ENGINEERING NARRATIVE DESCRIBING PROTECTION TO 460 – 470 MHz
LAND MOBILE OPERATIONS BY W14EQ-D FAC ID 126888
FCC FILE NUMBER 0000157629
TUPELO, MISSISSIPPI
AUGUST 21, 2021

INTRODUCTION

This report has been prepared in support of a request for Program Test Authority. The W14EQ-D CP specifies a new LPTV DTV facility to be implemented prior to expiration of the CP on August 27, 2021.

The CP carries a condition that “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. Program tests shall not be commenced under Section 73.1620(a) of the Commission’s Rules and may only be started after specific authority is granted by the Commission. An application for a license must be filed within 10 days after the start of program tests."

The description below is believed to contain a detailed analysis of the proposed facility and its lack of impact on 460 – 470 MHz Land Mobile operations. This documentation of no impact is being submitted prior to construction of the facilities due to a lack of time before CP expiration. Due to the simplicity of the CP facility it can be constructed and turned on in a period of one or two days and then the license application can be filed before CP expiration. As soon as the site is turned on the license application will be filed.

The designed facilities will be identical to the as built facilities as that is what is required by the owner of the FCC registered site. The study undertaken here is centered on the authorized coordinates and covers a circular area with a radius of 130 kilometers as specified in 73.709(b) of the Rules.

SCOPE AND METHODOLOGY

A search was made in the ULS, 08192021 database, of all records between the frequencies of 460 and 470 MHz and within 130 KM of the proposed W14EQ-D

transmitter location. 585 fixed facilities were found as tabulated in Exhibit 1. 1,183 mobile facilities were found as tabulated in Exhibit 2 . It is noted that the LM stations listed in both exhibits are ordered by greatest possible impact from the W14EQ-D facility to the least possible impact. Both exhibits show the first 20 LM facilities. The full Excel file lists are available upon request.

The locations of all of the Land Mobile facilities are plotted on the attached Google Earth maps. Figure 1 contains all facilities, Figure 2 shows only the mobile facilities, Figure 3 depicts base facilities only and Figure 4 shows the locations calculated to have the least buffer which in all cases exceed 68 dB when an 8 pole critical mask filter is employed due to the low, 5 watt (37 dBm) ERP.

The amount of buffer between a signal level that could cause interference to LM operations and the actual values was so great that an additional computation was undertaken. Exhibit 3 is a calculation of interfering signal level based on the transmitter with no mask filter. Here the clearance to the most critical facilities is tabulated and the least buffer is 27.6 dB. Because of this high level of protection and the maximum ERP of 5 watts the facility will use a full service mask proving even greater clearance than the Exhibit 3 values but not as great as the 68 dB or greater clearance for the 8 pole critical mask used for Exhibits 1 & 2.

The distance and bearing to these facility locations from the W14EQ-D location was calculated using standard FCC formulas.

The out of band attenuation of the 750 watt DTV transmitter signal was measured at the Broadcast Electronics / Elenos factory in Quincy, Illinois. A copy of the test data is attached in Appendix 1. The mask filter is a Dielectric 8 pole critical mask filter tuned for the intended purpose. Dielectric provided their attenuation data in an Excel file. The measured transmitter manufacturer emission was combined with the out of band attenuation of the filter as measured by the filter manufacturer and the resulting loss was subtracted from the KAOE-LD maximum ERP. These attenuations are plotted on Figure 5.

In this case the Broadcast Electronics / Elenos factory is supplying a 200 watt transmitter with the same RF amplifier configuration and the linear and non-linear correction circuits (exciter) is the same with almost identical performance expected in the band pass filter.

The W14EQ-D antenna is a Scala CL 1469, H.Pol. only, log periodic antenna oriented at 335 degrees true with an ERP of 5 watts. The pattern loss of the W14EQ-D

transmitting antenna was also subtracted from the W14EQ-D ERP at azimuths other than 335 degrees.

The cross polarization loss is 20 dB from the horizontally polarized CH 14 antenna to the typical LM vertically polarized antenna and that was subtracted.

The equivalent channel power of the 6 MHz DTV signal to a 30 kHz LM bandwidth, based on the measurement bandwidth given in 73.687(e)(4)(ii) of the FCC Rules was subtracted. Land mobile bandwidth from the ULS database is not included in the Exhibit 1 and 2 tabulations but has typically been found to be 20 kHz or less.

The resulting signal level, in dBm, was compared to the criterion of 17 dBuV/m (-90 dBm) given in 73.687(e)(4)(ii) of the FCC Rules.

CONCLUSIONS

The measured solid state transmitter out of band emission, when added to the filter mask is typical of what is found in multiple CH 14 studies submitted to the FCC.

