Report on a Study Performed for

DTV America Corporation regarding Low-Power Television Station K14SU-D, Channel 14, Keokuk, IA

Concerning Potential Out-of-Band-Emissions and Receiver Desensitization into Land Mobile Operations in the lower adjacent band to TV channel 14

March 7, 2022

Prepared by:

Joseph L. Snelson, Jr CPBE

Meintel, Sgrignoli, & Wallace

Meintel, Sgrignoli, & Wallace, LLC
1282 Smallwood Drive
Suite 372
Waldorf, Maryland 20603
(202) 251-7589

INTRODUCTION and BACKGROUND

This report has been prepared for DTV America Corporation regarding low-power digital television station K14SU-D ("K14SU"), Keokuk, IA. K14SU currently holds a construction permit, FCC File Number 0000162834, to operate on channel 14.

In the construction permit authorization that was granted the following condition must be met: *"During equipment tests, authorized by Section 73.1610 of the Commissions Rules, the permittee shall take adequate measures to identify and substantially eliminate objectionable interference which may be caused to existing land mobile radio facilities in the 460 to 470 MHz band. Documentation that objectionable interference will not be caused to existing land mobile radio facilities shall be submitted along with the request for Program Test Authority..."*

DTV America Corporation has requested MSW to study the potential impact that the constructed K14SU facility may have on active and authorized Land Mobile ("LM") facilities operating below channel 14.

MSW performed its study based on the parameters shown in the construction permit to determine if the combined as-built post-transmitter filter added to a typical transmitter response would protect LM facilities from Out-of-Band Emissions ("OOBE") and LM receiver desensitization from K14SU operating on TV channel 14.

The study focused on a circular area with a radius of 152 km and a center point being the transmitter site coordinates as stated in the K14SU construction permit. The area studied is shown in Appendix 1 of this report.

EXECUTIVE SUMMARY

MSW studied the predicted OOBE interference from K14SU operating on channel 14 into authorized LM stations operating below TV channel 14. The potential impact that K14SU might have on LM receiver desensitization was also included in the study.

Based on the results of this study the following conclusions were reached.

1. Utilization of a cascaded 8-Section post-transmitter filter was found to be effective in significantly reducing OOBE and protecting currently authorized LM stations.

2. There were no cases of OOBE interference into current Land Mobile operations reported in this study with the use of a cascaded 8-Section filter.

3. There were no cases of potential LM receiver desensitization into current Land Mobile operations reported in this study.

Considering the foregoing, K14SU would meet the requirement of the construction permit by demonstrating with this study that objectionable interference is not predicted to be caused into current Land Mobile operations. The remainder of this report gives the parameters and methodology used in conducting the study along with an analysis of the results.

SCOPE OF STUDY AND METHODOLOGY

The scope of this study consists of two parts with each part analyzing the impact of potential channel 14 OOBE interference from K14SU into a LM receiver and LM receiver desensitization due to K14SU operating on an adjacent channel at a power level either equal to or higher than that of LM base or mobile stations.

The first part of this study consisted of an overall area study based on a hypothetical LM station, both fixed and mobile, operating on a frequency close to the channel 14 band edge with default operating parameters (i.e. antenna height, bandwidth, etc.). This serves as an indicator of the effectiveness of post-transmitter filtering and antenna radiation characteristics in protecting actual LM operations close to the band edge and shows the approximate extent of interference and desensitization in terms of distance from the TV transmitter site. The parameters used for K14SU are found in Table 1 and the generic parameters used for both fixed and mobile LM operations are found in Table 2 of this report.

This area based interference study was performed using the Longley-Rice Irregular Terrain Model ("ITM") to predict interference caused by OOBE from K14SU into both fixed and mobile LM operations using the generic parameters. The study focused on a circular area with a defined radius from a center point with coordinates being the K14SU transmitter site.

The circular area was divided into cells with a size of approximately 1 km per side. The assumed LM receiver location was considered to be at the geographic center of the cell. A path profile was created between the television transmitter site and the cell center followed by the ITM analysis. The OOBE loss of the post-transmitter filter, at the LM station frequency, was added to the coupling factor, calculated from the bandwidth of the LM station and the 500 kHz measurement bandwidth used for digital television stations, to the received field strength. LM antenna gain and line loss were then added to the received field strength to obtain the final value used for interference prediction. The reference value used for interference prediction is 17 dBu[1].

Desensitization calculations were performed by using the free space loss from the television transmit antenna to the cell center point. The received power level in the direction of the cell included losses due to terrain, calculated antenna azimuth and elevation discrimination and coupling losses based on the bandwidth of the LM station and the 3 dB half-power bandwidth of the television station (approximately 5.38 MHz). LM antenna gain and assumed transmission line loss for fixed base stations was also considered. The reference value used for desensitization prediction is around 80 dB which is a typical receiver off-frequency rejection

[1] See §73.687 (e)(4)(ii) of the Rules

characteristic[2] near the television station's band edge. Rejection typically increases as the LM frequency moves further away from the band edge and was considered in this study.

The second part of the study consisted of analyzing interference and desensitization into currently authorized fixed and mobile LM facilities. A list of potentially impacted LM facilities was created from the FCC's Universal Licensing System ("ULS") database by searching for all active and licensed LM facilities within a culling distance of 152 km from the K14SU transmitter site. The entire area studied is shown on the map in Appendix 1 of this report.

Interference and desensitization calculations were performed similar to the cell analysis described for the first part of the study except the authorized LM facilities (e.g. frequency, antenna height, etc.) were utilized. Other study parameters utilized in the study, including ITM parameters, are shown in Table 3.

Tables 4 and 5 are example calculations for both the interference and desensitization for one of the fixed base stations studied. The purpose of these examples is to show in more detail how the study calculations were performed.

For authorized mobile LM operations a study was conducted similar to the general cell area study discussed earlier. A circular area was defined using the radius of operation for the mobile LM facility as authorized. If no radius was defined then a default radius of 48 km was used. The center point used was the coordinates of the mobile LM operation as authorized. The circular area was divided into 1 km/side cells and calculations were made at the geographic center of each cell. A pass/fail determination was made for each cell for both interference and desensitization as calculated from the received signal of K14SU. After analyzing all cells within the circular area the number of failures was compared to the total number of cells analyzed. If the total number of failures was at or under 2% of the total area the amount of interference or desensitization was considered de minimis and the facility was considered to have passed.

Land Use/Land Clutter losses were not considered in this study for either OOBE interference or desensitization calculations for both study parts.

For OOBE interference calculations the transmitter 500 kHz bandwidth lower adjacent channel sideband pre-filter response was added to the cascaded 8-Section post-transmitter filter to obtain the total OOBE rejection of the proposed transmission system (See Figure 2).

Most LM operations use vertical antenna polarization. With K14SU utilizing circular polarization the total received power at an LM station would be dependent on the polarization of the LM received antenna. For a LM station using linear polarization a conservative value of 6 dB was used in this study when considering antenna cross polarization discrimination. Received power was calculated based on the total power radiated from K14SU in both H and V planes and then applying the cross polarization factor based on the polarization of the LM facility respectively.

