

Question 4. Exhibit 1

Particulars of Operation

Telemetry Equipment

- A) Frequency: 471.25 MHz
- B) Max. RF Power: 2.0 W
- C) Max. EIRP: 3.0 dBWi
- D) Peak/Mean: Mean
- E) Emission: 30K0F2D
- F) Modulation: GFSK
- G) Necessary Bandwidth: 99% of the signal power in the occupied band

C-Band Aircraft to Ground Transmissions

- A) Frequency: 3650 to 3700 MHz
- B) Max. RF Power: 109 mW per channel
- C) Max. EIRP: 9.4 dBWi per channel
- D) Peak/Mean: Mean
- E) Emission: 30K0G7W
- F) Modulation: QPSK
- G) Necessary Bandwidth: 99% of the signal power in the occupied band

C-Band Ground to Aircraft Transmissions

- A) Frequency: 5854 to 5896 MHz
- B) Max. RF Power: 28.5 dBm per channel
- C) Max. EIRP: 29 dBWi per channel
- D) Peak/Mean: Mean
- E) Emission: 30K0G7W
- F) Modulation: QPSK
- G) Necessary Bandwidth: 99% of the signal power in the occupied band

Cellular Aircraft to Ground Transmissions

- A) Frequency: 824 to 850 MHz
- B) Max RF Power: 27.7 dBm per channel
- C) Max EIRP: -2.3 dBWi per channel
- D) Peak/Mean: Mean
- E) Emission: 30K0G7E
- F) Modulation: QPSK
- G) Necessary Bandwidth: 99 % of the signal power in the occupied band.

Cellular Ground to Aircraft Transmissions

- A) Frequency: 869 to 894 MHz
- B) Max RF Power: 39.5 dBm per channel
- C) Max EIRP: 24 dBW_i per channel
- D) Peak/Mean: Mean
- E) Emission: 30K0G7E
- F) Modulation: QPSK
- G) Necessary Bandwidth: 99 % of the signal power in the occupied band.

Question 5(c), Exhibit 2

Testing will involve a communications link between an aircraft and ground equipment. During testing the aircraft will fly between 15,000 and 30,000 feet, with most of the testing conducted at 18,000 feet. The center of flight operations will be over a point 4 kilometers north of the Page, Arizona airport. The geographic coordinates of the approximate center of mobile operations are given in item 5(c)(1). The flight pattern will remain within 45 km. of the center of the flight operation station.

Question 8, Exhibit 3

This equipment is being developed for export to developing nations. The technology is undergoing a proof of concept testing program, and is not linked to a specific contract with any foreign government at this time.

Question 13, Exhibit 4

Transmitting Equipment:

Telemetry Equipment

Manufactures: Sonic
Model Number: Skyline SL-UD
No. of Units: One in the aircraft, one on the ground.

C-Band Aircraft to Ground Transmissions

Manufactures: Motorola Special Test Equipment
Model Number: N/A
No. of Units: 1

C-Band Ground to Aircraft Transmissions

Manufactures: Motorola Special Test Equipment
Model Number: N/A
No. of Units: 1

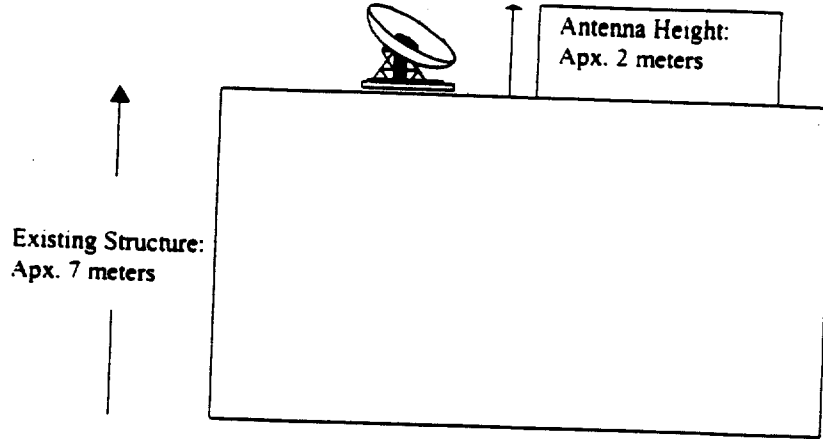
Cellular Aircraft to Ground Transmissions:

Manufacturers: Motorola Special Test Equipment
Model Number: N/A
No. of Units: 1

Cellular Ground to Aircraft Transmissions:

Manufacturers: Motorola, Nokia, Erikson
Model Number: ST7790 or equivalent
No. of Units: 23 max

