

## O'ZBEKISTONDA DAB+ FORMATIDAGI RAQAMLI RADIONI TADBIQ ETISH VA RIVOJLANTIRISH

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**Annotatsiya.** Ushbu maqolada O'zbekistonda DAB+ formatidagi raqamli radioni tadbiq etish va rivojlantirish haqida so'z boradi. O'zining ilk rivojlanish tarixini o'tgan asrning boshlarida boshlagan radioeshittirish hozirgi kunga qadar talab darajasi eng yuqori bo'lgan axborot manbasi bo'lib xizmat qilmoqda. Radioning boshqa turdagi axborot vositalaridan yagona afzalligi, inson bajarayotgan asosiy ishidan uzilmagan holda, fon rejimida axborotni qabul qilish imkonini beradi.

**Kalit so'zlar:** DAB+, raqamli, rivojlantirish, radioni, radioeshittirish.

## ВНЕДРЕНИЕ И РАЗВИТИЕ ЦИФРОВОГО РАДИО В ФОРМАТЕ DAB+ В УЗБЕКИСТАНЕ

**Аннотация:** Эта статья посвящена внедрению и развитию цифрового радио DAB+ в Узбекистане. Радиовещание, начавшее свою историю в начале прошлого века, служит источником информации с высочайшим уровнем востребованности. Единственное преимущество радио перед другими видами СМИ состоит в том, что оно позволяет получать информацию в фоновом режиме, не отрываясь от основной работы, которой занимается человек.

**Ключевые слова:** DAB+, цифровое, развитие, радио, вещание.

## IMPLEMENTATION AND DEVELOPMENT OF DIGITAL RADIO IN DAB+ FORMAT IN UZBEKISTAN

**Abstract:** This article is about implementation and development of DAB+ digital radio in Uzbekistan. Radio broadcasting, which began its history at the beginning of the last century, serves as a source of information with the highest level of demand. The only advantage of radio over other types of media is that it allows you to receive information in the background without interrupting the main work that a person is doing.

**Keywords:** DAB+, digital, development, radio, broadcasting.

## KIRISH

Barchamizga ma'lumki hozirda O'zbekistonda televideniye to'liq ravishda raqamli tarzda efirga uzatilmoqda. Faqatgina radioeshittirish tizimigina analog shaklda efirga uzatilishda davom etib kelinayotgan edi. Lekin, 2021- yilning 27-dekabr sanasidan boshlab O'zbekiston Respublikasi Axborot texnologiyalari va kommunikatsiyalarini rivojlantirish vazirligi tashabbusi bilan "Radioaloqa, radioeshittirish va televideniye markazi" davlat unitar korxonasi tomonidan Toshkent teleminorasida Toshkent shahar aholisi uchun test rejimida DAB+ standartida raqamli radiokanallar uzatilishi ta'minlandi.

Bugungi kunda Yevropada FM analog radioeshittirishdan zamonaviy raqamli radioeshittirishga o'tilayotgan bir davrda O'zbekiston Respublikasi ham radioeshittirish sohasida zamonaviy texnologiyalarni joriy etish yuzasidan O'rta Osiyo davlatlari orasida birinchilardan bo'lib DAB+ (Digital audio Broadcasting) standartdagi radioeshittirishni test

rejimida efirga uzatilishini yo'lga qo'yildi. DAB+ raqamli radioeshittirish bilan parallel ravishda FM diapazonida ham radiokanallar uzatib kelinmoqda.

Shu o'rinda raqamli radioeshittirish haqida. Raqamli radioeshittirish - bu raqamli axborotlarni radioto'lqinlar orqali simsiz uzatish texnologiyasi bo'lib, analog radioeshittirish tizimlaridagi radiochastota spektridan samarali foydalanish (30 MGts dan yuqori chastotalarda) yoki analog radioeshittirish chastota polosasida juda yuqori sifat standartlari xizmatlarini ko'rsatish imkonini beradi. Shuningdek, xarakteristikalarining yaxshilanganligi, tan narxi va iste'mol etiladigan quvvatningpastligi bilan ustunlikka ega hisoblanadi.

Raqamli radiotexnologiyani tatbiq etish istiqbollari umumevropa texnologiyalari standartlaridan DAB alohida o'rin tutadi. DAB (Eureka-147) raqamli radioeshittirishi 1995 yilda Xalqaro Elektaloqa Uyushmasi tomonidan tavsiya etilgan bo'lib, raqamli radioeshittirish tizimi DAB, Yevropa Radioeshittirish Uyushmasi klassifikatsiyasi asosida "Eureka - 147" nomli xalqaro tadqiqot loyihasi doirasida ishlab chiqilgan.

