Report for

Sonshine Family Television, Inc.

W14DF-D, Channel 14
Elliottsburg, PA

Regarding the Potential Impact from the proposed relocation of W14DF-D into Land Mobile Operations below TV Channel 14 and those operating under waiver on TV Channels 14 and 15

December 7, 2018

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 Sonshine Family Television, Inc., licensee of W14DF-D ("W14DF"), licensed to serve Elliottsburg, PA. W14DF is proposing to relocate its transmission facility to a site 83 kilometers southeast at a bearing of 132 degrees from its licensed location as identified in FCC File Number BLDTL20100629ALC. The relocation would also include an increase of Effective Radiated Power (ERP) from 2.43 kW to 15 kW.

The results of the TVStudy interference analysis for the relocation showed some failure checks to certain Land Mobile ("LM") operations operating outside a designated area as defined in the rules[1] and under a waiver. Appendix 3 is a list of these LM stations operating under waiver as reported by TVStudy. MSW was contracted to investigate this and determine what the impact, if any, would be into these LM operations by the relocation of W14DF.

The study also investigated the impact into all Land Mobile operations below Channel 14 from 464 MHz to 470 MHz within 250 km of the relocated W14DF facility.

SCOPE OF STUDY AND METHODOLOGY

The scope of this LM Study consisted of two parts. The first part was of a general study of potential interference caused by Out of Band Emissions ("OOBE") from the television station (W14DF) into Land Mobile operations that could be co-channel or in the adjacent bands to that of the relocated television station.

The study also included analyzing the potential for LM receiver desensitization ("overload") due to the television station operating in the adjacent band at a power level typically higher than that of LM stations.

For both parts of the study, fixed and mobile LM operations were considered. The parameters used for the television station are found in Table 1 and the generic parameters used for both fixed and mobile LM operations are found in Table 2.

An interference study was performed using the Longley-Rice Irregular Terrain Model ("ITM") to predict interference caused by OOBE from the television station into both fixed and mobile LM operations using the generic parameters. The study focused on a circular area with a radius of 250 km from a center point with coordinates near the relocated television station.

The circular area was divided into cells with a size of approximately 1 km per side. The assumed LM receiver location was considered 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 loss from the OOBE post-transmitter "Mask" filter, at the LM station frequency, was added along with the coupling factor which was calculated from the bandwidth of the LM

[1] See 47 C.F.R. § 90.303(b) and § 90.305(a)(b)

station and the 500 kHz measurement bandwidth used for digital television stations. LM antenna gain and line loss was then added to the results.

Overload calculations were performed by using the free space loss from the television transmitter to the cell center point. The received power level in the direction of the cell included any losses due to terrain, calculated antenna azimuth and elevation discrimination and coupling losses based on the bandwidth of the LM station and the 3dB half-power bandwidth of the television station. LM antenna gain and assumed transmission line loss for fixed base stations was also considered. Land Use/Land Clutter losses were not considered in the study.

The second part of the study consisted of analyzing interference and overload into currently authorized 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 250 km from the television station. The area studied is shown in Appendix 1 along with all LM operations found operating below TV channel 14. LM stations operating under waiver are shown in Appendix 2.

Interference and overload calculations were performed similar to the cell analysis described earlier 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 overload LM studies, respectively. These examples are based on the results of the LM station shown above Table 4.

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 a default radius of 48 km was used. The center point used was the coordinates of the 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 overload as calculated from the television station. 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 overload was considered de minimis and the facility was considered to have passed.

FCC rules require that the 52 dBu F(50, 10) contour[2] of a Low-Power television station not overlap the LM protected contour for co-channel operations. For adjacent channel LM operations the interference contour to be considered is 76 dBu.[3] While TVStudy did not report contour overlap to any of the protected areas identified in the rules[4] there were, however, some cases reported for LM stations operating under a waiver.

For this study, only LM operations below channel 14 and those reported as either a distance or contour check failure to LM stations operating under waiver were studied. The specific stations

[2] See 47 C.F.R. § 74.709(d)(1) and (2)
[3] See 47 C.F.R. § 74.709(d)(3)
[4] See 47 C.F.R. § 74.709(a)

that are under waiver and studied were those reported by TVStudy in the station interference analysis as listed in Appendix 3 of this report.

Most all LM operations use vertical antenna polarization. With W14DF proposing the use of horizontal polarization, LM stations would typically experience further reduction of interference and/or overload by 15 to 20 dB. A value of 15 dB of antenna cross polarization discrimination was utilized in this study for LM operations not indicating the use of horizontal, circular or elliptical polarization.

STUDY PARAMETERS

The parameters used for W14DF and LM operations are shown in Tables 1 and 2, respectively. Table 2 shows the general LM analysis parameters for the cell study. For the individual studies to each LM station the authorized parameters were used.

Table 1 - Parameters for television station W14DF-D

Parameter	Value
Analyzed Station	W14DF-D (Relocated)
Channel	14
Latitude (NAD83)	39-54-18.3
Longitude (NAD83)	76-34-57.2
Height of Antenna Center of radiation (AMSL)	408.5 m
ERP	15 kW
Antenna Type	Omnioid
Antenna Pattern Relative Field per Azimuth Bearing	Calculated
Polarization	H
Elevation Pattern Utilized	Real
Electrical Tilt	0.50 degree
Antenna Pattern Relative Field per Depression Angle	Calculated
Post-transmitter Filter Type	12-Section

Table 2 - Parameters for Land Mobile Stations

Parameter	Value
Antenna Type	Omni-directional
Frequency (MHz)*	469.9750, 478.0000[5]
Bandwidth*	30 kHz
Height of Antenna Center of radiation (AMSL)*	10.0 m
Polarization*	V
Receive Antenna Gain*	11.0 dBd
Antenna Pattern Relative Field per Azimuth Bearing	1.0
Antenna Pattern Relative Field per Depression Angle	1.0
Receive Line Loss	2.0 dB
Receiver Noise Floor	-120.0 dB
Receiver Out of Band Rejection	80.0

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

[5] 478 MHz was used since Land Mobile Operations for WQNI286 (Lancaster County, PA) begin at this frequency

Table 3 shows the parameters used for the Irregular Terrain Model in conducting the W14DF OOBE field intensities inside a circular area with a 250 km radius. These parameters were also used for determining the signal strength of W14DF OOBE into each LM station below channel 14 (464-470 MHz) or operating under waiver on channel 14 and 15 and reported as distance or contour check failures by TVStudy.

The study radius of 250 km was chosen to ensure all LM stations that could be potentially impacted by the relocation of W14DF would be studied.

Table 3 – Parameter settings utilized in Land Mobile Study

Parameter	Value
Study Radius	250.00 km
Study Centerpoint Latitude (NAD 83)	39-54-18.0 N
Study Centerpoint Longitude (NAD 83)	76-34-57.0 W
Cross Polarization Discrimination Factor	15.0 dB
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
FCC interference criteria per Section 73.687(e)(4)(ii)	17.0 dBuV/m
Number of cells analyzed	199808
Area analyzed	196374.92 sq km
Area predicted to receive field strength => 17.00 dBu 469.975 MHz	0.00 sq km
Area predicted to receive Overload 464-470 MHz	0.00 sq km
Area predicted to receive field strength => 17.00 dBu 478.0 MHz	0.00 sq km
Area predicted to receive Overload 476-482 MHz	0.00 sq km

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

STUDY METHODOLOGY AND EXAMPLE

Table 4 shows the methodology that was used for calculating interference from W14DF into the LM station shown below. Similarly, Table 5 shows the methodology of predicting receiver overload into the LM station.

