

Camp Parks DoD Uplink

NCFCC Meeting
April 20, 2011

by Dane E. Ericksen, P.E., CSRTE, 8-VSB, CBNT
Hammett & Edison, Inc., Consulting Engineers
Sonoma, California

Co-Chair, Engineers for the Integrity of
Broadcast Auxiliary Services Spectrum
(EIBASS)

SBE/DoD Memorandum of Understanding
(Based on the October 10, 2007, Fourth SBE/DoD Meeting)

- A. This Memorandum of Understanding (MOU) describes the radio frequency sharing arrangement of the spectral band, 2025-2110 MHz, between the Department of Defense (DoD) Space Operation Service, and the Federal Communications Commission (FCC)-licensed Television Broadcast Auxiliary Service (2GHz BAS) and related services as described below pursuant to the FCC Seventh Report and Order (7th R&O) dated 14 Oct 2004 (ET Docket No. 00-258).

- B. The parties to this MOU are the DoD Assistant Secretary of Defense/Networks and Information Integration (OASD/NII) Spectrum, and the Society of Broadcast Engineers (SBE), acting as an advocate for the interests of the 2GHz BAS licensees, and as the sponsor of the private sector frequency coordination program for this band as documented in the attached Addendums appropriate to the local site coordination.

**SBE/DoD Memorandum of Understanding
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Facility	Coordinates (NAD83)	
Naval Satellite Control Network, Prospect Harbor, ME	44°24'16"N	068°00'46"W
New Hampshire Tracking Station, New Boston AFS, NH	42°56'52"N	071°37'36"W
Eastern Vehicle Check-out Facility & GPS Ground Antenna & Monitoring Station, Cape Canaveral, FL	28°29'09"N	080°34'33"W
Buckley AFB, CO	39°42'55"N	104°46'36"W
Colorado Tracking Station, Schriever AFB, CO	38°48'21"N	104°31'43"W
Kirtland AFB, NM	34°59'46"N	106°30'28"W
Camp Parks Communications Annex, Pleasanton, CA	37°43'51"N	121°52'50"W
Naval Satellite Control Network, Laguna Park, CA	34°06'31"N	119°03'53"W
Vandenberg Tracking Station, Vandenberg AFB, CA	34°49'21"N	120°30'07"W
Hawaii Tracking Station, Kaena Pt, Oahu, HI	21°33'44"N	158°14'31"W
Guam Tracking Stations, Anderson AFB and Naval CTS, Guam	13°36'54"N	144°51'18"E

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The set of parameters defining DoD operations are:

- a) Uplink (Earth-to-space) power levels and transmission characteristics used by the DoD in spacecraft command and control signals
- b) Location of the DoD transmitting stations
- c) Frequency and spectral bandwidth of both the 2 GHz BAS and DoD signals
- d) Pointing of the DoD uplink antenna when transmitting relative to the identified 2 GHz BAS-RO terminals
- e) Times of DoD uplink transmission
- f) Nominal times of relevant 2GHz BAS link usage and
- g) Locations and technical characteristics to the 2 GHz BAS-RO terminals
- h) The protection goal of 2 GHz BAS-RO terminals is no more than a 0.5 dB degradation of the receiver/noise threshold as per Footnote 63 of the October 21, 2004, ET Docket 00-258 Seventh R&O.

- G. This MOU is subject to the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management (Redbook), and the applicable FCC rules in Title 47 of the Code of Federal Regulations. It is anticipated that this MOU will be reviewed by its signatories or their representatives every five years.
- H. Subject to unilateral change by either party as to its designated recipients notice shall be provided within 30 days of any change to the following organizations and/or their duly appointed representatives:
1. OASD/NII (Spectrum)
 2. SBE Executive Director