[2] Value obtained by researching desensitization characteristic values from various receiver manufacturers

STUDY PARAMETERS

The parameters used for K14SU operating on channel 14 and LM operations below channel 14 are shown in Tables 1 and 2, respectively. Table 2 shows the general LM analysis parameters for the area cell study. For the individual studies to each LM facility the authorized parameters were used as shown in the LM station's authorization.

Table 1 - Parameters authorized for K14SU

Parameter	Value
Analyzed TV Station	K14SU-D
TV Channel	14 (470-476 MHz)
Latitude (NAD83)	39-58-19.3
Longitude (NAD83)	91-19-40.4
Height of Antenna Center of radiation (AMSL)	355.7 m
Total ERP (15 kW H + 15 kW V)	30.0 kW
Antenna Type	Non-Directional
Polarization	Circular
Elevation Pattern	Real
Electrical Tilt	1.00 degrees
Antenna Mechanical Tilt Amount	N/A
Antenna Mechanical Tilt Orientation	N/A
Antenna Pattern Relative Field per Azimuth and Depression Angle	Calculated
Post-transmitter Filter Type	Cascaded 8-Section

Table 2 - Parameters for Land Mobile Stations

Parameter	Value
Antenna Type	Omni-directional
Frequency (MHz)* (Lower Adjacent to TV channel 14)	469.7500
Bandwidth*	30 kHz
Height of Antenna Center of radiation (AGL)*	10.0m FB, 3.0m MO
Polarization*	V
Receive Antenna Gain*	11.0 dBd FB, 0.0 dBd MO
Antenna Pattern Relative Field per Azimuth Bearing	1.0
Antenna Pattern Relative Field per Depression Angle	1.0
Receive Line Loss for Fixed Base stations	2.0 dB
Receiver Threshold	-120.0 dB
Receiver Out of Band Rejection (Fixed value used for cell study)	Approx. 80.0 dB**

* Value utilized for cell analysis. The authorized parameter was used for individual LM station studies

** Calculated based on LM frequency separation from the television station band edge frequency

Table 3 below shows the parameters used for the Irregular Terrain Model in deriving the proposed K14SU channel 14 station OOBE field intensities inside a circular area with a 152 km radius for the area cell study. These parameters were also used for determining the signal strength of K14SU OOBE into each LM station found inside the circular area (see Appendix 1).

Since the FCC Rules do not specify a defined distance to be studied for LM operations operating below channel 14 a study radius of 152 km was utilized for this study. This distance is based on the distance (130 km) stated in § 74.709 (b) of the Rules to the protected LM contour from a defined center point for LM operations. This distance is added to the distance from the LPTV transmitter to the edge of its 76 dBu, F50,10 contour[3], which is approximately 22 km for K14SU.

Table 3 – Parameter settings utilized in Land Mobile Study

Parameter	Value
Study Radius	152.00 km
Study Centerpoint Latitude (NAD 83)	39-58-19.0 N
Study Centerpoint Longitude (NAD 83)	91-19-40.0 W
Cross Polarization Discrimination Factor	6.0 dB
Target Study cell size	1.0 km/side
Study Path Distance Increment	0.1 km
Terrain Database	1 arc second
Location Variability	50 %
Time Variability	10 %
Confidence	50 %
Ground Permittivity	15.0
Ground Conductivity	0.005 S/m
Surface Refractivity	301.0 N-units PPM
Longley-Rice Mode ‡	1 or 3
Climate Code	5 Continental Temperate
Utilize Land Use/Land Clutter in analysis	False
Interference criteria utilized (typical LM Receiver Sensitivity)	17.0 dBuV/m
Number of cells analyzed	72692
Area analyzed	72573.31 sq km
Area predicted to receive field strength => 17 dBu FB Only	74.39 sq km
Area predicted to experience receiver desensitization FB Only	34.18 sq km

‡ 1 - Individual mode used for LM station analysis, 3 – Broadcast mode used for cell analysis

[3] See §74.709 (d)(1) and (d)(3) of the Rules

STUDY METHODOLOGY AND EXAMPLE

Tables 4 and 5 show the methodology that was used for calculating interference and desensitization, respectively, into the LM Fixed Base Station shown below.

Freq	Call	Svc	Svc	DTV->LM	DTV->LM	Ant	HAAT	HAGL	Gain	BW
Mhz	Sign	Code	Cls	Dist km	Az deg	Pol	m	m	dB	khz
460.9500	WPJK726	IG	FB	0.3	285.0	V	42.0	114.0	4.8	11.0

Table 4 - Methodology for Predicting Interference into a Land Mobile receiver from a DTV Station

Parameter	Value
Land Mobile Station Frequency	460.9500 MHz
Longley-Rice Calculated Received Field Strength [F50,10]TV Station	132.3 dBuV/m
Transmitter + Filter loss at frequency	156.1 dB
Transmitting and receiving antenna discrimination, combined†	1.7 dB
DTV coupling into LM (Bandwidth: DTV=500 kHz, LM=11.0 kHz)	16.6 dB
Effective Cross-polarization discrimination (Considers 6 dB & C-Pol)	2.0 dB
LM antenna gain	4.8 dB
LM line loss	2.0 dB
Calculated equivalent field strength	-41.4 dBuV/m
Interference criteria utilized (Per §73.687 (e)(4)(ii) of the Rules)	17.0 dBuV/m
Margin to interference	58.4 dB
Analysis result**	Pass

Table 5 - Methodology for Predicting Desensitization into a Land Mobile receiver from a DTV Station

Parameter	Value
Lower Band Edge Frequency of TV Station (Ch. 14)	470.3094 MHz
Transmit ERP (30 kW H+V)	74.8 dbm
Free Space Path Loss for dipole antenna at frequency and distance	72.4 dB
Terrain Loss	0.0 dB
Transmitting and receiving antenna discrimination†	1.7 dB
DTV coupling into LM (Bandwidth: DTV=5.38 MHz, LM=11.0 kHz)	26.9 dB
Effective Cross-polarization discrimination (Considers 6 dB C-Pol)	2.0 dB
LM antenna gain	4.8 dB
LM line loss	2.0 dB
LM receiver out-of-band rejection	109.4 dB
Effective received DTV station interference power	-134.5 dBm
LM receiver sensitivity	-120.0 dBm
Margin to desensitization	14.5 dB
Analysis result	Pass