Referencing Exhibit 3, of the 1,768 Land Mobile facilities studied the clearance between the signal level expected to represent the threshold of interference was at least 28.6 dB for the worst case fixed location and 27.6 dB to the worst case mobile facility. This is an extremely high safety buffer when it is considered that these numbers are based on no mask filter, transmitter emissions only, and the permittee will be installing a six pole full service mask filter. The suitability of this lesser filter requirement is related solely to the 5 watt ERP and geographic location.

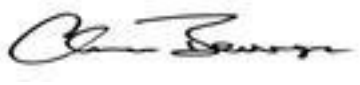
Review of Figure 4, the LMR locations with the least buffer, shows them to be widely spread out and located in a NW to North arc in the antenna major lobe. The very low transmit antenna elevation above ground causes the bulk of the propagation in this region to be obstructed with shadow attenuation.

This report documents analysis work undertaken to identify possible objectionable interference to Land Mobile operations in the 460 – 470 MHz band. The conclusions strongly suggest a lack of prohibited interference.

The permittee agrees to actively respond to any interference complaint and take steps as necessary to resolve any interference.

CERTIFICATION

The foregoing was prepared on behalf of Prism Broadcasting Network, Inc. by Clarence M. Beverage of Communications Technologies, Inc., Medford, New Jersey, whose qualifications are a matter of record with the Federal Communications Commission. The statements herein are true and correct of his own knowledge, except such statements made on information and belief, and as to these statements he believes them to be true and correct.



Clarence M. Beverage
for Communications Technologies, Inc.
Medford, New Jersey
August 21, 2021

EXHIBIT 1

W14EQ-D TUPELO, MISSISSIPPI
LISTING OF MOST CRITICAL FIXED LOCATIONS
460-470 MHz LAND MOBILE RADIO
August 2021

Callsign	Frequency	Class	Service	North Latitude	West Longitude	Distance, KM	Bearing	W40BZ ERP, DBM	Out of Band Atten-uation after Filter	W40BZ Antenna Pattern Loss	Free Space Loss	Cross Polar-ization Loss	Channel power equivalent	Resulting signal level receive location, DBM	Clearance to -90 dBm
WPBX897	461.7	IG	FB	34.2476111	88.664222	10.4	349.1	37	100	0.5	112.1	20	23	-218.6	128.6
WNGX398	462.25	IG	FB2	34.2303889	88.710889	10.4	323.0	37	100	0.5	112.1	20	23	-218.6	128.6
WNGX398	462.5	IG	FB2	34.2303889	88.710889	10.4	323.0	37	100	0.5	112.1	20	23	-218.6	128.6
WPSZ241	461.1	YG	FB6	34.2219444	88.715833	10.0	317.6	37	100	1.8	111.7	20	23	-219.5	129.5
WPSZ241	461.7	YG	FB6	34.2219444	88.715833	10.0	317.6	37	100	1.8	111.7	20	23	-219.5	129.5
WPOZ387	461.575	YG	FB8	34.2220556	88.715889	10.0	317.7	37	100	1.8	111.7	20	23	-219.5	129.5
WQXI905	463.7125	IG	FB2	34.2219444	88.715833	10.0	317.6	37	100	1.8	111.7	20	23	-219.5	129.5
WPOZ387	463.525	YG	FB8	34.2220556	88.715889	10.0	317.7	37	100	1.8	111.7	20	23	-219.5	129.5
WPOZ387	464.125	YG	FB8	34.2220556	88.715889	10.0	317.7	37	100	1.8	111.8	20	23	-219.6	129.6
WPDC702	460.525	PW	FB	34.2501111	88.712556	12.3	328.6	37	100	0.5	113.5	20	23	-220.0	130.0
WPDC702	460.55	PW	FB	34.2501111	88.712556	12.3	328.6	37	100	0.5	113.5	20	23	-220.0	130.0
WNLZ706	463.925	IG	FB4C	34.2501111	88.712556	12.3	328.6	37	100	0.5	113.6	20	23	-220.1	130.1
WPPB759	461.825	IG	FB2	34.2503889	88.721722	12.8	325.4	37	100	0.5	113.9	20	23	-220.4	130.4
WQRD431	461.225	IG	FB2	34.3108611	88.7015	18.1	342.7	37	100	0.5	116.9	20	23	-223.4	133.4
WPBX897	461.7	IG	FB4	34.3234444	88.710889	19.7	341.5	37	100	0.5	117.6	20	23	-224.1	134.1
WQOL304	461.6375	YG	FB2	34.3808889	88.895056	34.1	317.3	37	100	1.8	122.4	20	23	-230.2	140.2
WQOL304	462.0125	YG	FB2	34.3808889	88.895056	34.1	317.3	37	100	1.8	122.4	20	23	-230.2	140.2
WQOL304	463.25	YG	FB2	34.3808889	88.895056	34.1	317.3	37	100	1.8	122.4	20	23	-230.2	140.2
WQOL304	463.725	YG	FB2	34.3808889	88.895056	34.1	317.3	37	100	1.8	122.4	20	23	-230.2	140.2
WQXT353	462.275	IG	FB	34.4638611	88.64875	34.2	359.1	37	100	1.8	122.4	20	23	-230.2	140.2

