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Engineering Statement

KBER-FM Channel 266C Ogden

Application for Modification of License

This Engineering Statement has been prepared on behalf of Citadel Broadcasting Company ("Citadel"), and is a part of an application for modification of license BLH-19790130AE for FM station KBER at Ogden, Utah. KBER operates from the FM master antenna located on Farnsworth Peak; this antenna is shared with several other users.

The instant application serves to:

- 1) Provide the FCC Antenna Structure Registration Number for this structure.
- 2) Make a one-second correction in the licensed coordinates of KBER transmitter site, to match the coordinates on the FCC Antenna Structure Registration. No correction of the height data is necessary in conjunction with the coordinate correction.
- 3) Reflect a change in transmitter power output and effective radiated power for the station, caused by the recent replacement of the omnidirectional antenna.

Attached to this statement are several exhibits in support of the proposed modification of license:

- 1) An allocation study for KBER at the corrected coordinates.
- 2) A contour map demonstrating that KBER will continue to provide 70 dBu to Ogden, the station's community of license.
- 3) A copy of an intermodulation study report prepared for the Farnsworth Peak FM stations in conjunction with the antenna replacement, which also added a number of new stations to this master antenna system.
- 4) An NIER analysis for the new antenna system.

The revised technical parameters for KBER are:

Coordinates:	N40-39-34 x W112-12-05
FCC ASR #:	1053380
Site Elevation:	2755 m AMSL
Radiation Center:	48 m AGL 2803 m AMSL 1140 m HAAT
Omni ERP:	25 kW (H) 25 kW (V)

Allocation Considerations

The attached spacing study demonstrates that operation of KBER at the corrected coordinates meets the co-channel and adjacent channel spacing requirements for Class C stations as prescribed in §73.207 of the Commission's Rules, with the exception of a 5 km short-spacing to the authorized operation of KWSA 265C2 at Price, Utah (FCC File No. BMPH-20020726ABU).

This short-spacing, however, was created by KWSA in its July 2002 application. The licensed KWSA Class A operation is fully-spaced to KBER. In BMPH-20020726ABU, KWSA demonstrated that its proposed Class C2 facility would not cause prohibited contour overlap with KBER, presuming KBER operation with maximum Class C facilities of 100 kW ERP at 600 meters HAAT.

The one-second correction of the KBER transmitter site coordinates does not change the short-spacing with KWSA; the short-spacing will remain at 5 km. Furthermore, the KBER site coordinate correction will not introduce any prohibited contour overlap with KWSA. Therefore, the KBER transmitter site coordinate correction is believed to satisfy all spacing and allocation requirements.

