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"10주년 기념"

# 2019년도 한국통신학회 동계종합학술발표회 논문모집

**일시** 2019년 1월 23일(수)~25일(금) **장소** 용평리조트

◆ 동계종합학술발표회 '10주년 기념행사'
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# 포스터발표 세션 1월 24일(목)

## 17F – English Poster Session

Chair: Seung-Hoon Hwang(Dongguk University) 발표일시: 1월 24일(목), 17:00-18:20, 타워콘도 1층 에메랄드

17F-1 **An Extended Taxonomy for User Interfaces in Cross-Device User Interaction**
Hyoseok Yoon(Korea Electronics Technology Institute)

17F-2 **Private Ethereum Blockchain for Industrial Internet of Things (IIoT)**
Kevin Putra Dirgantoro, Jae-Min Lee, Dong-Seong Kim(Kumoh National Institute of Technology)

17F-3 **IEEE 802.11ax: Throughput Challenges in Industrial Wireless Network**
Sanjay Bhardwaj, Jae-Min Lee, Dong-Seong Kim(Kumoh National Institute of Technology)

17F-4 **Performance Analysis of IEEE 802.11ac and IEEE 802.11ax in Industrial Ad Hoc Network**
Nita Hidayati, Jae-Min Lee, Dong-Seong Kim(Kumoh National Institute of Technology)

17F-5 **Improvement of Capacity and Coverage based on Spectral Efficiency in Wireless Network**
Gaspard Gashema, Jae-Min Lee, Dong-Seong Kim(Kumoh National Institute of Technology)

17F-6 **Fault Recovery for Industrial Internet of Things using Fog Computing Platform**
Riesa Krisna Astuti Sakir, Muhammad Rusyadi Ramli, Jae-Min Lee, Dong-Seong Kim(Kumoh National Institute of Technology)

17F-7 **UAV-Assisted Underwater Acoustic Sensor Network for Tsunami Detection System**
Muhammad Taufiq Ramadhan, Muhammad Rusyadi Ramli, Jae-Min Lee, Dong-Seong Kim (Kumoh National Institute of Technology)

17F-8 **Provisioning UAV as Fog Node: Industrial Internet of Things Approach**
Heidy Indrayani, Rizki Rivai Ginanjar, Jae-Min Lee, Dong-Seong Kim(Kumoh National Institute of Technology)

17F-9 **Contact-based User Interface Techniques for Visual Data Exploration on Smartwatches**
Hyoseok Yoon(Korea Electronics Technology Institute)

17F-10 **Intelligent vision system for multi-rotor UAVs in SAR operations**
Trung-Thanh Ngo, Jae-Min Lee, Dong-Seong Kim(Korea Electronics Technology Institute)

17F-11 **Secrecy Performance Analysis of Wireless Powered Multihop Communication Networks**
Toan-Van Nguyen, Beongku An(Hongik University)

17F-12 **Implementation of a Novel Undersampled Modulation Scheme for Optical Camera Communication (OCC)**
Minh Duc Thieu,Yeong Min Jang(Kookmin University)

17F-13 **Summary of the Effect of Camera Parameters in Optical Camera Communication (OCC) System**
Huy Nguyen,Yeong Min Jang(Kookmin University)

17F-14 **Artificial Intelligence Application in Low Power Wide Area Network (LPWAN)**
Tung Lam Pham,Yeong Min Jang(Kookmin University)

17F-15 **Challenges for Visible Light Communication**
Hoan Nguyen,*Yeong Min Jang(Kookmin University,*Kookmin University)

# 포스터발표 세션 1월 24일(목)

17F-32 **Analysis of Distributed Clustering and Routing Techniques Suitable for Large-Scale Industrial IoT**
Etobi Damian Tita,*Williams-Paul Nwadiugwu,**Jae-Min Lee,Dong-Seong Kim(Kumoh National Institute of Technology,*Kumoh National of Technology,**Kumoh National Institute of Technology)

17F-33 **Energy-Efficient Dual-Hop Cooperative Routing in Underwater Acoustic Sensor Networks**
Hoa Tran Dang,Toha Hasnat,Jae-Min Lee,Dong-Seong Kim(Kumoh National Institute of Technology)

17F-34 **Secondary Transmit Power Control for Multi-Operator MmWave Spectrum Sharing**
Sang-Yeol Ma,Han-Kyul Park, Taesoo Kwon(Seoul National University of Science and Technology)

17F-35 **Evaluating CSS LoRa Performance for Underwater Acoustic Channel**
Ramsha Narmeen,Hojun Lee,Jeahak Chung(Inha University )

17F-36 **Virtual Cells Operation for 5G V2X Communications**
Umair Ahmad Mughal, Ishtiaq Ahmad, KyungHi Chang(Inha University )

17F-37 **Fast generation and compression for the holographic videos by using the rotational-motion compensation method**
Cao Hong Kun,Kim Eun Soo(Kwangwoon Univ.)