EXHIBIT 2

W14EQ-D TUPELO, MISSISSIPPILISTING
OF MOST CRITICAL MOBILE LOCATIONS
460-470 MHz LAND MOBILE RADIO
August 2021

Callsign	Frequency	Class	Service	North Latitude	West Longitude	Distance, KM	Bearing	W40BZ ERP, DBM	Out of Band Atten-uation after Filter	W40BZ Antenna Pattern Loss	Free Space Loss	Cross Polar-ization Loss	Channel power equivalent	Resulting signal level receive location, DBM	Clearance to -90 dBm
WQVA341	469.525	IG	MO	34.23581	88.6726111	9.3	342.9	37	39	0.5	111.3	20	23	-156.8	66.8
WQXI905	469.15	IG	MO	34.22194	88.7158333	10.0	317.6	37	39	1.8	111.8	20	23	-158.6	68.6
WQXI905	469.35	IG	MO	34.22194	88.7158333	10.0	317.6	37	39	1.8	111.8	20	23	-158.6	68.6
WPOZ387	469.125	YG	MO8	34.22206	88.7158889	10.0	317.7	37	39	1.8	111.8	20	23	-158.6	68.6
WQXI905	469.8125	IG	MO	34.22194	88.7158333	10.0	317.6	37	39	1.8	111.8	20	23	-158.6	68.6
WQXI905	469.9375	IG	MO	34.22194	88.7158333	10.0	317.6	37	39	1.8	111.8	20	23	-158.6	68.6
WPWG528	469.975	IG	MO	34.25039	88.7691111	15.7	312.2	37	39	1.8	115.8	20	23	-162.6	72.6
WQOL304	469.8	YG	MO	34.38089	88.8950556	34.1	317.3	37	39	1.8	122.5	20	23	-169.3	79.3
WQOL304	469.8	YG	MO	34.38089	88.8950556	34.1	317.3	37	39	1.8	122.5	20	23	-169.3	79.3
WQTZ309	469.44375	IG	MO	34.49581	88.6396667	37.8	0.4	37	39	4.1	123.4	20	23	-172.5	82.5
WQTZ309	469.61875	IG	MO	34.49581	88.6396667	37.8	0.4	37	39	4.1	123.4	20	23	-172.5	82.5
WQTZ309	469.75625	IG	MO	34.49581	88.6396667	37.8	0.4	37	39	4.1	123.4	20	23	-172.5	82.5
WQTZ309	469.86875	IG	MO	34.49581	88.6396667	37.8	0.4	37	39	4.1	123.4	20	23	-172.5	82.5
WQTZ309	469.95625	IG	MO	34.49581	88.6396667	37.8	0.4	37	39	4.1	123.4	20	23	-172.5	82.5
WQWS385	469.175	IG	MO	34.16844	88.6999444	5.4	285.1	37	39	21.3	106.6	20	23	-172.9	82.9
WPHD515	469.25	IG	MO	34.49622	89.0292222	51.8	317.0	37	39	1.8	126.2	20	23	-173.0	83.0
WQST785	469.175	IG	MO	34.62478	88.5908889	52.3	5.2	37	39	4.1	126.2	20	23	-175.3	85.3
WQSC809	469.25	IG	MO	34.68044	88.54225	59.0	9.0	37	39	4.1	127.3	20	23	-176.4	86.4
WQSC809	469.325	IG	MO	34.68044	88.54225	59.0	9.0	37	39	4.1	127.3	20	23	-176.4	86.4
WQSC809	469.375	IG	MO	34.68044	88.54225	59.0	9.0	37	39	4.1	127.3	20	23	-176.4	86.4

EXHIBIT 3

W14EQ-D TUPELO, MISSISSIPPI
LISTING OF MOST CRITICAL LOCATIONS
WITH NO MASK FILTER CONSIDERED
460-470 MHz LAND MOBILE RADIO
August 2021

