Spectrum Sharing via Consumption Models: Prototyping and Field Testing in an Urban FCC Innovation Zone

Abhishek Adhikari[1], Kevin Hermstein[1], David Chen[6], Manav Kohli[1], Jakub Kolodziejski[2], Fred Moshary[4], Carlos Caicedo Bastidas[3], Tingjun Chen[5], Ivan Seskar[2], Gil Zussman[1]

[1]Columbia University, [2]Rutgers University, [3]Syracuse University, [4]The City College of New York, [5]Duke University, [6]Stuyvesant High School

Abstract

- Efficient spectrum use represents an important objective given the rapid growth in mobile data and emergence of Beyond-5G networks.
- NOAA passive radiometer receivers operating at the same millimeter-wave (mmWave) frequency used by COSMOS and 5G at 28 GHz and have experienced interference, particularly from a nearby bridge.
- We manually create interference using programmable 28 GHz COSMOS mobile phased array antenna modules (PAAMs) for the creation of Spectrum Consumption Models (SCMs).

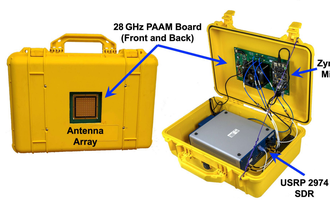
Infrastructure

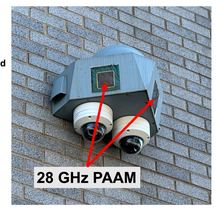
FCC Innovation Zone in West Harlem, NYC

- Allows for outdoor wireless experimentation without the need for an experimental license by the FCC.

NSF PAWR COSMOS Testbed

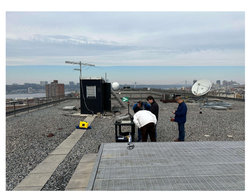
- Open programmable platform in NYC that enables researchers to evaluate Beyond-5G wireless systems.

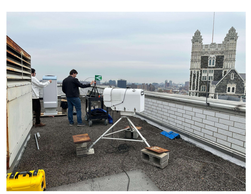




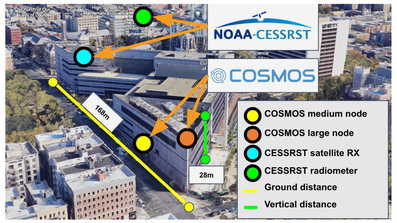
NOAA-CESSRST Cooperative Science Center

- Passive satellite and weather receivers experiencing interference (particularly from the direction of GWB).

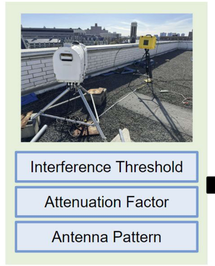




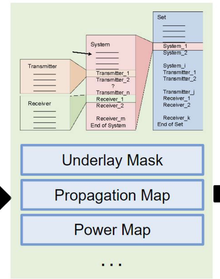
Dynamic Spectrum Access and Spectrum Consumption Models



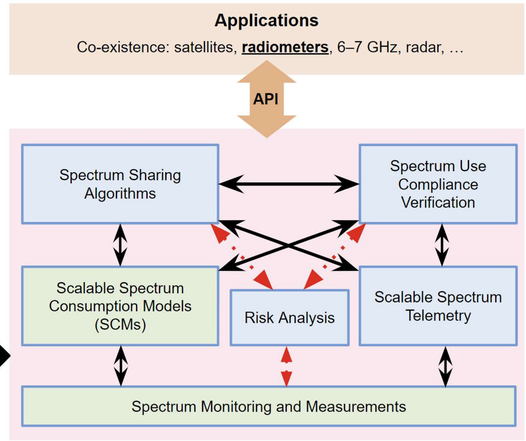
- Spectrum Consumption Models (SCMs) capture wireless device characteristics to inform DSA.



