

TECHNICAL STATEMENT  
KIMI MALVERN, IOWA, CH. 299C3  
MINOR MODIFICATION OF CONSTRUCTION PERMIT  
FCC FORM 301  
KONA COAST RADIO, LLC  
JANUARY 2014

This Technical Statement is made in support of a minor modification of Construction Permit for KIMI Sidney, Iowa, facility ID 189501, BMPH-20120509AAA, which modified the original Construction Permit BPH-20110926AEC.

**BACKGROUND**

KIMI is currently licensed to Humboldt, Nebraska on channel 300C3. In September 2011, it filed a minor change application to change its City of License to Sidney, Iowa on channel 299C3. The Commission granted this application and issued a Construction Permit BPH-20110926AEC. KIMI then modified this Construction Permit to “one step” upgrade this operation at Sidney to channel 299C2 from a new existing tower site location north of Sidney. FAA notification was not required since the tower was existing, was less than 200 feet (61 meters) in overall height, and was not within 8 kilometers of any airport. This modification of Construction Permit was promptly granted, BMPH-20120509AAA. The licensee Kona Coast Radio, LLC (“KCR”) made an arrangement to purchase this tower site from the land owner since the site had been abandoned and was not currently in use. KCR invested considerable resources to restore this tower site for use, including having to re-install the electric service feeding the equipment shelter. KCR then purchased a new 10 Bay, half-wave spaced directional antenna system from Propagation Systems, Inc., and all of the required associated transmission equipment, including a single phase Armstrong 10KW FM transmitter (since three phase electric was not available at this site).

In February 2013, most of the construction of the new KIMI transmission plant was completed (Figure 4 shows photographs of the KIMI tower site with 10 bay directional antenna and tower, as well as the transmitter installation). Some short term equipment tests were being conducted when KCR was contacted by the Federal Aviation Administration (“FAA”) about concerns of potential interference to an ILS frequency at the Offutt A.F.B.. KCR then investigated the potential interference concerns. KCR determined that the interference concerns, while technically possible, with the distance to Offutt A.F.B. (22.8 km) and the considerable distance to the other “intermixing” station (KKCD 32.5 km) the FAA was concerned with, that no interference would likely be caused to the Offutt A.F.B. ILS channel. It shared these findings with the FAA.

On March 3, 2013, KCR’s Communication Attorney, A. Wray Fitch, Esq. of Gammon and Grange, P.C. informed KCR that he was contacted by the Commission over the FAA concerns of interference and that KIMI should not conduct any further tests and that a license application requesting program test authority would not be granted until the FAA concerns were addressed.

Since that time, KCR has been working closely with the FAA to formulate a plan whereby the potential interference problems would be addressed.

In September 2013, the FAA concluded that KIMI could operate at its new transmitter site if it reduced its Effective Radiated Power from 50 KW to 13KW. It would also require that KCR reimburse the FAA \$17,500.00 for the cost of changing frequencies at the Offutt A.F.B. ILS for runway 30. See the attached email chain from Mark R. Gallant of the FAA at Figure 3.

KCR is willing to cooperate with this proposed lower ERP operation and reimbursement of expenses. However, at this lower ERP, KIMI would no longer provide the required 70 dBμ

City Grade contour coverage over its proposed City of License, Sidney, Iowa. KCR also verified that alternative contour predictions methods also indicated less than 70 dB $\mu$  coverage over Sidney, Iowa at the 13 KW ERP level.

In an effort to remedy this situation, KCR would now like to proposed service to Malvern, Iowa on channel 299C3 utilizing the same transmitter site for KIMI, but with the reduced ERP of 13KW, and now specify a non-directional antenna system since it would now meet full 73.207 spacing requirements at this location operating as a Class C3 station instead of the current class C2.

KCR would also like to change the Latitude by one second from the original Construction Permit, since a survey of the location conducted as required for submission of the FCC form 302-FM for directional antennas, revealed a slight error in the original coordinates. This error was less than a half second of latitude, but when rounded, rounded closer to 56" then from the current 57". See the Surveyors report at Figure 5. This modification of CP also seeks to correct this slight error in coordinates.

The new proposed operation will provide ample 70 dB $\mu$  contour coverage over all of the community of Malvern, Iowa. KIMI will provide this community with its first aural service as there are currently no AM or FM stations licensed to Malvern, Iowa. Malvern is a slightly larger community then the original proposed first service community of Sidney, Iowa.