Question 15(c). Exhibit 5



**C-band Frequency Search Report
for the Page, AZ Area**

prepared for

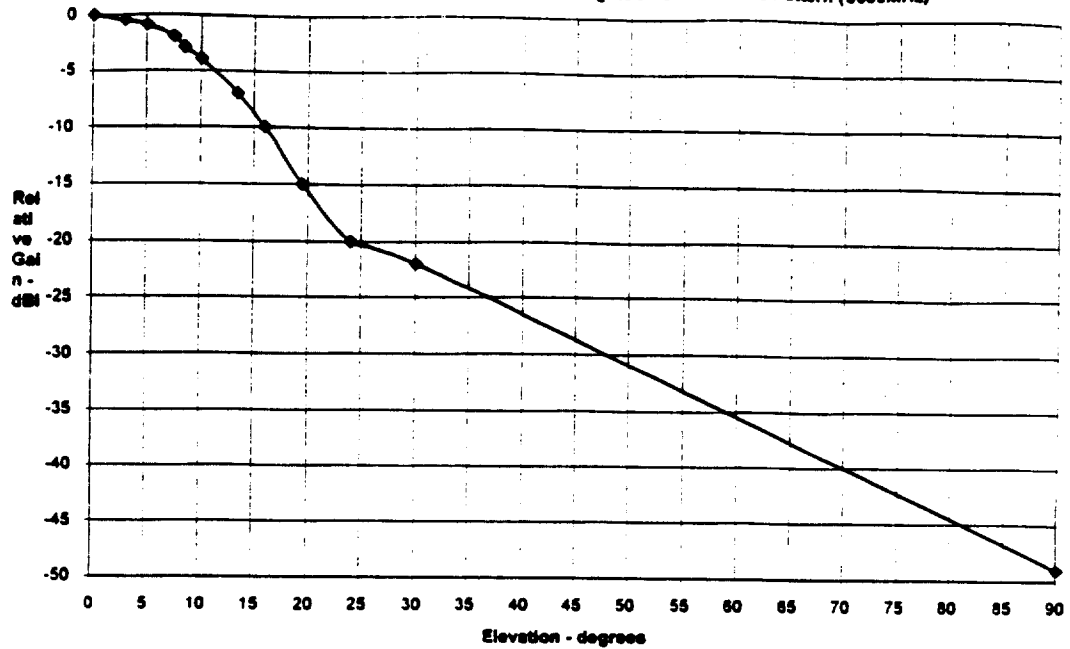
Motorola SatCom

prepared by

Comsearch

6/28/99

Figure 1 - Downlink C-Band 1 Foot Corrugated Horn Antenna Pattern (3600MHz)



Ground Transmitter System:
Antenna type: 4' parabolic with horn feed
Antenna Gain: 31 dBi at 5900 MHz
Antenna Pattern: See Figure 2 below
RF transmit power: 29.14 dBm max per carrier

site_name	Call Sign	lat(ddmmss)	lon(ddmmss)	Licensee	state	freq_start (MHz)	freq_end (MHz)
KINGMAN	KINGMAN	351554.0	1135652.0	Kingman Telecom	AZ	3625	4200
KINGMAN	KINGMAN	351554.0	1135652.0	Kingman Telecom	AZ	5850	6425
KINGMAN	KINGMAN	351554.0	1135652.0	U.S. Electro- Dynamics	AZ	3625	4200
KINGMAN	KINGMAN	351554.0	1135652.0	U.S. Electro- Dynamics	AZ	5850	6425

Table 1 – Summary of Earth Station Case in the 3.65-3.7 GHz and 5.85-5.925 GHz Band

3.1 Interference in the 3.65-3.7 GHz Band

The aircraft downlink power flux density (pfd) levels have been calculated for several flight scenarios. Under the worst case assumptions the pfd levels within a 50 km radius of Page, AZ range from $-87 \text{ dBW/m}^2/4\text{kHz}$ to $-110 \text{ dBW/m}^2/4\text{kHz}$. The maximum pfd level permitted in the 3.65-3.7 GHz band for low elevation angles of approach is $-152 \text{ dBW/m}^2/4\text{kHz}$ for angles between 0 and 5 degrees. Since Kingman, AZ is 450 km from Page, AZ the pfd levels will be much lower than $-152 \text{ dBW/m}^2/4 \text{ kHz}$. Based upon the antenna pattern provided in Figure 1 and the operational characteristics outlined above, the worst case pfd level at Kingman will be less than $-171 \text{ dBW/m}^2/4 \text{ kHz}$. This value considers a worst case altitude of 33,000 feet amsl. The radio horizon for an aircraft operating near Page, AZ (4,300' amsl) with an altitude of 33,000 amsl is about 239 miles or 385 km. Since the tests will be conducted within a 50 km radius of Page, Kingman is beyond the radio horizon for an aircraft operating under these parameters. The low pfd limits and the large distance between the test area and the earth stations at Kingman indicate no potential for interference and that intersystem coordination is not required.

3.2 Interference in the 5.85-5.925 GHz Band

In the 6 GHz band, the only potential interference victims are those satellites in the geostationary arc operating in the 5.85-5.924 GHz bands. There are no domestic and only a few international satellites operating in these bands that are within the view of a ground station operating around Page, AZ. They are shown in Table 2 below:

Satellite Name	Operator	Uplink Band (MHz)	Orbital Slot (deg.)	Elevation Angle (deg.)	Azimuth (deg.)	PFD @ Sat.* (dBW/m ²)
INTELSAT 603	Intelsat	5850-6425	24.5° W	< 0	n/a	
INTELSAT 605	Intelsat	5850-6425	27.5° W	< 0	n/a	
INTELSAT 801	Intelsat	5850-6425	31.5° W	0.69	96.04	-128.9
INTELSAT 601	Intelsat	5850-6425	34.5° W	1.69	97.89	-128.8
NSS806	New Skies	5850-6425	40.5° W	6.47	101.68	-128.7
INTELSAT 805	Intelsat	5850-6425	55.5° W	18.33	112.05	-128.45
Brasilsat B1	Embratel	5850-6425	70.0° W	29.23	124.16	-128.22
Brasilsat B3	Embratel	5850-6425	84.0° W	38.39	139.0	-128.04
INTELSAT 802	Intelsat	5850-6425	186.0° W	3.68	260.55	-128.8

Table 2 – Summary of Satellites Within View of Page, AZ Operating in the 5.85-5.925 GHz Band
(* worst possible case, assumes no antenna discrimination).

4.0 Summary

The frequency search results indicate that the choice of spectrum will preclude interference between the AERO system and any existing licensed operator. The potential for interference is further reduced due to the remoteness of the area of operation and the relatively low power levels for both the uplink and downlink.

provided by:

Ken Ryan
Comsearch
2002 Edmund Halley Dr
Reston, VA 20191
Tel: (703) 476-2685
Fax: (703) 476-2727
email: kryan@comsearch.com

**CERTIFICATION OF PERSON RESPONSIBLE
FOR ENGINEERING INFORMATION**

I hereby certify that I am the technically qualified person responsible for the review of the engineering information contained in this report, that I am familiar with the Commission's Rules, and that it is complete and accurate to the best of my knowledge and belief.