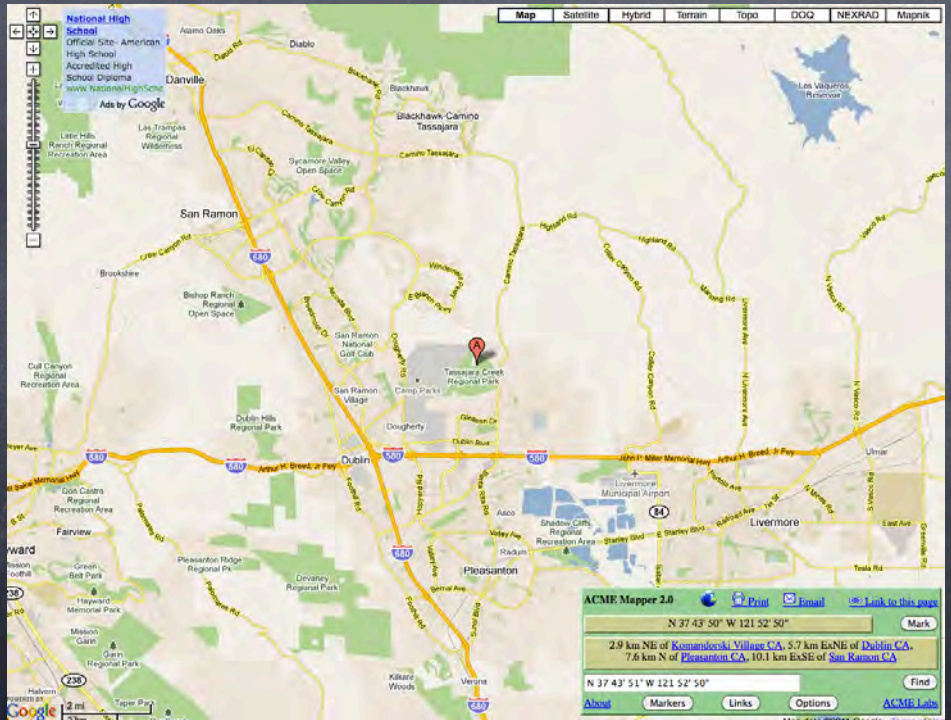
In Witness Whereof, the parties hereto have signed this Memorandum of Understanding this
_____ 30th _____ day of _____ April _____, 2009.

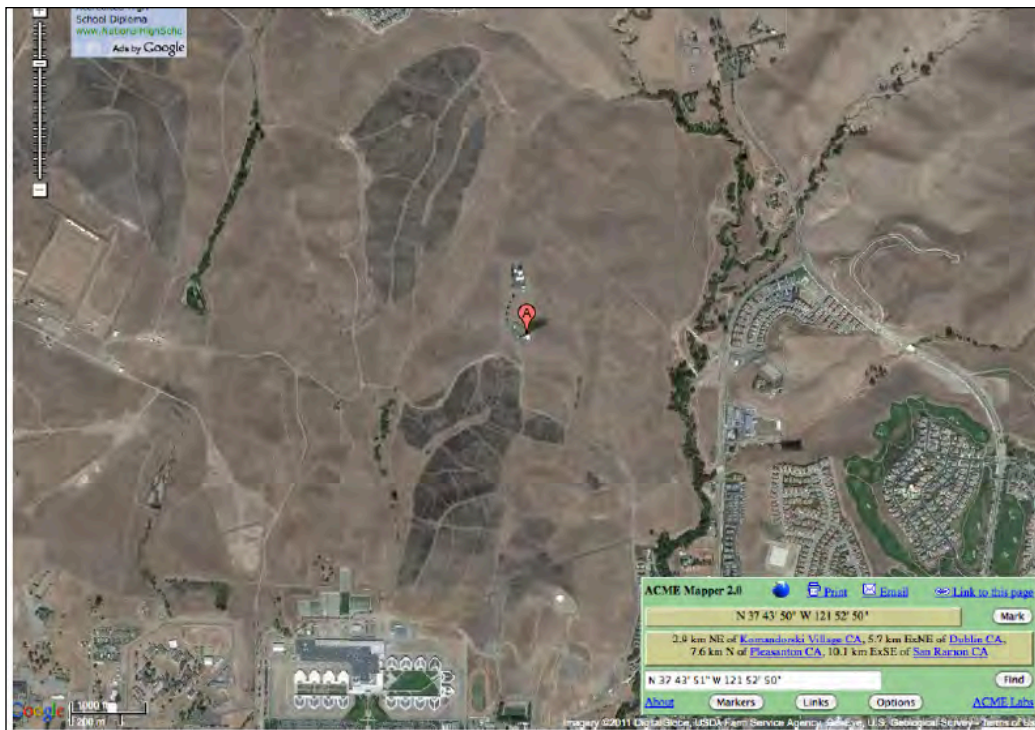
**Department of Defense
Assistant Secretary of Defense/
Networks and Information Integration
(OASD/NII) Spectrum**