The Commission may have concerns that KIMI could move closer to the "Omaha" urbanized area since channel 299C3 could operate from a tower site closer to the Omaha area under the normal spacing requirements under 73.207 and still provide 70 dB $\mu$  service over Malvern. However, with the FAA limitations of 13KW ERP at the current KIMI transmitter site, and because of other ILS interference concerns at both Offutt A.F.B and Eppley Field

(Omaha International Airport), no greater or closer emissions would be allowed on channel 299 (107.7 mhz), making it virtually impossible to exceed the restriction of no more than fifty percent 70 dBμ coverage of the Omaha urbanized area in the future. Thus, this proposed operation would be in compliance with the Commission new “Rural Radio” rules.

### **PROPOSED TECHNICAL FACILITIES**

KIMI seeks to propose operation on channel 299C3 at an existing 60 meter overall height tower site located at the NAD 27 coordinates of: N 40° 56’ 56”, W 95° 45’ 28”. This is a slight adjustment from the original application for KIMI to utilize this site. KIMI proposes to operate with 13 KW ERP with a 10 bay PSI non-directional antenna system with half-wavelength spacing between the bays. The antenna center of radiation will be 53 meter above the ground, 443 meters Above Mean Sea Level, and 124 meter Above the Average Terrain.

Figure 1 is a channel spacing study conducted from this proposed tower site. It shows that KIMI on channel 299C3 will meet all of the required spacing to other pertinent same channel and adjacent channel stations. This site will also be used at the allotment point of channel 299C3 for Malvern as it is well within the required 23.2 kilometers of Malvern for a class C3 allotment.

Figure 2 shows the predicted 70 dBμ contour, F50-50, for the proposed operation of KIMI. It also demonstrates that the new proposed operation will completely encompass the entire community of Malvern with city grade service.

Figure 3 is an email chain between KCR and Mark R. Gallant of the FAA. It indicates that the FAA would allow a 13KW ERP operation of KIMI at the current CP site.

Figure 4 is a photo of the antenna site with the 10 bay antenna installed as well as the transmitter equipment.

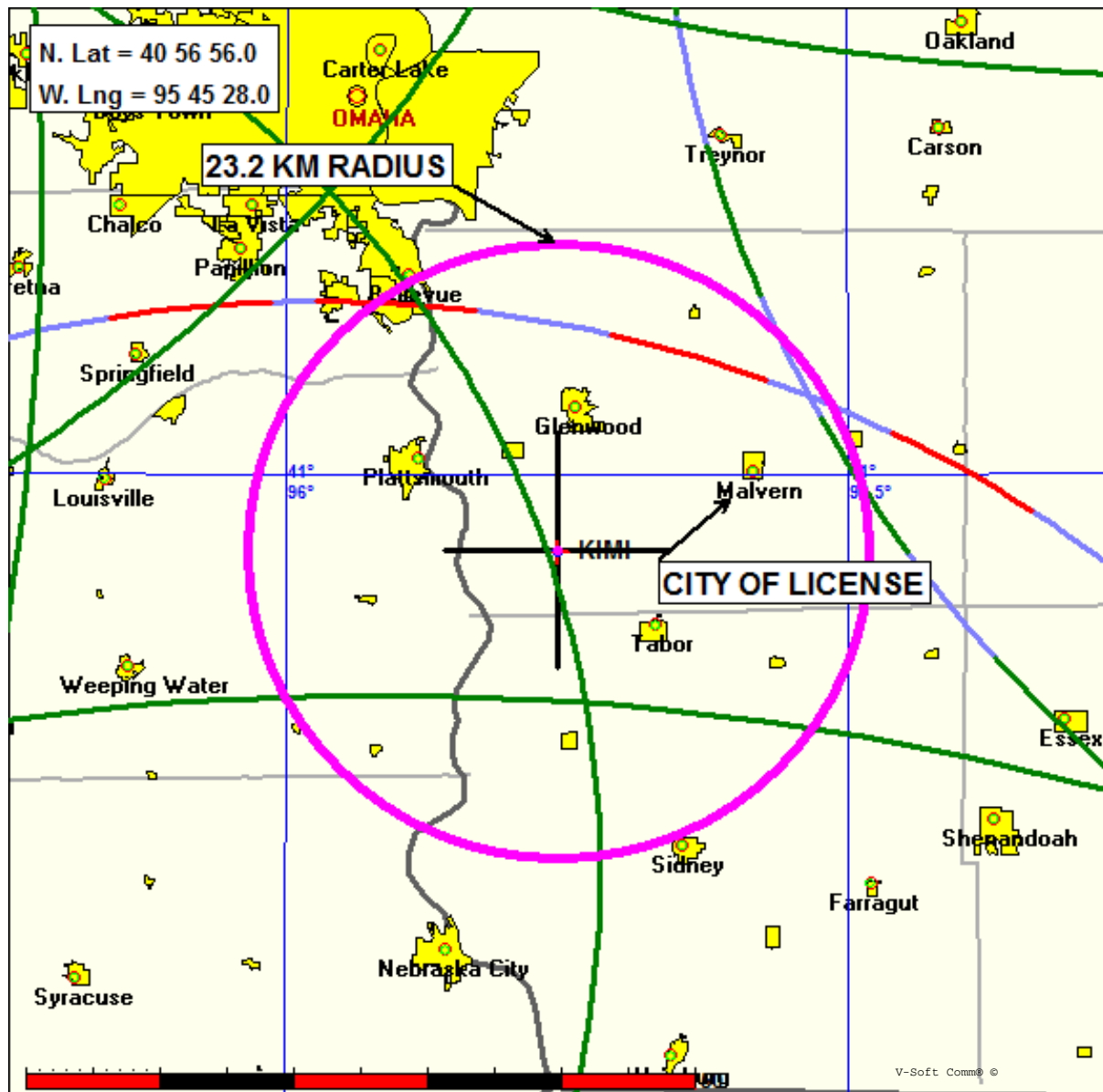
Figure 5 is a letter from a Licensed surveyor confirming the antenna installation, and verifying the coordinates of the existing tower site.

