ASSOCIATION OF
FEDERAL COMMUNICATIONS CONSULTING ENGINEERS

WASHINGTON, D.C.

Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of

Media Bureau Seeks Comment on Joint Petition for Rulemaking of America’s Public Television Stations, The AWARN Alliance, The Consumer Technology Association, and The National Association of Broadcasters Seeking To Authorize Permissive Use of The “Next Generation TV” Broadcast Television Standard

GN Docket No. 16-142

Ex Parte Comments of AFCCE

Established in 1948, the Association of Federal Communications Consulting Engineers ("AFCCE") is an organization that includes approximately 60 full members who are Registered Professional Engineers engaged in the practice of consulting engineering and over 100 members in allied fields of endeavor before the Federal Communications Commission. AFCCE members were involved in the development of the original television transmission system in widespread use in the U.S. (NTSC), the current transmission system (ATSC), and are involved in the development of Next Generation system.

In a recent Petition for Rulemaking,¹ Joint Petitioners asked the Commission to authorize a Next Generation Television broadcast transmission standard and specified certain Rule changes that would be necessary to achieve that result. AFCCE fully supports the proposals set forth in the Petition with regard to authorization of the System Discovery and Signaling Layer of ATSC 3.0 (Standard A/321) as an optional transmission standard that can be utilized by television licensees, and believes that based on known technical data² present interference protection requirements are

² It is understood that the following experimental special temporary authorities have been issued. Cleveland channels 9 and 31; Baltimore and DC channel 43; Las Vegas channel 45; Raleigh channel 39 and the just announced Sinclair ready for upgraded 3.0 testing. AFCCE looks forward to reviewing the technical data associated with these tests.
adequate to prevent interference between ATSC 3 systems, between ATSC 1 and ATSC 3 systems, and between ATSC 3 and wireless LTE systems.

AFCCE believes that Next Generation TV offers an opportunity to transform over-the-air broadcast television and finally realize the promise of broadcast/broadband convergence. Without regulatory permission, wireless companies have long been able to periodically upgrade their transmission technologies to realize improved efficiencies and implement new services, but television broadcasters have been locked into a technology that is two-decades old. Authorization by the FCC of ATSC Standard A/321 is a step toward correcting this competitive imbalance, and will allow consumer marketplace forces rather than regulatory mandates to decide the pace of conversion to ATSC 3, or indeed, whether that conversion occurs at all.

In its reply comments, CTIA expressed concern about the interference impact that ATSC 3 technology could have on wireless operations in the 600 MHz band. The April 8, 2016, report of Meintel, Sgrignoli, & Wallace\(^4\) ("MSW Report") demonstrates that under the conditions tested the interference potential of ATSC 3 is likely to be no greater than that of ATSC 1. Fundamentally, all digital communications systems, including ATSC 1, ATSC 3, and LTE, include signal processing so that the signals transmitted have the properties of random noise. This processing helps maximize the capacity of the transmission channel and thereby the spectral efficiency of the transmission by maximizing the entropy of the source.\(^5\) Because the systems are all noise-like, the co-channel interference potential of each is very similar under the same conditions and very little variation in interference potential would be expected between ATSC 1 and ATSC 3. The MSW Report addresses specifically co-channel, adjacent-channel, and out-of-band emissions from an ATSC 3 transmitter.

With respect to co-channel interference, three parameters are relevant: occupied bandwidth, in-channel power, and peak-to-average power ratio. As noted in the MSW Report,\(^6\) because the occupied bandwidth of ATSC3 is slightly greater than that of ATSC 1 but the total power is the same, the power density over the occupied portion of the 6 MHz TV channel is

\(^3\) https://ecfsapi.fcc.gov/file/1062775838804/CTIA%20ATSC%203.0%20Reply%20Comments,%206.27.16.pdf
\(^4\) Appendix B of Joint Petition.
\(^6\) Appendix B, pages 2 and 13. The occupied bandwidth of ATSC 3 is about 8% greater than ATSC 1.
slightly less than with ATSC 1. This reduction in power density would be expected to slightly reduce the likelihood of interference of ATSC 3 into wireless OFDM systems, such as LTE, at least when the channel overlap between the two systems is less than 100%.

