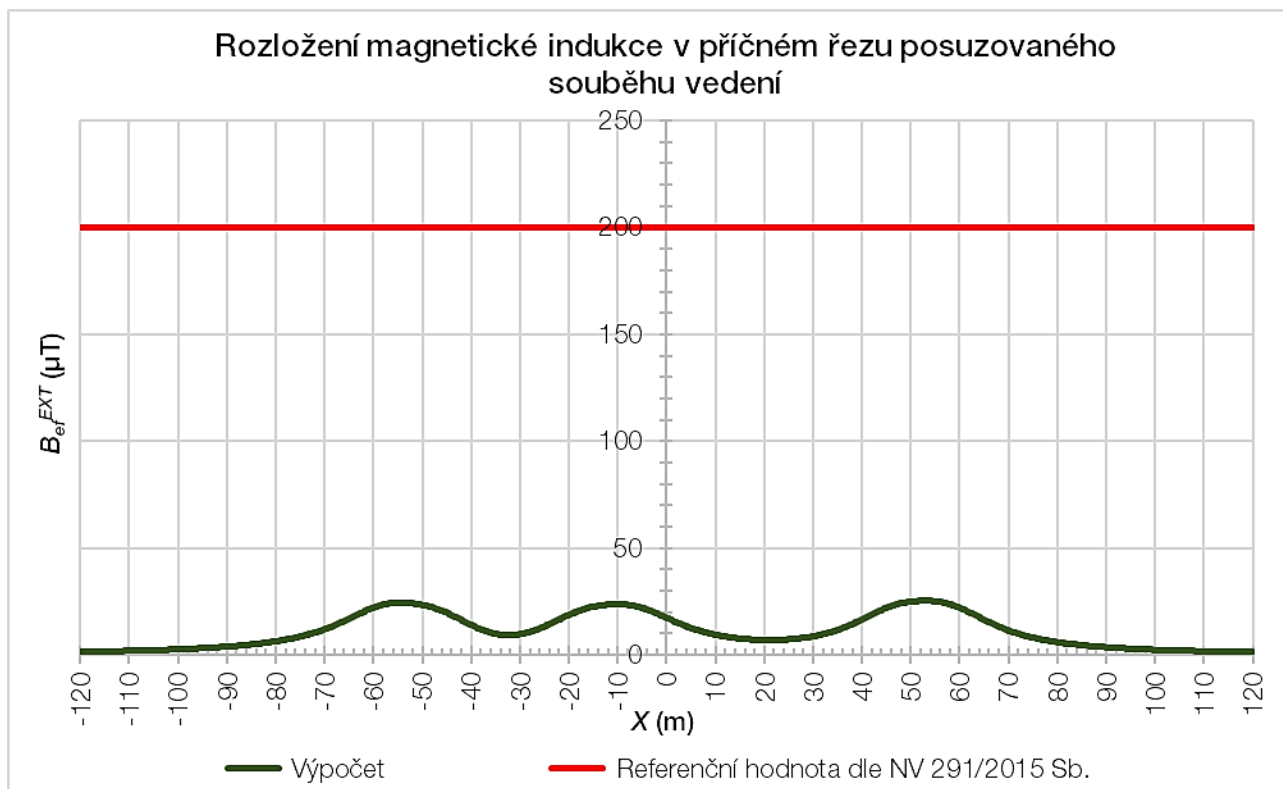
Tab. 10 Calculation results and assessment of the reference levels for E and B at a height of 1.8 m above ground

$B_{ef}^{EXT_{max}}$ (μT)	$E_{ef}^{EXT_{max}}$ (kV/m)	H (-)	H_{lim} (-)	$H \leq H_{lim}$	$E_{mod_{max}}$ (V/m)	ΔE_{mod} (mV/m)	δE_{mod} (%)
25.36	5.36	0.56	0.2	NO	0.048	0.22	0.45