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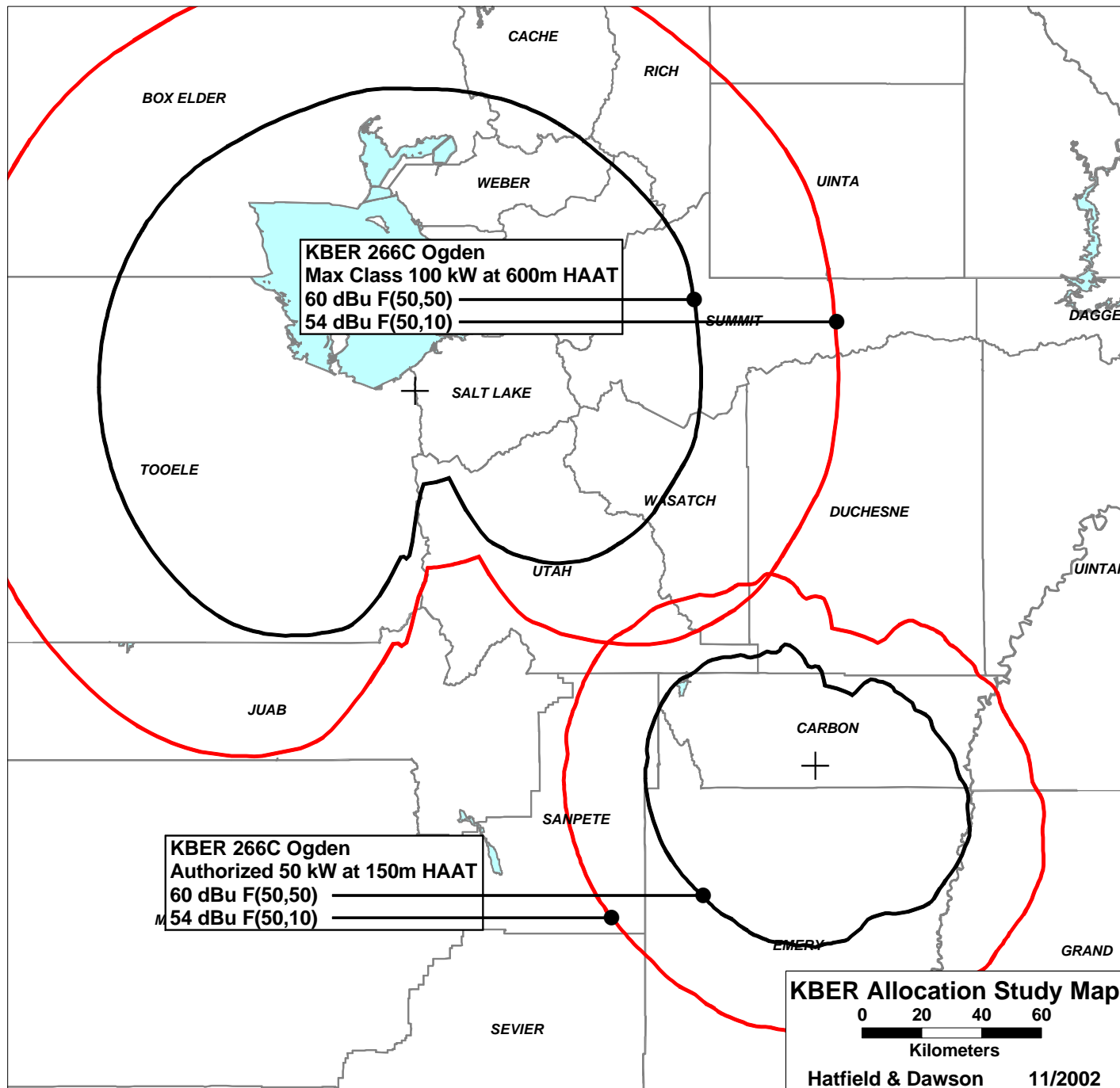
Channel: 266C      101.1 MHz
Latitude: 40 39 34
Longitude: 112 12 5
Safety Zone: 32 km
Job Title: KBER 266C Oarden