Because OFDM systems inherently have large crest factors, peak-to-average power ratio (PAPR) and crest factor reduction schemes are essential to realizing practical transmitters. These schemes, which are also incorporated into transmitters used by the wireless industry, will ensure that power excursions in ATSC 3 transmissions are not significantly greater than with ATSC 1. The MSW Report states that the PAPR of ATSC 3 transmissions is about 2.5 dB greater (at 99.9% statistical level) than for ATSC 1 transmissions, making the ATSC 3 interference potential “essentially the same” as Additive White Gaussian Noise (“AWGN”). AWGN is the type of interfering signal specified in the LTE receiver standard, which was the basis for the FCC’s interservice interference (ISIX) analysis. Therefore, it appears that the FCC’s ISIX analysis is adequately protective of LTE wireless receivers for ATSC 1 or ATSC 3 operations that are co-channel or partially co-channel.

With regard to adjacent-channel and out-of-band emissions from ATSC transmitters, no change to the existing DTV emission mask is requested or contemplated. Since the permitted levels of out-of-band emission from television transmitters are unchanged, the interference potential of ATSC 3 transmissions should be no greater than that of ATSC 1 when the affected wireless receiver is not co-channel.

In view of the foregoing, AFCCE finds no technical reason to delay the continued processing of the authorization of the ATSC 3 transmission standard, and urges the Commission to take the requisite actions necessary for expedited consideration.

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8 Appendix B, page 14.
11 47 CFR §73.622(h)
The above was discussed at the AFCCE Annual Meeting held on June 23-26, 2016 at Estes Park, Colorado and consensus was reached to provide comments concerning Docket 16-142. Further, it has been reviewed and received concurrence of the Board of Directors, and was circulated to the membership before these comments became final.

Respectfully Submitted,

[Signature]

Donald G. Everist
Acting FCC Liaison Chairman
AFCCE
P. O. Box 19333
Washington, D.C. 20036

Date: July 19, 2016
CERTIFICATION

This is to certify that copies of these comments were mailed at the M.L. King Post Office to all available commenters with which there was a full postal address (see the attached list). First-class postage was affixed to these comments.

Sincerely,

Donald G. Everist

Date: July 19, 2016

City of Washington

) ss

District of Columbia

Subscribed and sworn to before me this 19th day of July, 2016.

Carolyn L. Thompson
Notary Public

My Commission Expires: 3/28/2018
LPTV Spectrum Rights Coalition

MR MICHAEL GRAVINO
DIRECTOR
LPTV SPECTRUM RIGHTS COALITION
600 PENNSYLVANIA AVENUE SE
WASHINGTON DC 20003

American Cable Association

MR MATTHEW M POLKA
PRESIDENT AND CEO
AMERICAN CABLE ASSOCIATION
875 GREENTREE ROAD
SEVEN PARKWAY CENTER
SUITE 755
PITTSBURGH PA 15220

MR ROSS J LIEBERMAN
SENIOR VICE-PRESIDENT OF
GOVERNMENT AFFAIRS
AMERICAN CABLE ASSOCIATION
2415 39TH PLACE NW
WASHINGTON DC 20007

MR MICHAEL D NILSSON
HARRIS WILTSHIRES & GRANNIS LLP
ATTORNEYS FOR AMERICAN CABLE
ASSOCIATION
1919 M STREET NW
EIGHTH FLOOR
WASHINGTON DC 20007

MR PAUL J CARITJ
HARRIS WILTSHIRES & GRANNIS LLP
ATTORNEYS FOR AMERICAN CABLE
ASSOCIATION
1919 M STREET NW
EIGHTH FLOOR
WASHINGTON DC 20007

Attorneys for

RTP Holdings

MR CHARLES E (CHET) DAGIT III
FOUNDER AND MANAGING
DIRECTOR
RTP HOLDINGS
124 GULPH HILLS ROAD
RADNOR PA 19035

DISH Network L.L.C.