Freq	Call	Svc	Svc	DTV->LM		Ant	HAAT	HAGL	Gain	BW
Mhz	Sign	Code	Cls	Dist km	Az deg	Pol	M	m	dB	khz
476.0125	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8

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

Parameter	Value
Land Mobile Station Frequency	476.0125 MHz
Longley-Rice Calculated Received Field Strength [F50,10]	95.0 dBuV/m
Post-transmitter filter loss at Land Mobile frequency	55.1 dB
Transmitting and receiving antenna discrimination, combined†	2.7 dB
DTV coupling into LM (Bandwidth: DTV=500 kHz, LM=9.8 kHz)	17.1 dB
Cross-polarization discrimination	15.0 dB
LM antenna gain	9.5 dB
LM line loss	2.0 dB
Calculated equivalent field strength per Section 73.687(e)(4)(ii)	12.7 dBuV/m
FCC interference criteria per Section 73.687(e)(4)(ii)	17.0 dBuV/m
Margin to interference per Section 73.687(e)(4)(ii)	4.3 dB
Analysis result**	Pass

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

Parameter	Value
Upper Band Edge Frequency of TV Station (Ch. 14)	476.0 MHz
Transmit ERP (15 kW)	71.8 dbm
Free Space Path Loss for dipole antenna at frequency and distance	105.4 dB
Terrain Loss	0.0 dB
Transmitting and receiving antenna discrimination†	2.7 dB
DTV coupling into LM (Bandwidth: DTV=5.38 MHz, LM=9.8 kHz)	27.4 dB
Cross-polarization discrimination	15.0 dB
LM antenna gain	9.5 dB
LM line loss	2.0 dB
LM receiver out-of-band rejection	80.0 dB
Effective received DTV station interference power	-151.2 dBm
Estimated LM receiver noise floor	-120.0 dBm
Margin to overload interference	31.2 dB
Analysis result‡	Pass

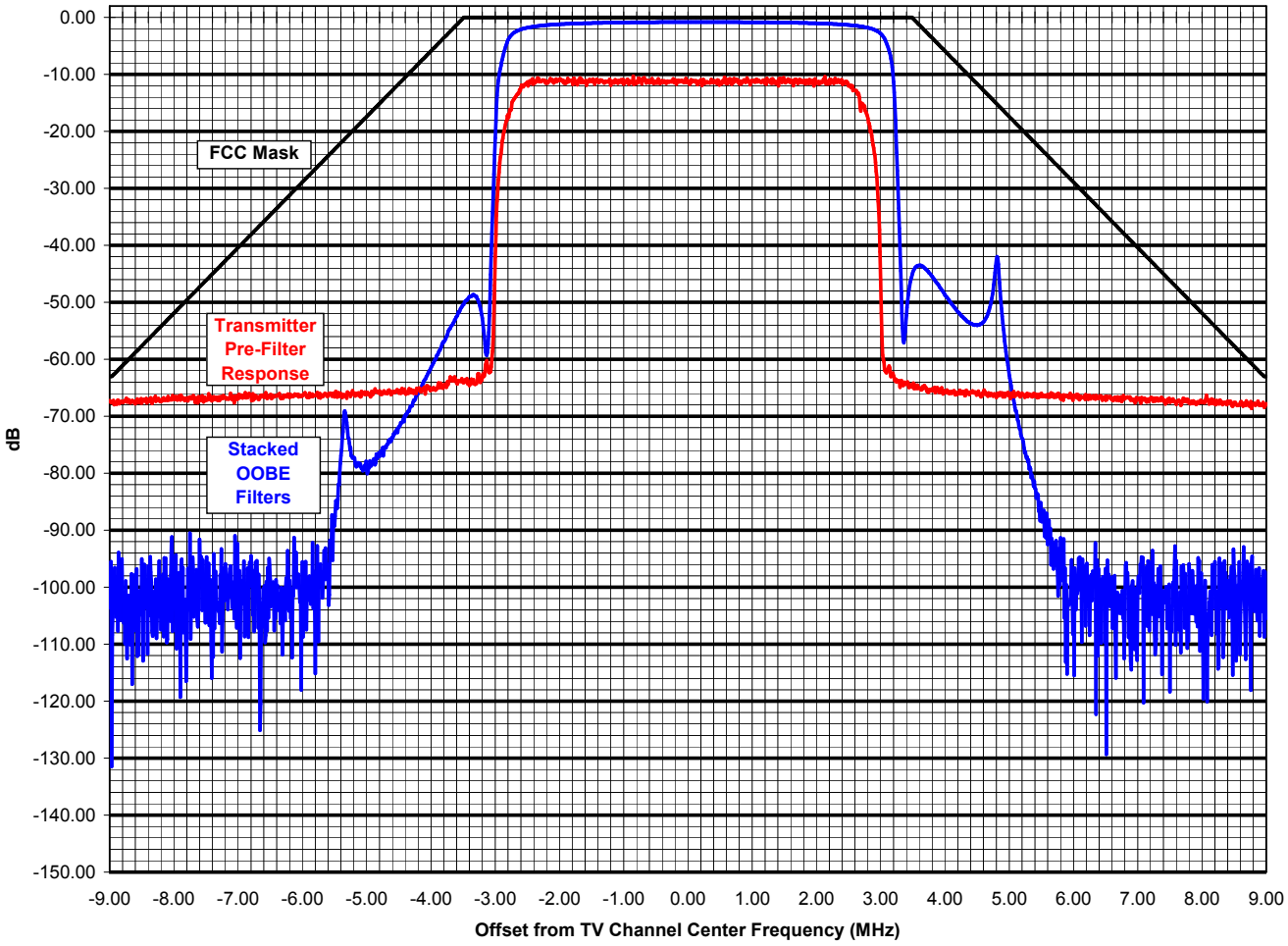
† Only transmit antenna azimuth and elevation discrimination factors are considered

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

‡ If overload is predicted, LM receiver pre-filtering would be required

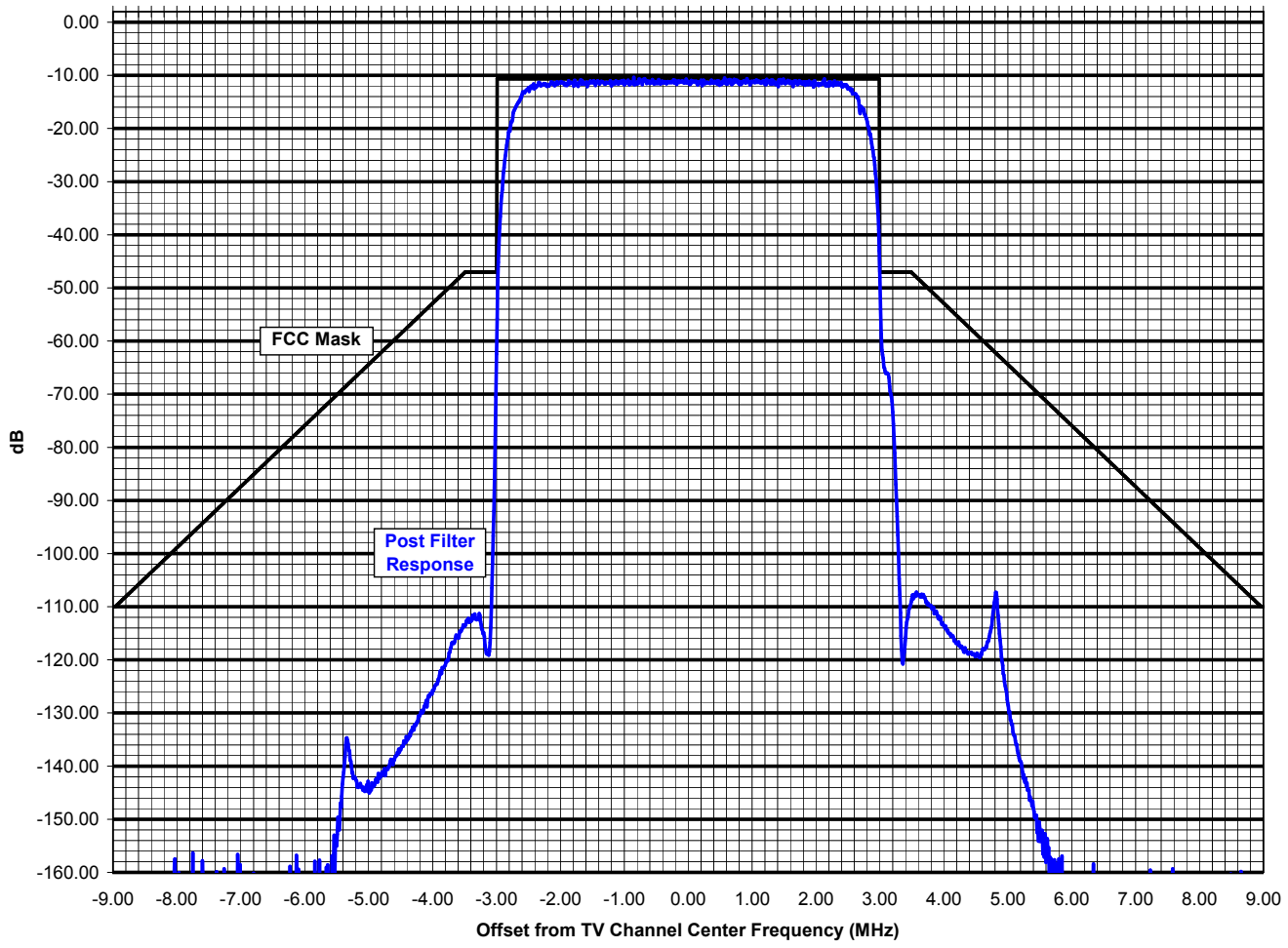
DTV POST-TRANSMITTER FILTER

The LM study performed for W14DF included the use of a 12-Section post-transmitter filter. Below is the response of the proposed 12-Section filter overlaid with the pre-filter response of the transmitter exciter and power amplifiers.