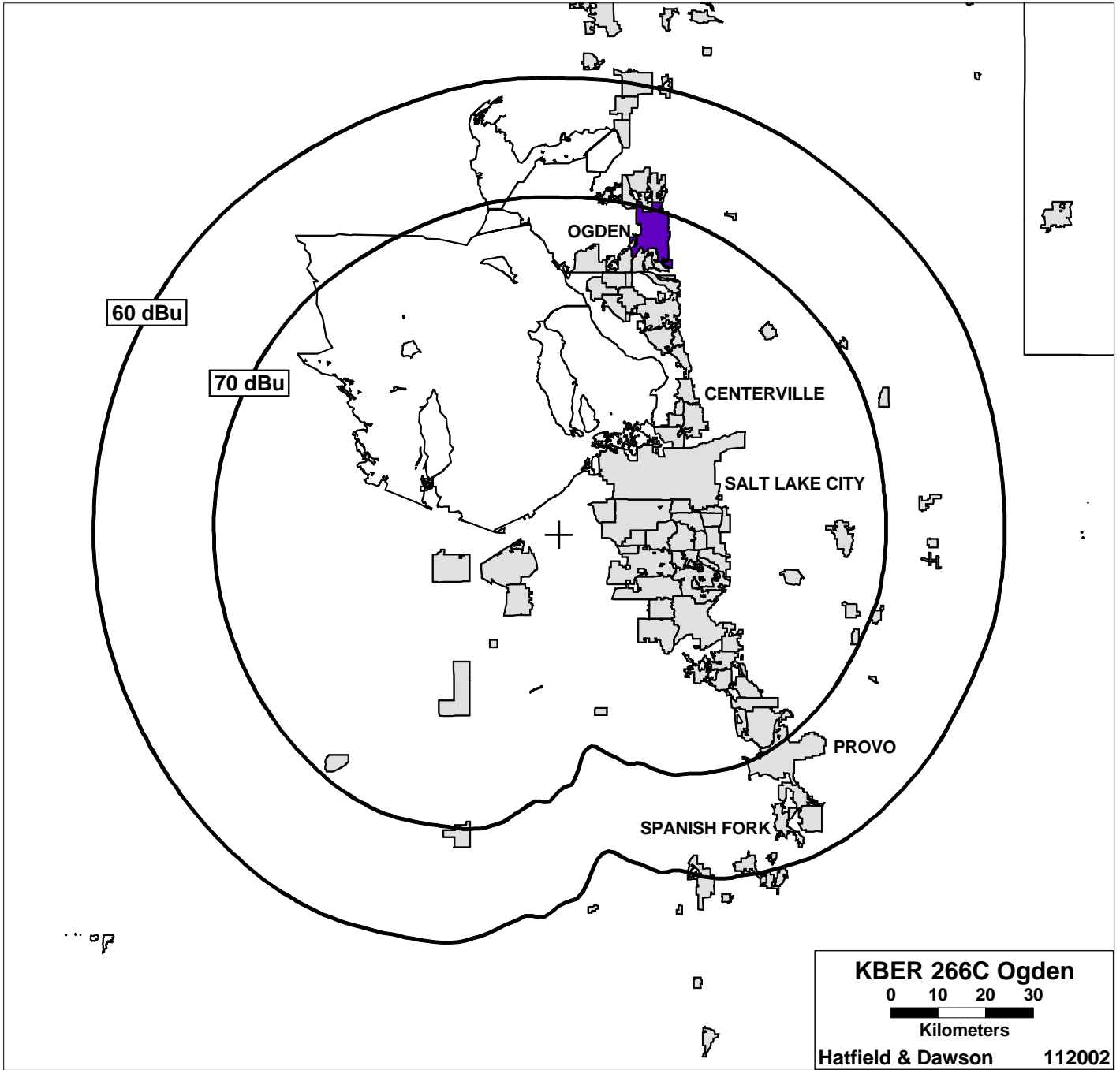
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Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
K213CP LIC	SALT LAKE CITY UT BLFT-981009TG	213D 90.5	0.010 968.0	DA	40-16-57 111-56-10	151.8	47.52 0.00	0 TRANS
K213CQ LIC	SALT LAKE CITY UT BLFT-001016ACD	213D 90.5	0.010 516.0		40-48-27 111-53-18	57.9	31.14 0.00	0 TRANS
KJQN LIC	BRIGHAM CITY UT BLH-020215ABI	264C 100.7	81.000 660.0		41-47-08 112-13-55	358.8	125.09 20.09	105 CLEAR
K264AC LIC	RURAL UTAH COUNTY UT BLFT-930720TB	264D 100.7	0.010 710.0	DA	40-05-19 111-49-17	153.0	71.13 0.00	0 TRANS
K265BX LIC	PARK CITY, ETC. UT BLFT-841211TB	265D 100.9	0.020 335.0		40-40-58 111-31-22	87.2	57.44 0.00	0 TRANS
KWSA CP MOD	PRICE UT BMPH-020726ABU	265C2 100.9	50.000 150.0		39-32-08 110-38-00	132.6 SS	182.90 -5.10	188 SHORT
KWSA LIC	PRICE UT BLH-851216KB	265A 100.9	3.000 34.0		39-32-42 110-48-56	136.0	171.10 6.10	165 CLOSE
K266AF LIC	POCATELLO ID BLFT-961121TG	266D 101.1	0.210 443.0	DA	42-52-26 112-30-47	354.1	247.31 0.00	0 TRANS
KBER LIC	OGDEN UT BLH-790130AE	266C 101.1	25.000 1140.0		40-39-35 112-12-05	322.8	0.04 -289.96	290 SHORT
KPKK CP MOD	OAKLEY UT BMPH-010730ABY	268C1 101.5	14.500 619.0		40-52-16 110-59-42	76.6	104.54 -0.46	105 SHORT
KPKK CP MOD	OAKLEY UT BMPH-020314AAZ	268C 101.5	89.000 647.0		40-52-16 110-59-43	76.6	104.52 -0.48	105 SHORT
KPKK-1 APP	OGDEN UT BNPFTB-020710AAP	268D 101.5	5.000 0.0	DA	41-09-57 112-00-52	15.5	58.40 0.00	0 BOOST
NEW-T APP	PROVO UT BNPFT-021115AAO	268D 101.5	0.150 177.0	DA	40-19-22 111-40-12	129.6	58.54 0.00	0 TRANS