17F-38 **Analyzing Pattern-based Prefetching Method for DRAM/NVM Hybrid Main Memory System**
Jeong-Geun Kim, Yun-Su Cho, Shin-Dug Kim(Yonsei University)

17F-39 **FERT: Full Exploitation of Row-Hammering Threshold for TWiCe**
Yun-Su Jo, Jeong-Geun Kim, Shin-Dug Kim*(Yonsei University)

17F-40 **A Spiking Neural Network of Digit Classification Using Prior Probability as Supervised Learning Model Representative**
Unang Sunarya,Yuli Sun Hariyani,Donggyu Sim,Cheolsoo Park(Kwangwoon University)

17F-41 **Performance Analysis of VLC-UWB Hybrid (VUH) Network for Indoor Device Connectivity**
Ikechi Saviour Igboanusi,Nwadiugwu Williams Paul Chukwuka,Jae-Min Lee,Dong-Seong Kim (Kumoh National Institute of Technology)

17F-42 **Evaluation of Content Transfer Performance in the Information-Centric LTE Network**
Jaemin Shin, Kamrul Hasan, Seong-Ho Jeong(HUFS)

17F-43 **A Cluster-based Efficient Caching Mechanism in InformationCentric Networks**
Kamrul Hasan, Seong-Ho Jeong(HUFS)

17F-44 **Effect of ytterbium concentration on spectroscopic properties of erbium-doped fluorophosphate glasses for optical amplifier**
K. Linganna,Jung-Hwan In,Ju H. Choi(KOPTI)

17F-45 **Performance Evaluation in Cache-Enabled Cross-haul Networks**
Haoran Mei,Limei Peng(Kyoungpook National University)

# Virtual Cells Operation for 5G V2X Communications

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## Abstract

Virtual cell (VC) is an emergent concept in cellular networks that shifts the base-station-centric point of view to a user-centric one. Instead of traditional base station assignment, VCs contain a number of transmission points (TPs) with an association pattern that is created for, and moves with, every user in the network. In this paper, we study the VCs for vehicle-to-everything (V2X) communications, where V2X messages are broadcasted to groups of vehicles. The VC concept is extended to broadcast groups and form VCs for hotspots (HSs) of vehicles. Hence, the main objective is to serve a maximum number of HSs sharing the same radio resource, with as less energy as possible, while guaranteeing a certain communication reliability to the served vehicles.

## I. Introduction

Vehicle-to-everything (V2X) communications is considered as one of the key enablers for intelligent transport systems (ITS) and connected cars. Among current wireless technologies, long-term evolution advanced (LTE-A) has been considered as the main candidate to provide cellular V2X (C-V2X) [1]. In C-V2X, vehicles communicate via uplink/downlink (UL/DL) through the network infrastructure. In UL, vehicles can send unicast messages to a V2X application server through the base stations (BSs).

The fifth generation of wireless networks (5G) is expected to bring many new techniques from which C-V2X will also benefit. Along with the new opportunities and capabilities that 5G offers, a paradigm shift is manifesting itself from the BS-centric to a user-centric approach called VCs [1].

## II. Concept of Virtual Cell

The VC concept is a user-centric radio access design for future generations of wireless networks, which aims at overcoming the limitations of traditional cell construct [2]. In contrast to the conventional BS-centric approach with static cell-topology, VCs are formed by taking the user at the center, and associating several serving TPs located around it. The associated TPs cooperatively serve their user and their association is adapted to its movement, creating a cell that moves with and always surrounds the user. The number of hard handovers is minimized and cell edge experience is avoided [2].

VCs can be realized with remote radio heads (RRHs), distributed antenna systems (DASs) or BSs that operate in a cooperative multipoint (CoMP) manner, which is illustrated in Fig. 1.

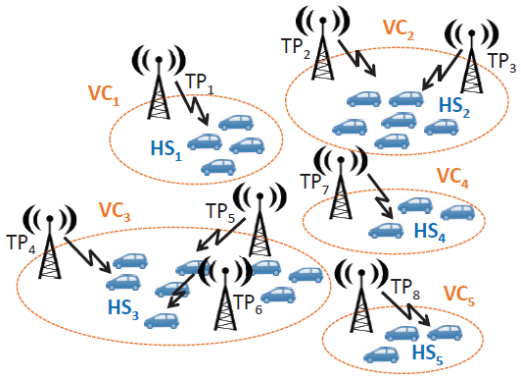


Fig. 1. VCs with different number of TPs and each VC is serving a HS of vehicles with different size.

## III. VCs For V2X Hotspots

HSs of vehicles in close proximity to each other, residing in target areas of V2X services, receive multicast V2X messages through the TPs. Each HS could be regarded as a group of vehicles traveling relatively close to each other. For example, safety-related warning messages may need to be transmitted to the vehicles traveling to a hazardous location ahead, whereas a traffic signal priority message could be sent to another group of vehicles approaching a nearby junction at the same time. Accordingly, VCs are formed by taking HSs of vehicles at the center of the cell and associating the closest TPs with each of them, which will then cooperatively multicast data.

## IV. VCs Optimization Stages for 5G V2X Communication

In [3], author proposed three optimization stages, which are the transmission weight selection, the power control, and the admission control. Optimizing the transmission weights to minimize the radiated power, while guaranteeing the target SINR value to each served vehicle. The power control

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stage of the algorithm controls the transmission powers p of the VCs and minimize the total radiated virtual power under the maximum power control of all TPs, and the check that all vehicles achieve the threshold SINR. The admission control is introduced to maintain the target SINR threshold and maximum transmission power for operating V2X services with feasible PC.

## V. Conclusions

In this paper, we present the concept of VCs for 5G V2X communication. By guaranteeing a certain SINR value to vehicles, the main goal is to maximize the number of served HSs of vehicles where they receive the data, and minimize the total power radiated by the network. Moreover, the VCs optimization stages for 5G V2X communication (i.e., transmission weight selection, power control and VC-admission control) are breifly discussed in this paper.

## ACKNOWLEDGEMENT

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