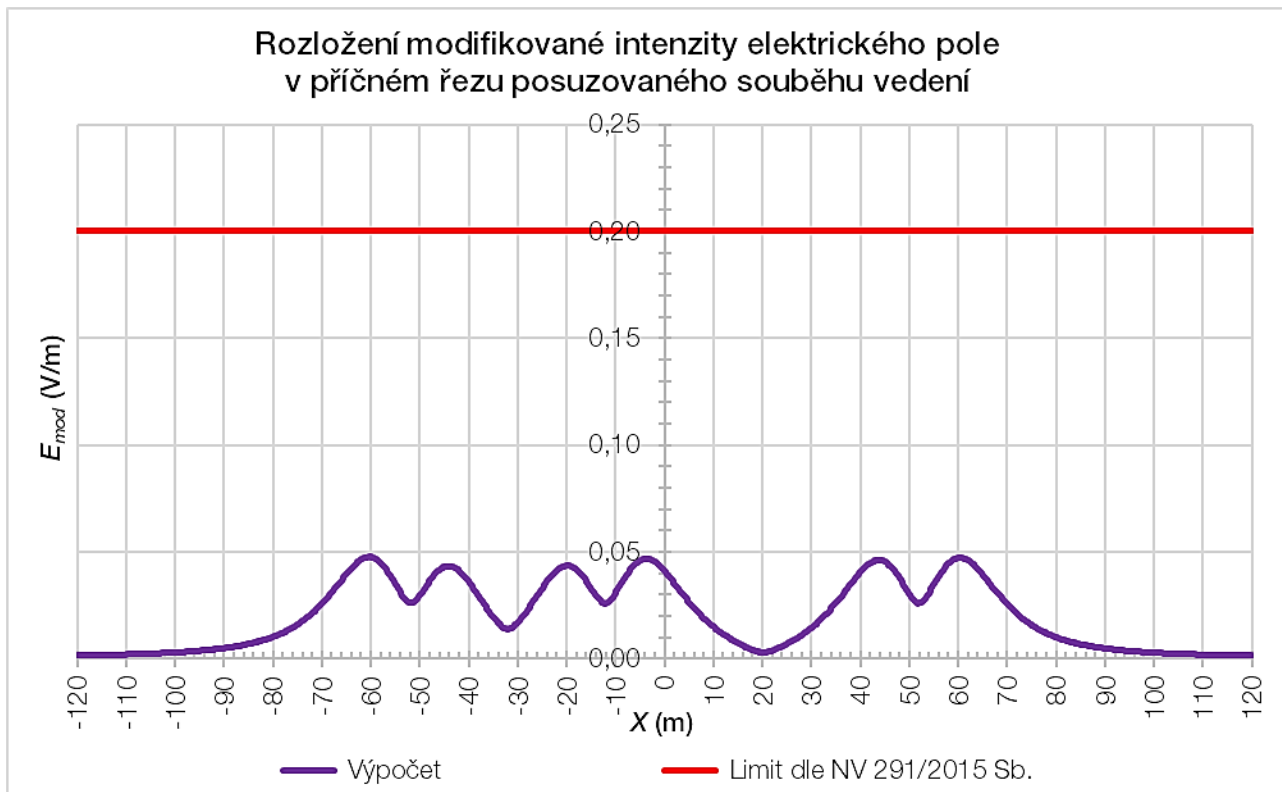
Rozložení intenzity elektrického pole v příčném řezu posuzovaného souběhu vedení	Electric field strength distribution in the cross-section of the assessed parallel routing
Výpočet	Calculation
Referenční hodnota dle NV 291/2015 Sb.	Reference level under GD 291/2015 Coll.

Fig. 12 Electric field strength at a height of 1.8 m above ground as a function of distance from the axis of the assessed parallel routing



Rozložení magnetické indukce v příčném řezu posuzovaného souběhu vedení	Magnetic flux density distribution in the cross-section of the assessed parallel routing
Výpočet	Calculation
Referenční hodnota dle NV 291/2015 Sb.	Reference level under GD 291/2015 Coll.

Fig. 13 Magnetic flux density at a height of 1.8 m above ground as a function of distance from the axis of the assessed parallel routing



Rozložení modifikované intenzity elektrického pole v příčném řezu posuzovaného souběhu vedení	Modified electric field strength distribution in the cross-section of the assessed parallel routing
Výpočet	Calculation
Limit dle NV 291/2015 Sb.	Limit under GD 291/2015 Coll.