MR JEFFREY H BLUM
SENIOR VICE-PRESIDENT
HADASS KOGAN CORPORATE
COUNSEL
DISH NETWORK LLC
1110 VERMONT AVENUE NW
SUITE 750
WASHINGTON DC 20005

MS ALISON MINEA
DIRECTOR REGULATORY AFFAIRS
HADASS KOGAN CORPORATE
COUNSEL
DISH NETWORK LLC
1110 VERMONT AVENUE NW
SUITE 750
WASHINGTON DC 20005
Public Knowledge, Common Cause and Open Technology Institute at New America

MR HAROLD FELD
SENIOR VICE-PRESIDENT
PUBLIC KNOWLEDGE
1818 N STREET NW
SUITE 410
WASHINGTON DC 20036

MR MICHAEL CALABRESE
DIRECTOR WIRELESS FUTURE PROJECT
OPEN TECHNOLOGY INSTITUTE AT NEW AMERICA
740 15TH STREET NW
9TH FLOOR
WASHINGTON DC 20005

MR TODD O'BOYLE
COMMON CAUSE
1133 19TH STREET NW
SUITE 900
WASHINGTON DC 20036

= Entravision Communications =

Attorneys for

MR BARRY FRIEDMAN
THOMPSON HINE LLP
ATTORNEYS FOR ENTRAVISION COMMUNICATIONS
SUITE 700
1919 M STREET NW
WASHINGTON DC 20036

National Cable & Telecommunications Association

MR RICK CHESSEN
NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION
25 MASSACHUSETTS AVENUE NW
SUITE 100
WASHINGTON DC 20001-1431

MS DIANE B BURSTEIN
NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION
25 MASSACHUSETTS AVENUE NW
SUITE 100
WASHINGTON DC 20001-1431

DR WILLIAM A CHECK
SENIOR VICE-PRESIDENT
NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION
25 MASSACHUSETTS AVENUE NW
SUITE 100
WASHINGTON DC 20001-1431

MR ANDY SCOTT
VICE-PRESIDENT ENGINEERING, SCIENCE & TECHNOLOGY
NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION
25 MASSACHUSETTS AVENUE NW
SUITE 100
WASHINGTON DC 20001-1431
Dolby Laboratories, Inc.

MR CRAIG C TODD
SENIOR VICE-PRESIDENT AND CHIEF TECHNOLOGY OFFICER
DOLBY LABORATORIES INC
1275 MARKET STREET
SAN FRANCISCO CA 94103

Raycom Media, Inc.

TEGNA, Inc.

Graham Media Group

Pearle Mobile DTV Company LLC

Public Broadcasting Service and Corporation for Public Broadcasting

MR WILLIAM WEBER
VICE-PRESIDENT GOVERNMENT AFFAIRS
PUBLIC BROADCASTING SERVICE
2100 CRYSTAL DRIVE
ARLINGTON VA 22202

MR KURT WIMMER
COVINGTON & BURLING LLP
ATTORNEYS FOR
RAYCOM MEDIA INC / TEGNA INC /
GRAHAM MEDIA GROUP
850 TENTH STREET NW
WASHINGTON DC 20001

MR WILLIAM WEBER
VICE-PRESIDENT GOVERNMENT AFFAIRS
PUBLIC BROADCASTING SERVICE
2100 CRYSTAL DRIVE
ARLINGTON VA 22202

MR KURT WIMMER
COVINGTON & BURLING LLP
ATTORNEYS FOR
RAYCOM MEDIA INC / TEGNA INC /
GRAHAM MEDIA GROUP
850 TENTH STREET NW
WASHINGTON DC 20001

MR ERIC WOLF
VICE-PRESIDENT TECHNOLOGY
PUBLIC BROADCASTING SERVICE
2100 CRYSTAL DRIVE
ARLINGTON VA 22202

MS HANNAH LEPLOW
COVINGTON & BURLING LLP
ATTORNEYS FOR
RAYCOM MEDIA INC / TEGNA INC /
GRAHAM MEDIA GROUP
850 TENTH STREET NW
WASHINGTON DC 20001