Callsign	Frequency	Class	Service	North Latitude	West Longitude	Distance, KM	Bearing	W40BZ ERP, DBM	W40BZ Antenna Pattern Loss	Free Space Loss	Cross Polar-ization Loss	Channel power equivalent	Resulting signal level receive location, DBM	Clearance to -90 dBm
WQVA341	461.325	IG	MO	34.2358056	88.67261111	9.3	342.9	37	0.5	111.1	20	23	-117.6	27.6
WQVA341	466.25	IG	MO	34.2358056	88.67261111	9.3	342.9	37	0.5	111.2	20	23	-117.7	27.7
WQVA341	468.2875	IG	MO	34.2358056	88.67261111	9.3	342.9	37	0.5	111.2	20	23	-117.7	27.7
WQVA341	469.525	IG	MO	34.2358056	88.67261111	9.3	342.9	37	0.5	111.3	20	23	-117.8	27.8
WPBX897	461.7	IG	FB	34.2476111	88.66422222	10.4	349.1	37	0.5	112.1	20	23	-118.6	28.6
WNXQ680	462.2125	IG	MO	34.2303889	88.71088889	10.4	323.0	37	0.5	112.1	20	23	-118.6	28.6
WNGX398	462.25	IG	FB2	34.2303889	88.71088889	10.4	323.0	37	0.5	112.1	20	23	-118.6	28.6
WNGX398	462.4	IG	MO	34.2303889	88.71088889	10.4	323.0	37	0.5	112.1	20	23	-118.6	28.6
WNGX398	462.5	IG	FB2	34.2303889	88.71088889	10.4	323.0	37	0.5	112.1	20	23	-118.6	28.6
WNXQ680	467.2125	IG	MO	34.2303889	88.71088889	10.4	323.0	37	0.5	112.2	20	23	-118.7	28.7
WNGX398	467.25	IG	MO	34.2303889	88.71088889	10.4	323.0	37	0.5	112.2	20	23	-118.7	28.7
WNGX398	467.5	IG	MO	34.2303889	88.71088889	10.4	323.0	37	0.5	112.2	20	23	-118.7	28.7
WPSZ241	461.1	YG	FB6	34.2219444	88.71583333	10.0	317.6	37	1.8	111.7	20	23	-119.5	29.5
WPSZ241	461.1	YG	MO	34.2219444	88.71583333	10.0	317.6	37	1.8	111.7	20	23	-119.5	29.5
WPSZ241	461.7	YG	FB6	34.2219444	88.71583333	10.0	317.6	37	1.8	111.7	20	23	-119.5	29.5
WPSZ241	461.7	YG	MO	34.2219444	88.71583333	10.0	317.6	37	1.8	111.7	20	23	-119.5	29.5
WPOZ387	461.575	YG	FB8	34.2220556	88.71588889	10.0	317.7	37	1.8	111.7	20	23	-119.5	29.5
WPOZ387	461.575	YG	MO8	34.2220556	88.71588889	10.0	317.7	37	1.8	111.7	20	23	-119.5	29.5
WQXI905	463.7125	IG	FB2	34.2219444	88.71583333	10.0	317.6	37	1.8	111.7	20	23	-119.5	29.5
WQXI905	463.7125	IG	MO	34.2219444	88.71583333	10.0	317.6	37	1.8	111.7	20	23	-119.5	29.5