Fig. 14 Modified electric field strength at a height of 1.8 m above ground as a function of distance from the axis of the assessed parallel routing

6.3 CROSSING OF THE 110 KV UNDERGROUND CABLE LINES (AUXILIARY POWER SUPPLY FOR SMR ETE) WITH THE 400 KV AND 110 KV OVERHEAD LINES OF THE EXISTING UNITS

The root-mean-square electric field strength and magnetic flux density profiles in the cross-section of the assessed line crossing at a height of 1.8 m above ground are plotted in Fig. 15 and Fig. 16. The profile of modified electric field strength in human tissue at a height of 1.8 m above ground is plotted in Fig. 17. The root-mean-square electric field strength and magnetic flux density profiles in the cross-section of the assessed line crossing at a height of 0.1 m above ground are plotted in Fig. 18 and Fig. 19. The profile of modified electric field strength in human tissue at a height of 0.1 m above ground is plotted in Fig. 20. These profiles are shown in relation to the reference levels specified in GD 2015 for members of the general public in a non-occupational environment. The calculation results and the assessment of the electric-field-strength and magnetic-flux-density reference levels are summarized for a height of 1.8 m above ground in Tab. 11 and for a height of 0.1 m above ground in Tab. 12.

Statement of conformity:

The planned crossing of the 110 kV underground cable lines (auxiliary power supply for SMR ETE) with two Delta 400 kV single-circuit overhead lines (power evacuation from Units 1 and 2) and two Soudek 110 kV overhead lines (auxiliary power supply for Units 1 and 2) complies with the requirements of GD 2015 for members of the general public in a non-occupational environment and

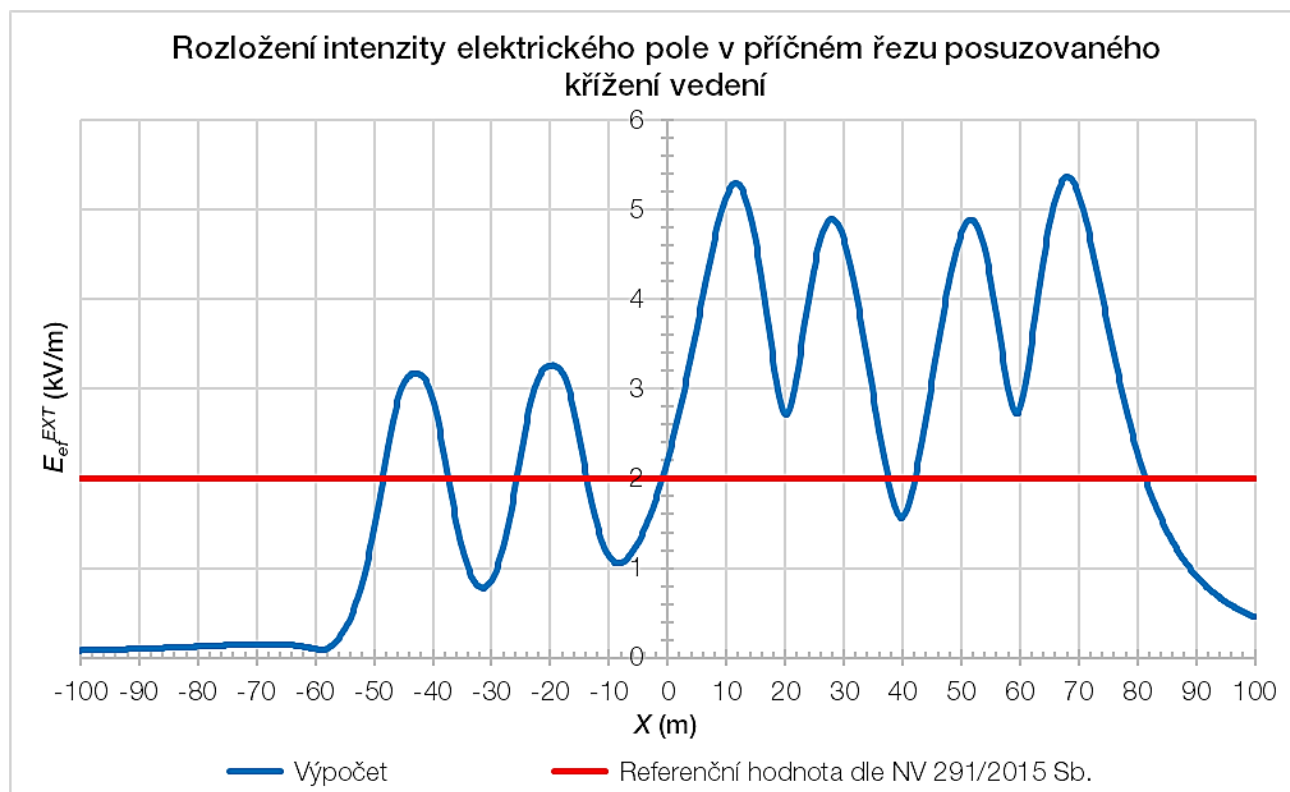
ČSN 33 2040, "Electrical engineering regulations. Protection against the effects of 50 Hz electromagnetic fields in areas affected by electric power system equipment."