DAB tizimi quyidagi afzalliklarga ega: harakatlanishdagi yuqori ishonchli mobil qabul (300 km/s gacha); SFN qurish imkoniyati; MPEG Layer II tovushi (sifati yaxshi stereo uchun 192-256 kbit/s, me'yoriy sifat uchun 128 kbit/s); ma'lumotlar uzatish xizmati; tan narxi nisbatan arzon bo'lgan 350 dan ortiq turdagiradio qabul qilgich modellari va boshqalar.

Hozirda DAB UQT diapazonida mavjud bo'lgan barcha raqamli radioeshittirish tizimlari ichida eng mukammal va keng tatbiq etilgan yagona tizim hisoblanadi.

DAB+ standarti, DAB ning yanada takomillashgan va samarador varianti bo'lib, FM radiodan o'zining yuqori sifati hamda ko'plab yangi imkoniyatlari bilan ajralib turadi. Bugungi kunda ushbu turdagi stantsiyalar Xitoy, Indoneziya, Janubiy Koreya, Avstraliya, Germaniya, Daniya, Shveysariya, Norvegiya va boshqa mamlakatlarda faoliyat yuritmoqda.

Shu o'rinda O'zbekiston uchun ushbu standart qanday ahamiyatga ega, degan tabiiy savol yuzaga keladi. Bunda eng avvalo, hozirda asosan faqat Toshkent shahar aholisigina o'z efirlarni uzatish bilan imkoniyati cheklanayotgan FM tijorat radioeshittirish stantsiyalari bilan bog'liq bo'lgan qator muammolar o'zining ijobiy yechimini topadi.

Shuningdek, DAB+ raqamli radiouzatish standartini muvaffaqiyatli rivojlan- tirishning muhim shartlaridan biri erkin radiochastota polosasining mavjudligi hisoblanadi. Buning uchun, Toshkentdagi 88-108 MGts diapazonida mahalliy radioeshittirish stantsiyalari deyarli to'la band ekanligini inobatga olgan holda, chegaradosh hududlarga radiosignallarni uzatishda DAB+ raqamli radiouzatish standarti uchun 175-230 MGts diapazonida radiochastota polosasini ajratish imkoniyatini ko'rib chiqish maqsadga muvofiq bo'ladi.

Bulardan tashqari DAB va odatiy FM o'rtasida bir necha farqlar mavjud. Masalan, axborotlarni uzatish usulini olaylik. Unga ko'ra har bir FM radiostantsiyalari o'zining radioeshittirish dasturlarini mustaqil tarzda uzatadi. DAB+ standartida esa, bitta uzatgich o'zida 18 tagacha bo'lgan radiokanallar multiplekserga birlashtiriladi. Qolaversa, DAB+ standartida qo'llaniladigan ovoz signalini kodlashda foydalaniladigan MPEG-4 HE-AAC v2 (ISO/IEC 14496-3 standarti) samarali usuli, raqamli tovush signal tezligini uch martagacha kamaytirgan holda uning sifatini saqlab qolish imkonini beradi.

DAB standartining hayotga tatbiq etilishi tinglovchilar uchun ulkan imkoniyatlarni beradi. Eng muhimi analog eshittirishda mavjud bo'lmagan sifat raqobat bardoshligini oshiradi. Texnik jihatdan qaraydigan bo'lsak, DAB ning hal qiluvchi va inqilobiy xususiyati mavjud bo'lgan qator uzatish rejimlaridan tanlash imkoniyati hisoblanadi. Bu esa eshittiruvchi uchun

uzatish tezligi, signal ishonchliligi, uzatish quvvati va qamrov doirasini egallashda yuqori samaradorlikni kafolatlaydi.

Raqamli radioeshittirishning yuqorida sanab o'tilgan afzalliklarni hisobga olgan holda, ayni vaqtda O'zbekistonda DAB+ standartini joriy etish maqsadida respublikaning turli hududlarida qator ilmiy-tadqiqot ishlari olib borilmoqda. Unda raqamli radioeshittirishning jahonda mavjud bo'lgan tizimlaridan unumli foydalanayotgan rivojlangan mamlakatlarning an'alarini qo'llagan holda, O'zbekiston sharoitida o'ziga mos keladigan standart turidan foydalanish va uning asosida mukammal ishlab chiqilgan istiqbolli rejani qabul qilish juda muhim hisoblanadi.