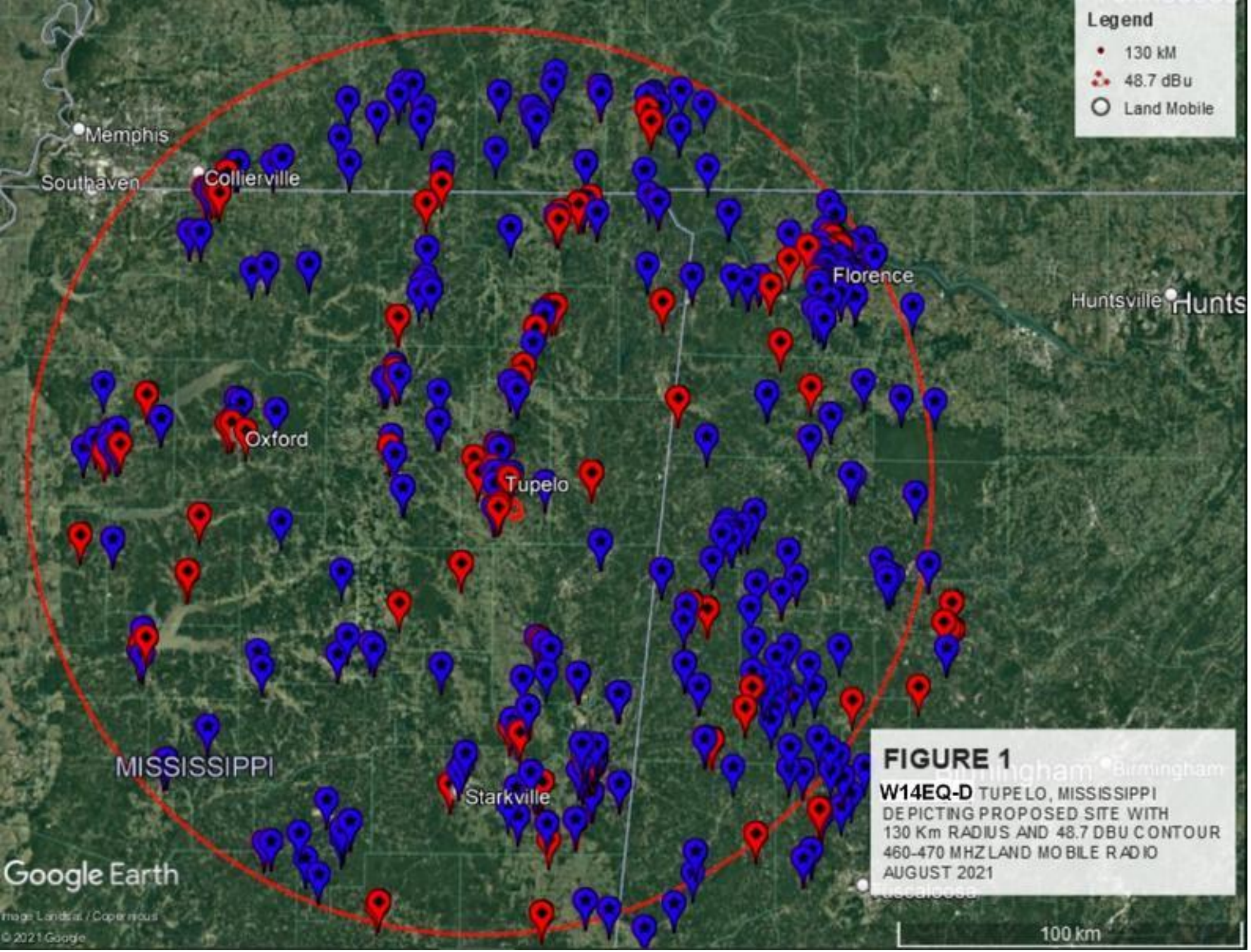


FIGURE 1

W14EQ-D TUPELO, MISSISSIPPI
DEPICTING PROPOSED SITE WITH
130 Km RADIUS AND 48.7 DBU CONTOUR
460-470 MHZ LAND MOBILE RADIO
AUGUST 2021