[illegible]

44444 END OF FM SPACING STUDY FOR CHANNEL 266 44444





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OCCUPIED BANDWIDTH AND SPURIOUS EMISSIONS MEASUREMENTS
KBER – FM, OGDEN, UTAH

5 November 2002

ENGINEERING REPORT

On the evening of 31 October 2002, I made the equipment performance measurements contemplated in 47 CFR § 73.1590 (a & b) and described in 47 CFR § 73.317 (b-d), for radio station KBER(FM), Ogden, Utah.

KBER is one of 13 stations sharing a master antenna system at the Farnsworth Peak transmitter site in the Oquirrh Mountains, west of Salt Lake City, Utah. The outputs of the 13 transmitters are combined using a constant impedance balanced bandpass filter combining system designed and fabricated by Jampro Antennas of Sacramento, California. These measurements were made in response to the replacement of the antenna system and the modification of the combining system to allow for the addition of three more stations.

Measurements were made while the station was broadcasting programming material typical of its daily operation. KBER operates stereophonically with no subsidiary communications services. All 13 stations were operating into the combined antenna system at full licensed/permitted power during the measurements.

The combining system consists of two combining chains, one of six stations, the other of seven. The outputs of the two combining chains are combined using a 90° hybrid, the output lines of which feed the antenna. Stations with 800 kHz frequency spacing are assigned to opposite combining chains, taking advantage of the 30-35 dB transhybrid loss to improve isolation. Sample loops are provided in the output transmission lines of both combining chains. The measurement sample was taken from the loop located in the chain which KBER feeds.

47 CFR § 73.317 (b) & (c) requires that all signals between 120 and 240 kHz removed from the carrier be attenuated below the level of the carrier by at least 25 dB; that all signals between 240 kHz and 600 kHz removed from the carrier be attenuated by at

least 35 dB below the level of the carrier; and that all signals greater than 600 kHz removed from the carrier be attenuated by at least 80 dB below the level of the carrier.

Three sets of measurements were made to assure compliance with these requirements. The first measurement looked at the spectrum between –600 kHz and +600 kHz, relative to the carrier frequency, in order to assess the station's occupied bandwidth under modulation. The second measurement looked at the spectrum from –1 Mhz to –600 kHz and +600 kHz to +1 MHz, relative to the carrier frequency, to look for near-in intermodulation products. The third measurement scanned the spectrum from 9 KHz to 1 GHz in order to detect any out-of-band intermodulation products or harmonics.

All measurements were taken with a Rohde & Schwarz Model FSP3 Spectrum Analyzer, Serial Number 835151/011, within current calibration.

To measure the occupied bandwidth, the spectrum analyzer was set to 101.1 MHz center frequency, 200 kHz/div span, 3 kHz resolution bandwidth, and 10 kHz video filtering. This results in a measurement noise floor of approximately –72 dBC. An unmodulated carrier was used to establish the reference point at the top of the screen, the analyzer placed in the peak hold mode and modulation applied. After ten minutes of data collection, the resultant spectrum was saved and a plot made of it for analysis.

A copy of this plot is included as Figure 1, below. The emission limits of 47 CFR § 73.317 (b-d) are shown on the plot as red lines. It can be clearly seen from this plot that the occupied bandwidth of KBER lies well within the prescribed limits between –600 kHz and +600 kHz, relative to the carrier frequency.