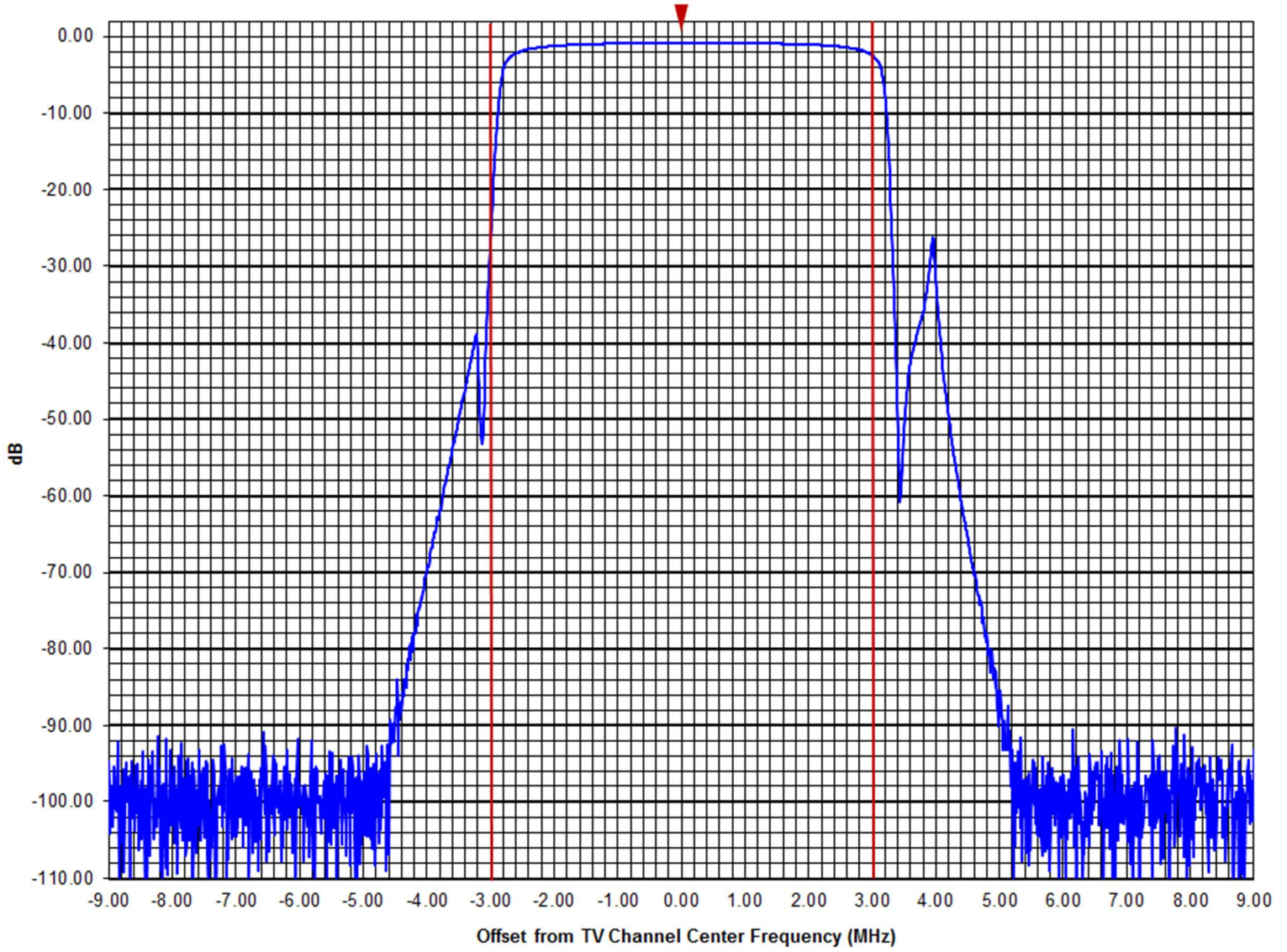
† Only transmit antenna azimuth and elevation discrimination factors are considered

** If analysis fails additional Post-transmitter filtering would be required.

DTV POST-TRANSMITTER FILTER

The plot below in Figure 1 shows the OOBE response of the cascaded 8-Section filter for K14SU operating on channel 14. The filter response was provided by the filter manufacturer.

Figure 1
Post-Transmitter Filter Response

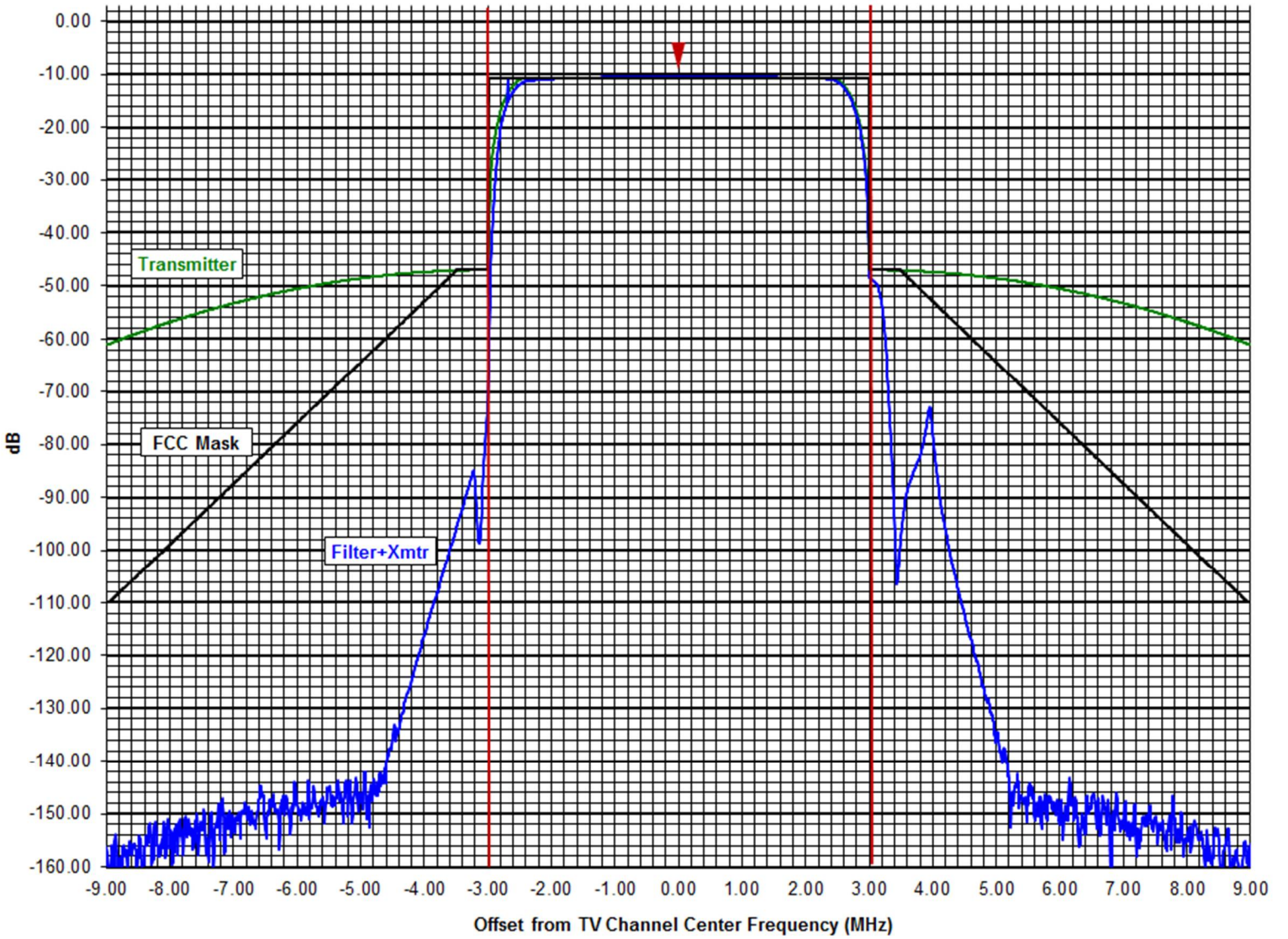


As shown above, this more rigorous filter adds significant attenuation to OOBE, particularly near the band edge (-3.5 MHz). Combined with the transmitter pre-filter response, very effective filtering of OOBE is provided.