Blue: Total Response of a 12-Section Filter
Red: Transmitter Exciter and Power Amplifier Pre-filter response
Black: Approximate Full-Service Post-transmitter filter response

Shown below is a plot of the total response of the proposed 12-Section post-transmitter filter plus the pre-filter response the transmitter exciter and power amplifiers. The response is shown compared to the FCC Mask. The sharp response of a 12-Section filter will significantly reduce OOBE beginning at the channel 14 band edges.



Blue: Total Response of a 12-Section Filter plus transmitter exciter and power amplifiers
Black: FCC Full-Service Mask Response

ANALYSIS RESULTS

1. The study performed showed that adequate interference protection for current LM operations operating under waiver, as reported by TVStudy, on TV channels 14 and 15 can be accomplished by using a 12-Section post-transmitter filter.

2. WQNI286 is licensed for the entire county of Lancaster, PA, with no specific coordinates identified. An area study was performed using a frequency near those authorized. The study returned no interference or overload cases.

3. In May 2016 Lancaster County, Licensee of WQNI287, submitted an application to the FCC to delete the frequencies assigned for operation on channel 15. A search of the ULS confirmed that there are no frequencies assigned in that band to WQNI287. This facility, therefore, was not considered in the study.

4. Adequate interference protection of current LM operations on 464-470 MHz can be accomplished using a 12-Section post-transmitter filter.

5. No signal overload issues were reported in the study for any LM operations.

Table 7 – Statistics from Study Results

Item	Value
Land Mobile Authorizations Studied	10,137
Total of Land Mobile Facilities Studied	41,705
Land Mobile Facilities Studied 464-470 MHz	41,371
Waivered Land Mobile Facilities Studied 470-482 MHz	334
Interference Cases found from 464-470 MHz	0
Worst Case Interference Margin	25.2 dB
Overload Cases found from 464-470 MHz	0
Worst Case Overload Margin	16.8 dB
Interference Cases found on TV Channels 14 & 15	0
Worst Case Interference Margin	4.3 dB
Overload Cases found on TV Channels 14 & 15	0
Worst Case Overload Margin	>20.0 dB

The results of the LM interference study and receiver overload are shown at the far right of each station shown in Appendices 4 and 5. Due to there being 41,371 analyzed facilities below channel 14, only 30 of the lowest margins are shown.

CONCLUSION

MSW studied the predicted W14DF OOBE and signal overload into Land Mobile stations inside a 250 km radius circular area from a center point near the site where it is proposed to relocate W14DF. Based on the results of the analysis the following conclusions were reached.

1. There is no distance separation or contour overlap to any of the LM areas as defined in the rules.

2. W14DF will protect the LM operations operating on channels 14 and 15 under a waiver with the use of a 12-Section post-transmitter filter.

3. W14DF will protect the LM operations operating on 464-470 MHz with the use of a 12-Section post-transmitter filter.

4. There are no signal overload issues predicted into any authorized LM facilities.

Based on the conclusions of the study performed, W14DF should adequately protect Land Mobile operations with the use of a 12-Section post-transmitter filter.

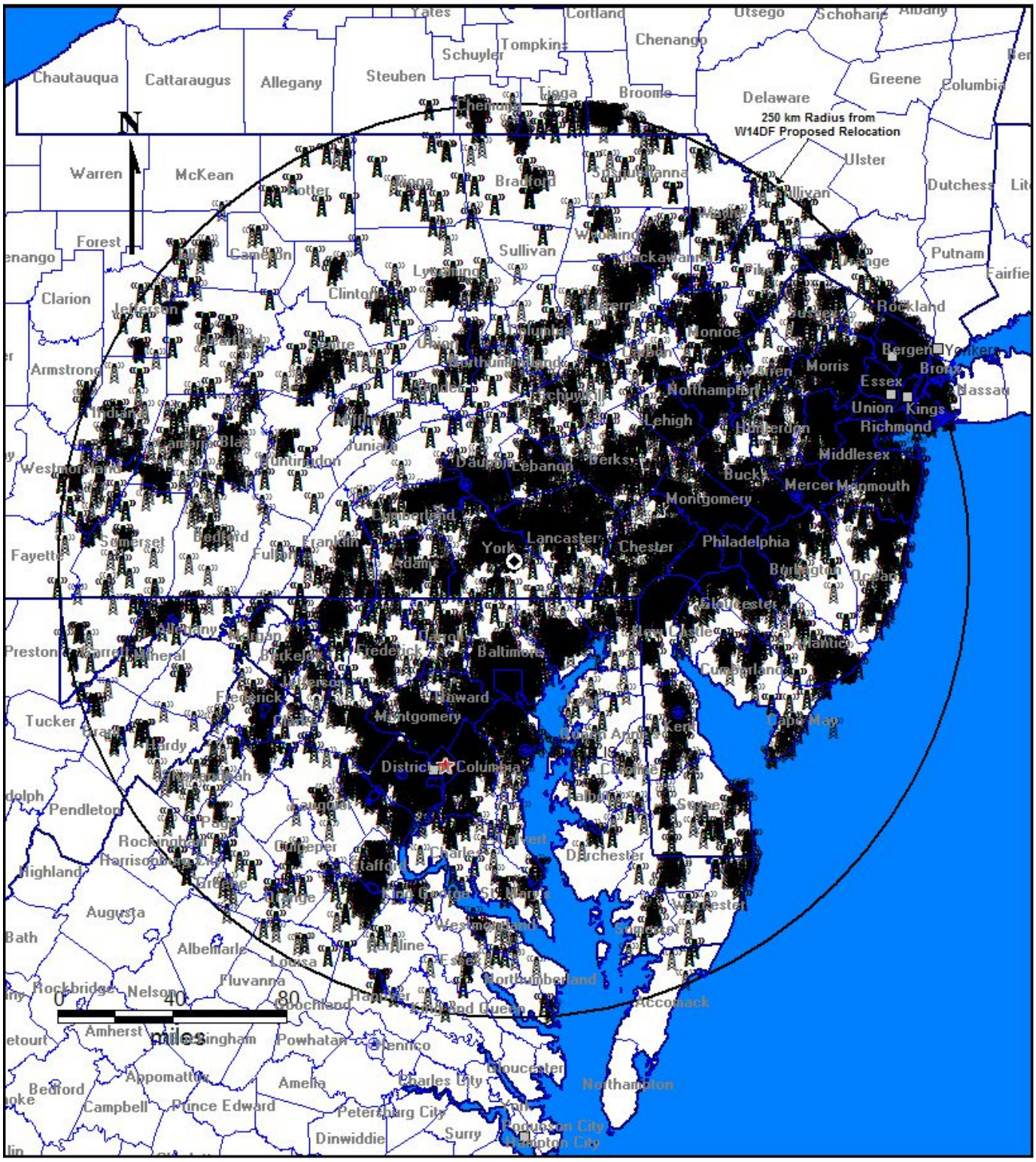
The study conducted by MSW is based on using the ITM prediction model. Real world propagation conditions, including errors and omissions in the FCC database, intermodulation products, etc. may affect the actual results in the field and are considered outside the control of MSW.

MSW stands ready to answer any questions that may arise about this report or the methodology utilized.