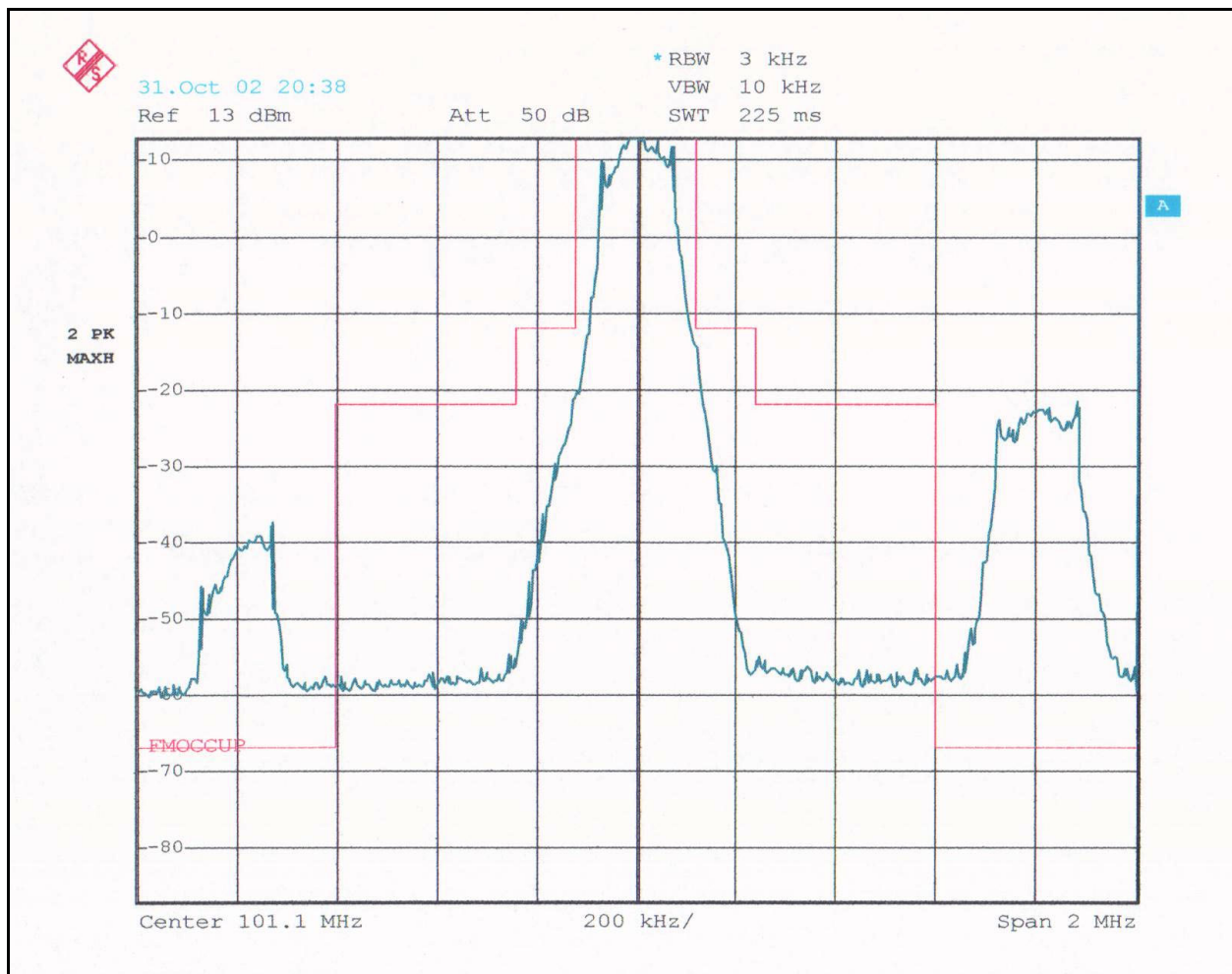


FIGURE 1

To make the second set of measurements a set of six notch filters, connected in series, was inserted between the measurement port and the input of the spectrum analyzer. The notch filters were tuned using a Hewlett-Packard 8712B Network Analyzer to place a notch at the center frequency of each of the stations on the combiner chain shared with KBER. The insertion loss of the notch filters was typically –20 dB at the center frequency and less than –0.5 dB at ± 600 kHz. The purpose of the notch filters was to increase the dynamic range of the spectrum analyzer by reducing internally generated harmonics and intermodulation products.

The reference level of the spectrum analyzer was reduced by 15 dB, making the top of the screen equal to –15 dBC. No other changes were made to the instrument settings. This configuration reduced the instrument noise floor to approximately –93 dBC. The instrument was again placed in the peak hold mode, data collected for ten minutes, and a plot of the resulting spectrum made.

A copy of this plot is included as Figure 2, below. The emission limits between –1 MHz and –600 kHz, and +600 kHz and +1 Mhz are shown as red lines on the plot. The signal that appears 800 kHz below the KBER carrier was identified as KSFI(FM), Salt Lake City, Utah. The signal that appears 800 kHz above the KBER carrier was identified as KKAT(FM), Ogden, Utah. Both stations are part of the Farnsworth Peak combined antenna system. Other than these signals there are no signals above the prescribed emissions limit.