TOTAL DTV TRANSMITTER PLUS POST-TRANSMITTER FILTER RESPONSE

Shown below in Figure 2 is a typical transmitter OOBE pre-filter response (green plot). Total response of both the cascaded 8-Section post-transmitter filter plus the transmitter response is also shown (blue plot). The full-service FCC mask response is shown for reference (black plot) to show the effectiveness of the filtering.

Figure 2
Response of Typical Transmitter plus an 8-Section Post-Transmitter Filter



As shown above, the cascaded filter adds significant attenuation to OOBE beginning at -3.5 MHz which is just outside the lower edge of TV channel 14. Combined with a typical transmitter pre-filter response, very effective filtering of OOBE is provided and surpasses that of the full-service FCC mask.

ANALYSIS RESULTS

This study was performed pursuant to a condition placed in a construction permit, FCC File Number 0000162834, for K14SU, channel 14, Keokuk, IA. Specifically, the condition states that K14SU must not cause objectionable interference into Land Mobile operations operating in the 460-470 MHz band below channel 14.

The map in Appendix 1 shows the K14SU 51 dBuV/m protected contour along with all LM facilities located within a radius of 152 km from the transmitter site and operating in the band from 460 to 470 MHz which is below TV channel 14.

The area study that was conducted using the parameters found in Tables 1 and 2 of this report showed a small number of cells within 5 km of the transmitter site that were predicted to receive interference or desensitization at a frequency of 469.7500 MHz. This is visually shown in Appendix 2 for interference and Appendix 3 for desensitization. Due, however, to the physical location of the LM facilities and the specific operating parameters authorized none of the facilities analyzed are predicted to be impacted by either interference or desensitization.

There were 3,755 authorized LM facilities studied, consisting of both fixed base and mobile. There were no cases of interference or desensitization reported into any LM facility.

There were 1,116 Fixed Base LM facilities studied. Appendix 4 is a list, stacked in ascending order, of 30 of the fixed base stations with the lowest interference margin, with the lowest margin being 20.5 dB. Appendix 5 is a list, stacked in ascending order, of 30 of the fixed base stations with the lowest receiver desensitization, with the lowest margin being 14.7 dB.

There were 2,639 Mobile LM facilities studied. Appendix 6 is a list of 30, stacked in ascending order, of the mobile stations with the lowest average area interference margin, with the lowest margin being 12.7dB. Appendix 7 is a list, stacked in ascending order, of 30 of the mobile stations with the lowest receiver desensitization, with the lowest margin being 20.4 dB.

Due to the large number of LM facilities studied a full list was not included with this report. The full list is available and can be provided upon request.

Regarding desensitization, receiver desensitization rejection characteristics may vary based on the frequency separation of the desired LM channel from the band edge of the higher power station. Rejection of an undesired off-frequency source could increase from 80 to 90 dB or more depending on the frequency separation with respect to the LM station. Rejection also depends on the front end architecture of the LM radio as designed by the manufacturer. Desensitization is not dependent on the type of post-transmitter filter used since it is not an OOBE issue but that of a sensitive LM radio being in close proximity to the band edge of a higher power facility, like that of a television station. As stated earlier, no cases of desensitization were predicted into any authorized LM operations.

Table 7 below shows a high level summary of the study results for current authorized LM stations studied within a 152 km radius of the transmitter site.

Table 7 – Statistics from the Analysis of Current Licensed LM facilities

Item	Value	Comment
LM Authorizations Found	876	-
Individual LM Locations Studied	3,755	-
Closest LM Frequency to Band Edge	470.0000 MHz	WQFB702
Closest Fixed Base Land Mobile Location	0.3 km	WPJK726
Fixed Base Stations:		
Lowest Predicted IX Margin	20.5 dB	WQFB702
Number Predicted to Receive IX	0	-
Lowest Predicted Desens Margin	14.7 dB	WPJK726
Stations Potentially Affected by Desens	0	-
Mobile LM Operations:		
Lowest Predicted IX Margin	12.7 dB	WQVS930
Number Predicted to Receive IX	0	-
Lowest Predicted Desens Margin	20.4 dB	WQHD876
Stations Potentially Affected by Desens	0	-

CONCLUSION

MSW studied the predicted OOBE interference into authorized LM stations operating within a radius of 152 km from a center point defined by the K14SU transmitter site coordinates with K14SU operating on channel 14 as defined in its construction permit, FCC File Number 0000162834. The potential impact that K14SU might have on LM receiver desensitization was also studied.

Based on the results of the study the following conclusions were reached.

1. Utilization of a cascaded 8-Section post-transmitter filter was found to be effective in significantly reducing OOBE and protecting currently authorized LM stations.

2. There were no cases of OOBE interference into current Land Mobile operations reported in this study with the use of the cascaded 8-Section filter.

3. There were no cases of potential LM receiver desensitization into current Land Mobile operations reported in this study.

Considering the above, K14SU would meet the requirement of the construction permit by demonstrating with this study that objectionable interference or desensitization will not be caused into Land Mobile operations.

This study conducted by MSW is based on the ITM prediction model. Actual field conditions including, but not limited to, propagation conditions, errors and omissions in the FCC database, active and passive intermodulation products and LM receiver characteristics may affect the actual results in the field and are considered outside the control of MSW.

This study was performed using defined locations extracted from the FCC ULS database (e.g. geographical coordinates and well defined boundaries, such as radius and center point) as granted for both fixed base and mobile LM operations. The FCC database base contains hundreds of authorizations for itinerant users that are authorized over the entire country, states, counties and other wide areas including the General Mobile Radio Service which does not define specific locations. It is impractical to attempt to analyze these operations without knowing the specific location of a LM receiver if and when they are deployed in the area studied.

MSW stands ready to answer any questions regarding this report and to assist in responding to any interference or desensitization issues that might arise.