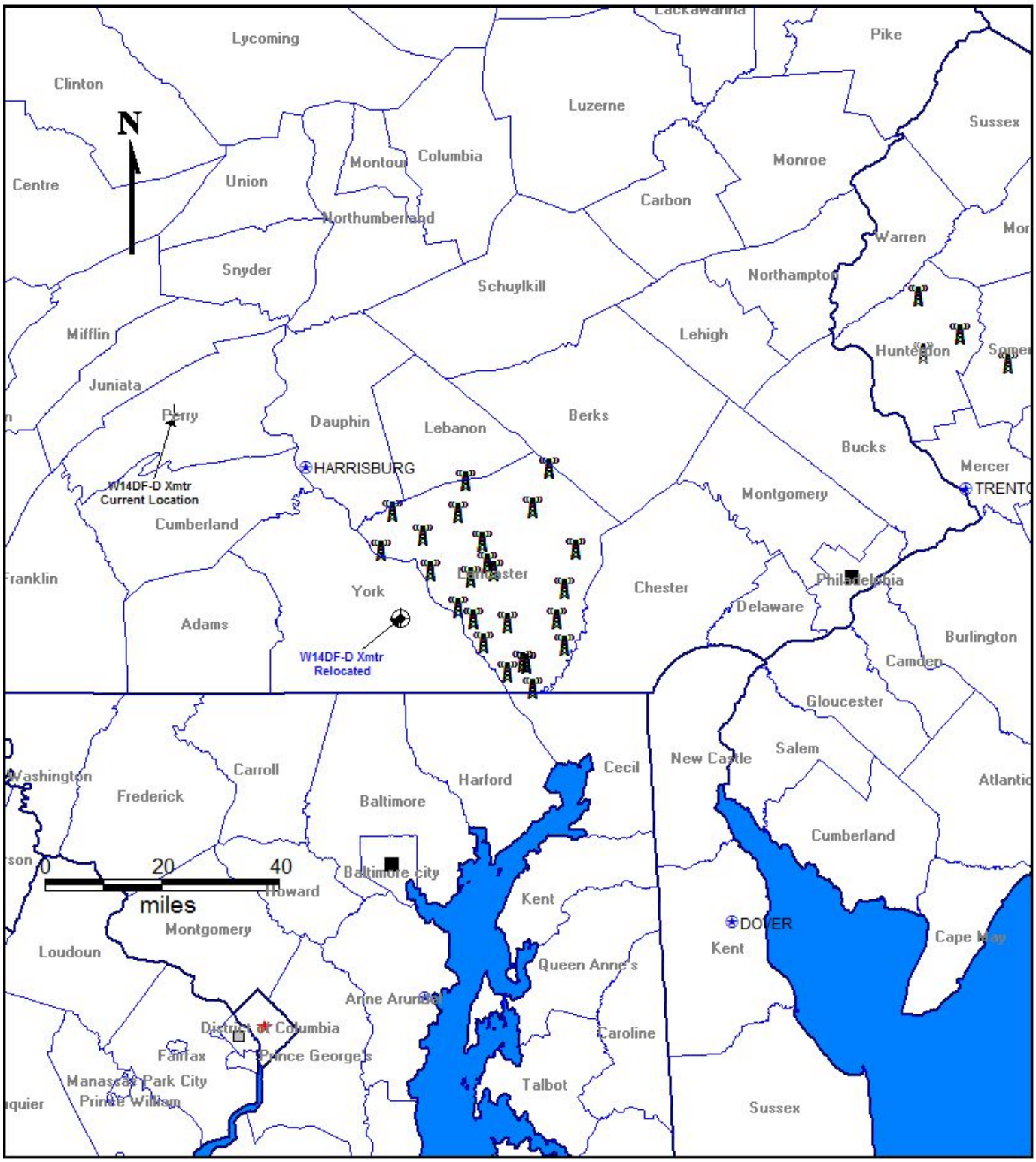
Prepared by,

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

APPENDIX 1
Land Mobile Facilities below TV Channel 14
Within a 250 km Radius (155 mi) of the Proposed Relocation of W14DF-D



APPENDIX 2
Land Mobile Operations with a Waiver for Operation on TV Channels 14 or 15 and Current and Proposed W14DF-D, Channel 14 Transmitter Sites



APPENDIX 3
List of LM Facilities Operating under Waiver between 470-482 MHz
As Reported from TVStudy

**Proposal fails contour check to land mobile station: BUCKS PA WQFA917 ch. 14
**Proposal fails contour check to land mobile station: HUNTERDON NJ WQFA917 ch. 14
**Proposal fails contour check to land mobile station: HUNTERDON NJ WQFA917 ch. 14
**Proposal fails contour check to land mobile station: HUNTERDON NJ WQFA917 ch. 14
**Proposal fails contour check to land mobile station: HUNTERDON NJ WQFA917 ch. 14
**Proposal fails contour check to land mobile station: HUNTERDON NJ WQFA918 ch. 14
**Proposal fails contour check to land mobile station: HUNTERDON NJ WQFA918 ch. 14
**Proposal fails distance check to land mobile station: LANCASTER PA WQNI284 ch. 15, 36.7 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQNI284 ch. 15, 20.1 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQNI284 ch. 15, 51.3 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQNI284 ch. 15, 57.5 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQNI286 ch. 15, 15.2 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQNI287 ch. 15, 27.8 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB478 ch. 15, 23.4 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB478 ch. 15, 32.6 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB478 ch. 15, 29.1 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB478 ch. 15, 46.9 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB478 ch. 15, 41.4 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB480 ch. 15, 32.8 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB480 ch. 15, 29.4 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB480 ch. 15, 20.1 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB480 ch. 15, 19.2 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB480 ch. 15, 51.3 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB483 ch. 15, 16.0 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB483 ch. 15, 22.3 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB483 ch. 15, 28.4 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB483 ch. 15, 15.2 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB483 ch. 15, 28.0 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB483 ch. 15, 30.5 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB485 ch. 15, 41.3 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB485 ch. 15, 45.5 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB485 ch. 15, 23.8 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB485 ch. 15, 42.8 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQRB485 ch. 15, 45.7 km
**Proposal fails distance check to land mobile station: LANCASTER PA WQVS780 ch. 15, 35.6 km
**Proposal fails contour check to land mobile station: SOMERSET NJ WIL900 ch. 14

APPENDIX 4
LM Facilities Operating under Waiver between 470-482 MHz
Sorted by the Results Returned from TVStudy
Overall Status: Passed

Listed below are the LM facilities identified by TVStudy that failed either a distance or contour check. The study showed that no interference or overload is predicted into any of the LM facilities listed below.

WQNI286 - A search of the ULS database showed this authorization being licensed to the entire county of Lancaster, PA. The only location shown was for mobile over the entire county with 50 frequencies beginning at 478 MHz (inside TV channel 15). A 1 km/side cell study was conducted for the entire county. No interference or overload cases were found.

WQNI287 - A search of the ULS database showed that the lowest frequency authorized is 500.4 MHz which is inside TV channel 19, well distanced from W14DF in terms of frequency separation. Further investigation of the ULS showed that the licensee of WQNI286 had requested of the Commission delete the frequencies inside channel 15 due to receiving interference from a full power TV station. Therefore, the waiver granted for this authorization should not be in effect.

There were 334 facilities identified that are associated with the failure checks reported from TVStudy. None of the facilities are predicted to be impacted by the proposed W14DF relocation.

TV Ch	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	OL Mgn dB
14	470.3125	WQFA917	PW	FB2	165.9	57.5	V	141.9	38.1	10.0	11.2	22.7	>20.0
14	470.5250	WQFA917	PW	FB2	165.9	57.5	V	141.9	38.1	10.0	11.2	19.3	>20.0
14	470.5500	WQFA917	PW	FB2	165.9	57.5	V	141.9	38.1	10.0	11.2	19.4	>20.0
14	470.6750	WQFA917	PW	FB2	165.9	57.5	V	141.9	38.1	10.0	11.2	18.6	>20.0
14	470.7750	WQFA917	PW	FB2	165.9	57.5	V	141.9	38.1	10.0	11.2	18.7	>20.0
14	470.8000	WQFA917	PW	FB2	165.9	57.5	V	141.9	38.1	10.0	11.2	18.8	>20.0
14	470.9875	WQFA917	PW	FB2	165.9	57.5	V	141.9	38.1	10.0	11.2	18.3	>20.0
14	471.3250	WQFA917	PW	FB2	165.9	57.5	V	141.9	38.1	10.0	11.2	18.2	>20.0
14	471.3750	WQFA917	PW	FB2	159.7	62.6	V	187.8	82.0	10.0	11.2	18.7	>20.0
14	471.3750	WQFA917	PW	FB2	165.9	57.5	V	141.9	38.1	10.0	11.2	18.5	>20.0
14	472.6125	WQFA917	PW	FB2	165.9	57.5	V	141.9	38.1	10.0	11.2	18.3	>20.0
14	470.3125	WQFA918	PW	MO	171.1	62.5	V				11.2	15.8	>20.0
14	470.5250	WQFA918	PW	MO	171.1	62.5	V				11.2	12.5	>20.0
14	470.5500	WQFA918	PW	MO	171.1	62.5	V				11.2	12.6	>20.0
14	470.6750	WQFA918	PW	MO	171.1	62.5	V				11.2	11.8	>20.0
14	470.7750	WQFA918	PW	MO	171.1	62.5	V				11.2	11.9	>20.0
14	470.8000	WQFA918	PW	MO	171.1	62.5	V				11.2	12.0	>20.0
14	470.9875	WQFA918	PW	MO	171.1	62.5	V				11.2	11.5	>20.0
14	471.3250	WQFA918	PW	MO	171.1	62.5	V				11.2	11.4	>20.0
14	471.3750	WQFA918	PW	MO	171.1	62.5	V				11.2	11.7	>20.0