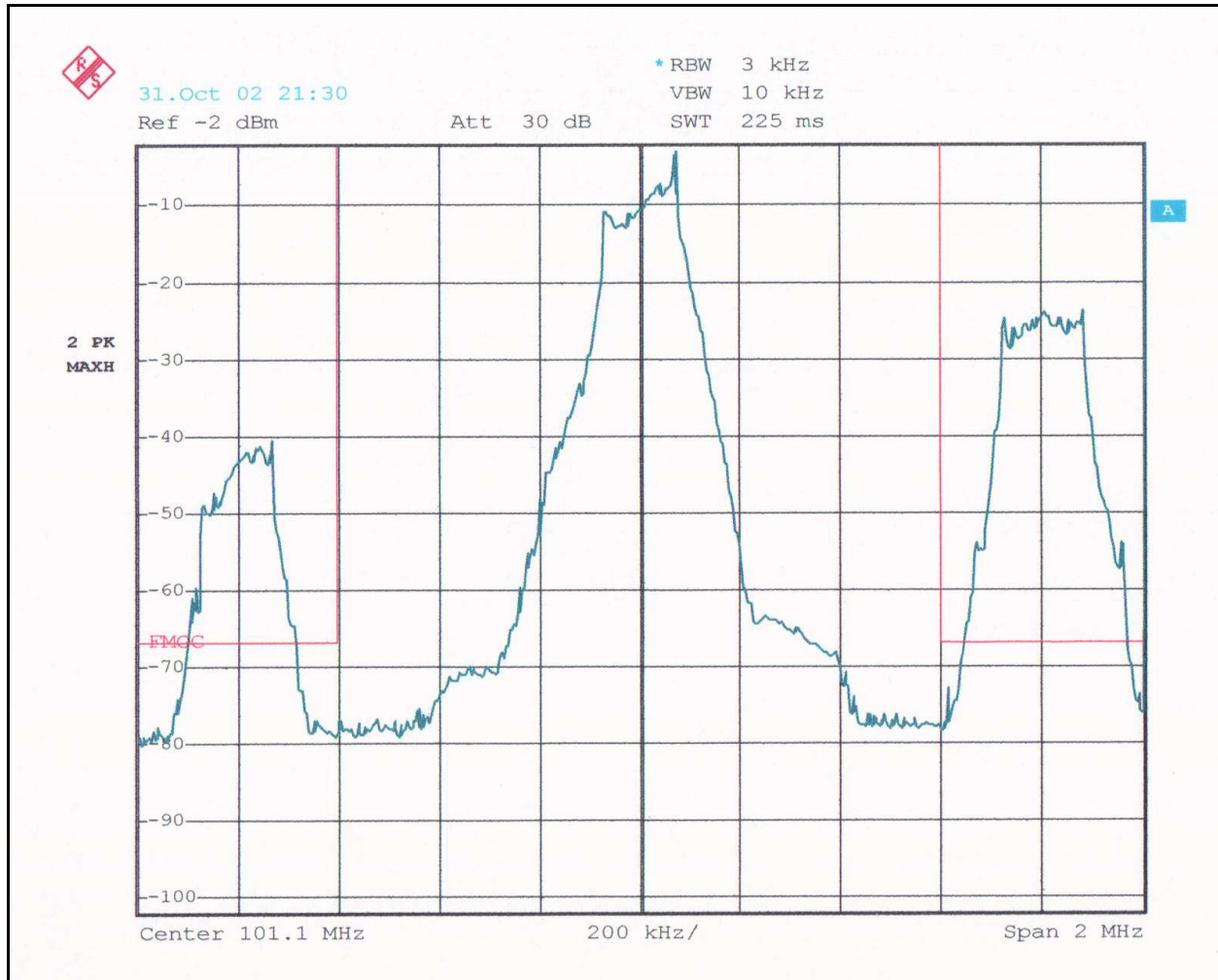


FIGURE 2

To measure spurious signals and harmonics, the spectrum analyzer was set to 2 MHz/div span, 10 kHz resolution bandwidth, and 30 kHz video filtering. The notch filters remained in the sample line. The analyzer was initially set at 10 MHz center frequency and then incremented successively by 20 MHz to scan the spectrum from 9 kHz to 1 GHz. Any signals that were greater –80 dBC were noted. Upon completion of the scan, each of these signals was compared to a list of known transmitters in the area and the analyzer was used to demodulate the signal. All of the signals noted were identified as being either signals from other stations in the combined system or ingress from other known transmitters. No intermodulation products, spurious signals or harmonics were found that could be attributed to the operation of KBER.