CERTIFICATION

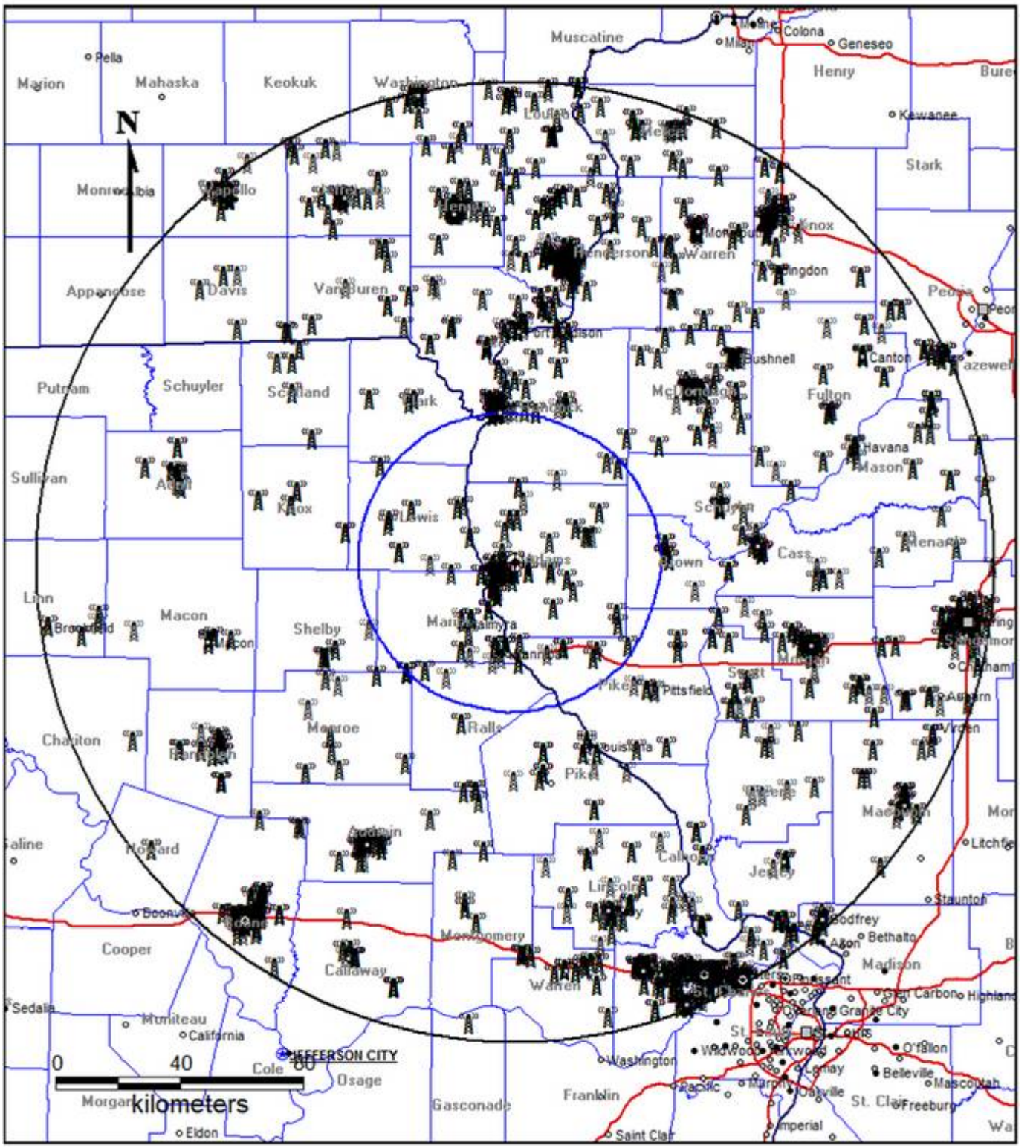
The undersigned author of this report, Joseph L. Snelson, Jr., is a Certified Professional Broadcast Engineer (CPBE) as recognized by the Society of Broadcast Engineers and possesses over 50 years of experience in Broadcast Engineering including Television signal analysis, propagation, coverage and interference prediction. He is a contract employee of Meintel, Sgrignoli and Wallace, LLC, Broadcast Television & Radio Engineers, and was assigned to identify the impact that the granted facility for K14SU would have on authorized Land Mobile facilities operating on the lower adjacent TV channel 14 (460-470 MHz).

The undersigned hereby certifies that all statements made in this report are true and correct to the best of his own knowledge except, where noted, when data or information has been supplied by others, which he believes to be correct.

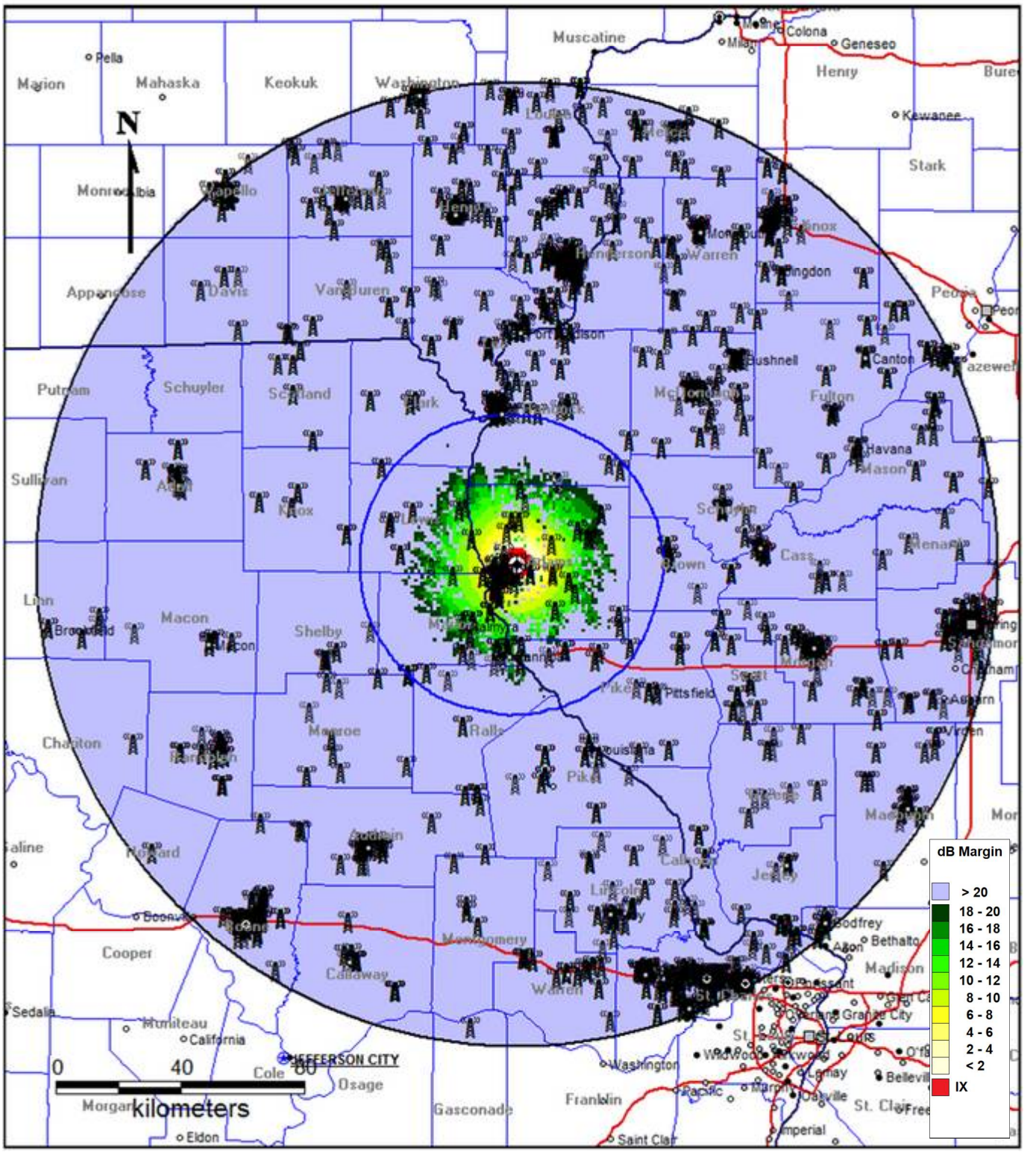
Joseph L. Snelson, Jr. CPBE
Email: joe.snelson@mswdtv.com
Phone: 702-610-9081