14	472.6125	WQFA918	PW	MO	171.1	62.5	V				11.2	11.5	>20.0
14	473.3125	WQFA918	PW	MO	171.1	62.5	V				11.2	11.6	>20.0
14	473.5250	WQFA918	PW	MO	171.1	62.5	V				11.2	11.7	>20.0
14	473.5500	WQFA918	PW	MO	171.1	62.5	V				11.2	11.3	>20.0
14	473.6750	WQFA918	PW	MO	171.1	62.5	V				11.2	11.7	>20.0
14	473.7750	WQFA918	PW	MO	171.1	62.5	V				11.2	11.3	>20.0
14	473.8000	WQFA918	PW	MO	171.1	62.5	V				11.2	11.3	>20.0
14	473.9875	WQFA918	PW	MO	171.1	62.5	V				11.2	11.3	>20.0
14	474.3250	WQFA918	PW	MO	171.1	62.5	V				11.2	11.2	>20.0
14	474.3750	WQFA918	PW	MO	171.1	62.5	V				11.2	11.8	>20.0
14	475.6125	WQFA918	PW	MO	171.1	62.5	V				11.2	13.7	>20.0
15	476.0125	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	18.6	>20.0
15	476.0125	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	16.6	>20.0
15	476.0125	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	23.9	>20.0
15	476.0125	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	23.9	>20.0
15	476.0875	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	29.5	>20.0
15	476.0875	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	27.4	>20.0
15	476.0875	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	34.7	>20.0
15	476.0875	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	34.7	>20.0
15	476.1250	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	29.7	>20.0
15	476.1250	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	27.6	>20.0
15	476.1250	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	34.9	>20.0
15	476.1250	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	35.0	>20.0
15	476.1625	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	33.0	>20.0
15	476.1625	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	31.0	>20.0
15	476.1625	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	38.3	>20.0
15	476.1625	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	38.3	>20.0
15	476.2000	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	36.8	>20.0
15	476.2000	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	34.8	>20.0
15	476.2000	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	42.1	>20.0
15	476.2000	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	42.1	>20.0
15	476.2375	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	46.4	>20.0
15	476.2375	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	44.3	>20.0
15	476.2375	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	51.7	>20.0
15	476.2375	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	51.7	>20.0
15	476.2750	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	58.3	>20.0
15	476.2750	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	56.2	>20.0
15	476.2750	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	63.6	>20.0
15	476.2750	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	63.6	>20.0
15	476.3500	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	83.9	>20.0
15	476.3500	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	81.9	>20.0
15	476.3500	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	89.2	>20.0
15	476.3500	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	89.2	>20.0
15	476.4250	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	76.1	>20.0
15	476.4250	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	74.0	>20.0
15	476.4250	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	81.4	>20.0
15	476.4250	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	81.4	>20.0
15	476.4625	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	73.7	>20.0
15	476.4625	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	71.6	>20.0

15	476.4625	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	79.0	>20.0
15	476.4625	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	79.0	>20.0
15	476.5375	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	71.2	>20.0
15	476.5375	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	69.2	>20.0
15	476.5375	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	76.5	>20.0
15	476.5375	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	76.5	>20.0
15	476.6125	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	71.3	>20.0
15	476.6125	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	69.2	>20.0
15	476.6125	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	76.6	>20.0
15	476.6125	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	76.6	>20.0
15	476.6875	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	71.4	>20.0
15	476.6875	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	69.4	>20.0
15	476.6875	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	76.7	>20.0
15	476.6875	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	76.7	>20.0
15	476.7250	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	72.6	>20.0
15	476.7250	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	70.5	>20.0
15	476.7250	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	77.9	>20.0
15	476.7250	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	77.9	>20.0
15	476.8000	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	73.3	>20.0
15	476.8000	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	71.2	>20.0
15	476.8000	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	78.6	>20.0
15	476.8000	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	78.6	>20.0
15	476.8750	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	74.5	>20.0
15	476.8750	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	72.4	>20.0
15	476.8750	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	79.8	>20.0
15	476.8750	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	79.8	>20.0
15	477.0625	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	78.0	>20.0
15	477.0625	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	75.9	>20.0
15	477.0625	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	83.3	>20.0
15	477.0625	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	83.3	>20.0
15	477.1000	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	83.8	>20.0
15	477.1375	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	79.0	>20.0
15	477.1375	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	76.9	>20.0
15	477.1375	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	84.3	>20.0
15	477.1375	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	84.3	>20.0
15	477.2125	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	80.5	>20.0
15	477.2125	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	78.5	>20.0
15	477.2125	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	85.8	>20.0
15	477.2125	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	85.8	>20.0
15	477.2875	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	81.2	>20.0
15	477.2875	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	79.2	>20.0
15	477.2875	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	86.5	>20.0
15	477.2875	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	86.5	>20.0
15	477.3625	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	81.9	>20.0
15	477.3625	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	79.9	>20.0
15	477.3625	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	87.2	>20.0
15	477.3625	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	87.2	>20.0
15	477.4000	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	82.1	>20.0
15	477.4000	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	80.0	>20.0

15	477.4000	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	87.4	>20.0
15	477.4000	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	87.4	>20.0
15	477.4750	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	82.4	>20.0
15	477.4750	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	80.4	>20.0
15	477.4750	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	87.7	>20.0
15	477.4750	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	87.7	>20.0
15	477.5500	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	82.9	>20.0
15	477.5500	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	80.8	>20.0
15	477.5500	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	88.2	>20.0
15	477.5500	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	88.2	>20.0
15	477.6625	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	81.0	>20.0
15	477.6625	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	78.9	>20.0
15	477.6625	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	86.2	>20.0
15	477.6625	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	86.3	>20.0
15	477.7750	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	74.2	>20.0
15	477.7750	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	72.1	>20.0
15	477.7750	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	79.4	>20.0
15	477.7750	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	79.5	>20.0
15	477.8125	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	70.8	>20.0
15	477.8125	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	68.7	>20.0
15	477.8125	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	76.0	>20.0
15	477.8125	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	76.1	>20.0
15	477.8500	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	75.2	>20.0
15	477.8500	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	73.1	>20.0
15	477.8500	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	80.4	>20.0
15	477.8500	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	80.5	>20.0
15	477.8875	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	80.7	>20.0
15	477.8875	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	78.6	>20.0
15	477.8875	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	86.0	>20.0
15	477.8875	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	86.0	>20.0
15	477.9250	WQNI284	YW	FB8	36.7	109.5	V	62.4	55.4	10.2	8.1	85.3	>20.0
15	477.9250	WQNI284	YW	FB8	20.1	90.9	V	41.9	36.6	2.4	8.1	83.2	>20.0
15	477.9250	WQNI284	YW	FB8	57.5	44.9	V	83.4	36.6	3.0	8.1	90.6	>20.0
15	477.9250	WQNI284	YW	FB8	51.3	68.5	V	227.0	76.2	3.0	8.1	90.6	>20.0
15	476.1625	WQRB478	YW	FB8	46.9	50.2	V	179.1	80.0	6.0	9.8	33.1	>20.0
15	476.4250	WQRB478	YW	FB8	46.9	50.2	V	179.1	80.0	6.0	9.8	76.1	>20.0
15	476.6875	WQRB478	YW	FB8	46.9	50.2	V	179.1	80.0	6.0	9.8	71.5	>20.0
15	477.1375	WQRB478	YW	FB8	46.9	50.2	V	179.1	80.0	6.0	9.8	79.0	>20.0
15	477.2875	WQRB478	YW	FB8	46.9	50.2	V	179.1	80.0	6.0	9.8	81.3	>20.0
15	477.4000	WQRB478	YW	FB8	46.9	50.2	V	179.1	80.0	6.0	9.8	82.1	>20.0
15	477.5500	WQRB478	YW	FB8	46.9	50.2	V	179.1	80.0	6.0	9.8	82.9	>20.0
15	477.8500	WQRB478	YW	FB8	46.9	50.2	V	179.1	80.0	6.0	9.8	75.2	>20.0
15	478.0750	WQRB478	YW	FB8	41.4	25.6	V	233.2	42.2	12.0	9.8	87.8	>20.0
15	478.0750	WQRB478	YW	FB8	41.4	25.6	V	235.2	42.2		9.8	99.8	>20.0
15	478.0750	WQRB478	YW	FB8	32.6	28.9	V	9.0	31.8	6.0	9.8	93.4	>20.0
15	478.0750	WQRB478	YW	FB8	29.1	355.7	V	78.4	40.4	9.5	9.8	85.7	>20.0
15	478.0750	WQRB478	YW	FB8	23.4	15.4	V	31.3	39.2	6.0	9.8	88.2	>20.0
15	478.1500	WQRB478	YW	FB8	41.4	25.6	V	233.2	42.2	12.0	9.8	92.0	>20.0
15	478.1500	WQRB478	YW	FB8	41.4	25.6	V	235.2	42.2		9.8	104.0	>20.0