Tab. 11 Calculation results and assessment of the reference levels for E and B at a height of 1.8 m above ground

$B_{ef}^{EXT_{max}}$ (μT)	$E_{ef}^{EXT_{max}}$ (kV/m)	H (-)	H_{lim} (-)	$H \leq H_{lim}$	$E_{mod_{max}}$ (V/m)	ΔE_{mod} (mV/m)	δE_{mod} (%)
35.05	5.36	0.57	0.2	NO	0.049	0.30	0.61

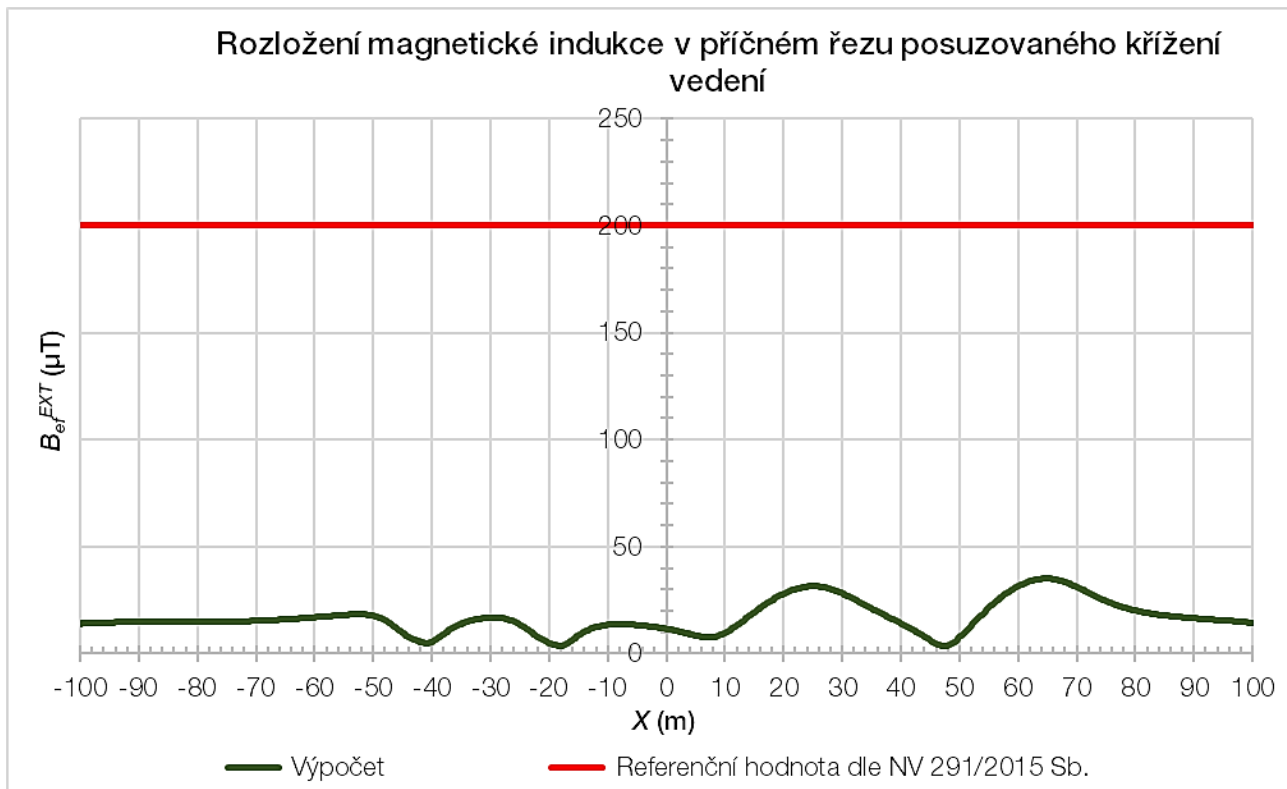
Tab. 12 Calculation results and assessment of the reference levels for E and B at a height of 0.1 m above ground