March 7, 2022

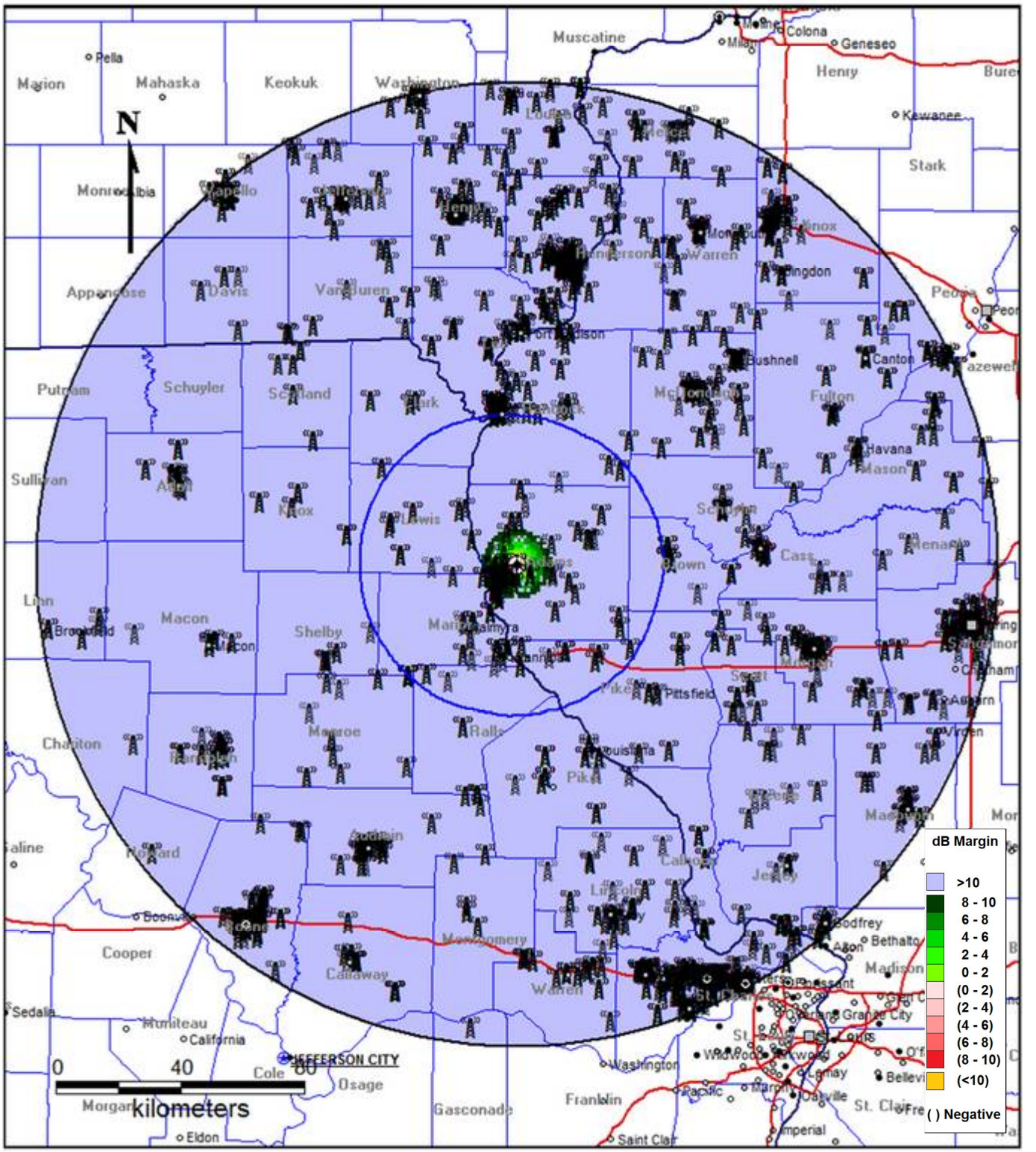
APPENDIX 1
K14SU-D, Channel 14, Keokuk, IA
Land Mobile Facilities, 460-470 MHz, within 152 km of the K14SU-D Transmitter Site
K14SU-D 51 dBu Protected Contour Shown in Blue



APPENDIX 2
K14SU-D, Channel 14, Keokuk, IA
Fixed Base Area Interference Study within 152 km of the K14SU-D Transmitter Site at 469.75 MHz
K14SU-D 51 dBu Protected Contour Shown in Dark Blue



APPENDIX 3
K14SU-D, Channel 14, Keokuk, IA
Fixed Base Area Desensitization Study within 152 km of the K14SU-D Transmitter Site 469.75 MHz
K14SU-D 51 dBu Protected Contour Shown in Dark Blue



APPENDIX 4
Land Mobile Fixed Base Stations with the Lowest Interference Margins
Listing of the Lowest 30 out of 1,116 Fixed Base LM Facilities