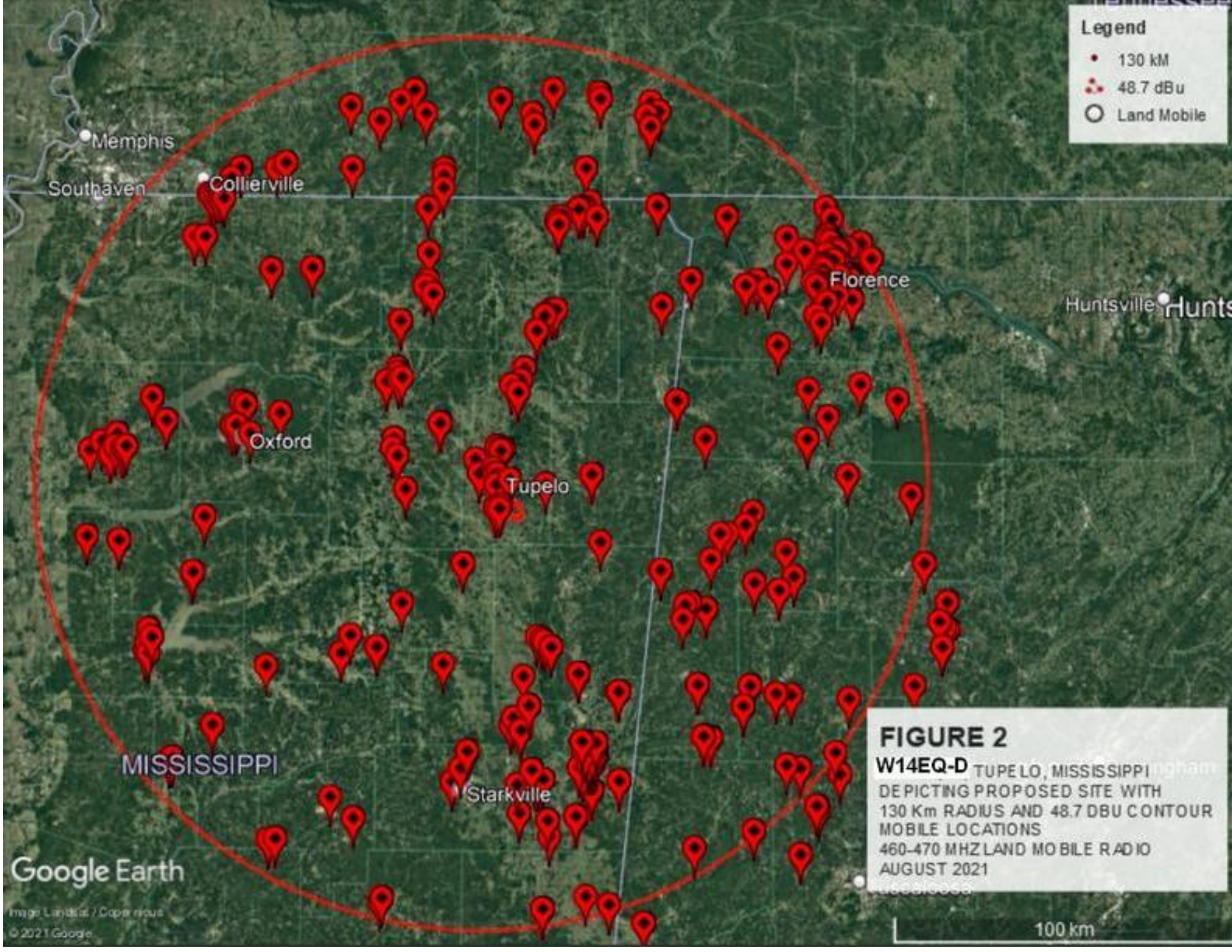


FIGURE 2

W14EQ-D TUPELO, MISSISSIPPI
DEPICTING PROPOSED SITE WITH
130 Km RADIUS AND 48.7 DBU CONTOUR
MOBILE LOCATIONS
460-470 MHZ LAND MOBILE RADIO
AUGUST 2021