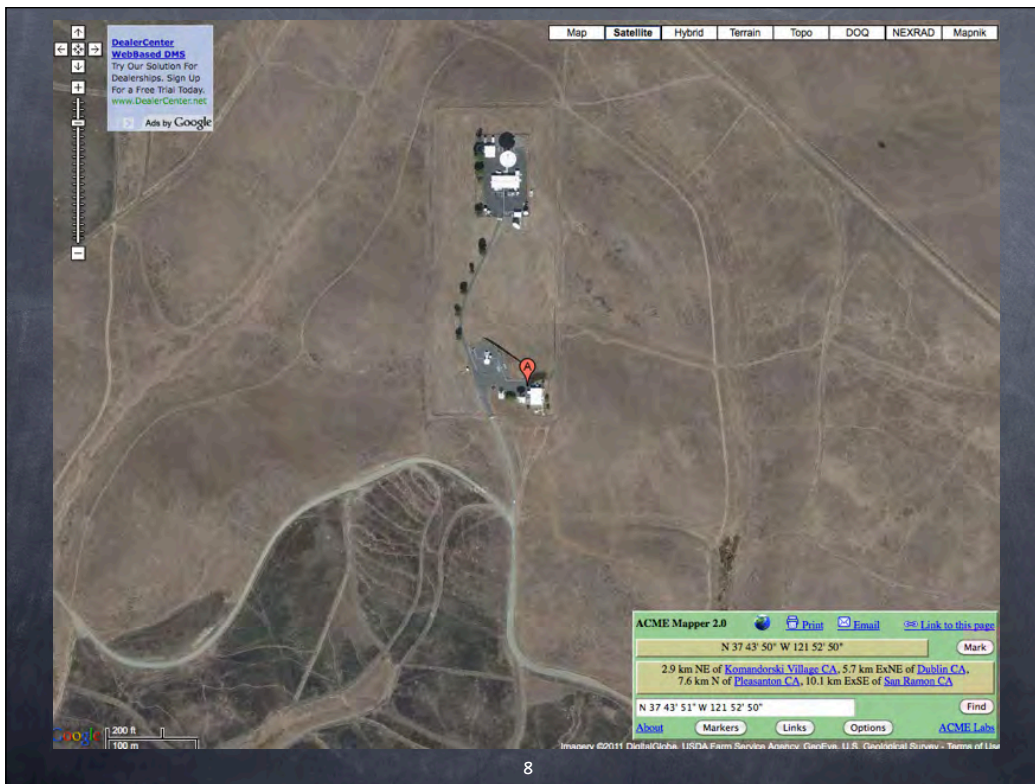
By: John G. Grimes John G. Grimes

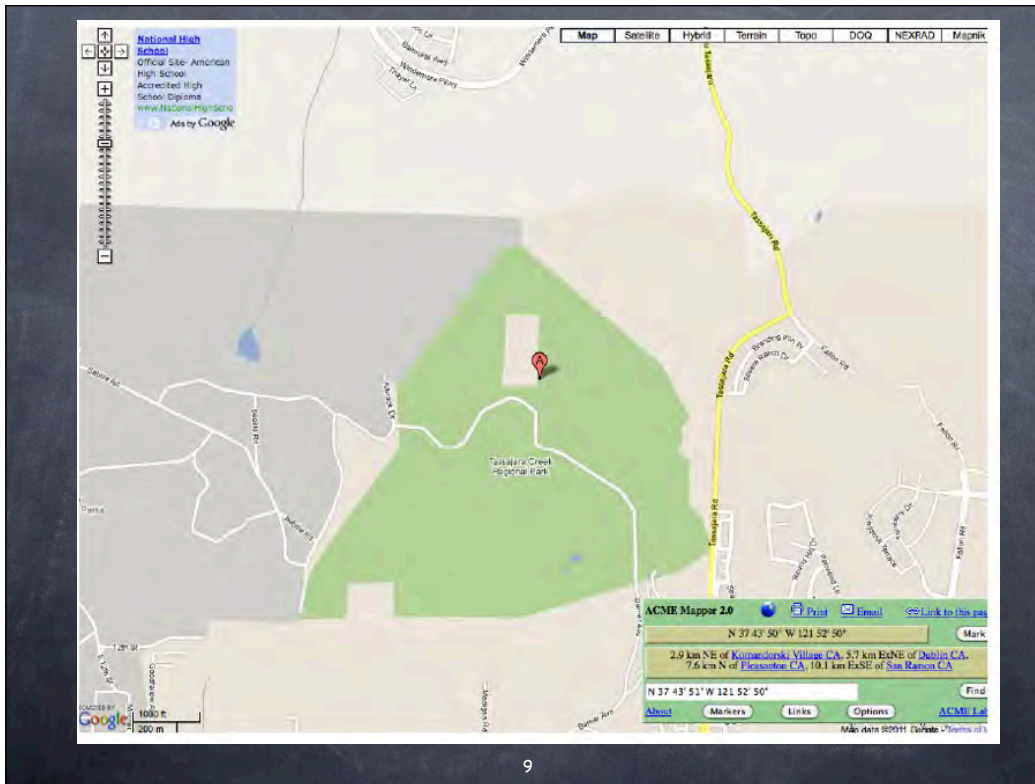
Society of Broadcast Engineers, Incorporated