KCR has determined that the new proposed operation of KIMI at Malvern, Iowa on channel 299C3 will comply will all of the Commission's rules and regulation for a commercial FM broadcast station.

CH 299 C3 107.7 MHz

Current Spacings to 3rd Adj.

FIGURE 1, CHANNEL SPACING STUDY FROM PROPOSED SITE  
KIMI MALVERN, IA, CH.229C3



Data Date:01-11-14 Job Date:01-12-14								
Call	CH#	Type	Location		Azi	D-KM	FCC	Margin
KIMI.C *	299C2	CP -Z	Sidney	IA	0.0	0.03	177.0	-177.0 *
KIMI	300C3	LIC-N	Humboldt	NE	192.8	81.64	99.0	-17.4
KBBK	297C1	LIC	Lincoln	NE	251.4	76.31	76.0	0.31
KMAJ-FM	299C1	LIC	Carbondale	KS	183.4	221.86	211.0	10.9
KKRF	300C3	LIC-N	Stuart	IA	61.4	120.63	99.0	21.6
KTIC-FM	300C2	LIC	West Point	NE	315.1	147.62	117.0	30.6
KSYZ-FM	299C1	LIC	Grand Island	NE	276.2	250.65	211.0	39.7
KICD-FM	299C1	LIC	Spencer	IA	11.4	251.39	211.0	40.4
KILV	298C3	LIC-Z	Castana	IA	347.8	143.05	99.0	44.1
KZKX	245C1	LIC	Seward	NE	282.5	92.57	24.0	68.6
KKDM	298C1	LIC	Des Moines	IA	68.6	220.72	144.0	76.7
KVVL	246C3	LIC	Maryville	MO	132.6	91.03	14.0	77.0
KDSN-FM	296A	LIC	Denison	IA	16.3	125.94	42.0	83.9
KNWI	296C2	LIC	Osceola	IA	86.3	159.77	56.0	103.8
KLTE	300C1	LIC	Kirksville	MO	114.2	260.54	144.0	116.5
KSFT-FM	296A	LIC-N	South Sioux City	NE	342.2	185.61	42.0	143.6
KDVB	245A	LIC	Effingham	KS	169.5	157.70	12.0	145.7