$B_{ef}^{EXT_{max}}$ (μT)	$E_{ef}^{EXT_{max}}$ (kV/m)	H (-)	H_{lim} (-)	$H \leq H_{lim}$	$E_{mod_{max}}$ (V/m)	ΔE_{mod} (mV/m)	δE_{mod} (%)
63.25	5.18	0.58	0.2	NO	0.052	0.54	1.04



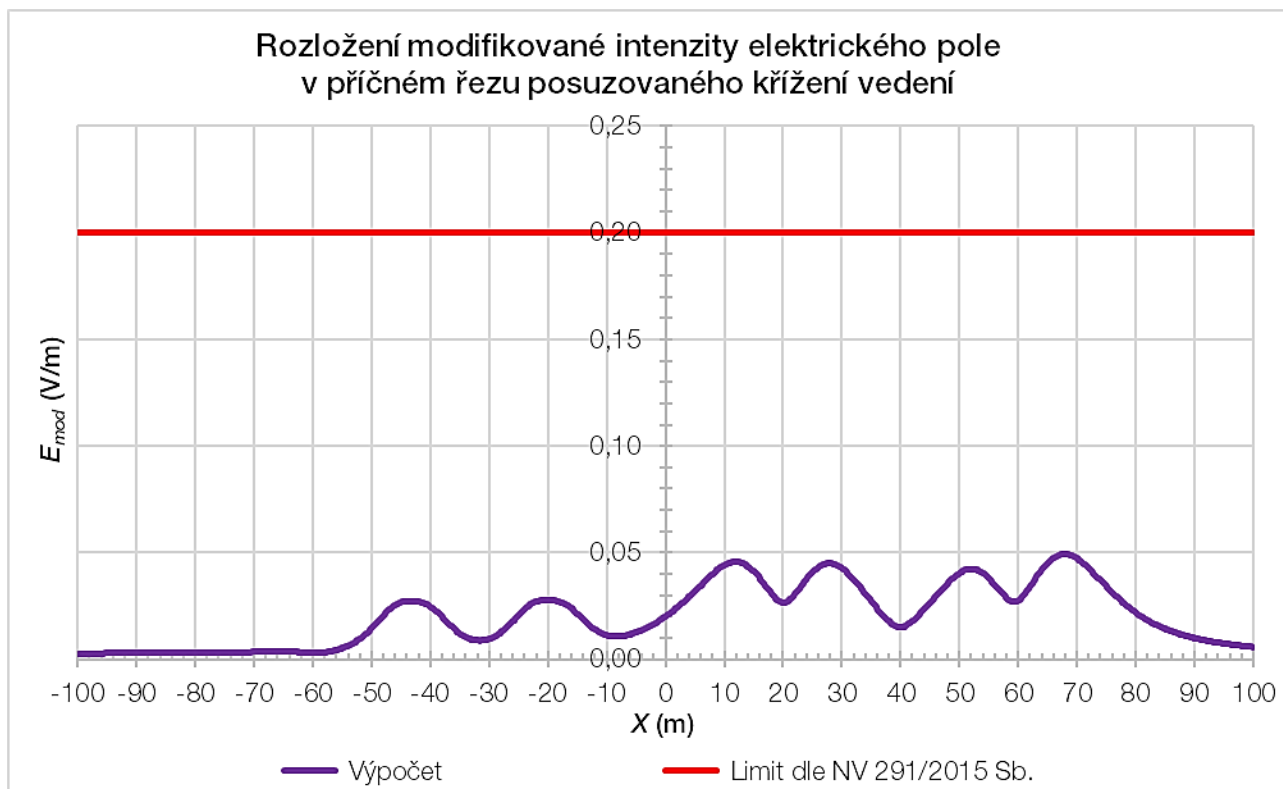
Rozložení intenzity elektrického pole v příčném řezu posuzovaného křížení vedení	Electric field strength distribution in the cross-section of the assessed line crossing
Výpočet	Calculation
Referenční hodnota dle NV 291/2015 Sb.	Reference level under GD 291/2015 Coll.