By: 

Gary K. Edwards
Manager
Satellite Services
Comsearch

Dated: July 2, 1999

**Engineering Statement in Support of Airborne Communications Test at Page, AZ
Satellite Communications Group
Motorola**

July 1, 1999

**Ellis Engineering
1103 LaNeuille Rd.
Lafayette, LA 70508
PH: 318.289.0294
FAX: 318.289.0295
Web: EllisEngineering.com
Email: cfellis@EllisEngineering.com**

Engineering Statement in Support of Airborne Communications Test at Page, AZ
Satellite Communications Group
Motorola

Introduction

The Motorola Satellite Communication Group plans a two year test of a communications system in the vicinity of Page, AZ. This document supports the use of a narrow band (25 kHz) 3.85 watt ERP RF modem within the channel 14 TV band.

A transmit/receive modem will be mounted in the aircraft and communicate with an identical modem located at the airport in Page, AZ. The test plane will fly from 15,000 to 30,000 feet not farther than 45 Km from the center of Page, AZ. Most of the test will be performed within an 8 Km range of Page, AZ. The modem will be used to supply a data link from the ground for control and information services during the test. The frequency of the modems will be precise. The antennas are vertically polarized making them cross polarized with general TV antennas. The communication link will be intermittently used during the short daily tests.

Method of Interference Analysis

The interference analysis included within this document is based on the FCC Rules and Regulations regarding the allocation of LPTV and TV Translator facilities. The analysis is performed with the most conservative methods to assure that no interference will occur to normal TV, DTV, LPTV, and TV translator facilities during the short duration of this test. Since one data transmitter will be mounted in an aircraft, the analysis was completed as if the data transmitter were located at the center of Page, AZ at a height of 30,000 feet above mean sea level. Due to the largely free space transmission of this data signal, the Free Space (with multiple rounded obstacle diffraction loss) Model was used for the test signal. Normal TV facilities were modeled using standard FCC contours. This assures that the worst case interference situation is examined. Analysis was also performed within a 45 Km radius in all directions from the center of Page to assure that no interference will be caused during the short test when the plane is at this distance. Much of the test will be performed at altitudes less than 30,000 feet, thus assuring even less chance of interference. Table 1 is a standard LPTV allocation study using no offset on channel 14 using the Page airport coordinates with the antenna at 2 meters above ground. The uplink antenna will be located at the airport. This study demonstrates that the uplink antenna will cause no interference to TV facilities.

The TV rules governing Standard NTSC TV, Digital TV, LPTV and translators are contained within this document. An answer to each applicable rule is given demonstrating no interference. Motorola assures that the frequency tolerance of the RF modems used in this test will comply with 74.761. Note that the proposed signal is only 25 kHz in bandwidth. It is located at 471.25 MHz, the visual carrier frequency of channel 14. Since the TV facilities involved in this study broadcast with maximum spectral energy about this carrier, the maximum desired to undesired signal strengths will be achieved with this arrangement. Although the test can be accomplished with the modems exactly on this frequency, Motorola requests that a 1 MHz band (+/- 500 kHz) around 471.25 MHz be allowed for operation of the frequency agile RF modems so that incoming interference can be eliminated if necessary. Even though the maximum antenna height is 30,000 feet AMSL, the powers and bandwidth of the proposed signal will not interfere with the normal signals of any TV facility. The nearest operating channel 14 TV station is KJZZTV (BLCT-951010KE) in Salt Lake City, UT at a distance of 420.7 Km. The nearest operating channel 14 LPTV or TV translator is K14HC (BLTT-9008091A) in Prescott, AZ at a distance of 277.7 Km.

Conclusions

The grant of an Experimental License for the Motorola Satellite Systems Group to perform airborne test using a 25 kHz. bandwidth signal on 471.25 Mhz in the Page, AZ area for data links will cause no interference to any operating TV facilities.

74.705 TV BROADCAST ANALOG STATION PROTECTION

(a) The TV broadcast station protected contour will be its Grade B contour signal level as defined in 73.683 and calculated from the authorized maximum radiated power (without depression angle correction), the horizontal radiation pattern, height above average terrain in the pertinent direction, and the appropriate chart from 73.699. (Revised 83-129, 6/18/83)

(b) (1) An application to construct a new low power TV or TV translator station or change the facilities of an existing station will not be accepted if it specifies a site which is within the protected contour of a co-channel or first adjacent channel TV broadcast station (Added 82-107, 6/17/82)

ANS: See answer to 74.705 (b)(2)

(2) Due to the frequency spacing which exists between TV Channels 4 and 5, between Channels 6 and 7, and between Channels 13 and 14, adjacent channel protection standards shall not be applicable to these pairs of channels. (See 73.603(a) of Part 73 of this chapter.) (Added 82-107, 6/17/82)

ANS: Nearest TV on both channels 14 and 15 is channel 14 KSGI Digital Allocation in Cedar City, UT at 158.4 Km. This facility is not on the air and has no application is on file. The nearest operating station is KINC (BLCT-90116KE), channel 15, Las Vegas, NV at 337.7 Km. The proposed operating area is not within the protected contour of a co-channel or first adjacent channel TV broadcast station.

(3) A UHF low power TV or TV translator construction permit application will not be accepted if it specifies a site within the UHF TV broadcast station's protected contour and proposes operation on a channel either 14 or 15 channels above the channel in use by the TV broadcast station. (Added 82-107, 6/17/82)

ANS: No channels in use 14 or 15 channels below channel 14.

(4) A UHF low power TV or TV translator construction permit application will not be accepted if it specifies a site less than 100 kilometers from the transmitter site of a UHF TV broadcast analog station operating on a channel which is the seventh channel above the requested channel, unless it can demonstrate that the service area of the low power TV or TV translator station as established in 74.707(a) is not located in an area where the TV broadcast analog station is regularly viewed.

ANS: No standard TV facilities on channel 21 within 150 Km.

(5) An application for a new UHF low power TV or TV translator construction permit, a change of channel, or a major change in facilities pursuant to 73.3572 of this chapter proposing a maximum effective radiated power of more than 50 kilowatts will not be accepted if it specifies a site less than 32 kilometers from the transmitter site of a UHF TV broadcast analog station operating on a channel which is the second, third, or fourth channel above or below the requested channel.