By: Barry Thomas Barry Thomas, President

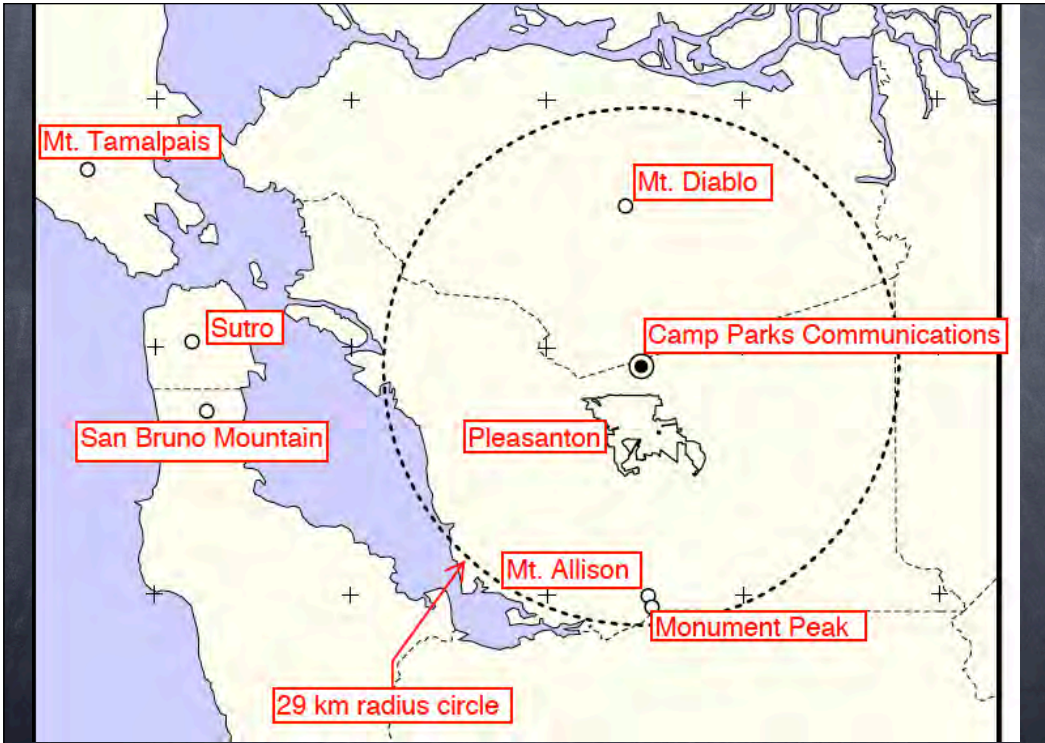




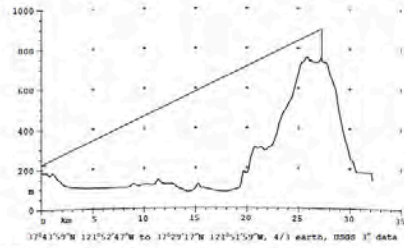




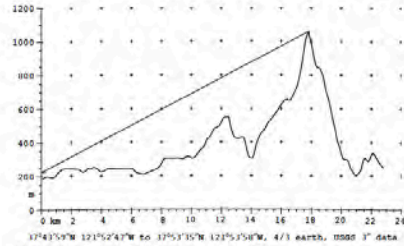




Camp Parks Communications Annex Terrain Profiles



Terrain profile from actual Camp Parks Communications Annex uplink location near Pleasanton, CA, to ENG-RO site at Monument Peak. Path is 27.2 kilometers (16.9 miles) bearing 177.5°T. Profile extends 5 kilometers beyond the Monument Peak ENG-RO site.