In light of the above measurements I believe that KBER is in full compliance with the requirements of 47 CFR § 73.317 (a) through (d).

ENGINEER'S STATEMENT

I hereby affirm that:

I have been retained by KBER to ascertain their compliance with 47 CFR § 73.1590 (a) & (b) and 47 CFR § 73.317 (b-d) and to prepare this report;

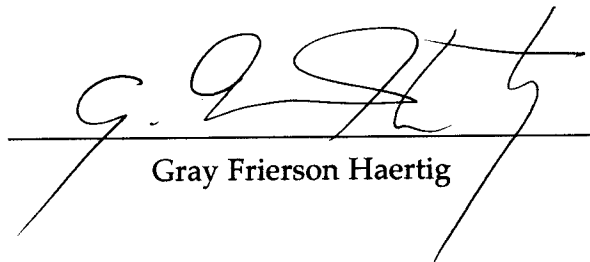
This report and associated exhibits were prepared by me, and are based on measurements made by me;

To the best of my knowledge all statements made herein are true and reflect the actual facts of the matter;

I am a Broadcast Engineer of 36 years experience and;

My qualifications are a matter of record with the Commission.

Respectfully submitted this 5th day of November, 2002,



Gray Frierson Haertig

– GRAY FRIERSON HAERTIG & ASSOC. –
TELECOMMUNICATIONS ENGINEERING

Farnsworth Peak FM Master Antenna NIER Analysis

Facilities Proposed

The proposed operation will be at an effective radiated power of 25 kilowatts. Operation is proposed with a 7-level circularly-polarized omni-directional Jampro panel antenna. This master antenna will be shared by approximately twelve FM stations, and will replace the existing 4-level panel antenna currently in use by those stations.

The antenna will be mounted on the KSL-TV tower at Farnsworth Peak, 17 miles southwest of Salt Lake City. This is a multiple-user communications site hosting a number of FM and television broadcast stations. The FCC Antenna Structure Registration Number for the tower is 1053380.

NIER Calculations

The power density calculations for the proposed facility were made using the techniques outlined in the EPA report titled: *An Engineering Assessment of the Potential Impact of Federal Radiation Protection Guidance on the AM, FM, and TV Broadcast Services* (Gailey & Tell, April, 1985).

"Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. Equation #1, contained in the Gailey & Tell report and shown below, was used to calculate the ground level power density figures from each antenna at incremental distances from the base of its supporting tower.

$$S(mW / cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

D is the distance in meters from the center of radiation to the calculation point.

Ground level power densities have been calculated for locations extending from the base of the

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tower to a distance of 1000 meters. Values past this point are increasingly negligible.

Calculations of the power density produced by the proposed panel antenna system assume a “worst case” ring-stub element pattern. The highest calculated ground level power density for a single station on this antenna occurs at a distance of 8 meters from the base of the antenna support structure. At this point the power density is calculated to be 24.9 FW/cm², just 2.5% of 1000 FW/cm² (the FCC standard for controlled environments such as this one.)