ANS: There are no operating facilities nor CP's granted for TV facilities on channels 10, 11, 12, 13, 15, 16, 17 and 18 within 100 Km. of the operating area. There is

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an allocation for channel 17 in Page, AZ and an application for that channel.
Proposed facility has only 3.85 watts ERP.

(c) The low power TV, TV translator, or TV booster station field strength is calculated from the proposed effective radiated power (ERP) and the antenna height above average terrain (HAAT) in pertinent directions. (Revised 9/21/87, 87-244)

(1) For co-channel protection, the field strength is calculated using Figure 9a, 10a, or 10c of 73.699 (F(50,10) charts) of Part 73 of this chapter (Added 82-107, 6/17/82)

ANS: A much more conservative model (Free Space) is used for the proposed temporary facility due to the unusual height of the airborne antenna.

(2) For low power TV, TV translator, and TV boosters that do not specify the same channel as the TV broadcast station to be protected, the field strength is calculated using Figure 9, 10, or 10b of 73.699 (F(50,50) charts) of Part 73 of this chapter. (Revised 9/21/87, 87-244)

ANS: A much more conservative model (Free Space) is used for the proposed temporary facility due to the unusual height of the airborne antenna.

(d) A low power TV, TV translator, or TV booster station application will not be accepted if the ratio in dB of its field strength to that of the TV broadcast station at the protected contour fails to meet the following: (Revised 9/21/87, 87-244)

(1) -45 dB for co-channel operations without offset carrier frequency operation or -28 dB for offset carrier frequency operation. An application requesting offset carrier frequency operation must include the following: (Added 82-107, 6/17/82)

(i) A requested offset designation (zero, plus, or minus) identifying the proposed direction of the 10 kHz offset from the standard carrier frequencies of the requested channel. If the offset designation is not different from that of the station being protected, the -45 dB ratio must be used. (Added 82-107, 6/17/82)

ANS: Figure 1 demonstrates the interfering 29 dbu [50,10] contour as calculated by free space and multiple diffraction loss (when hitting the ground) methods. The 74 dbu protected coverage contours are calculated using standard FCC methods as outlined in this section. The proposed system will use a 25 kHz bandwidth 5.28 dbd ERP transmitter at 471.25 MHz. The frequency stability and accuracy of the data transmitting device exceeds the standards set out in 74.761 for offset operation.

This facility will use zero frequency offset to limit interference to all co-channel TV facilities. Figure 2 demonstrates the interfering 46 dbu [50,10] contour allowed by offset operation.

(ii) A description of the means by which the low power TV, TV translator, or TV booster station will be maintained within the tolerances specified in 74.761 for offset operation (Revised 9/27/87, 87-244)

ANS: The frequency of the transmitter modem will be held within +/- 1 kHz as outlined in 74.761.

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- (2) 6 dB when the protected TV broadcast station operates on a VHF channel that is one channel above the requested channel. (Added 82-107, 6/17/82)
- (3) 12 dB when the protected TV broadcast station operates on a VHF channel that is one channel below the requested channel. (Added 82-107, 6/17/82)
- (4) 15 dB when the protected TV broadcast station operates on a UHF channel that is one channel above or below the requested channel. (Added 82/107, 6/17/82)

ANS: The distance to the 89 dbu free space contour is 488 meters and does not reach the ground from the altitudes used in this test.
- (5) 23 dB when the protected TV broadcast station operates on a UHF channel that is fourteen channels below the requested channel. (Added 82/107, 6/17/82)

ANS: No channels in use 14 or 15 channels below channel 14.
- (6) 6 dB when the protected TV broadcast station operates a UHF channel that is fifteen channels below the requested channel. (Added 82/107, 6/17/82)

ANS: No UHF channels in use 14 or 15 channels below channel 14.
- (e) In support of a request for waiver of the interference protection rules, an applicant for a low power TV, TV translator or TV booster may make full use of terrain shielding and Longley-Rice terrain dependent propagation prediction methods to demonstrate that the proposed facility would not be likely to cause interference to TV broadcast stations. Guidance on using the Longley-Rice methodology is provided in *OET Bulletin No. 69*. Copies of *OET Bulletin No. 69* may be inspected during normal business hours at the: Federal Communications Commission, 1919 M St., NW., Dockets Branch (Room 239), Washington, DC 20554. This document is also available through the Internet on the *FCC Home Page* at <http://www.fcc.gov>.

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74.706 DIGITAL TV (DTV) STATION PROTECTION. (Added 97-115, 6/13/97)

- (a) For purposes of this section, the DTV station protected service area is the geographic-area in which the field strength of the station's signal exceeds the noise-limited service levels specified in 73.622(e) of this chapter. The extremity of this area (noise-limited perimeter) is calculated from the authorized maximum radiated power (without depression angle correction), the horizontal radiation pattern, and height above average terrain in the pertinent direction, using the signal propagation method specified in 73.625(b) of this chapter. (Added 97-115, 6/13/97)
- (b)
 - (1) An application to construct a new low power TV or TV translator station or change the facilities of an existing station will not be accepted if it specifies a site which is located within the noise-limited service perimeter of a co-channel DTV station. (Added 97-115, 6/13/97)
 - (3) Due to the frequency spacing which exists between TV Channels 4 and 5, between Channels 6 and 7, and between Channels 13 and 14, adjacent channel protection standards shall not be applicable to these pairs of channels. (Added 97-115, 6/13/97)
- (c) The low power TV, TV translator, or TV booster station field strength is calculated from the proposed effective radiated power (ERP) and the antenna height above average terrain (HAAT) in pertinent directions. (Added 97-115, 6/13/97)
 - (1) For co-channel protection, the field strength is calculated using Figure 9a, 10a, or 10c of 73.699 (F(50,10) charts) of Part 73 of this chapter. (Added 97-115, 6/13/97)
 - (2) For adjacent channel protection, the field strength is calculated using Figure 9, 10, or 10b of 73.699 (F(50,50) charts) of Part 73 of this chapter. (Added 97-115, 6/13/97)
- (d) A low power TV, TV translator or TV booster station application will not be accepted if the ratio in dB of its field strength to that of the DTV station (L/D ratio) fails to meet the following:
 - (1) -2 dB or less for co-channel operations. This maximum L/D ratio for co-channel interference to DTV service is only valid at locations where the signal-to-noise (S/N) ratio is 25 dB or greater. At the edge of the noise-limited service area, where the S/N ratio is 16 dB, the maximum L/D ratio for co-channel interference from analog low power TV, TV translator or TV booster service into DTV service is -21 dB. At locations where the S/N ratio is greater than 16 dB but less than 25 dB, the maximum L/D field strength ratios are found from the following Table (for values between measured values, linear interpolation can be used): (Revised 98-24, 5/19/98)