Fig. 15 Electric field strength at a height of 1.8 m above ground as a function of distance from the axis of the assessed crossing cross-section



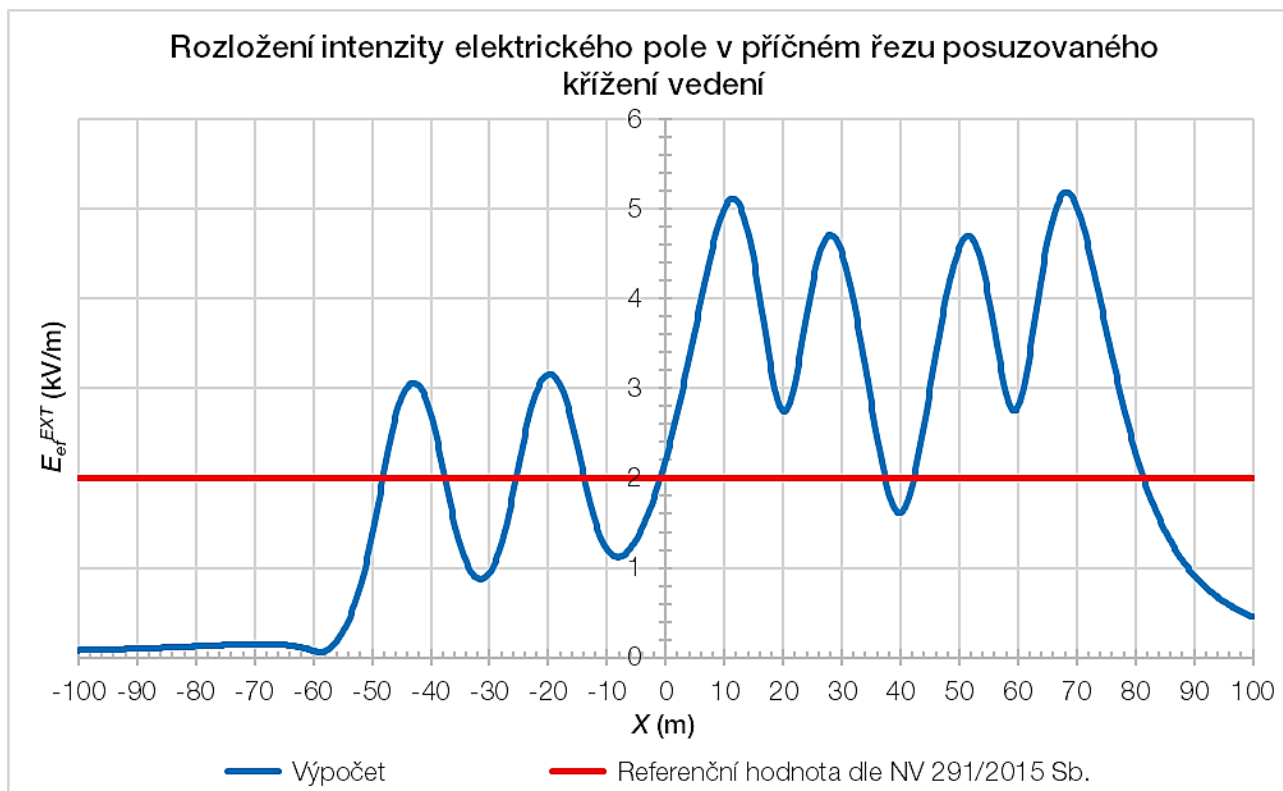
Rozložení magnetické indukce v příčném řezu posuzovaného křížení vedení	Magnetic flux density distribution in the cross-section of the assessed line crossing
Výpočet	Calculation
Referenční hodnota dle NV 291/2015 Sb.	Reference level under GD 291/2015 Coll.

