

plants. Moss *Pleurozium scherberi* is a good indicator of contamination, due to small unit mass on unit of square, especially, exposed by hydrated or underflood in polluted solid.

From the other side, americium-241 has quite low factor of transition in living organisms, as it has no chemical analogs, so organism considers it like alien material. Thus, the intake of americium-241 in human organism is possibly realized by consumption of animal meat whose ration contains solid polluted by radionuclide. So, in meat of wild boars, which ration contains contaminated solid, radionuclide have been found. Also inhalation income of radionuclide can occur in polluted lands. At inhalation input, radionuclide bound in chemical compound, can rapidly transfer from lungs to blood and can be deposited in liver, skeleton and kidneys for a long time.

Americium-241 is a source of alpha-radiation and in case of transfer in organism leads to inner irradiation. Its influence on the organism of animals was studied the most. The main consequence of incorporation is tumors of lungs and osteosarcomas.

According to the map of density of pollution of americium-241 and polonium-241 of Polesye state radiation-ecological reserve of 2009 and 2056, the main part of plutonium-241 and americium-241 fell out in exclusion zone and some border zones (Mogilev region). In 2056 the peak of accumulation of americium-241 in solid has been predicted, as a result of decay of plutonium-241. For example, in the exclusion zone in region of settlements Lesok, Molochki, Grada the density of pollution by Americium-241 will increase from 10,0–20,0 Bk/km² in 2009 to 20,0–40,0 Bk/km² in 2056. From the other side, the possibility of increase of radiation pollution near the border zone, for example, Narovlia and Lomish, is from 4,0–10,0 Bk/km² in 2009 to 4,0–10,0 Bk/km² in 2056.

RADIO FREQUENCY TECHNOLOGY: GENERAL AND THEORETICAL INFORMATION

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Due to the discovery of microwave radio frequency radiation, we use many modern technical means. RF technology is widely used in accelerator technics. To transmit high-frequency power, a coaxial cable, a planar line, a coaxial line, a waveguide are used. The most important characteristics of the transmission of radio frequency energy are the quality factor, SWR, active and reactive components of the impedance, and other parameters of RF devices. All of the above values can be determined using large schemes and complex mathematical calculations. In real conditions, these parameters are determined using expensive devices, the use of which greatly simplifies the solution of many practical problems.

Keywords: radio frequency technology, waveguide, accelerator technics, vector analyzer, SWR, impedance, cavity resonator, quality factor.

Nowadays it's hard to imagine our life without portable electronics, space television, home appliances and radio navigation. We use all these techniques due to the discovery of microwave RF radiation. RF technology is widely used in accelerator technics (particles acceleration, charged ions generation, particle bunching, etc.). High frequency technology differs from classical electronics: there is no difference between the elements and the transmission line. The elements that affect the propagation of waves are often irregularities in the transmission line itself: plates, diaphragms, dowels, couplers, etc.

To transmit high-frequency power, a coaxial cable, a planar line, a coaxial line, a waveguide are used. Unlike other transmission lines, waveguide has the greatest practical interest. The advantages of waveguides are that the wave does not decay in the dielectric with increasing frequency, as in coaxial cables, and breakdown requires much more power than in a coaxial or planar line.

The limitations of the waveguide are that only electromagnetic waves with a longitudinal component (magnetic field vector H or electric field vector E) and dispersion (phase velocity depends on frequency) can propagate through it.

When the short-circuiting plug is installed at the end of the transmission line, the standing wave is formed in the waveguide. That is, the direct wave in the waveguide will be completely reflected from the load.

The most important characteristic of a reflected wave is the reflection coefficient, VSWR (voltage standing wave ration, hereinafter SWR) and the quantity inverse to it, TWR (travelling wave coefficient).

To calculate the SWR, it is necessary to calibrate the detector of the measuring line, and then determine the minimum and maximum electric field intensity from the graph. Then the maximum electric field intensity value is divided by the minimum value. The SWR value will range from one to infinity.

Along with the SWR, the most important characteristic of a wave is impedance. It is given by a complex number:

$$Z = R + jX, \quad (1)$$

where R and X are active and reactive resistance components correspondingly.

The impedance can be calculated using complex formulas or using the Wolpert Smith chart.

To achieve a consistent state in the transmission line, it is necessary to compensate for the reactive component of the impedance. For these purposes reactive dowel can be used, which is not used in high-power waveguides, since the electric strength of the waveguide decreases.

To clarify a few more characteristics, we introduce the concept of resonance. Resonance is a sharp increase in the amplitude of stationary oscillations when the frequency of external influence coincides with certain values characteristic of a given system. A cavity resonator is used to amplify power. The main characteristics of the cavity resonator are the resonant frequency and quality factor.

The unloaded Q factor of the resonator is the ratio of the energy stored in the resonator to the energy of losses during the oscillation period inside the resonator.

The loaded Q-factor is real Q-factor of the resonance system being part of an electric circuit. To determine it, one should measure the resonant frequency and the frequencies of half-power relative to the maximum power of the resonance.

Thus, all of the above values can be determined using large schemes and complex mathematical calculations. In real tasks quality factor, SWR, active and reactive components of the impedance, and other parameters of the RF devices are usually measured directly, with the vector network analyzer (VAC). VAC measures properties of the signal transmission through the device under test and the properties of the signal reflection from its ports.

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PRE-SEEDING SEED TREATMENT IN ELECTRIC FIELD

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Germination is the most important quality property of seed material which is determined in the laboratory. It is understood as the ability of seeds under optimal, standardized laboratory conditions to form a healthy, normally developed seedling within a certain period of time (root and shoot are normally developed). In a laboratory analysis of germination, % of germinating seeds of a given culture ("pure seeds") that germinate under these conditions are determined.

Electrical stimulation (pre-sowing treatment) of seeds is necessary to increase the energy of their germination, germination, crop yields, resistance to adverse weather conditions and reduce the growing season. When seeds are excited, cell division increases, moisture absorption increases, and the insufficient effect of natural electrophysical factors (solar radiation, temperature, etc.) is compensated.

In this paper, we consider the effect of an electric field on the germination of cereal seeds using barley cultivars as an example. For the experiment, eight samples of seed were taken. Each sample contained 100 units of barley grains. All samples were divided into two groups of four samples each. To disturb the period of physiological rest, an electric field of high tension was used. An SDL-1 dielectric seed separator was used to create an electric field. In the dielectric separator, the working bodies are a drum made of a dielectric material, on which two insulated conductors, which are electrodes, are wound (close to – turn to turn). A high voltage of 5 kV from a step-up low-power transformer was supplied to them. An inhomogeneous electric field was creat-