Signal-to-Noise Ratio (dB)	DTV-to-low power ratio (dB)
16.00	21.00
16.35	19.94
17.35	17.69
18.35	16.44
19.35	7.19
20.35	4.69
21.35	3.69
22.35	2.94
23.35	2.44
25.00	2.00

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- (2) +48 dB for adjacent channel operations at: (Added 97-115, 6/13/97)
- (i) The DTV noise-limited perimeter if a low power TV, TV translator, or TV booster station is located outside that perimeter. (Added 97-115, 6/13/97)
 - (ii) At all points within the DTV noise-limited area if a low power TV or TV translator is located within the DTV noise-limited perimeter, as demonstrated by the applicant. (Added 97-115, 6/13/97)

ANS: There are no operating channel 15 DTV facilities within 300 Km of the test area.

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74.705 LOW POWER TV AND TV TRANSLATOR STATION PROTECTION.

- (a) (1) A low power TV or TV translator will be protected from interference from other low power TV or TV translator stations, or TV booster station within the following predicted contours: (Revised 87-244, 9/21/87)
- (i) 62 dBu for stations on Channels 2 through 6; (Added 82-107, 6/17/82)
 - (ii) 68 dBu for stations on Channels 7 through 13; and (Added 82-107, 6/17/82)
 - (iii) 74 dBu for stations on channels 14 through 69. (Revised 82-333, 9/14/82)

Existing licensees and permittees that did not furnish sufficient data required to calculate the above contours by April 15, 1983 are assigned protected contours having the following radii: (Added 83-129, 6/13/83)

Up to 0.001 kW VHF/UHF - 1 mile (1.6 km) from transmitter site
Up to 0.01 kW VHF; up to 0.1 kW UHF - 2 miles (3.2 km) from transmitter site
Up to 0.1 kW VHF; up to 1 kW UHF - 4 miles (6.4 km) from transmitter site

New applicants must submit the required information: they cannot rely on this table. (Added 83-129, 6/13/83)

- (2) The low power TV or TV translator station protected contour is calculated from the authorized effective radiated power and antenna height above average terrain, using Figure 9, 10, or 10b of 73.699 (F[50.50] charts of Parts 73 of this chapter. (Added 82-107, 6/17/82)
- (b) (1) An application to construct a new low power TV, TV translator, or TV booster station or change the facilities of an existing station will not be accepted if it specifies a site which is within the protected contour of a co-channel or first adjacent channel low power TV, TV translator, or TV booster station, except that a TV booster station may be located within the protected contour of its co-channel primary station. (Revised 87-244, 9/21/87)
- (3) Due to the frequency spacing which exists between TV Channels 4 and 5, between 6 and 7, and between Channels 13 and 14, adjacent channel protection standards shall not be applicable to these pairs of channels. (See 73.603(a) of Part 73 of this chapter.) (Added 82-107, 6/17/82)

ANS: The nearest LPTV or TV translator on channels 14 or 15 is K15DX (BLTT-930628IA), channel 15 in Fredonia, Etc., AZ located 92.7 Km from the test area. This facility's service contour is far outside of the test area. Figure 3 gives the allocation situation for all channel 14 and 15 TV facilities within 200 km of the test area.

- (4) A UHF low power TV, TV translator, or TV booster construction permit application will not be accepted if it specifies a site within the UHF low power TV, TV translator, or TV booster station's protected contour and proposes operation on a channel that is 15 channels above the channel in use by the low power TV, TV translator, or TV booster station. (Revised 97-115, 6/13/97)

ANS: There are no UHF facilities 15 channels below this channel 14 proposal.

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(c) The low power TV, TV translator, or a TV booster construction permit application field strength is calculated from the proposed effective radiated power (ERP) and the antenna height above average terrain (HAAT) in pertinent directions.

(1) For co-channel protection, the field strength is calculated using Figure 9a, 10a, or 10c of 73.699 (F[50,10] charts) of Part 73 of this chapter (Added 82-107, 6/17/82)

ANS: A much more conservative model (Free Space) is used for the proposed temporary facility due to the unusual height of the airborne antenna.

(2) For low power TV, TV translator, or TV booster applications that do not specify the same channel as the low power TV, TV translator, or TV booster station to be protected, the field strength is calculated using Figure 9, 10, or 10b of 73.699 (F (50,50) charts) of Part 73 of this chapter.

ANS: A much more conservative model (Free Space) is used for the proposed temporary facility due to the unusual height of the airborne antenna.