## REFERENCES

1. Münzer, B., Schoeffmann, K. and Böszörmenyi, L., 2017. Content-based processing and analysis of endoscopic images and videos: A survey. *Multimedia Tools and Applications*, [online] 77(1), pp.1323-1362.
2. Ali, S., Zhou, F., Bailey, A., Braden, B., East, J., Lu, X. and Rittscher, J., 2021. A deep learning framework for quality assessment and restoration in video endoscopy. *Medical Image Analysis*, [online] 68, p.101900.
3. Teramoto A., Shibata T., Yamada, H., Hirooka Y., Saito K. and Fujita H., 2021. Automated Detection of Gastric Cancer by Retrospective Endoscopic Image Dataset Using U-Net R- CNN. *Applied Sciences*, 11(23), p.11275.
4. Usmonov M. T. The Concept of Compatibility, Actions on Compatibility. *International Journal of Academic Multidisciplinary Research (IJAMR)*, Vol. 5 Issue 1, January - 2021, Pages: 10-13.
5. Usmonov M. T. The Concept of Number. The Establishment of the Concept of Natural Number and Zero. *International Journal of Academic Information Systems Research (IJASIR)*, Vol. 4 Issue 12, December - 2020, Pages: 7-9.
6. Usmonov M. T. The Concept of Compatibility, Actions on Compatibility. *International Journal of Engineering and Information Systems (IJEIS)*, Vol. 4 Issue 12, December - 2020, Pages: 66-68.
7. Usmonov M. T. General Concept of Mathematics and Its History. *International Journal of Academic Multidisciplinary Research (IJAMR)*. Vol. 4 Issue 12, December - 2020, Pages: 38-42
8. Usmonov M. T. Asymmetric Cryptosystems. *International Journal of Academic Engineering Research (IJAER)* ISSN: 2643-9085 Vol. 5 Issue 1, January - 2021, Pages: 6-9.
9. Usmonov M. T. Basic Concepts of Information Security. *International Journal of Academic and Applied Research (IJAAR)* ISSN: 2643-9603 Vol. 5 Issue 1, January - 2021, Pages: 5-8.
10. Usmonov M. T. Communication Control Systems, Methodology. *International Journal of Academic Engineering Research (IJAER)* ISSN: 2643-9085 Vol. 5 Issue 1, January - 2021, Pages: 47-50.
11. Usmonov M. T. Compatibility between the Two Package Elements. Binar Relations and Their Properties. *International Journal of Academic Multidisciplinary Research (IJAMR)* ISSN: 2643-9670 Vol. 5 Issue 1, January - 2021, Pages: 52-54.
12. Usmonov M. T. Cryptographic Protection of Information. *International Journal of Academic and Applied Research (IJAAR)* ISSN: 2643-9603 Vol. 5 Issue 1, January - 2021, Pages: 24-

- 26.
13. Usmonov M. T. Electronic Digital Signature. International Journal of Academic Pedagogical Research (IJAPR) ISSN: 2643-9123 Vol. 5 Issue 1, January - 2021, Pages: 30-34.
  14. Usmonov M. T. "Equal" And "Small" Relations. Add. Laws Of Addition. International Journal of Academic Information Systems Research (IJASIR) ISSN: 2643-9026 Vol. 5 Issue 1, January - 2021, Pages: 27-29.
  15. Usmonov M. T. Establish Network Protection. International Journal of Academic Engineering Research (IJAER) ISSN: 2643-9085 Vol. 5 Issue 1, January - 2021, Pages: 14-21.
  16. Usmonov M. T. Fundamentals of Symmetric Cryptosystem. International Journal of Academic and Applied Research (IJAAR) ISSN: 2643-9603 Vol. 5 Issue 1, January - 2021, Pages: 36-40.
  17. Usmonov M. T. General Concepts of Mathematics. International Journal of Academic Information Systems Research (IJASIR) ISSN: 2643-9026 Vol. 5 Issue 1, January - 2021, Pages: 14-16.
  18. Usmonov M. T. Identification and Authentication. International Journal of Academic Pedagogical Research (IJAPR) ISSN: 2643-9123 Vol. 5 Issue 1, January - 2021, Pages: 39-47.
  19. Usmonov M. T. Information Protection and Its Types. International Journal of Academic and Applied Research (IJAAR) ISSN: 2643-9603 Vol. 5 Issue 1, January - 2021, Pages: 1-4.
  20. Usmonov M. T. Information Protection in Wireless Communication Systems. International Journal of Academic Pedagogical Research (IJAPR) ISSN: 2643-9123 Vol. 5 Issue 1, January - 2021, Pages: 61-64.
  21. Usmonov M. T. Information protection supply. International Journal of Academic and Applied Research (IJAAR) ISSN: 2643-9603 Vol. 5 Issue 1, January - 2021, Pages: 12-15.
  22. Usmonov M. T. Information Security Policy. International Journal of Academic Pedagogical Research (IJAPR) ISSN: 2643-9123 Vol. 5 Issue 1, January - 2021, Pages: 70-73.
  23. Usmonov M. T. Information War. International Journal of Academic and Applied Research (IJAAR) ISSN: 2643-9603 Vol. 5 Issue 1, January - 2021, Pages: 79-82.
  24. M.Liedlgruber and A. Uhl, "Endoscopic image processing - an overview," 2009 *Proceedings of 6th International Symposium on Image and Signal Processing and Analysis*, 2009, pp. 707-712, doi: 10.1109/ISPA.2009.5297635