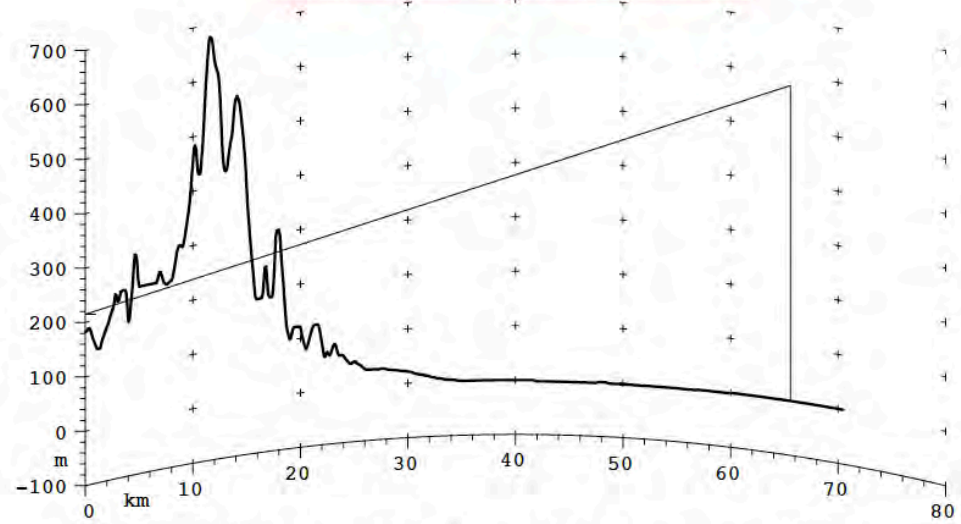
Terrain profile from actual Camp Parks Communications Annex uplink location near Pleasanton, CA, to ENG-RO site at Mt. Diablo. Path is 17.8 kilometers (11.1 miles) bearing 354.4°T. Profile extends 5 kilometers beyond the Mt. Diablo ENG-RO site.



SOCIETY OF BROADCAST ENGINEERS, INC.
Indianapolis, Indiana

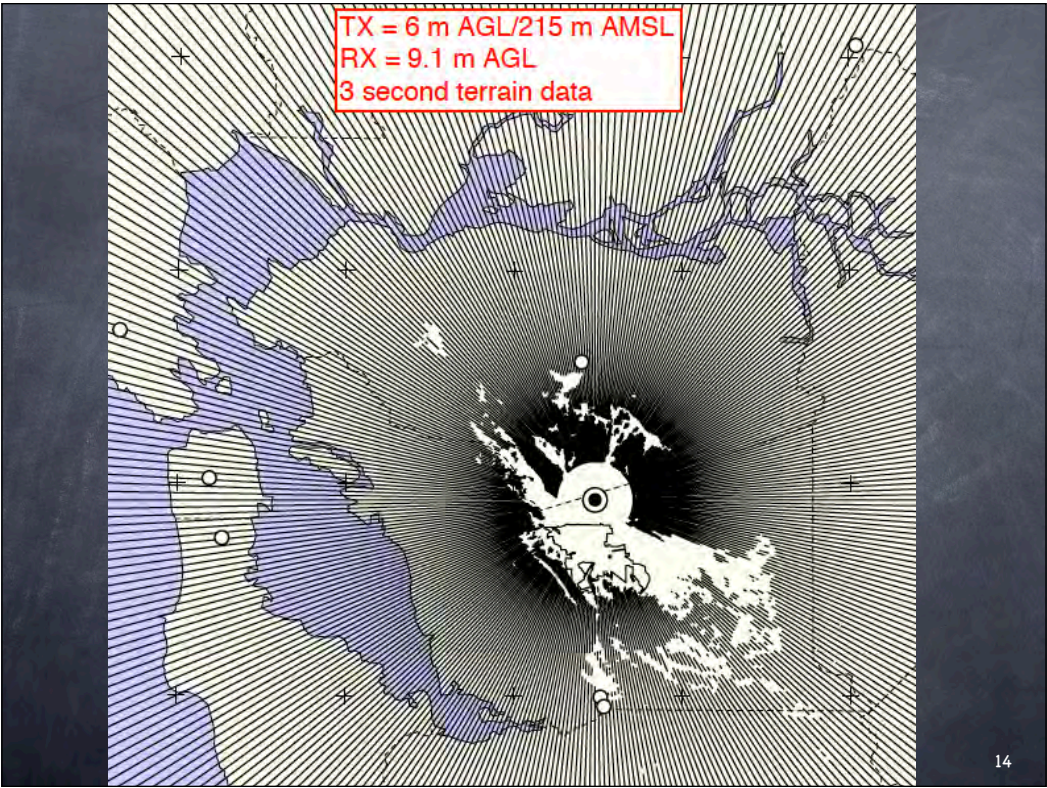
031005
Figure 6B

Camp Parks DoD uplink to
Walnut Grove (KXTV/KOVR-TV tower, ASR1011404)
Assumed TX C.O.R. = 215 m AMSL (6 m AGL)
Assumed RX C.O.R. = 580 m AMSL (580 m AGL)