(d) A low power TV, TV translator, or TV booster station application will not be accepted if the ratio in dB of its field strength to that of the authorized low power TV, TV translator, or TV booster station at its protected contour fails to meet the following:

(1) -45 dB for co-channel operations without offset carrier frequency operation or -28 dB for offset carrier frequency operation. An application requesting offset carrier frequency operation must include the following: (Added 82-107, 6/17/82)

(i) A requested offset designation (zero, plus, or minus) identifying the proposed direction of the 10 kHz offset from the standard carrier frequencies of the requested channel. If the offset designation is not different from that of the station being protected, or if the station being protected is not maintaining its frequencies within the tolerance specified in 74.761 for offset operation, the -45 dB ratio must be used. (Added 82-107, 6/17/82)

ANS: Figure 1 demonstrates the interfering 29 dbu [50,10] contour as calculated by free space loss and multiple diffraction loss (when hitting the ground) methods. The 74 dbu protected coverage contours are calculated using standard FCC methods as outlined in this section. The proposed system will use a 25 kHz bandwidth 5.28 dbd ERP transmitter at 471.25 MHz. The frequency stability and accuracy of the data transmitting device exceeds the standards set out in 74.761 for offset operation.

This facility will use zero frequency offset to limit interference to all co-channel TV facilities. Figure 2 demonstrates the interfering 46 dbu [50,10] contour allowed by offset operation.

There are three LPTV facilities within the 29 dbu interfering contour of the proposed test: K14JS, K14HG, and K14HC. K14JS has plus frequency offset. K14HG uses a minus frequency offset. And K14HC has a plus frequency offset. The proposed test modem transmitter will use a zero frequency offset at 471.25 Mhz, the video carrier frequency of channel 14.

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- (ii) A description of the means by which the low power TV, TV translator, or TV booster station's frequencies will be maintained within the tolerances specified in 74.761 for offset operation.

ANS: The frequency of the transmitter modem will be held within +/- 1 kHz as outlined in 74.761

- (2) 6 dB when the protected low power TV or TV translator station operates on the VHF channel that is one channel above the requested channel. (Added 82-107, 6/17/87)
- (3) 12 dB when the protected low power TV or TV translator station operates on a VHF channel that is one channel below the requested channel. (Added 82-107, 6/17/87)
- (5) 15 dB when the protected low power TV or TV translator station operates on a UHF channel that is one channel above or below the requested channel. (Added 82/107, 6/17/82)

ANS: The distance to the 89 dbu free space contour is 488 meters and does not reach the ground from the altitudes used in this test.

- (6) 6 dB when the protected low power TV or TV translator station operates on a UHF channel that is fifteen channels below the requested channel.

ANS: There are no UHF TV channels 15 channels below channel 14.

- (e) In support of a request for waiver of the interference protection rules, an applicant for a low power TV or TV translator station may make full use of terrain shielding and Longley-Rice terrain dependent propagation prediction methods to demonstrate that the proposed facility would not be likely to cause interference to low power TV, TV translator and TV booster stations. Guidance on using the Longley-Rice methodology is provided in *OET Bulletin No. 69*. Copies of *OET Bulletin No. 69* may be inspected during normal business hours at the: Federal Communications Commission, 1919 M St., NW., Dockets Branch (Room 239), Washington, DC 20554. This document is also available through the Internet on the *FCC Home Page* at <http://www.fcc.gov>.

**Engineering Statement in Support of Airborne Communications Test at Page, AZ
Satellite Communications Group
Motorola**

74.709 LAND MOBILE STATION PROTECTION

ANS: There are no land mobile facilities within 400 Km of the proposed test area.

**Engineering Statement in Support of Airborne Communications Test at Page, AZ
Satellite Communications Group
Motorola**

Table 1

TV CHANNEL INTERFERENCE STUDY

Job title: Detailed LPTV Study Page, AZ Municipal Airport
Proposed latitude: N 36 55 31.00
Proposed longitude: W 111 26 52.00
Proposed transmit antenna elevation(AMSL):1297.0 meters (2 meters above ground)
Proposed maximum ERP: 0.0039 kW
Database file name: FCC
Proposed offset: no offset
Proposed zone: 0

Proposed channel: 14

CH	Call	Record	City	ST	Z	Status	Bear.	Dist.	Reqd. Dist.	Result
15+	ALLOTM	10786	FARMINGTON	NM	2		87.8	289.0	0.0	
16-	ALLOTM	11124	MONTICELLO	UT	2		59.9	213.9	0.0	
14+	ALLOTM	11134	MOAB	UT	2		41.8	248.1	0.0	
18+	ALLOTM	11348	HOLBROOK	AZ	2		152.4	252.4	0.0	
15o	ALLOTM	11391	PRICE	UT	2		10.4	301.9	0.0	
16o	ALLOTM	11657	FLAGSTAFF	AZ	2		185.5	192.5	0.0	
17o	ALLOTM	11677	PAGE	AZ	2		250.9	1.2	0.0	
15	K15EM	11694	ESCALANTE	UT	0	LIC	352.3	96.6	4.4	
	Prop F(50,10)	89 dBu	0.0 km + K15EM	F(50,50)	74 dBu		4.4 km =		4.4	
	Prop F(50,50)	74 dBu	2.1 km + K15EM	F(50,50)	89 dBu		1.8 km =		3.9	
17o	NEW	11695	PAGE	AZ	2	APP	295.0	22.8	32.0	-9.2
	32 km distance separation requirement from Part 74.705(b)(5)									
Not Granted and Not on Air										
19o	ALLOTM	12217	PRESCOTT	AZ	2		199.4	280.4	0.0	

**Engineering Statement in Support of Airborne Communications Test at Page, AZ
Satellite Communications Group
Motorola**

Table 1 (continued)

CH	Call	Record	City	ST	Z	Status	Bear.	Dist.	Reqd. Dist.	Result
15	K15DX	12242	FREDONIA, ETC.	AZ	0	LIC	274.5	94.2		3.2
	Prop F(50,10)	89 dBu	0.0 km + K15DX	F(50,50)	74	dBu	3.2 km	=		3.2
	Prop F(50,50)	74 dBu	0.0 km + K15DX	F(50,50)	89	dBu	0.0 km	=		0.0
16+	ALLOTM	12635	CEDAR CITY	UT	2		300.8	166.2		0.0
14	KSGI_DT	12691	CEDAR CITY	UT	2	ALLOC	296.0	159.3		277.5 ACINF
	Prop F(50,10)	20 dBu	30.2 km + KSGI_D	F(50,90)	41	dBu	108.8 km	=		139.1
	Prop F(50,50)	74 dBu	0.0 km + KSGI_D	F(50,10)	29	dBu	277.5 km	=		277.5

No Application and Not on Air

End of channel 14 study

**AFFIDAVIT AND QUALIFICATIONS OF
C. F. ELLIS**

Charles F. Ellis affirms that he is a consulting radio and electronics engineer; that he is a professional engineer registered in the State of Louisiana; that the foregoing report was prepared by him or under his direction; and that the statements contained therein are true to his own personal knowledge except those stated to be on information and belief, and as to those statements, he verily believes them to be true.