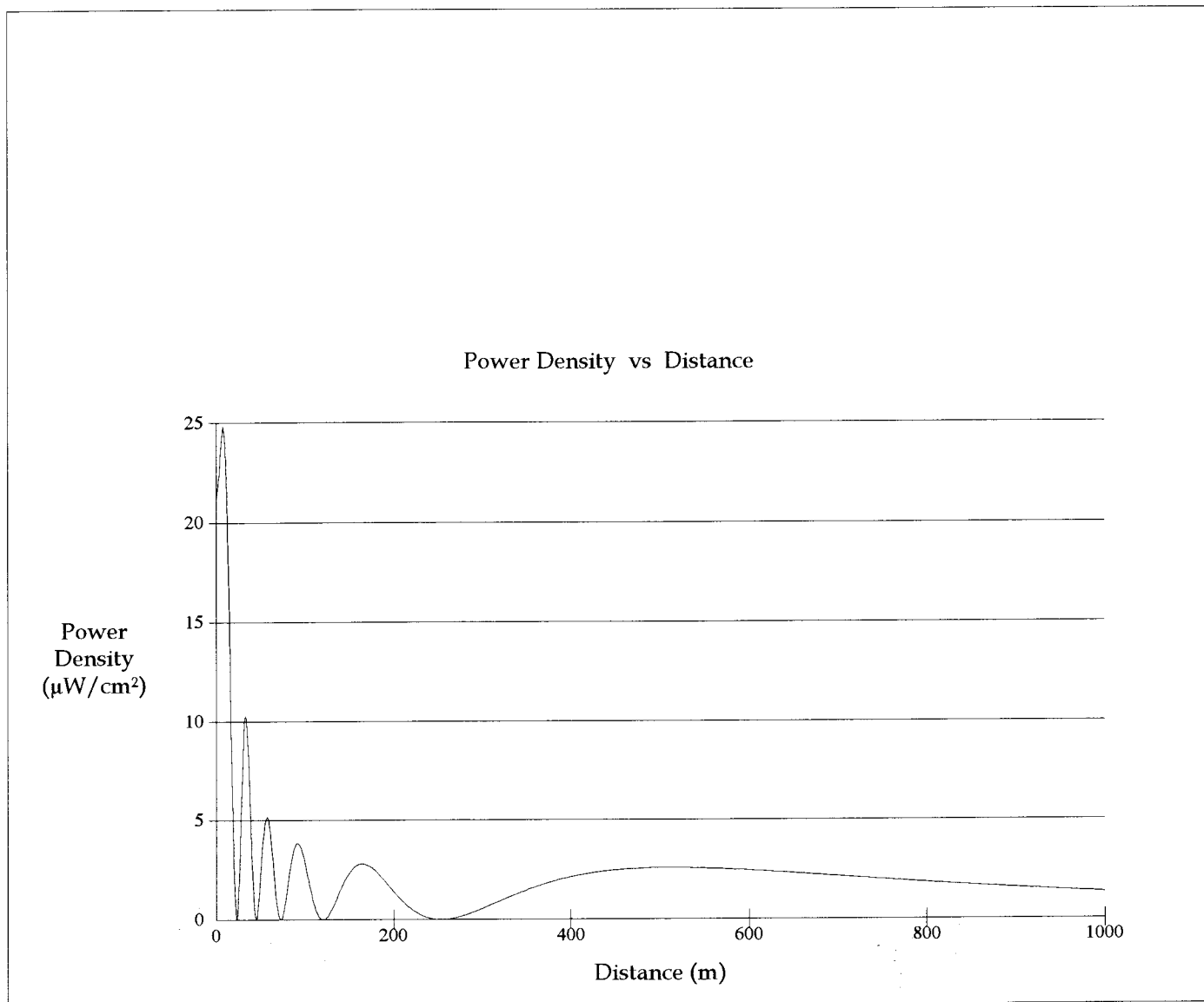
This figure is less than 5% of the applicable FCC exposure limit at all locations between 1 and 1000 meters from the base of the antenna support structure. Section 1.1307(b)(3) of the Commission's Rules excludes applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicants proposed facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the proposed facility is in compliance with Section 1.1301 et seq and no further analysis of non-ionizing radiation at this site is required in this application.

The Farnsworth Peak communication site is located on an isolated mountain top in rough and rugged terrain, and is inaccessible to the general public. Public access to the site is restricted by a locked gate and the antenna tower is posted with warning signs. Pursuant to OST Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any maintenance work is undertaken.

The permittee/licensee in coordination with other users of the site must reduce power or cease

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operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency radiation in excess of FCC guidelines.



Ground-Level NIER Analysis

OET FMModel

Farnsworth Peak FM Master

Antenna Type: Jampro panel JAHD-7/4(28) – Ring Stub assumed for worst case

Number of Elements: 7

Element Spacing: 0.8 wavelength

Distance: 1000 meters

Horizontal ERP: 25 kW

Vertical ERP: 25 kW

Antenna Height: 48 meters AGL

Maximum Power Density is $24.9 \mu\text{W}/\text{cm}^2$ at 8 meters from the antenna structure.

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