15	478.1500	WQRB478	YW	FB8	32.6	28.9	V	9.0	31.8	6.0	9.8	97.6	>20.0
15	478.1500	WQRB478	YW	FB8	29.1	355.7	V	78.4	40.4	9.5	9.8	89.9	>20.0
15	478.1500	WQRB478	YW	FB8	23.4	15.4	V	31.3	39.2	6.0	9.8	92.4	>20.0
15	478.3375	WQRB478	YW	FB8	41.4	25.6	V	233.2	42.2	12.0	9.8	100.9	>20.0
15	478.3375	WQRB478	YW	FB8	41.4	25.6	V	235.2	42.2		9.8	112.9	>20.0
15	478.3375	WQRB478	YW	FB8	32.6	28.9	V	9.0	31.8	6.0	9.8	106.5	>20.0
15	478.3375	WQRB478	YW	FB8	29.1	355.7	V	78.4	40.4	9.5	9.8	98.8	>20.0
15	478.3375	WQRB478	YW	FB8	23.4	15.4	V	31.3	39.2	6.0	9.8	101.3	>20.0
15	478.4125	WQRB478	YW	FB8	41.4	25.6	V	233.2	42.2	12.0	9.8	103.8	>20.0
15	478.4125	WQRB478	YW	FB8	41.4	25.6	V	235.2	42.2		9.8	115.8	>20.0
15	478.4125	WQRB478	YW	FB8	32.6	28.9	V	9.0	31.8	6.0	9.8	109.4	>20.0
15	478.4125	WQRB478	YW	FB8	29.1	355.7	V	78.4	40.4	9.5	9.8	101.7	>20.0
15	478.4125	WQRB478	YW	FB8	23.4	15.4	V	31.3	39.2	6.0	9.8	104.2	>20.0
15	478.6000	WQRB478	YW	FB8	41.4	25.6	V	233.2	42.2	12.0	9.8	113.1	>20.0
15	478.6000	WQRB478	YW	FB8	41.4	25.6	V	235.2	42.2		9.8	125.1	>20.0
15	478.6000	WQRB478	YW	FB8	32.6	28.9	V	9.0	31.8	6.0	9.8	118.7	>20.0
15	478.6000	WQRB478	YW	FB8	29.1	355.7	V	78.4	40.4	9.5	9.8	111.0	>20.0
15	478.6000	WQRB478	YW	FB8	23.4	15.4	V	31.3	39.2	6.0	9.8	113.5	>20.0
15	478.7875	WQRB478	YW	FB8	41.4	25.6	V	233.2	42.2	12.0	9.8	120.3	>20.0
15	478.7875	WQRB478	YW	FB8	41.4	25.6	V	235.2	42.2		9.8	132.3	>20.0
15	478.7875	WQRB478	YW	FB8	32.6	28.9	V	9.0	31.8	6.0	9.8	125.9	>20.0
15	478.7875	WQRB478	YW	FB8	29.1	355.7	V	78.4	40.4	9.5	9.8	118.2	>20.0
15	478.7875	WQRB478	YW	FB8	23.4	15.4	V	31.3	39.2	6.0	9.8	120.7	>20.0
15	478.8625	WQRB478	YW	FB8	41.4	25.6	V	233.2	42.2	12.0	9.8	123.8	>20.0
15	478.8625	WQRB478	YW	FB8	41.4	25.6	V	235.2	42.2		9.8	135.8	>20.0
15	478.8625	WQRB478	YW	FB8	32.6	28.9	V	9.0	31.8	6.0	9.8	129.4	>20.0
15	478.8625	WQRB478	YW	FB8	29.1	355.7	V	78.4	40.4	9.5	9.8	121.7	>20.0
15	478.8625	WQRB478	YW	FB8	23.4	15.4	V	31.3	39.2	6.0	9.8	124.3	>20.0
15	476.1625	WQRB480	YW	FB8	51.3	68.5	V	224.1	79.2	6.0	9.8	34.5	>20.0
15	476.4250	WQRB480	YW	FB8	51.3	68.5	V	224.1	79.2	6.0	9.8	77.6	>20.0
15	476.4625	WQRB480	YW	FB8	32.8	116.9	V	65.7	70.7	9.5	9.8	68.5	>20.0
15	476.4625	WQRB480	YW	FB8	20.1	90.9	V	44.6	42.7	9.5	9.8	63.7	>20.0
15	476.4625	WQRB480	YW	FB8	29.4	92.7	V	193.6	70.6	9.5	9.8	66.9	>20.0
15	476.6875	WQRB480	YW	FB8	51.3	68.5	V	224.1	79.2	6.0	9.8	72.9	>20.0
15	476.7250	WQRB480	YW	FB8	32.8	116.9	V	65.7	70.7	9.5	9.8	67.4	>20.0
15	476.7250	WQRB480	YW	FB8	20.1	90.9	V	44.6	42.7	9.5	9.8	62.6	>20.0
15	476.7250	WQRB480	YW	FB8	29.4	92.7	V	193.6	70.6	9.5	9.8	65.8	>20.0
15	477.1375	WQRB480	YW	FB8	51.3	68.5	V	224.1	79.2	6.0	9.8	80.5	>20.0
15	477.2875	WQRB480	YW	FB8	51.3	68.5	V	224.1	79.2	6.0	9.8	82.7	>20.0
15	477.3625	WQRB480	YW	FB8	32.8	116.9	V	65.7	70.7	9.5	9.8	76.8	>20.0
15	477.3625	WQRB480	YW	FB8	20.1	90.9	V	44.6	42.7	9.5	9.8	71.9	>20.0
15	477.3625	WQRB480	YW	FB8	29.4	92.7	V	193.6	70.6	9.5	9.8	75.2	>20.0
15	477.4000	WQRB480	YW	FB8	51.3	68.5	V	224.1	79.2	6.0	9.8	83.6	>20.0
15	477.5500	WQRB480	YW	FB8	51.3	68.5	V	224.1	79.2	6.0	9.8	84.3	>20.0
15	477.6625	WQRB480	YW	FB8	32.8	116.9	V	65.7	70.7	9.5	9.8	75.8	>20.0
15	477.6625	WQRB480	YW	FB8	20.1	90.9	V	44.6	42.7	9.5	9.8	71.0	>20.0
15	477.6625	WQRB480	YW	FB8	29.4	92.7	V	193.6	70.6	9.5	9.8	74.2	>20.0
15	477.8125	WQRB480	YW	FB8	32.8	116.9	V	65.7	70.7	9.5	9.8	65.6	>20.0
15	477.8125	WQRB480	YW	FB8	20.1	90.9	V	44.6	42.7	9.5	9.8	60.8	>20.0