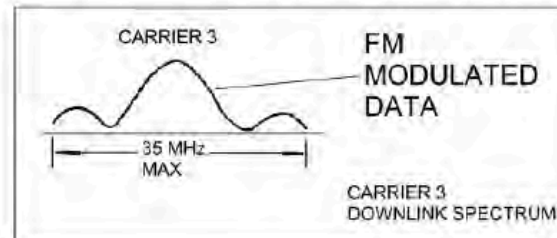
37°43'51"N 121°52'46"W to 38°14'24"N 121°30'03"W, 4/3 earth, USGS 3" data

TX = 6 m AGL/215 m AMSL
RX = 9.1 m AGL
3 second terrain data



DOWNLINK	
FreqDown =	FreqUp * 256/205(1+2V/C) = 2202.50-2297.500 MHz, 20 channels, 5000 kHz spacing
Carrier 1	PRN ranging, 1.024 MHz (PSK, PI/2), 1.2500 MHz voice, 1.700(PSK, FM/FM) PCM/PM, PAM/FM or FM/FM
Carrier 2	High bit-rate PCM, 5 MHz below carrier 1
Carrier 3	FM modulated data, 35 MHz maximum bandwidth

Carrier 3 is very interesting. The wideband FM signal seems to be an **image link** of some sort.



This is Google's cache of <http://www.ntia.doc.gov/osmhome/EPS/openness/appendd.html>. It is a snapshot of the page as it appeared on Mar 24, 2011 16:58:32 GMT. The [current page](#) could have changed in the meantime. [Learn more](#)

These search terms are highlighted: **dod sgls uplinks**

[Text-only version](#)

APPENDIX D: TECHNICAL ISSUES REGARDING THE 1761-1842 MHZ BAND SEGMENT

INTRODUCTION

Expanding the reallocation of the 1710-1755 MHz band to include the 1755-1760 MHz and 1845-1850 MHz

INTERFERENCE TO TERRESTRIAL MOBILE SERVICE FROM SGLS EARTH STATIONS

The interference impact on terrestrial mobile and personal stations from SGLS earth stations will be assessed under interference-limited conditions.[EN 19] An interference-limited condition exists when the signal-to-noise ratio at the victim receiver is somewhat greater than the minimum required value, so that the interference level might be allowed to exceed the receiver noise. The maximum permissible interference levels that can be received by personal stations without significantly degrading the quality of the service provided are given in TABLE D-2.

The interference level at a mobile service receiver from SGLS earth station transmissions can be determined using the following equation:

$$I = PI + GI + GR - Lreq - FDR$$

where

I is the interference power at the terrestrial receiver (dBm);

PI is the SGLS earth station transmitter power (dBm);

GI is the SGLS earth station transmitter antenna gain in the direction of the terrestrial

GR is the antenna gain of the terrestrial mobile receiver (dBi);

Lreq is the propagation loss required to preclude interference to the terrestrial receiver

FDR is the frequency dependent rejection (dB).

To compute the interference level at a mobile service receiver, a transmitter power of 7 kW will be used for fixed SGLS earth stations and a value of 1 kW will be used for transportable SGLS earth stations. The term GI is a function of the antenna elevation of the earth station. For the purpose of this analysis GI will be calculated using both the mainbeam and sidelobe antenna gains shown in TABLE D-3. The mainbeam gain represents the worst-case condition and will result in the maximum required distance separation to preclude interference to mobile and personal terrestrial receivers. The sidelobe antenna gain was calculated using an earth station elevation angle of 3 degrees and procedures specified in Appendix 29 of the ITU Radio Regulations.[EN 20]

$$L_{req} = 48 + 20 \text{ Log}F + 40\text{Log}D_{sep} + (10-10\text{Log}h_1) + (10-10\text{Log}h_2)$$

where

Dsep is the required distance separation (km);

h1 is the height of the personal or mobile receiver antenna (m);

h2 is the height of the SGLS earth station transmitter antenna (m);

F is the frequency (MHz).

an ENG-RO C.O.R. height of only 1 m AGL is too low

Antenna heights of 1 meter (terrestrial) and 15 meters (SGLS earth station) will be used to determine the required distance separation. Using the above equation, the required distance separations necessary to preclude interference between SGLS earth stations and terrestrial receivers are given in TABLE D-10.

TABLE D-10: Required Distance Separations to Preclude Interference Between SGLS Earth Stations And Terrestrial Receivers

SGLS Station	Indoor Station Dsep (km)	Outdoor Station Dsep (km)
Fixed		
Mainbeam Gain	73	82
Sidelobe Gain	26	29
Transportable		
Mainbeam Gain	46	52
Sidelobe Gain	16	18

therefore sidelobes are only -47 dB down

Provided that the calculated distance separations given in TABLE D-10 can be maintained, the impact on terrestrial stations from fixed SGLS earth station transmitters is expected to be manageable. However, the transportable SGLS earth stations present a more difficult problem, since their exact locations are not always known, hence making coordination difficult.