							Page # 2	
Call	CH#	Type	Location		Azi	D-KM	FCC	Margin
KDVB.C	245C2	CP	Effingham	KS	170.9	173.75	17.0	156.8
KNSX.A	246C3	APP	Moville	IA	350.5	180.00	14.0	166.0
KNSX	246C3	RSV-A	Moville	IA	350.5	180.00	14.0	166.0
KNSX.C	246A	CP	Moville	IA	353.1	178.76	12.0	166.8
KMJK	297C1	LIC	North Kansas Cit	MO	145.0	250.02	76.0	174.0
KFMW	300C	LIC	Waterloo	IA	62.3	363.66	176.0	187.7
KZRS	300C1	LIC	Great Bend	KS	227.4	351.43	144.0	207.4
KIAQ	245C1	LIC	Clarion	IA	34.2	233.22	24.0	209.2
KCVK	299A	LIC-N	Otterville	MO	134.7	353.94	142.0	211.9
KELQ	300C2	LIC	Flandreau	SD	345.8	346.29	117.0	229.3
KZBK	245C2	LIC	Brookfield	MO	116.1	255.18	17.0	238.2
KZBK	245C2	LIC	Brookfield	MO	116.1	255.18	17.0	238.2

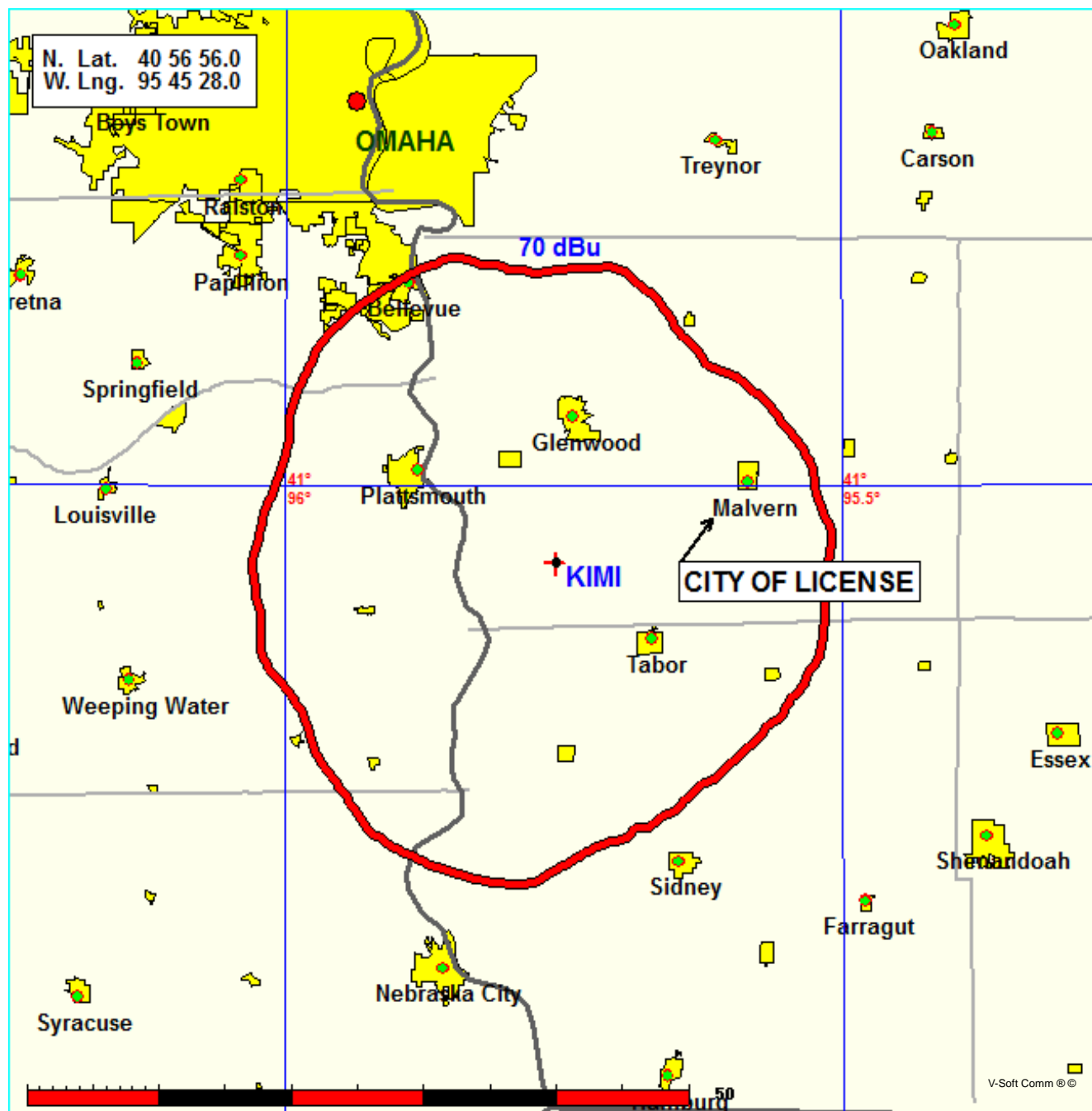
RSV-R, reserved, needs protection, RSV-A, allocation, does not if a CP or LIC has been granted.  
All separation margins include rounding