Freq Mhz	Call Sign	Svc Code	Svc Cls	DTV->LM Dist km	DTV->LM Az deg	Ant Pol	HAAT m	HAGL m	Gain dB	BW khz	IX Mgn dB	DS Mgn dB	Result Status
470.0000	WQFB702	IG	FB2T	0.6	232.3	V			4.0	11.0	20.5	35.8	OK
470.0000	WQFB702	IG	FX1T	0.6	232.3	V			4.0	11.0	20.5	35.8	OK
460.9500	WPJK726	IG	FB	0.3	285.0	V	42.0	114.0	4.8	11.0	58.4	14.5	OK
461.0000	WPJK726	IG	FB	0.3	285.0	V	42.0	114.0	4.8	11.0	58.4	14.4	OK
468.2750	WAB839	IG	FX1	8.1	236.6	V		44.0		20.0	76.3	24.0	OK
462.5000	WQBV291	IG	FB2C	3.6	268.0	V	41.0	18.0	5.0	11.2	78.3	29.4	OK
469.2000	KCL560	IG	FX1	83.4	283.6	V	0.0	15.0	4.1	11.0	78.3	60.2	OK
464.5250	WQHT828	IG	FB2	5.0	216.8	V	39.9	12.0	6.0	11.2	78.5	25.9	OK
463.9750	WQBI522	IG	FB2C	6.2	234.8	V	49.8	35.0	6.0	11.2	81.6	29.0	OK
463.0000	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.9	OK
463.0250	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.9	OK
463.0500	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.8	OK
463.0750	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.7	OK
463.1000	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.7	OK
463.1250	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.6	OK
463.1500	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.6	OK
463.1750	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.5	OK
463.2500	WNVV591	IG	FB2	5.8	131.3	V		40.0	4.5	11.2	82.5	31.7	OK
463.8500	WNUN805	IG	FB	4.7	112.3	V		5.0	2.0	11.2	84.2	31.9	OK
468.2250	WAN648	IG	FX1	19.4	140.8	V	34.0	12.0	4.0	11.2	84.3	31.5	OK
463.8500	WNUN805	IG	FB2	5.8	131.3	V		56.0	2.6	11.2	84.4	32.1	OK
464.6750	KNDU781	IG	FB	7.5	260.7	V	0.0	15.0		11.2	85.2	34.9	OK
463.7000	WQYD350	YG	FB2	3.8	191.4	V	57.0	17.0		7.6	85.3	33.3	OK
461.0750	WPHH737	IG	FB2	7.4	236.1	V		51.0	3.7	11.2	85.4	40.1	OK
462.3000	WPXA339	IG	FB2	4.8	227.2	V	44.5	24.3		11.2	85.4	37.1	OK
461.2500	WQTW434	IG	FXO	4.8	302.0	V	30.0	15.2		11.2	85.6	39.8	OK
464.6750	KNDU781	IG	FB	7.7	243.7	V	0.0	15.0		11.2	85.6	35.2	OK
463.8500	WRBV621	IG	FB2	8.2	236.7	V	48.0	36.5	6.0	7.6	85.7	33.4	OK
463.3125	WQSY380	IG	FB2	10.5	210.7	V	-24.7	9.1	6.0	11.2	86.3	35.3	OK
461.4250	WQAT642	IG	FB2	10.8	221.9	V	26.6	45.7	6.0	11.2	86.5	40.2	OK

APPENDIX 5
Fixed Base Operations with the Lowest Desensitization Margins
Listing of the Lowest 30 out of 1,116 Mobile LM Facilities

Freq Mhz	Call Sign	Svc Code	Svc Cls	DTV->LM Dist km	DTV->LM Az deg	Ant Pol	HAAT m	HAGL m	Gain dB	BW khz	IX Mgn dB	DS Mgn dB	Result Status
461.0000	WPJK726	IG	FB	0.3	285.0	V	42.0	114.0	4.8	11.0	58.4	14.7	OK
460.9500	WPJK726	IG	FB	0.3	285.0	V	42.0	114.0	4.8	11.0	58.4	14.9	OK
468.2750	WAB839	IG	FX1	8.1	236.6	V		44.0		20.0	76.3	24.1	OK
464.5250	WQHT828	IG	FB2	5.0	216.8	V	39.9	12.0	6.0	11.2	78.5	26.1	OK
463.9750	WQBI522	IG	FB2C	6.2	234.8	V	49.8	35.0	6.0	11.2	81.6	29.2	OK
462.5000	WQBV291	IG	FB2C	3.6	268.0	V	41.0	18.0	5.0	11.2	78.3	29.7	OK
468.2250	WAN648	IG	FX1	19.4	140.8	V	34.0	12.0	4.0	11.2	84.3	31.5	OK
463.1750	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.7	OK
463.1500	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.8	OK
463.1000	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.9	OK
463.1250	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	31.9	OK
463.0750	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	32.0	OK
463.2500	WNVV591	IG	FB2	5.8	131.3	V		40.0	4.5	11.2	82.5	32.0	OK
463.0250	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	32.1	OK
463.0500	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	32.1	OK
463.8500	WNUN805	IG	FB	4.7	112.3	V		5.0	2.0	11.2	84.2	32.1	OK
463.0000	WPQH903	PW	FB	6.0	229.3	V	51.0	40.0	5.2	11.2	82.1	32.2	OK
463.8500	WNUN805	IG	FB2	5.8	131.3	V		56.0	2.6	11.2	84.4	32.3	OK
464.2250	WQAT642	IG	FB2	10.8	221.9	V	26.6	45.7	6.0	11.2	88.7	33.4	OK
463.7000	WQYD350	YG	FB2	3.8	191.4	V	57.0	17.0		7.6	85.3	33.6	OK
463.8500	WRBV621	IG	FB2	8.2	236.7	V	48.0	36.5	6.0	7.6	85.7	33.6	OK
464.3250	WPGK371	IG	FB2	6.6	188.7	V	41.8	10.6	0.6	11.2	91.3	34.3	OK
464.6750	KNDU781	IG	FB	7.5	260.7	V	0.0	15.0		11.2	85.2	35.1	OK
464.6750	KNDU781	IG	FB	7.7	243.7	V	0.0	15.0		11.2	85.6	35.4	OK
463.3125	WQSY380	IG	FB2	10.5	210.7	V	-24.7	9.1	6.0	11.2	86.3	35.5	OK
464.9750	WQYD350	YG	FB2	7.2	237.8	V	59.0	40.0		7.6	86.5	35.6	OK
464.7250	WQRV784	IG	FB2	9.9	341.1	V	48.0	45.7	1.8	11.0	92.1	35.6	OK
470.0000	WQFB702	IG	FB2T	0.6	232.3	V			4.0	11.0	20.5	35.7	OK
470.0000	WQFB702	IG	FX1T	0.6	232.3	V			4.0	11.0	20.5	35.7	OK
463.3125	WQSY380	IG	FB2	10.9	216.2	V	22.9	21.0	6.0	11.2	86.5	35.8	OK

APPENDIX 6
Mobile Operations with the Lowest Interference Margins
Listing of the Lowest 30 out of 2,639 Fixed Base LM Facilities