LICENSEE: KDTV LICENSE PARTNERSHIP, G.P.

ATTN: CHRISTOPHER G. WOOD
 KDTV LICENSE PARTNERSHIP, G.P.
 5999 CENTER DRIVE SUITE 4083
 LOS ANGELES, CA 90045

Call Sign KB98132	
File Number	
Radio Service TP - TV Pickup	
SMSA	Station Class MO

FCC Registration Number (FRN): 0001531425

Grant Date 08-01-1985	Effective Date 10-19-2009	Expiration Date 12-01-2014	Print Date 02-05-2010
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LOCATION

Fixed Location Address or Area of Operation:
 Circular Area Of Operation Defined By Radius 48.3 KM Around Coordinates
 37-29-04.7 N, 121-51-56.8 W
 City: MILPITAS County: ALAMEDA State: CA

No fixed ENG-RO sites of record-oh oh.

Loc No.	Location Name	Latitude	Longitude	Elevation	Antenna Structure Registration No.
001	San Francisco Area	37-29-04.7 N	121-51-56.8 W		

FREQUENCY PATHS

Frequency (MHz)	Tol (%)	Emission Desig	EIRP Constr (dBm)	Constr Date	Path No	Seg No	Emit Loc No	Ant Hgt (m)	Gain (dBi)	Beam (deg)	POL	AZIM (deg)	Rec Loc No	Rec Call Sign
2025.0-2109.5	0.00050	12M0D7W 12M0W7D 12M0D7W	60.000	04-19-2011	002	1	001	6.1	20.0	14.0	R	VARY	001	

KTVU PARTNERSHIP
2102 COMMERCE DRIVE
SAN JOSE, CA 95131

Call Sign KA55536	
File Number	
Radio Service TP - TV Pickup	
SMSA	Station Class MO

FCC Registration Number (FRN): 0001543974

Grant Date 12-19-1980	Effective Date 03-31-2009	Expiration Date 12-01-2014	Print Date 11-21-2009
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LOCATION

Fixed Location Address or Area of Operation:
Circular Area Of Operation Defined By Radius 96.6 KM Around Coordinates
37-23-38.8 N, 121-53-22.8 W
City: SAN JOSE County: SANTA CLARA State: CA

Fixed ENG-RO
site; good. Is this
the only one?

Loc No.	Location Name	Latitude	Longitude	Elevation	Antenna Structure Registration No.
001	ENG Truck	37-23-38.8 N	121-53-22.8 W		
002	Monument Peak	37-29-16.7 N	121-52-02.8 W	743.4	1019291

FREQUENCY PATHS

Frequency (MHz)	Tol (%)	Emission Desig	EIRP (dBm)	Constr Date	Path No	Seg No	Emit Loc No	Ant Hgt (m)	Gain (dBi)	Beam (deg)	POL	AZIM (deg)	Rec Loc No	Rec Call Sign
2025.0- 2025.5	0.00050	25K0G1D	61.200	09-30-2010	002	1	001	6.1	23.0	9.0	S	VARY	002	
2025.5- 2109.5	0.00050	12M0F8W 12M0W7D	61.200	09-30-2010	002	1	001	6.1	23.0	9.0	S	VARY	002	
2109.5- 2110.0	0.00050	25K0G1D	61.200	09-30-2010	002	1	001	6.1	23.0	9.0	S	VARY	002	

Technical Publications

H&E actively encourages its professional staff members to author technical papers and other publications that might benefit the broadcasting industry. The publications listed below are available as Acrobat PDF files ([Adobe Acrobat Reader](#) or equivalent is needed to view PDF files).

Note: Any regulatory information provided in these papers and articles was correct at the time of original publication. Regulations should always be verified with current requirements and practices.