\* MODIFICATION OF CP BEING PROPOSED BY THIS APPLICATION TO SPECIFY A NEW CITY OF LICENSE, MALVERN, IA

FIGURE 2, PREDICTED 70 DBU CONTOUR  
KIMI MALVERN, IA, CH.299C3

Coverage Study - NGDC 30 SEC  
01-12-2014

KIMI-C CH299 C3, 13.0 kW, 124.0M HAAT, 443.0M COR AMSL  
Service Contour = 70 dBu. Population = 41,336





Subj: **Re: KIMI Sidney, Iowa**  
Date: 6/18/2013 8:09:02 A.M. Mountain Standard Time  
From: [Mark.R.Gallant@faa.gov](mailto:Mark.R.Gallant@faa.gov)  
To: [VicMichael@aol.com](mailto:VicMichael@aol.com)  
CC: [AWF@GG-Law.com](mailto:AWF@GG-Law.com), [mike.bowers@faa.gov](mailto:mike.bowers@faa.gov), [Vee.Stewart@faa.gov](mailto:Vee.Stewart@faa.gov)

Hi Mr. Michael,

The only solution we can see for you to operate 107.7 MHz at Sydney, IA is if you reduce your ERP to 13 KW. You will also have to pay for the retuning of the Offutt, NE AFB ILS for runway 30. The ROM for that cost is \$17,500. Please let me know if you will be pursuing this?

V/R,

Mark R. Gallant

AJW-iC6

Manager, CSA Spectrum Engineering Team

817-222-4761-W

817-301-4505-C

From: VicMichael@aol.com  
To: Mark R Gallant/ASW/FAA@FAA  
Cc: AWF@GG-Law.com, Mike Bowers/ACE/FAA@FAA, Vee Stewart/ACE/FAA@FAA  
Date: 05/20/2013 10:18 AM  
Subject: Re: KIMI Sidney, Iowa

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Mark,

Thanks for the update.

Could we reduce to 13,000 watts ERP? While we would certainly not wish to reduce our ERP,, technically at the current site it would not then meet the FCC requirement that we provide 70 dBu "city grade" signal level over our community of license (Sidney, IA). However, we could maybe get the FCC to let us either have a waiver on this requirement, or we could file to change to a different community of license that the 70 dbu would cover with a 13KW ERP signal. So if was an option for us to remain at our current site,, I would certainly have to consider it. We have a long term land lease for this tower site,, and have invested quite a bit in getting it developed.

Thanks again for the update and the help with this,

Vic

In a message dated 5/20/2013 6:05:47 A.M. Mountain Daylight Time, Mark.R.Gallant@faa.gov writes:

Hi Mr. Michael,

No, I am waiting for a response from Offutt AFB as to their ability to change frequency.

I have a question for you. Would you be able to reduce your power to 13000 Watts max?

V/R,

Mark R. Gallant

AJW-1C6

Manager, CSA Spectrum Engineering Team

817-222-4761-W

817-301-4505-C

From: VicMichael@aol.com

To: Mark R Gallant/ASW/FAA@FAA

Cc: AWF@GG-Law.com, Mike Bowers/ACE/FAA@FAA, Vee Stewart/ACE/FAA@FAA

Date: 05/18/2013 11:23 AM

Re: KIMI Sidney, Iowa

Subject:

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Mark,

Any progress with this? Would really appreciate and thoughts or ideas you might have to help us.

Thanks,

Vic

In a message dated 5/1/2013 10:48:21 A.M. Mountain Daylight Time, Mark.R.Gallant@faa.gov writes:

Hi Mr. Michael,

We are working on this case to see what options are available and will be getting back with you soon. The software we used to obtain our results is Airspace Analysis Model (AAM) V5.0.7.