MR THOMAS ROSEN
ASSISTANT GENERAL COUNSEL
PUBLIC BROADCASTING SERVICE
2100 CRYSTAL DRIVE
ARLINGTON VA 22202

MS ANNE SCHELLE
MANAGING DIRECTOR
PEARLE MOBILE DTV COMPANY LLC
850 10TH STREET NW
SUITE 312N
WASHINGTON DC 20001

MR J WESTWOOD SMITHERS
SENIOR VICE-PRESIDENT AND GENERAL COUNSEL
CORPORATION FOR PUBLIC BROADCASTING
401 NINTH STREET NW
WASHINGTON DC 20004
GatesAir Inc.
MR PHIL ARGYRIS  CEO
GATESAIR INC
5300 KINGS ISLAND DRIVE
SUITE 101
MASON OH 45040

AT&T Services, Inc.
MS CATHY CARPINO
DAVID LAWSON
ATTORNEYS FOR AT&T SERVICES INC
1120 20TH STREET NW
SUITE 1000
WASHINGTON DC 20036

MS GARY L PHILLIPS
DAVID LAWSON
ATTORNEYS FOR AT&T SERVICES INC
1120 20TH STREET NW
SUITE 1000
WASHINGTON DC 20036

Its attorneys

American Tower Corporation
MR PETER STARKE
VICE-PRESIDENT BROADCASTING
AMERICAN TOWER CORPORATION
10 PRESIDENTIAL WAY
WOBURN MA 01801

MR PAUL ROBERTS
VICE-PRESIDENT COMPLIANCE
AMERICAN TOWER CORPORATION
3500 REGENCY PARKWAY
SUITE 100
CARY NC 27518

The Advanced Television Systems Committee, Inc.
MR MARK S RICHER
PRESIDENT
THE ADVANCED TELEVISION SYSTEMS COMMITTEE INC
1776 K STREET NW
SUITE 800
WASHINGTON DC 20006

Advanced Television Broadcasting Alliance
MR LOUIS LIBIN
EXECUTIVE DIRECTOR
ADVANCED TELEVISION BROADCASTING ALLIANCE
382 FOREST AVENUE
WOODMERE NY 11598

MR ROBERT FOLLIARD
CHAIRMAN
ADVANCED TELEVISION BROADCASTING ALLIANCE
382 FOREST AVENUE
WOODMERE NY 11598

Cox Media Group
MR MICHAEL D BASILE
COOLEY LLP
ATTORNEYS FOR COX MEDIA GROUP
1299 PENNSYLVANIA AVENUE NW
WASHINGTON DC 20004

MR JASON E RADEMACHER
COOLEY LLP
ATTORNEYS FOR COX MEDIA GROUP
1299 PENNSYLVANIA AVENUE NW
WASHINGTON DC 20004
Its Attorneys
Meredith Corporation

MR PAUL KARPOWICZ
PRESIDENT LOCAL MEDIA GROUP
MEREDITH CORPORATION
425 14TH STREET NW
ATLANTA GA 30318

Gray Television, Inc.

MR ROBERT FOLLIARD
VICE-PRESIDENT
GRAY TELEVISION INC
4370 PEACHTREE ROAD NE
ATLANTA GA 30319

Casey Joseph

MR CASEY JOSEPH
VICE-PRESIDENT SALES
LS TELECOM INC
5021 HOWERTON WAY
SUITE E
BOWIE MD 20715

JOHN NOTOR

MR JOHN NOTOR
PRESIDENT/CHIEF TECHNOLOGIST
NOTOR RESEARCH
1548 ARATA COURT
SAN JOSE CA 95125

MR PETER MONCURE
RADIOSOFT INC
194 PROFESSIONAL PARK DRIVE
CLARKESVILLE GA 30523

Bill Sanford

MR BILL SANFORD CEO
LAKELAND PUBLIC TELEVISION
TELEVISION STATION KAWE-TV
108 GRANT AVENUE NE
BEMIDJI MN 56601-3620

Ing. Peter Riemann
President
LS telecom Limited
1145 Hunt Club, Suite 100
Ottawa, Ontario, Canada K1V 0Y3
Prienmann@L.Stelecom.com

Klaus Huber
International Liaison Manager
LS telecom AG
Im Gewerbegebiet 31-33
D-77839 Lichtenau, Germany

MR BILL SANFORD CEO
LAKELAND PUBLIC TELEVISION
TELEVISION STATION KAWB-TV
422 NW THIRD STREET
BRAINERD MN 56401-2917