Fig. 16 Magnetic flux density at a height of 1.8 m above ground as a function of distance from the axis of the assessed crossing cross-section



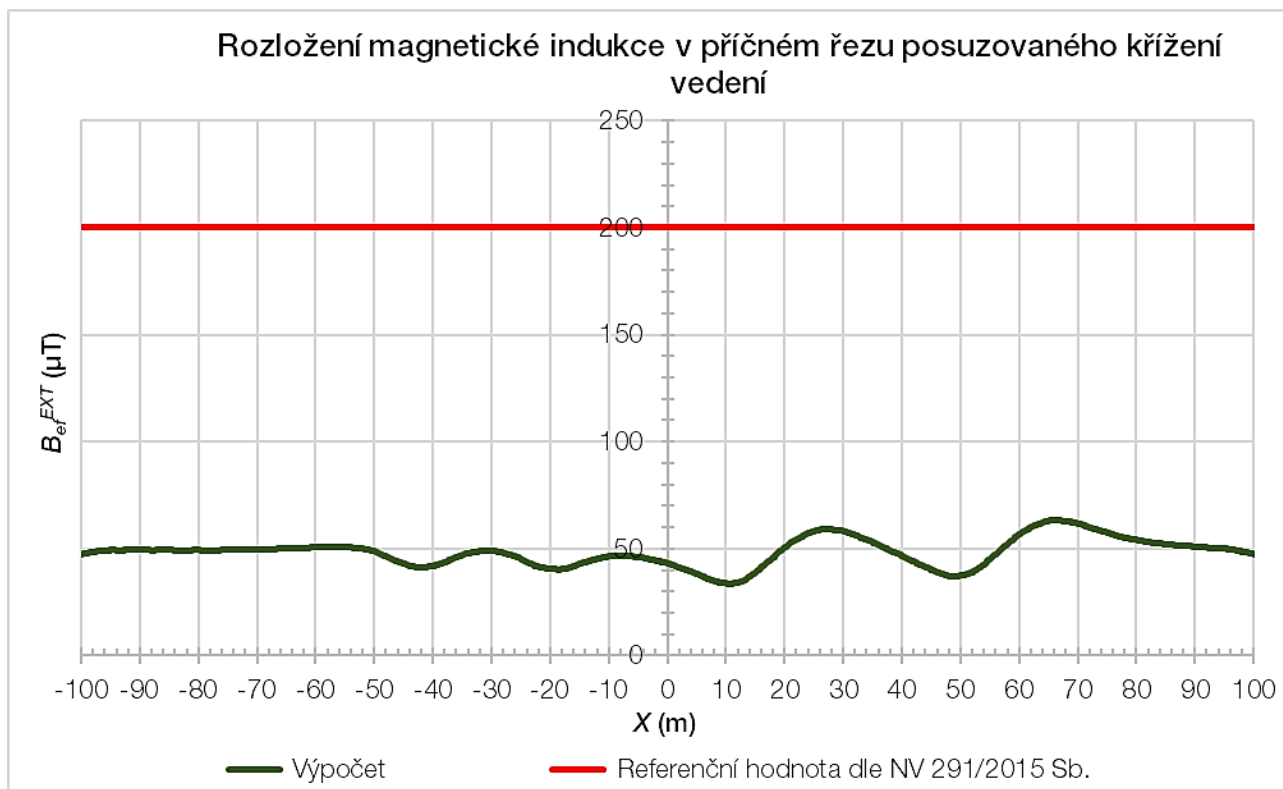
Rozložení modifikované intenzity elektrického pole v příčném řezu posuzovaného křížení vedení	Modified electric field strength distribution in the cross-section of the assessed line crossing
Výpočet	Calculation
Limit dle NV 291/2015 Sb.	Limit under GD 291/2015 Coll.