Mark R. Gallant

AJW-1C6

Manager, CSA Spectrum Engineering Team

817-222-4761-W

817-301-4505-C

From: VicMichael@aol.com

To: Mike Bowers/ACE/FAA@FAA

Cc: Mark R Gallant/ASW/FAA@FAA, AWF@GG-Law.com, Vee Stewart/ACE/FAA@FAA

Date: 04/29/2013 02:59 PM

Re: KIMI Sidney, Iowa  
Subject:

Hi Mike,

I am in receipt of the FAA's determination regarding the new KIMI(FM) Sidney, IA (I have attached it for reference).

As mentioned before we are a small company and have devoted considerable time and resources into getting the new station built and ready to go on the air. Because this was an existing tower, the FCC did not require that we file for FAA approval before granting of our Construction Permit. Because of your inquiry to the FCC, they will now not allow us to go on the air with our new station.

But, I also understand the great importance of any new communication service not causing interference to aircraft navigational services. With this in mind, I would like the opportunity to come up with some plans of action that might eventually allow us to go on the air with our new FM station, but yet fully protect any ILS frequencies from potential interference.

It would be most helpful and save time if I could get more information about the computer program you are using to produce your potential Intermodulation interference findings. There are many of these programs around that use different sets of methodology. Is there anyway you could let me know what program you are using? and if it might be available for me to obtain a copy of it? Its just hard for me to look at some alternatives if I don't know what this program is looking at.

The following is a few plans of action that I would like the opportunity for us to try to solve this issue, listed in order of our preference:

1) Request that we be allowed to do some short term tests with KIMI with its currently built facilities. Perhaps transmitting for a few hours a day, only during good weather days to see if any problems are caused to these ILS frequencies. Tests could be done over several weeks on specific days. As mentioned before, I have some experience with Intermodulation interference issues, and after studying this situation, I am quite confident that the operation of KIMI at its present site would not generate enough field strength at any location where the other mixing stations field strength would be strong enough to generate Intermodulation products that would be above the normal ambient noise floor to cause any interference problems. The separation between the mixing stations is just to great. But the only way to absolutely prove this is with signal tests, which we will be willing to do as mentioned above as long as you would suggest to make sure there are no interference issues. So I hope you might consider this request.

2) Determine at what (if any) power level we might be able to run towards these ILS frequency conflicts to see if there is some way to modify the KIMI operation to comply with the FAA's RF standards. Is there a power level or distance where the use of 107.7 would not be a problem? Unfortunately there are no other commercial FM channels available for use at Sidney, Iowa at any power level, so an alternate channel for use by KIMI doesn't seem to be a possibility.

3) Change the ILS frequency at Offutt. The 109.5 mhz frequency seems to be the one of greatest concern.

Please let me know your comments on this. Would like to find an answer somewhere here.

Thanks,

Vic Michael  
KIMI-FM  
Kona Coast Radio, LLC  
87 Jasper Lake Road  
Loveland, CO 80537  
970-669-9200

In a message dated 4/1/2013 9:51:18 A.M. Mountain Daylight Time, mike.bowers@faa.gov writes:  
Mr. Michael,

After the airspace analysis were completed, here are the predicted  
interferer's for the following approach's.

Offutt AFB  
2 X KIMI (107.7) - KKCD (105.9) = OFF LOC (109.5 MHz), RWY 30  
KIMI (107.7) + KSRZ (104.5) - KVSS (102.7) = OFF LOC (109.5 MHz), RWY 30  
KIMI (107.7) + KXKT (103.7) - KOOO (101.9) = OFF LOC (109.5 MHz), RWY 30

Omaha Eppley Airfield  
KIMI (107.7) + KSRZ (104.5) - KOOO (101.9) = OMA LOC (110.3 MHz), RWY 14R  
KIMI (107.7) + KOPW (106.9) - KXKT (103.7) = PPY LOC (110.9 MHz), RWY 18  
KIMI (107.7) + KXKT (103.7) - KGBI (100.7) = OGN LOC (110.7 MHz), RWY 36

These results are with the 10-bay directional FM antenna positioned 50  
degrees True.