CCNY Rooftop Measurements

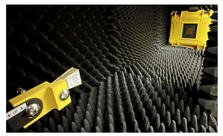


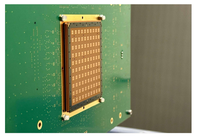
SCM Construct

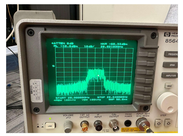


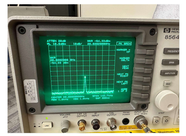
Zone Management System (ZMS)

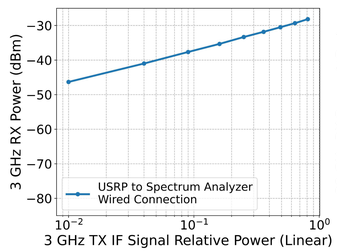
28 GHz Programmable Phased Array Antenna Module (PAAM)

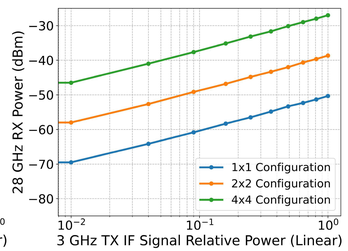


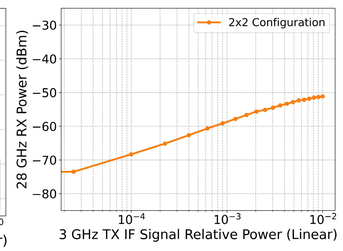




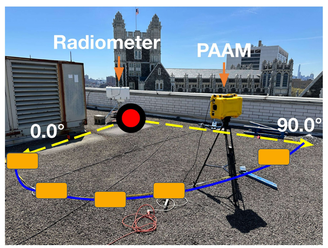


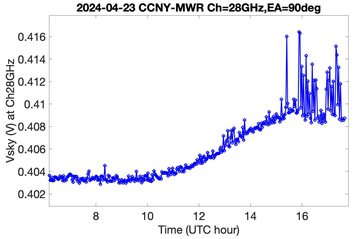


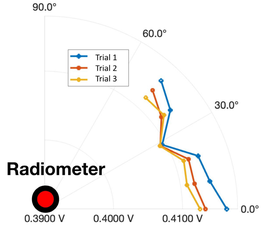




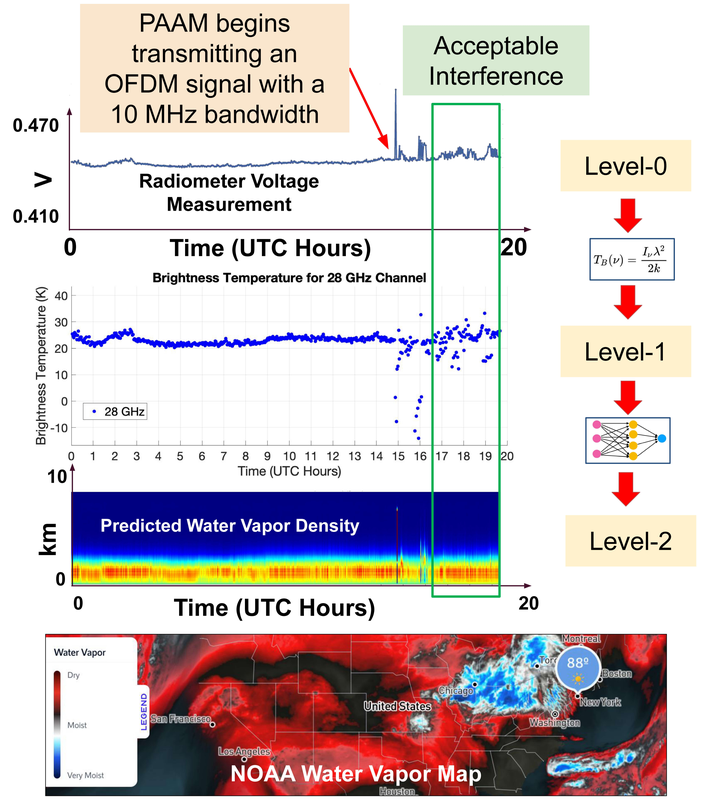
Interfere with NOAA Microwave Radiometer



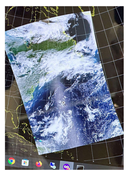




Acceptable Interference



Ongoing: Satellite Receiver 7-8 GHz



Satellite	Start Date Date, Local time	Start Time Date, Local time	Az	Max altitude Local time	Az	El	End Time Local time	Az
NOAA-21	9/3/24	12:33:00 PM	SE	12:40:00 PM	ENE	23°	12:47:00 PM	N
			127°		63°			1°
	9/3/24	2:13:00 PM	S	2:20:00 PM	W	49°	2:27:00 PM	NNW
			180°		261°			341°

References

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