Freq Mhz	Call Sign	Svc Code	Svc Cls	DTV->LM Dist km	DTV->LM Az deg	Ant Pol	HAAT m	HAGL m	Gain dB	BW khz	IX Mgn dB	DS Mgn dB	Result Status
469.9625	WQVS930	IG	MO	1.4	198.7	V				11.2	12.7	21.5	OK
469.9750	WQYD350	YG	MO	0.7	121.7	V				7.6	16.1	27.2	<2%
469.9813	WQLK924	YG	MO8	0.7	121.7	V				4.0	21.1	33.4	<2%
469.7250	WQRV784	IG	MO	0.7	121.7	V				11.0	21.2	23.2	OK
469.6625	WPXD506	IG	MO	3.4	226.9	V				11.2	22.1	21.5	OK
469.6375	WPXD506	IG	MO	3.4	226.9	V				11.2	23.1	21.5	OK
470.0000	WQFB702	IG	MO	0.7	121.7	V				11.0	23.6	38.9	OK
469.5250	WQHT828	IG	MO	0.7	121.7	V				11.2	27.5	21.9	OK
469.6375	WPSE393	IG	MO	7.4	116.4	V				11.2	27.8	26.2	OK
469.8875	WPXD506	IG	MO	3.4	226.9	V				11.2	28.4	20.7	OK
469.4625	WPXD506	IG	MO	3.4	226.9	V				11.2	30.1	22.0	OK
469.7625	WQCZ368	YG	MO	9.9	213.9	V				4.0	30.4	33.8	OK
469.6125	WQRX299	YG	MO8	1.4	198.7	V				11.0	33.8	31.4	OK
469.7375	WQKG909	IG	MO	1.7	68.0	V				11.2	35.4	38.0	OK
469.3250	WPGK371	IG	MO	0.7	121.7	V				11.2	35.5	22.5	OK
469.6250	KUI773	IG	MO	0.7	121.7	V				11.0	36.8	35.0	OK
469.6000	WPUB842	IG	MO	12.7	268.5	V				20.0	37.2	34.1	OK
469.6875	WPKQ782	IG	MO	20.7	74.3	V				11.2	37.7	38.0	OK
469.6625	WQAB738	IG	MO	0.7	121.7	V				11.2	38.4	37.9	OK
469.6625	KD39828	IG	MO	0.7	121.7	V				11.2	38.6	38.0	OK
469.9125	WQTD640	IG	MO	1.7	68.0	V				11.2	39.0	37.3	OK
469.8125	WQTF725	IG	MO	1.7	344.5	V				11.2	39.3	38.0	OK
469.6375	WQAB738	IG	MO	0.7	121.7	V				11.2	39.4	38.0	OK
469.6375	KD39828	IG	MO	0.7	121.7	V				11.2	39.6	38.1	OK
469.2250	WQAT642	IG	MO	0.7	121.7	V				11.2	39.7	22.6	OK
469.9250	WNPD787	IG	MO	13.5	2.4	V			4.8	11.3	40.5	41.6	OK
469.4250	WNSO535	IG	MO	0.7	121.7	V				11.2	41.0	31.6	OK
469.9750	WNED262	IG	MO	54.1	335.2	V				11.2	41.4	52.3	OK
469.7750	WQDN662	IG	MO	28.7	324.5	V				11.2	43.1	46.7	OK
469.1375	WPXD506	IG	MO	3.4	226.9	V				11.2	43.2	22.9	OK

Notes:

1. Mobile analysis performed within a defined area of operation from mobile LM coordinates
2. 48 km radius used for mobile area of operation if not specified in authorization
3. Mobile Distance/Azimuth is shown to the cell with the lowest margin
4. Average mobile interference and/or Desensitization margins over the area are shown
5. Status OVR1 - More than 2% of the mobile area predicted to have interference
6. Status OVR2 - More than 2% of the mobile area predicted to have Desensitization
7. Status OVR3 - More than 2% of the mobile area predicted to have both interference and Desensitization

APPENDIX 7
Mobile Operations with the Lowest Desensitization Margins
Listing of the Lowest 30 out of 2,639 Fixed Base LM Facilities

Freq Mhz	Call Sign	Svc Code	Svc Cls	DTV->LM Dist km	DTV->LM Az deg	Ant Pol	HAAT M	HAGL m	Gain dB	BW khz	IX Mgn dB	DS Mgn dB	Result Status
467.9000	WQHD876	IG	MO	0.7	121.7	V				11.2	72.9	20.4	OK
467.8500	WQHD876	IG	MO	0.7	121.7	V				11.2	75.3	20.5	OK
467.8750	WQHD876	IG	MO	0.7	121.7	V				11.2	75.4	20.5	OK
469.8875	WPXD506	IG	MO	3.4	226.9	V				11.2	28.4	20.6	OK
467.8375	WQHD876	IG	MO	0.7	121.7	V				11.2	71.8	20.6	OK
467.7625	WQHD876	IG	MO	0.7	121.7	V				11.2	70.6	20.8	OK
469.6625	WPXD506	IG	MO	3.4	226.9	V				11.2	22.1	21.4	OK
469.9625	WQVS930	IG	MO	1.4	198.7	V				11.2	12.7	21.5	OK
469.6375	WPXD506	IG	MO	3.4	226.9	V				11.2	23.1	21.5	OK
469.5250	WQHT828	IG	MO	0.7	121.7	V				11.2	27.5	21.9	OK
469.4625	WPXD506	IG	MO	3.4	226.9	V				11.2	30.1	22.0	OK
469.3250	WPGK371	IG	MO	0.7	121.7	V				11.2	35.5	22.5	OK
469.2250	WQAT642	IG	MO	0.7	121.7	V				11.2	39.7	22.6	OK
469.1375	WPXD506	IG	MO	3.4	226.9	V				11.2	43.2	22.8	OK
469.7250	WQRV784	IG	MO	0.7	121.7	V				11.0	21.2	23.2	OK
468.8375	WPXD506	IG	MO	3.4	226.9	V				11.2	55.7	23.7	OK
468.7625	WPXD506	IG	MO	3.4	226.9	V				11.2	58.5	23.9	OK
468.4875	WPXD506	IG	MO	3.4	226.9	V				11.2	69.6	24.6	OK
468.3125	WQSY380	IG	MO	0.7	121.7	V				11.2	75.4	25.2	OK
469.6375	WPSE393	IG	MO	7.4	116.4	V				11.2	27.8	26.1	OK
468.9125	WQUY479	IG	MO	3.6	203.9	V				11.2	55.4	26.4	OK
467.5000	WQBV291	IG	MO	0.7	121.7	V				11.2	78.2	27.1	OK
469.9750	WQYD350	YG	MO	0.7	121.7	V				7.6	16.1	27.2	<2%
467.3000	WPXA339	IG	MO	0.7	121.7	V				11.2	80.8	27.6	OK
468.8500	WRBV621	IG	MO	0.7	121.7	V			3.0	7.6	59.0	27.8	OK
467.1750	WQAT642	IG	MO	0.7	121.7	V				11.2	76.3	27.9	OK
468.3625	WQUY479	IG	MO	3.6	203.9	V				11.2	78.1	27.9	OK
467.3750	WPFQ431	IG	MO	0.7	121.7	V				11.2	81.0	28.1	OK
467.3750	WPFQ431	IG	MO	0.7	121.7	V				11.2	81.0	28.1	OK
468.9750	WQBI522	IG	MO	0.7	121.7	V				11.2	54.9	28.7	OK

Notes:

1. Mobile analysis performed within a defined area of operation from mobile LM coordinates
2. 48 km radius used for mobile area of operation if not specified in authorization
3. Mobile Distance/Azimuth is shown to the cell with the lowest margin
4. Average mobile interference and/or Desensitization margins over the area are shown
5. Status OVR1 - More than 2% of the mobile area predicted to have interference
6. Status OVR2 - More than 2% of the mobile area predicted to have Desensitization
7. Status OVR3 - More than 2% of the mobile area predicted to have both interference and Desensitization