

ABSTRACT OF SCIENTIFIC SPECIALTY

2.2.13. RADIO ENGINEERING, INCLUDING SYSTEMS AND TV DEVICES

The scientific specialty covers the following areas of knowledge: radio circuits and signals; electrodynamics and propagation of radio waves; circuitry of analog electronic devices; digital devices and microprocessors; microwave devices and antennas; electronics; devices for generating and forming signals; devices for receiving and converting signals; computing devices and systems; radio engineering systems; statistical theory of radio engineering systems.

Includes the following areas of research:

Investigation of new processes and phenomena in radio engineering, which make it possible to increase the efficiency of radio engineering devices and systems.

Investigation of the phenomena of the passage of electromagnetic waves of various ranges through media, their scattering and reflection.

Development and research of new radio engineering devices and systems that improve the characteristics of accuracy, speed, noise immunity.

Development and research of devices for generating, amplifying, converting and synthesizing radio signals, image and sound signals in radio engineering devices and systems for various purposes, including television systems and devices. Creation of methods for their calculation and design principles.

Development and research of algorithms, including digital ones, for processing signals and information in radio engineering devices and systems for various purposes, including the synthesis and optimization of processing algorithms.

Development and research of methods and algorithms for processing signals and information in radio engineering devices and systems for various purposes, including radio television and communication systems, in the presence of interference in order to increase noise immunity.

Development and research of methods for ensuring electromagnetic compatibility of radio engineering systems and devices, including radio television and communication systems, methods for destroying and protecting information in these systems.

Development and research of radio engineering devices and information transmission systems, including radio relay and telemetry, including space ones, in order to increase their throughput, noise immunity and noise immunity.

Research and development of new television systems and devices, including television cameras, including those with IP interfaces, digital codecs, modems and other devices for transmitting and reproducing images and sound, as well as methods and algorithms for modulation, demodulation, encoding, decoding and restoration of images, including in photodetectors, and sound, in order to improve the quality of transmitted information and noise immunity.

Development and research of methods and devices for transmitting, receiving, processing, displaying, storing and distributing information, including space, on-air, cable and mobile video communications.

Development of promising information technologies, including digital ones, as well as using neural networks, for signal, image and speech recognition in intelligent radio engineering, robotic and other vision systems.

Development of methods for improving the clarity, color reproduction quality, absolute and contrast sensitivity of images generated and used in television systems.

Creation of the theory of synthesis, analysis and adaptation of radio engineering devices and systems, signal processing algorithms and information in these systems.

Development and research of modeling methods for radio engineering devices and systems, including high-definition, ultra-high-definition, ultra-high-definition digital television systems and other formats, for television broadcasting and special applications.

Development and research of physical, mathematical and hybrid simulation models of radio engineering devices and systems, including systems and devices of analog and digital television and optoelectronic devices.

Development of scientific And technical fundamentals design, design, production technology, testing, and certification of radio engineering devices and systems, including black-and-white, color, spectral-zonal, infrared, terahertz and multi-angle television systems, passive and active surround television systems, including holographic ones.

Development of methods and devices for television measurements, including colorimetry, quantitative assessment of the quality of generated, transmitted and received information.

Development of radio engineering and television devices for use in industry, robotics, cosmonautics, astronomy, metrology, information and measurement technology, as well as for underground, underwater and other applications.