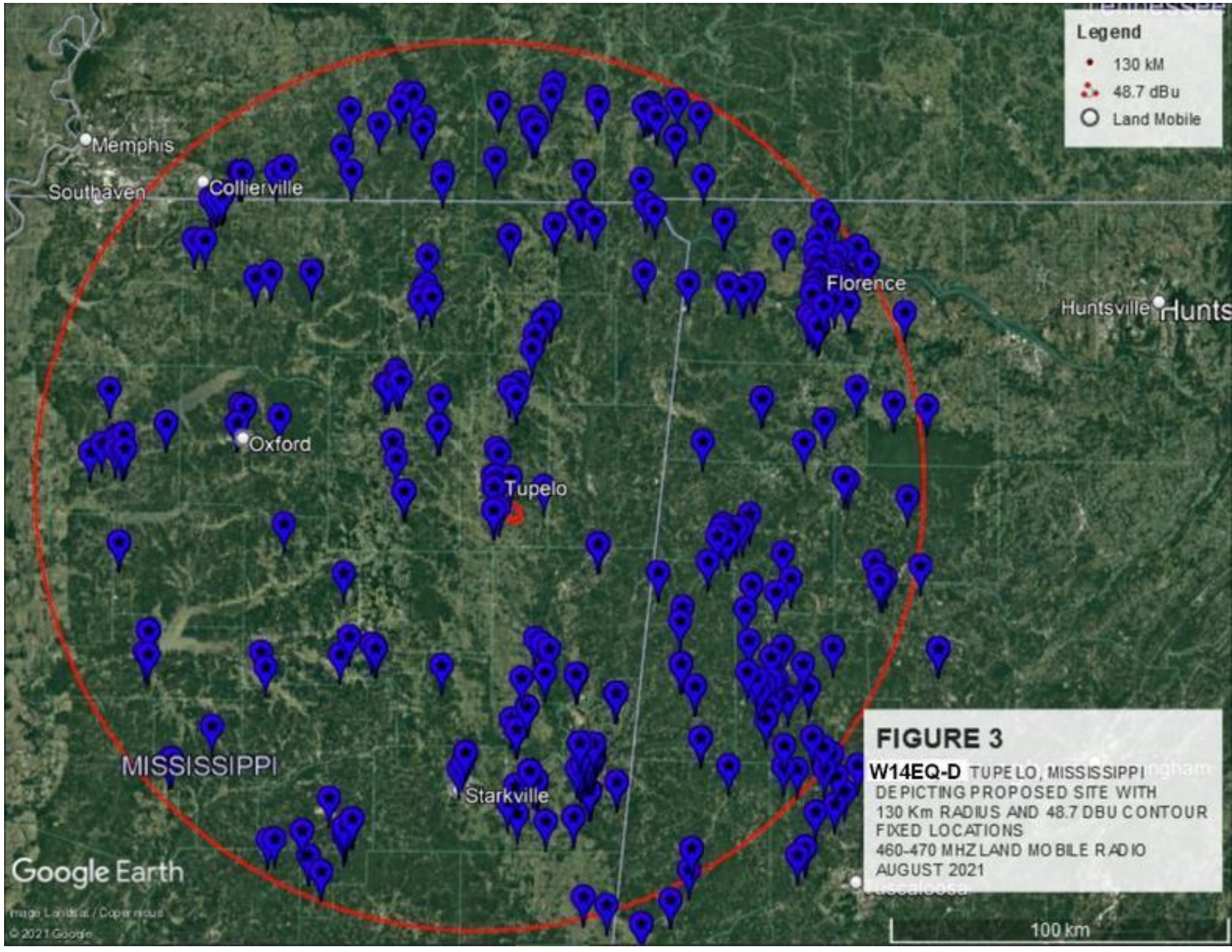


FIGURE 3

W14EQ-D TUPELO, MISSISSIPPI
DEPICTING PROPOSED SITE WITH
130 Km RADIUS AND 48.7 DBU CONTOUR
FIXED LOCATIONS
460-470 MHZ LAND MOBILE RADIO
AUGUST 2021