15	477.8125	WQRB480	YW	FB8	29.4	92.7	V	193.6	70.6	9.5	9.8	64.0	>20.0
15	477.8500	WQRB480	YW	FB8	51.3	68.5	V	224.1	79.2	6.0	9.8	76.6	>20.0
15	477.9250	WQRB480	YW	FB8	32.8	116.9	V	65.7	70.7	9.5	11.0	79.7	>20.0
15	477.9250	WQRB480	YW	FB8	20.1	90.9	V	44.6	42.7	9.5	9.8	75.3	>20.0
15	477.9250	WQRB480	YW	FB8	29.4	92.7	V	193.6	70.6	9.5	9.8	78.6	>20.0
15	478.0750	WQRB480	YW	FB8	19.2	344.2	V	-1.9	39.5	9.5	9.8	119.5	>20.0
15	478.1500	WQRB480	YW	FB8	19.2	344.2	V	-1.9	39.5	9.5	9.8	123.7	>20.0
15	478.3375	WQRB480	YW	FB8	19.2	344.2	V	-1.9	39.5	9.5	9.8	132.6	>20.0
15	478.4125	WQRB480	YW	FB8	19.2	344.2	V	-1.9	39.5	9.5	9.8	135.5	>20.0
15	478.6000	WQRB480	YW	FB8	19.2	344.2	V	-1.9	39.5	9.5	9.8	144.8	>20.0
15	478.7875	WQRB480	YW	FB8	19.2	344.2	V	-1.9	39.5	9.5	9.8	152.0	>20.0
15	478.8625	WQRB480	YW	FB8	19.2	344.2	V	-1.9	39.5	9.5	9.8	155.5	>20.0
15	476.0125	WQRB483	YW	FB8	30.5	47.3	V	65.1	31.1	10.0	9.8	10.7	>20.0
15	476.0125	WQRB483	YW	FB8	28.0	57.8	V	47.9	51.8	6.0	9.8	14.5	>20.0
15	476.0125	WQRB483	YW	FB8	22.3	60.2	V	37.5	40.4	6.0	9.8	12.6	>20.0
15	476.0125	WQRB483	YW	FB8	28.4	63.4	V	59.8	58.7	6.0	9.8	14.7	>20.0
15	476.0125	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8	4.3	>20.0
15	476.0125	WQRB483	YW	FB8	16.0	80.2	V	48.9	46.8	9.5	9.8	6.7	>20.0
15	476.0875	WQRB483	YW	FB8	30.5	47.3	V	65.1	31.1	10.0	9.8	21.5	>20.0
15	476.0875	WQRB483	YW	FB8	28.0	57.8	V	47.9	51.8	6.0	9.8	25.3	>20.0
15	476.0875	WQRB483	YW	FB8	22.3	60.2	V	37.5	40.4	6.0	9.8	23.4	>20.0
15	476.0875	WQRB483	YW	FB8	28.4	63.4	V	59.8	58.7	6.0	9.8	25.6	>20.0
15	476.0875	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8	15.2	>20.0
15	476.0875	WQRB483	YW	FB8	16.0	80.2	V	48.9	46.8	9.5	9.8	17.5	>20.0
15	476.2750	WQRB483	YW	FB8	30.5	47.3	V	65.1	31.1	10.0	9.8	50.3	>20.0
15	476.2750	WQRB483	YW	FB8	28.0	57.8	V	47.9	51.8	6.0	9.8	54.1	>20.0
15	476.2750	WQRB483	YW	FB8	22.3	60.2	V	37.5	40.4	6.0	9.8	52.2	>20.0
15	476.2750	WQRB483	YW	FB8	28.4	63.4	V	59.8	58.7	6.0	9.8	54.4	>20.0
15	476.2750	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8	44.0	>20.0
15	476.2750	WQRB483	YW	FB8	16.0	80.2	V	48.9	46.8	9.5	9.8	46.3	>20.0
15	476.3500	WQRB483	YW	FB8	30.5	47.3	V	65.1	31.1	10.0	9.8	76.0	>20.0
15	476.3500	WQRB483	YW	FB8	28.0	57.8	V	47.9	51.8	6.0	9.8	79.8	>20.0
15	476.3500	WQRB483	YW	FB8	22.3	60.2	V	37.5	40.4	6.0	9.8	77.9	>20.0
15	476.3500	WQRB483	YW	FB8	28.4	63.4	V	59.8	58.7	6.0	9.8	80.0	>20.0
15	476.3500	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8	69.6	>20.0
15	476.3500	WQRB483	YW	FB8	16.0	80.2	V	48.9	46.8	9.5	9.8	72.0	>20.0
15	476.5375	WQRB483	YW	FB8	30.5	47.3	V	65.1	31.1	10.0	9.8	63.3	>20.0
15	476.5375	WQRB483	YW	FB8	28.0	57.8	V	47.9	51.8	6.0	9.8	67.1	>20.0
15	476.5375	WQRB483	YW	FB8	22.3	60.2	V	37.5	40.4	6.0	9.8	65.2	>20.0
15	476.5375	WQRB483	YW	FB8	28.4	63.4	V	59.8	58.7	6.0	9.8	67.3	>20.0
15	476.5375	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8	56.9	>20.0
15	476.5375	WQRB483	YW	FB8	16.0	80.2	V	48.9	46.8	9.5	9.8	59.3	>20.0
15	476.6125	WQRB483	YW	FB8	30.5	47.3	V	65.1	31.1	10.0	9.8	63.3	>20.0
15	476.6125	WQRB483	YW	FB8	28.0	57.8	V	47.9	51.8	6.0	9.8	67.1	>20.0
15	476.6125	WQRB483	YW	FB8	22.3	60.2	V	37.5	40.4	6.0	9.8	65.3	>20.0
15	476.6125	WQRB483	YW	FB8	28.4	63.4	V	59.8	58.7	6.0	9.8	67.4	>20.0
15	476.6125	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8	57.0	>20.0
15	476.6125	WQRB483	YW	FB8	16.0	80.2	V	48.9	46.8	9.5	9.8	59.4	>20.0
15	476.8000	WQRB483	YW	FB8	30.5	47.3	V	65.1	31.1	10.0	9.8	65.3	>20.0

15	476.8000	WQRB483	YW	FB8	28.0	57.8	V	47.9	51.8	6.0	9.8	69.1	>20.0
15	476.8000	WQRB483	YW	FB8	22.3	60.2	V	37.5	40.4	6.0	9.8	67.3	>20.0
15	476.8000	WQRB483	YW	FB8	28.4	63.4	V	59.8	58.7	6.0	9.8	69.4	>20.0
15	476.8000	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8	59.0	>20.0
15	476.8000	WQRB483	YW	FB8	16.0	80.2	V	48.9	46.8	9.5	9.8	61.4	>20.0
15	476.8750	WQRB483	YW	FB8	30.5	47.3	V	65.1	31.1	10.0	9.8	66.5	>20.0
15	476.8750	WQRB483	YW	FB8	28.0	57.8	V	47.9	51.8	6.0	9.8	70.3	>20.0
15	476.8750	WQRB483	YW	FB8	22.3	60.2	V	37.5	40.4	6.0	9.8	68.5	>20.0
15	476.8750	WQRB483	YW	FB8	28.4	63.4	V	59.8	58.7	6.0	9.8	70.6	>20.0
15	476.8750	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8	60.2	>20.0
15	476.8750	WQRB483	YW	FB8	16.0	80.2	V	48.9	46.8	9.5	9.8	62.6	>20.0
15	477.0625	WQRB483	YW	FB8	30.5	47.3	V	65.1	31.1	10.0	9.8	70.1	>20.0
15	477.0625	WQRB483	YW	FB8	28.0	57.8	V	47.9	51.8	6.0	9.8	73.9	>20.0
15	477.0625	WQRB483	YW	FB8	22.3	60.2	V	37.5	40.4	6.0	9.8	72.0	>20.0
15	477.0625	WQRB483	YW	FB8	28.4	63.4	V	59.8	58.7	6.0	9.8	74.1	>20.0
15	477.0625	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8	63.7	>20.0
15	477.0625	WQRB483	YW	FB8	16.0	80.2	V	48.9	46.8	9.5	9.8	66.1	>20.0
15	477.2125	WQRB483	YW	FB8	30.5	47.3	V	65.1	31.1	10.0	9.8	72.6	>20.0
15	477.2125	WQRB483	YW	FB8	28.0	57.8	V	47.9	51.8	6.0	9.8	76.4	>20.0
15	477.2125	WQRB483	YW	FB8	22.3	60.2	V	37.5	40.4	6.0	9.8	74.5	>20.0
15	477.2125	WQRB483	YW	FB8	28.4	63.4	V	59.8	58.7	6.0	9.8	76.6	>20.0
15	477.2125	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8	66.2	>20.0
15	477.2125	WQRB483	YW	FB8	16.0	80.2	V	48.9	46.8	9.5	9.8	68.6	>20.0
15	477.4750	WQRB483	YW	FB8	30.5	47.3	V	65.1	31.1	10.0	9.8	74.5	>20.0
15	477.4750	WQRB483	YW	FB8	28.0	57.8	V	47.9	51.8	6.0	9.8	78.3	>20.0
15	477.4750	WQRB483	YW	FB8	22.3	60.2	V	37.5	40.4	6.0	9.8	76.4	>20.0
15	477.4750	WQRB483	YW	FB8	28.4	63.4	V	59.8	58.7	6.0	9.8	78.5	>20.0
15	477.4750	WQRB483	YW	FB8	15.2	32.5	V	56.6	38.6	9.5	9.8	68.1	>20.0
15	477.4750	WQRB483	YW	FB8	16.0	80.2	V	48.9	46.8	9.5	9.8	70.5	>20.0
15	476.4625	WQRB485	YW	FB8	42.8	90.2	V	93.6	42.6	10.0	9.8	71.3	>20.0
15	476.4625	WQRB485	YW	FB8	45.7	79.7	V	118.7	47.7	10.5	9.8	69.8	>20.0
15	476.4625	WQRB485	YW	FB8	23.8	106.9	V	115.6	38.6	9.5	9.8	64.6	>20.0
15	476.4625	WQRB485	YW	FB8	41.3	117.9	V	70.8	52.8	9.5	9.8	74.0	>20.0
15	476.4625	WQRB485	YW	FB8	45.5	99.4	V	85.2	78.2	9.5	9.8	76.6	>20.0
15	476.7250	WQRB485	YW	FB8	42.8	90.2	V	93.6	42.6	10.0	9.8	70.2	>20.0
15	476.7250	WQRB485	YW	FB8	45.7	79.7	V	118.7	47.7	10.5	9.8	68.7	>20.0
15	476.7250	WQRB485	YW	FB8	23.8	106.9	V	115.6	38.6	9.5	9.8	63.6	>20.0
15	476.7250	WQRB485	YW	FB8	41.3	117.9	V	70.8	52.8	9.5	9.8	72.9	>20.0
15	476.7250	WQRB485	YW	FB8	45.5	99.4	V	85.2	78.2	9.5	9.8	75.5	>20.0
15	477.3625	WQRB485	YW	FB8	42.8	90.2	V	93.6	42.6	10.0	9.8	79.5	>20.0
15	477.3625	WQRB485	YW	FB8	45.7	79.7	V	118.7	47.7	10.5	9.8	78.1	>20.0
15	477.3625	WQRB485	YW	FB8	23.8	106.9	V	115.6	38.6	9.5	9.8	72.9	>20.0
15	477.3625	WQRB485	YW	FB8	41.3	117.9	V	70.8	52.8	9.5	9.8	82.3	>20.0
15	477.3625	WQRB485	YW	FB8	45.5	99.4	V	85.2	78.2	9.5	9.8	84.8	>20.0
15	477.6625	WQRB485	YW	FB8	42.8	90.2	V	93.6	42.6	10.0	9.8	78.6	>20.0
15	477.6625	WQRB485	YW	FB8	45.7	79.7	V	118.7	47.7	10.5	9.8	77.1	>20.0
15	477.6625	WQRB485	YW	FB8	23.8	106.9	V	115.6	38.6	9.5	9.8	71.9	>20.0
15	477.6625	WQRB485	YW	FB8	41.3	117.9	V	70.8	52.8	9.5	9.8	81.3	>20.0
15	477.6625	WQRB485	YW	FB8	45.5	99.4	V	85.2	78.2	9.5	9.8	83.9	>20.0