Mike Bowers  
AJW-1C6  
CSA Spectrum Engineering Team  
Kansas City, MO  
816-329-3467-W  
816-225-8680-C

From: VicMichael@aol.com

To: Mike Bowers/ACE/FAA@FAA

Cc: Mark R Gallant/ASW/FAA@FAA

Date: 03/12/2013 06:27 PM

Subject: Re: KIMI Sidney, Iowa

Mike,

For reference, I did file an FAA study,, the file number is 2013-ACE-589-OE.

If you need me to do anything, please let me know.

Thanks,

Vic Michael

In a message dated 3/12/2013 10:31:59 A.M. Mountain Daylight Time, mike.bowers@faa.gov writes:  
Mr. Michael,

Thanks for the information. I will go a head and start the Airspace Analysis process using that data you provided below.

Also an Aeronautical Study needs to be filed with the FAA for record keeping.

I added Mark Gallant, my manager, to the email.

Mike Bowers  
AJW-1C6  
CSA Spectrum Engineering Team  
Kansas City, MO  
816-329-3467-W  
816-225-8680-C

From: VicMichael@aol.com

To: Mike Bowers/ACE/FAA@FAA

Date: 03/11/2013 10:40 PM

Subject: KIMI Sidney, Iowa

Hi Mike,

Thanks for taking the time today to discuss the interference concerns regarding KIMI Sidney, Iowa today.

I have attached a copy of the antenna certification for KIMI Sidney. As mentioned, it is a 10 bay with half wavelength spacing between the bays. This antenna puts a very nice clean pattern pointed at the horizon with a fairly tight beam, since this is a fairly high gain antenna. It is also directional since we are protecting a station in the Lincoln area. Thus,

the FCC requires us to "pattern proof" this antenna system with a measured horizontal and vertical pattern.

I have also attached a copy of our FCC Construction Permit for KIMI. It has some details on the operation as well.

I did some basic research on the potential interference problem with the ILS at Offutt AFB, and I do agree with your findings. There is a potential intermodulation mix with KKCD and KIMI. The difference between 107.7 and 105.9 is 1.8 megahertz, which when added back to the 107.7 frequency comes out at 109.5 mhz, or the ILS frequency for the runway 30 approach at Offutt.

I also did a little more research on the potential for the two signals to intermix based on the projected field strengths generated by both KKCD and KIMI,, plus compared this to the old Pacific Junction operation (old call letters were KGGG, so will use those as a reference) and KKCD.

So basic data I found was this:

The distances between Offutt and the three FM's:

Offutt and KKCD	9.8 km (6.1 mi.)	158 degrees
Offutt and old KGGG	12.1 km (7.5 mi.)	290 degrees
Offutt and new KIMI	22.8 km (14.1 mi.)	326 degrees

The distance between KKCD and KGGG and KIMI:

KKCD and old KGGG	20.1 km (12.2 mi.)
KKCD and new KIMI	32.5 km (20.1 mi.)

The approach to runway 30 at Offutt is at a 300 degree true heading. This put the approach coming in roughly over the town of Glenwood. This was very close to the old KGGG Pacific Junction tower site, which was 290 degrees off of the runway. The new KIMI is 326 degrees off of the runway heading and is quite a bit further south of Glenwood.

As can also be seen, the distance separating KKCD and KIMI is almost double that of the old KGGG, or 32.5 kilometers, whereas the old KGGG and KKCD was 20.1 kilometers. This is somewhat significant since the FCC has requirements for spacing between two FM's that are spaced by the standard receiver "I.F." frequencies (10.6 and 10.8 mhz). In this case, the required I.F. channel spacing between a class C2 (KKCD) and another Class C2 station (KIMI) is 20 kilometers. The old KGGG and KKCD were spaced right at the minimum spacing of 20 kilometers, whereas KKCD and KIMI are spaced by 32 kilometers, or well beyond the minimum. While not a standard I.F. spacing case,, basically a similar situation where the two FM's mix causing an Intermodulation product. The old KGGG and KKCD likely did cause some intermodulation interference because of there relatively close proximity. But as mentioned today on the phone, with RF field strength's falling off at a rate of the inverse of a square root,, strong signals which are prone to intermixing, dissipate quickly with distance. With KIMI being located 9 miles further south then the old KGGG, this should dramatically cut down the risk of intermixing with KKCD.

I have attached some signal strength predictions between KKCD, the old

KGGG

and the new KIMI for comparison. I have also marked on the map the runway for Offutt for reference.