Fig. 17 Modified electric field strength at a height of 1.8 m above ground as a function of distance from the axis of the assessed crossing cross-section



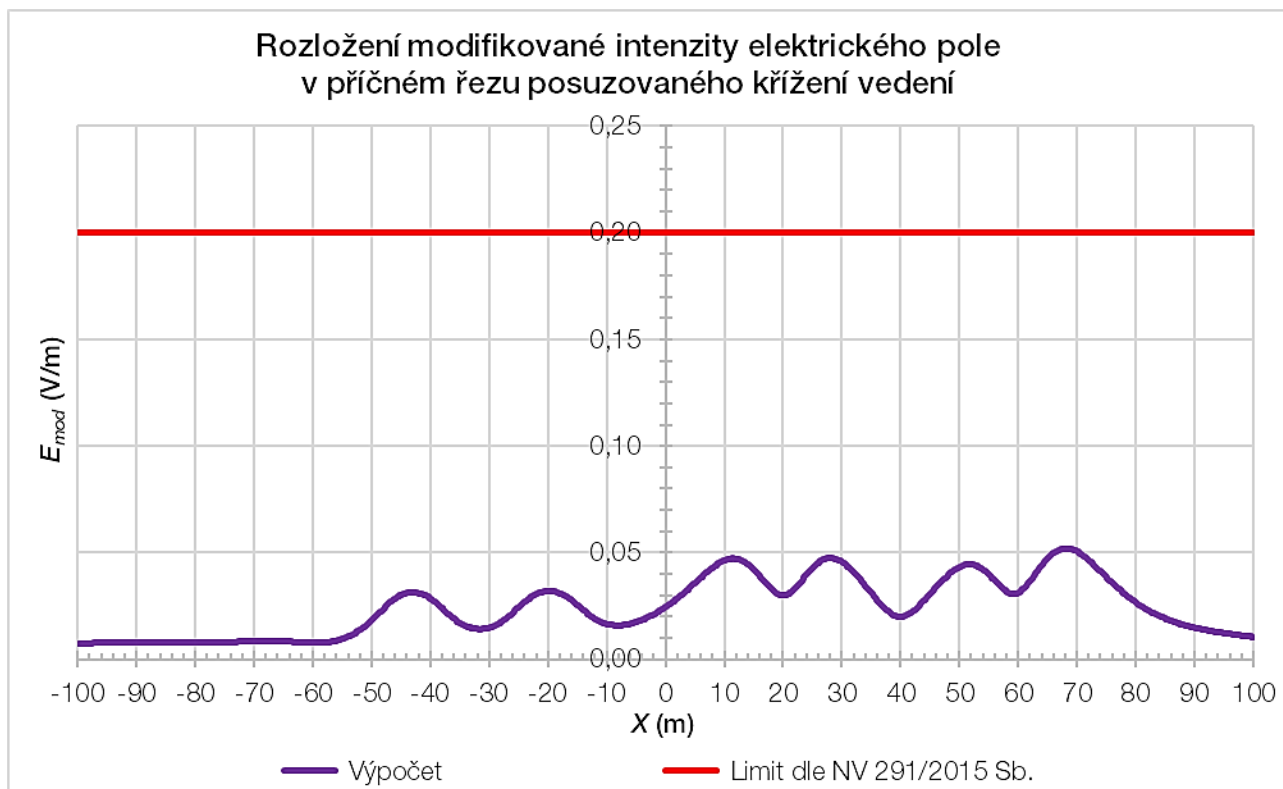
Rozložení intenzity elektrického pole v příčném řezu posuzovaného křížení vedení	Electric field strength distribution in the cross-section of the assessed line crossing
Výpočet	Calculation
Referenční hodnota dle NV 291/2015 Sb.	Reference level under GD 291/2015 Coll.

Fig. 18 Electric field strength at a height of 0.1 m above ground as a function of distance from the axis of the assessed crossing cross-section



Rozložení magnetické indukce v příčném řezu posuzovaného křížení vedení	Magnetic flux density distribution in the cross-section of the assessed line crossing
Výpočet	Calculation
Referenční hodnota dle NV 291/2015 Sb.	Reference level under GD 291/2015 Coll.

Fig. 19 Magnetic flux density at a height of 0.1 m above ground as a function of distance from the axis of the assessed crossing cross-section



Rozložení modifikované intenzity elektrického pole v příčném řezu posuzovaného křížení vedení	Modified electric field strength distribution in the cross-section of the assessed line crossing
Výpočet	Calculation
Limit dle NV 291/2015 Sb.	Limit under GD 291/2015 Coll.

Fig. 20 Modified electric field strength at a height of 0.1 m above ground as a function of distance from the axis of the assessed crossing cross-section

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