15	477.8125	WQRB485	YW	FB8	42.8	90.2	V	93.6	42.6	10.0	9.8	68.4	>20.0
15	477.8125	WQRB485	YW	FB8	45.7	79.7	V	118.7	47.7	10.5	9.8	66.9	>20.0
15	477.8125	WQRB485	YW	FB8	23.8	106.9	V	115.6	38.6	9.5	9.8	61.7	>20.0
15	477.8125	WQRB485	YW	FB8	41.3	117.9	V	70.8	52.8	9.5	9.8	71.1	>20.0
15	477.8125	WQRB485	YW	FB8	45.5	99.4	V	85.2	78.2	9.5	9.8	73.7	>20.0
15	477.9250	WQRB485	YW	FB8	42.8	90.2	V	93.6	42.6	10.0	9.8	82.9	>20.0
15	477.9250	WQRB485	YW	FB8	45.7	79.7	V	118.7	47.7	10.5	9.8	81.4	>20.0
15	477.9250	WQRB485	YW	FB8	23.8	106.9	V	115.6	38.6	9.5	9.8	76.3	>20.0
15	477.9250	WQRB485	YW	FB8	41.3	117.9	V	70.8	52.8	9.5	9.8	85.6	>20.0
15	477.9250	WQRB485	YW	FB8	45.5	99.4	V	85.2	78.2	9.5	9.8	88.2	>20.0
15	476.4625	WQVS780	YW	FB8	35.5	109.9	V	83.0	68.0	9.5	9.8	70.4	>20.0
15	476.7250	WQVS780	YW	FB8	35.5	109.9	V	83.0	68.0	9.5	9.8	69.3	>20.0
15	477.3625	WQVS780	YW	FB8	35.5	109.9	V	83.0	68.0	9.5	9.8	78.7	>20.0
15	477.6625	WQVS780	YW	FB8	35.5	109.9	V	83.0	68.0	9.5	9.8	77.7	>20.0
15	477.8125	WQVS780	YW	FB8	35.5	109.9	V	83.0	68.0	9.5	9.8	67.5	>20.0
15	477.9250	WQVS780	YW	FB8	35.5	109.9	V	83.0	68.0	9.5	9.8	82.1	>20.0
14	471.1625	WIL900	YW	FB2	179.5	66.5	V	53.0	68.0	4.0	11.0	28.2	>20.0
14	471.1875	WIL900	YW	FB2	179.5	66.5	V	53.0	68.0	4.0	11.0	28.2	>20.0
14	472.3875	WIL900	YW	FB2	179.5	66.5	V	53.0	68.0	4.0	11.0	28.0	>20.0
14	472.4125	WIL900	YW	FB2	179.5	66.5	V	53.0	68.0	4.0	11.0	28.2	>20.0

Notes:

1. Mobile analysis performed within a defined area of operation from mobile LM coordinates
2. Mobile Distance/Azimuth is to the cell with the lowest margin
3. Average mobile interference and/or overload margins are shown
4. 48 km radius used for mobile area of operation if not specified in authorization

APPENDIX 5
30 Out of 41,371 of the Lowest Margin LM Facilities 464-470 MHz
Overall Status: Passed

Freq	Call	Svc	Svc	DTV->LM		Ant	HAAT	HAGL	Gain	BW	IX Mgn	OL Mgn
Mhz	Sign	Code	Cls	Dist km	Az deg	Pol	m	m	dB	khz	dB	dB
469.9750	WPBT934	IG	MO	91.5	193.7	V				11.2	25.2	>20.0
469.9750	WNSG880	IG	MO	69.0	181.9	V				7.6	26.9	>20.0
469.9750	WNRV919	IG	MO	59.4	182.1	V				11.0	31.2	>20.0
469.9750	WNGI686	IG	MO	27.6	69.0	V				7.6	31.8	>20.0
469.9750	WPUS454	IG	MO	16.7	359.9	V				11.0	33.4	>20.0
469.9750	WPRL575	IG	MO	25.2	42.0	V				11.0	34.8	>20.0
469.9625	WQNT317	IG	MO6	25.5	95.0	V				7.6	35.1	>20.0
469.9625	WPLI212	IG	MO6	120.0	80.6	V				11.2	35.4	>20.0
469.9750	WQPG578	IG	MO	38.3	263.5	V				4.0	36.1	>20.0
469.9500	WPFU958	YG	MO6	28.4	94.2	V				7.6	41.2	>20.0
469.9500	WRBY585	IG	MO	26.4	39.6	V				7.6	41.2	>20.0
469.9750	WYJ798	IG	MO	44.0	351.5	V				20.0	42.0	>20.0
469.9625	WNYB482	IG	MO	121.1	80.1	V				11.2	43.8	>20.0
469.9500	WSO555	IG	MO	50.3	222.5	V				4.0	46.7	>20.0
469.9375	WQNT317	IG	MO6	25.5	95.0	V				7.6	47.6	>20.0
469.9750	WNXJ776	IG	MO	56.0	262.5	V				11.0	48.6	>20.0
469.9125	WQUC552	IG	MO	68.4	182.1	V			7.0	11.0	48.8	17.6
469.9750	WPKI326	IG	MO	54.7	49.5	V				11.2	49.4	>20.0
469.9750	WQRB487	IG	MO	55.1	278.6	V				4.0	49.5	>20.0
469.9813	WPDA641	IG	MO	77.4	92.4	V				4.0	50.8	>20.0
469.9250	WNNU225	IG	MO	41.8	333.7	V				11.2	51.1	>20.0
469.9750	WQUJ741	IG	MO6	100.5	334.9	V				11.2	51.3	>20.0
469.9750	WNWR973	IG	MO	55.7	278.4	V				4.0	51.6	>20.0
469.9750	WPLK889	IG	MO	86.6	249.9	V				7.6	51.7	>20.0
469.9750	WNQN985	IG	MO	54.7	226.4	V				4.0	52.5	>20.0
469.9750	WPPT613	IG	MO	89.4	234.0	V				11.2	52.6	>20.0
469.9250	WNGI686	IG	MO	27.9	70.7	V				7.6	52.8	>20.0
469.9250	WNXE238	IG	MO6	92.2	195.4	V				7.6	52.8	>20.0
469.9500	WNMU682	YK	MO	136.8	313.9	V				7.6	53.1	>20.0
469.5500	WNZM274	IG	MOI	121.7	87.2	V			3.3	8.3	53.2	>20.0

Notes:

1. Mobile analysis performed within a defined area of operation from mobile LM coordinates
2. Mobile Distance/Azimuth is to the cell with the lowest margin
3. Average mobile interference and/or overload margins are shown
4. 48 km radius used for mobile area of operation if not specified in authorization