Would like to see if we could arrange some tests to make sure that no interference is being caused to the ILS. I totally understand that working under the new FAA sequestration budgetary cuts, so I might offer that maybe there is a way I could help reimburse the FAA for these tests? Not sure if that is even possible,, but willing to put the offer out there if it was. As mentioned today,, I just would like to see if there was a way we can make sure that the new operation of KIMI is not going to be a problem before we commence normal operations from the new site. While we would like to go on the air relatively soon,, I would rather wait a few more weeks, or whatever it takes to make sure we don't generate any FAA issues.

If it did turn out to be an issue,, what are the chances of changing the 109.5 mhz ILS frequency at Offutt? Just curious if this was a possibility.

After you review this information, please let me know how you would like to proceed with this. Look forward to working with you on this.

I am the sole station owner, but also do all the engineering for the station. I have a couple of small stations in Colorado and Wyoming and have operated stations for many years. Have had one other interference issue once many years ago,, not with the FAA, but with WY highway patrol. Fortunately, in that case, we were able to change channels with our new FM, so we moved one channel up to get rid of the intermodulation interference. But in this case, we are stuck on 107.7 since no other channels work for Sidney, Iowa. So hoping that this might be ok as is.

Any questions let me know,

Thanks again,

Vic Michael  
Owner/Manager/Engineer  
KIMI  
Kona Coast Radio, LLC  
87 Jasper Lake Road  
Loveland, CO 80537  
970-669-9200  
970-744-9191(cell)  
970-669-0800(fax)

(See attached file: KIMI95dbucontours.pdf)(See attached file: KIMIC2CP.pdf)(See attached file: KIMICERTIFICATIONJ1012FM-1125.pdf)(See attached file: KIMIKKCDwithOldPJ.pdf)(See attached file: KKCDwithKIMILR.pdf)

[attachment "KIMIFAAetermination42013.pdf" deleted by Mark R Gallant/ASW/FAA]



FIGURE 4  
PHOTO OF KIMI AS CURRENTLY BUILT  
AT EXISTING TOWER SITE



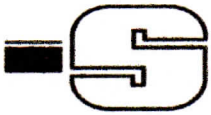


FIGURE 4 (CONTINUED)  
PHOTOS OF TRANSMITTER  
ROOM





FIGURE 5 - SURVEYOR'S LETTER



ENGINEERS & PLANNERS  
**SNYDER & ASSOCIATES**  
IOWA | MISSOURI | NEBRASKA | SOUTH DAKOTA | WISCONSIN

**DATE: 4-01-13**

**TO:** Mauna Towers, LLC  
87 Jasper Lake Road  
Loveland, CO 80537  
Attn. Vic Michael

**RE:** KIMI – Sidney, Iowa Site


On March 26, 2013 personnel from Snyder & Associates performed a field survey to verify the true direction of the 10 antennas at the KIMI – Sidney, Iowa Tower. Site control for this data was derived using Real Time Kinematic (RTK) GPS observations from State of Iowa's Real Time Network (RTN). The RTN exports data to our GPS in NAD83/WGS84 positions allowing us to calculate true bearings.

Next, a Leica Geosystems reflectorless total station was set approximately 200' from the tower, orientated to the geodetic datum and used to locate the center of tower and antenna directions. The results are as follows;

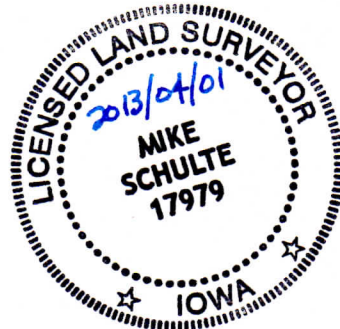
Center of Tower: Latitude - 40° 56' 56" 30540"N  
Longitude – 95° 45' 29.13709"W

Antenna Directions: Azimuth of 41 degrees with a variance of +/- 1 degree

I hereby certify the true direction of all 10 antennas is 41 degrees, +/- 1 degree, as measured on March 26, 2013 and is within the specified tolerance.

  
Mike Schulte PLS

04/01/2013





**ENGINEERS & PLANNERS**  
**SNYDER & ASSOCIATES**  
1751 Madison Avenue | Council Bluffs, IA 51503

Mauna Towers, LLC  
87 Jasper Lake Road  
Loveland, CO 80537  
Attn. Vic Michael