C. F. Ellis, P.E.

Affiant

July 1, 1999

Figure 1

Prop. model: Free Space + RMD
 Time: 10.0% Loc.: 50.0%
 Prediction Confidence Margin: 0.0dB
 Climate: Continental Temperate
 Groundcover: USGS
 Atmospheric Abs.: none
 K Factor: 1.333
 RX Antenna - Type: OMNI
 Height: 9.1 m AGL Gain: 0.00 dBd
 Field strength at remote

> 29.0 dBuV/m
 < 29.0 dBuV/m

Min. receiver threshold level: -200.0 dBmW

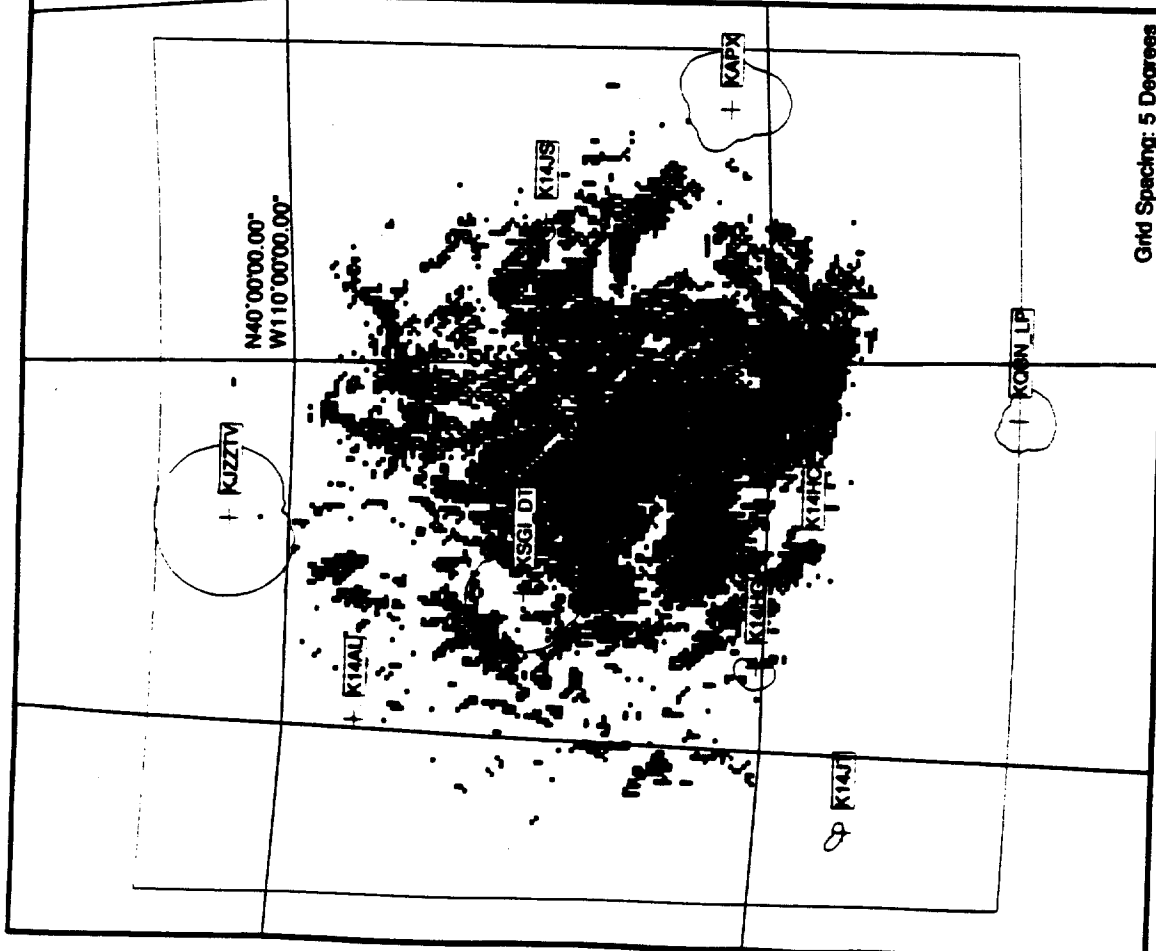
Ant. Elev. ERPd Ant. Type
 Site AMSL (m) (GBW/Orient. Coordinates
 Prop_Tx* 9144.0 5.86 Omni-V N36°54'46.00"
 Group: 1 471.2500 MHz W111°27'46.00"

KILOMETERS



Possible Areas of Interference Based on Full TV
 Signal with no Offset

Prepared by:
 Ellis Engineering
 Lafayette, LA
 318.208.0204
 June 30, 1999



Grid Spacing: 5 Degrees

Figure 2

Prop. model: Free Space + RMD
Time: 10.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Groundcover: USGS
Atmospheric Abs.: none
K Factor: 1.333
RX Antenna - Type: OMNI
Height: 9.1 m AGL Gain: 0.00 dBd
Field strength at remote
> 46.0 dBuV/m
< 46.0 dBuV/m
Min. receiver threshold level: -200.0 dBmW

Ant. Elev. ERPd Ant. Type
Site AMSL (m) (dBW) Orient. Coordinates
Prop_Tx 9144.0 5.86 Omni-V N36°54'46.00"
group: 1 471.2500 MHz W111°27'46.00"