Authors	Document Title	Publication
Dane E. Ericksen, P.E.	2 GHz ENG, Round III	SBE Signal, February/March 1999
Dane E. Ericksen, P.E.	A Review of IOT Performance	Broadcast Engineering, July 1996
Dane E. Ericksen, P.E.	A Summary of FCC BAS Issues (PDF)	58th Annual Broadcast Engineering Conference Proceedings, National Association of Broadcasters, 2004
Dane E. Ericksen, P.E.	Additional figures for the article "Return to OTA" (PDF)	TV Technology, July, 2008
Stanley Salek, P.E.	Analysis of FM Booster System Configurations (PDF)	1992 NAB Engineering Conference
Stanley Salek, P.E.	Audio Signal Analysis	NAB Engineering Handbook, Tenth Edition, 2007 (co-author) (also in Seventh, Eighth, and Ninth Editions), Chapter 8.1
Dane E. Ericksen, P.E.	BAS Spectrum Issues	TV Technology, March 23, 1998
Stanley Salek, P.E.	Digital Audio Broadcasting	CRC Electrical Engineering Handbook, Broadcasting and Optical Communications Technology, Third Edition, 2006 (co-author) (also in First and Second Editions), Chapter 1.5
Stanley Salek, P.E.	Digital Audio Broadcasting	CRC Electronics Handbook, Second Edition, 2005 (co-author) (also in First Edition), Chapter 16.2
Dane E. Ericksen, P.E.	Distance and Bearing Calculations	NAB Engineering Handbook, Tenth Edition, 2007 (also in Eighth and Ninth Editions, as Chapter 1.6), Chapter 1.7
Dane E. Ericksen, P.E.	DoD Uplinks Status Report (PDF)	61st Annual Broadcast Engineering Conference Proceedings, National Association of Broadcasters, 2007



EIBASS Web Site

www.eibass.org

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Engineers for the Integrity of Broadcast Auxiliary Services Spectrum



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- On The Lighter Side

LINKS OF INTEREST

- The Society of Broadcast Engineers
- Sprint-Nextel Broadcast 2 Ghz Relocation Site

Our Mission



The mission of Engineers for the Integrity of Broadcast Auxiliary Services Spectrum is very simple: File comments with the F.C.C. on matters that impact the Broadcast Auxiliary Services spectrum. We feel that users of the BAS spectrum can best be represented effectively before the FCC by an organization with this as its one and only concern.

Engineers for the Integrity of Broadcast Auxiliary Services Spectrum



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- Hammett & Edison, Inc
- EIBASS Press Release 10-25-2010
- EIBASS Press Release 11/3/2010

This agreement was signed on April 30, 2009, but has not been uploaded to the ECFS despite an agreement at the October 6, 2009, SBE Board of Directors meeting to do so. Although apparently DoD has provided a hard copy of the MOU to an unnamed person at the FCC, this is not the same as having the agreement appear in the pertinent docket records in the ECFS. Accordingly, and as a courtesy to SBE and DoD, EIBASS has now rectified that omission.

Display # 20

- 1  [SBE-DoD MOU Regarding the 2 GHz TV BAS Band.](#)

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- EIBASS Press Release 10-25-2010
- EIBASS Press Release 11/3/2010

EIBASS has developed comments and remarks concerning issues important to Broadcast Auxiliary Services Spectrum users. Here is a list of documents that we have filed with the FCC, Congress, and/or other parties on these topics.

- [Relaxed QOBE Requirements for BRS Stations](#) (1)
- [\(S.2881\) FCC Technical Resource Enforcement Act](#) (3)
- [MSS flexibility and grandfathered TV BAS Ch. A10](#) (1)
- [ET 09-36 \(MMNS devices at 413-457 MHz\)](#) (4)
- [IB Docket No. 04-286](#) (1)
- [IB 02-364 \(MSS ATC/grandfathered TV BAS Ch A10\)](#) (1)
- [WT 09-176 \(Use of Telex headsets by NPPs\)](#) (2)
- [Request for DR on PCNs for minor-change apps](#) (2)
- [WT Docket 07-121 \(WSI DRE microwave antennas\)](#) (2)
- [Letter to Commission on NAD83 conversion](#) (2)
- [Letter to FCC on Aural STL antenna standards](#) (1)
- [WT Docket 99-87 \(Narrow banding of RPU channels\)](#) (1)
- [WT 03-66 \(BRS Channel 1 vs grandfathered A10\)](#) (2)
- [WT Dockets 08-166/08-167, Wireless Microphones](#) (2)
- [SBE-DoD MOU Regarding the 2 GHz TV BAS Band](#) (1)
- [2 GHz TV BAS transition deadline](#) (1)
- [Clarity Media \("Trucker TV"\)](#) (2)
- [ET 04-186 & DA 09-2479 White Space Devices](#) (1)
- [RM-11605 POFIS backhauls at 7.125-8.500 MHz](#) (1)
- [ET 10-120/FDA-2010-N-0291, Health Care Devices](#) (1)
- [WT Docket 10-153 \(BAS Flexibility\)](#) (2)
- [450 MHz RPU band vs. H.R.607](#) (1)
- [ET Docket 10-236, Updated Part 5 ERS Rules](#) (2)
- [150 Mhz Wide Channels at 18Ghz](#) (1)

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April 20, 2011, NCFCC Meeting

 Questions?