Possible Areas of Interference Based on Full TV
Signal with Offset

Prepared by:
Ella Engineering
Lafayette, LA
318 289 0294
June 30, 1999

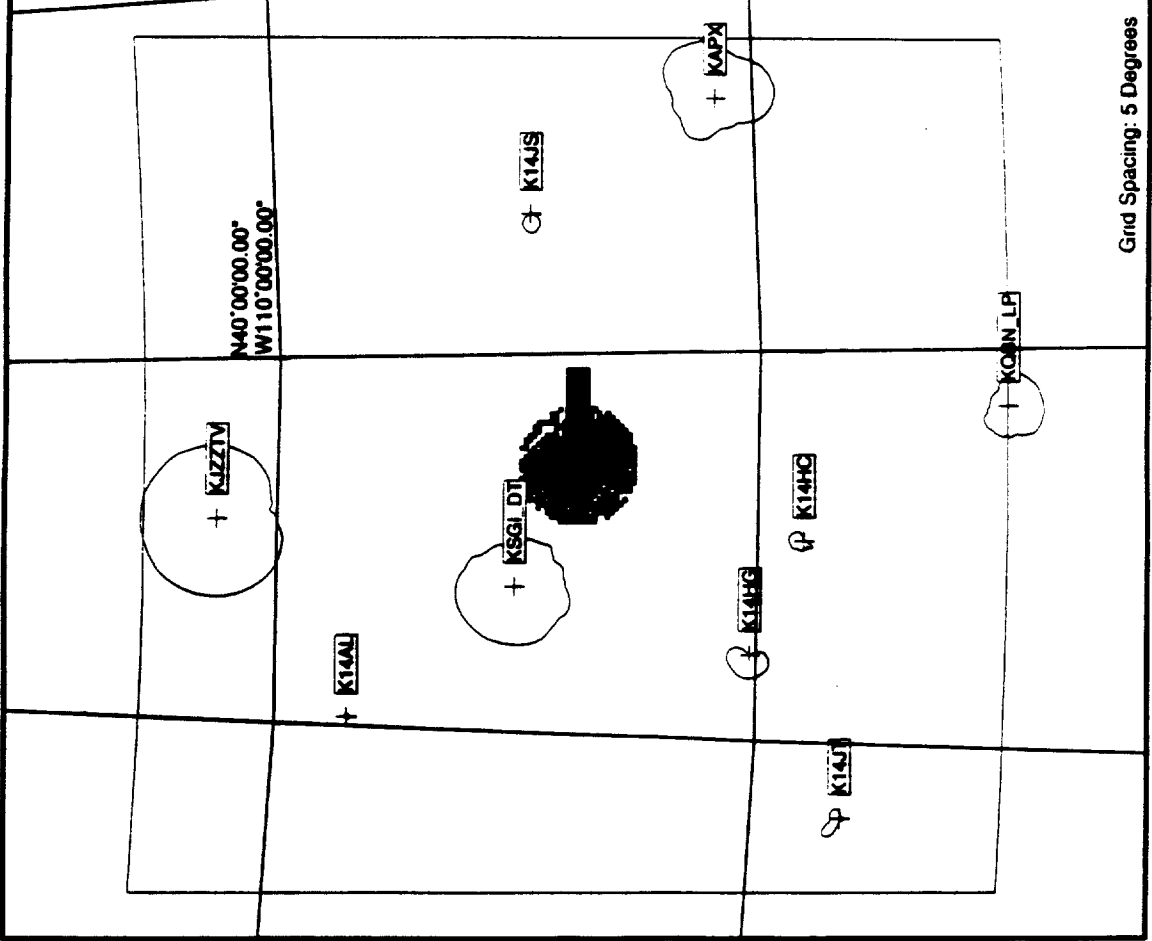


Figure 3

Prop. model: FCC
Time: 50.0% Loc.: 50.0%

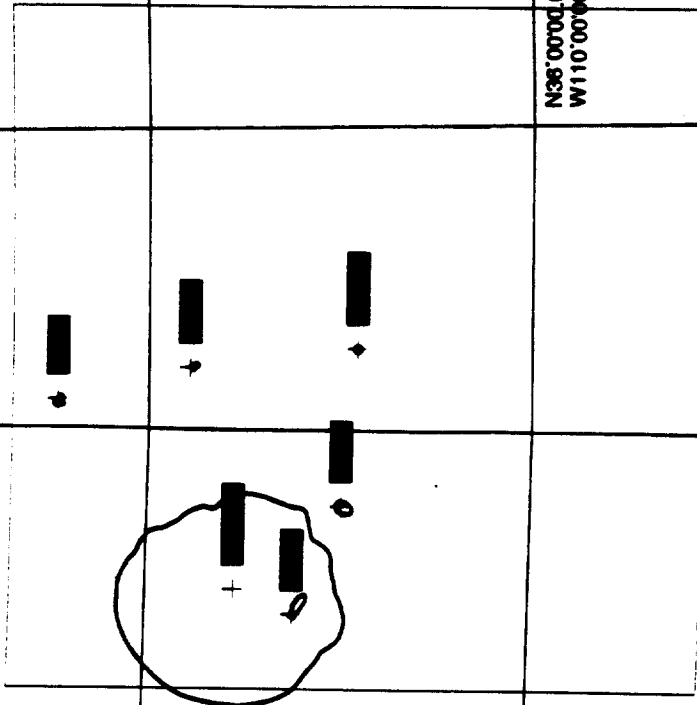
Field strength at remote
= 74.0 dBuV/m

Ant. Elev. ERPd Ant. Type
AMS L (m)(dBW)/Orient. Coordinates
Prop. Tx* 5486.4 3.01 Omni-V N36°54'46.00"
Group: 1 473.0000 MHz W111°27'46.00"



Channel 14 and 15 TV
and LPTV Facilities
Within 200 Km

Prepared By:
Ella Engineering
Lafayette, LA
318.288.0284
June 30, 1998



N36°00'00.00"
W110°00'00.00"

Grid Spacing: 2 Degrees