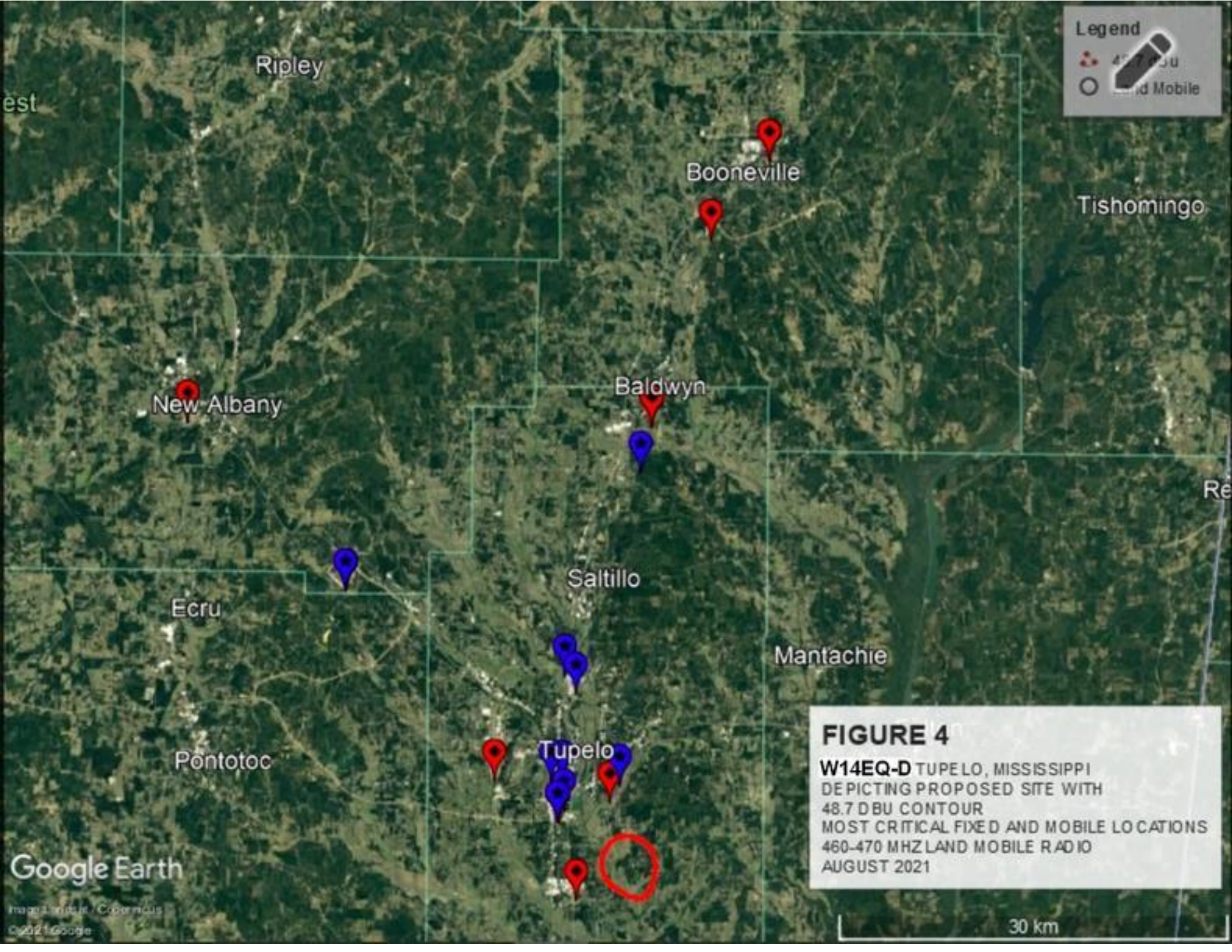


FIGURE 4

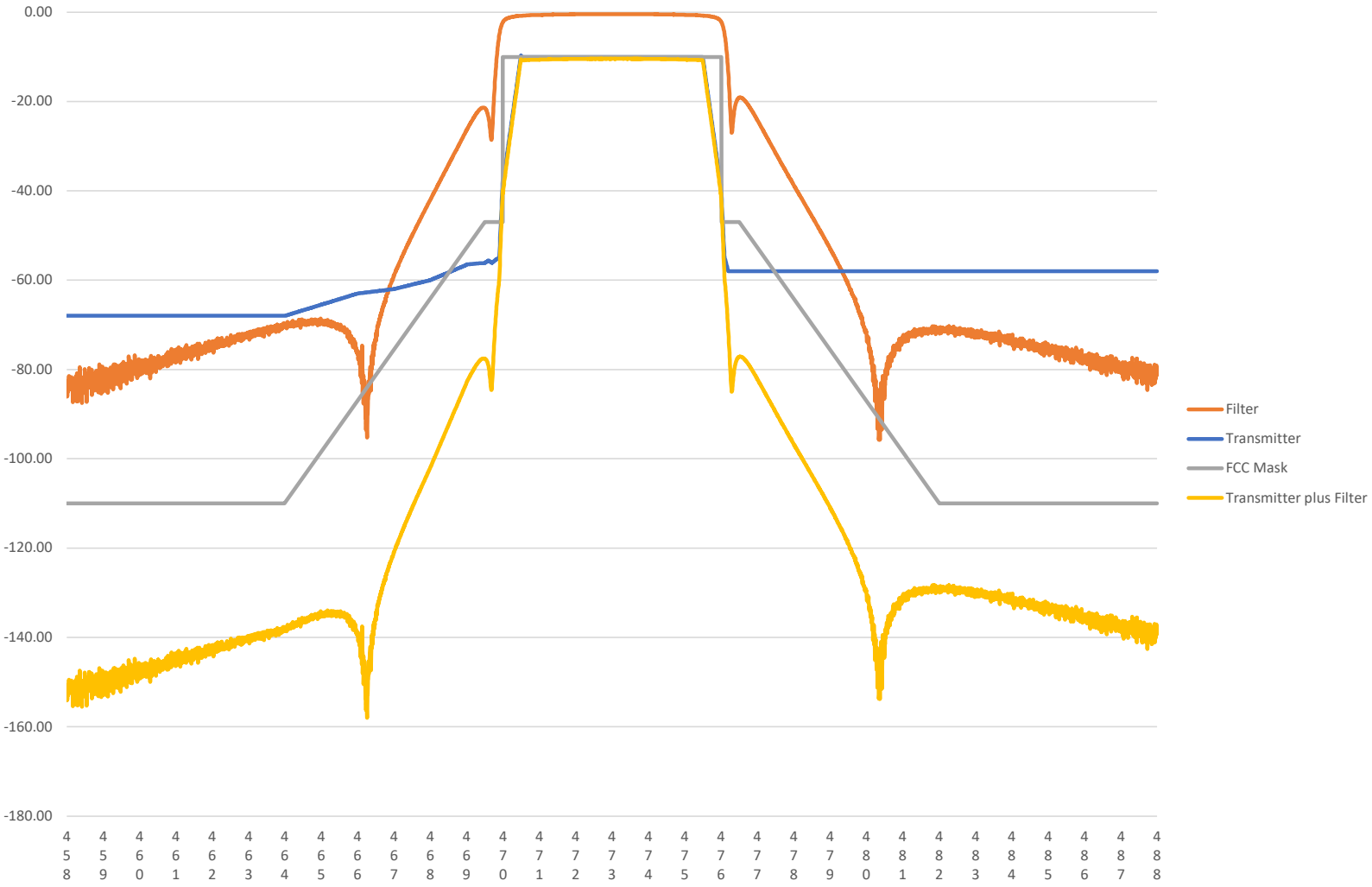
W14EQ-D TUPELO, MISSISSIPPI
DEPICTING PROPOSED SITE WITH
48.7 DBU CONTOUR
MOST CRITICAL FIXED AND MOBILE LOCATIONS
460-470 MHZ LAND MOBILE RADIO
AUGUST 2021

FIGURE 5

W14EQ-D CH 14 **TUPELO, MS**

MEASURED RESPONSE OF FILTER AND TRANSMITTER OUT OF BAND

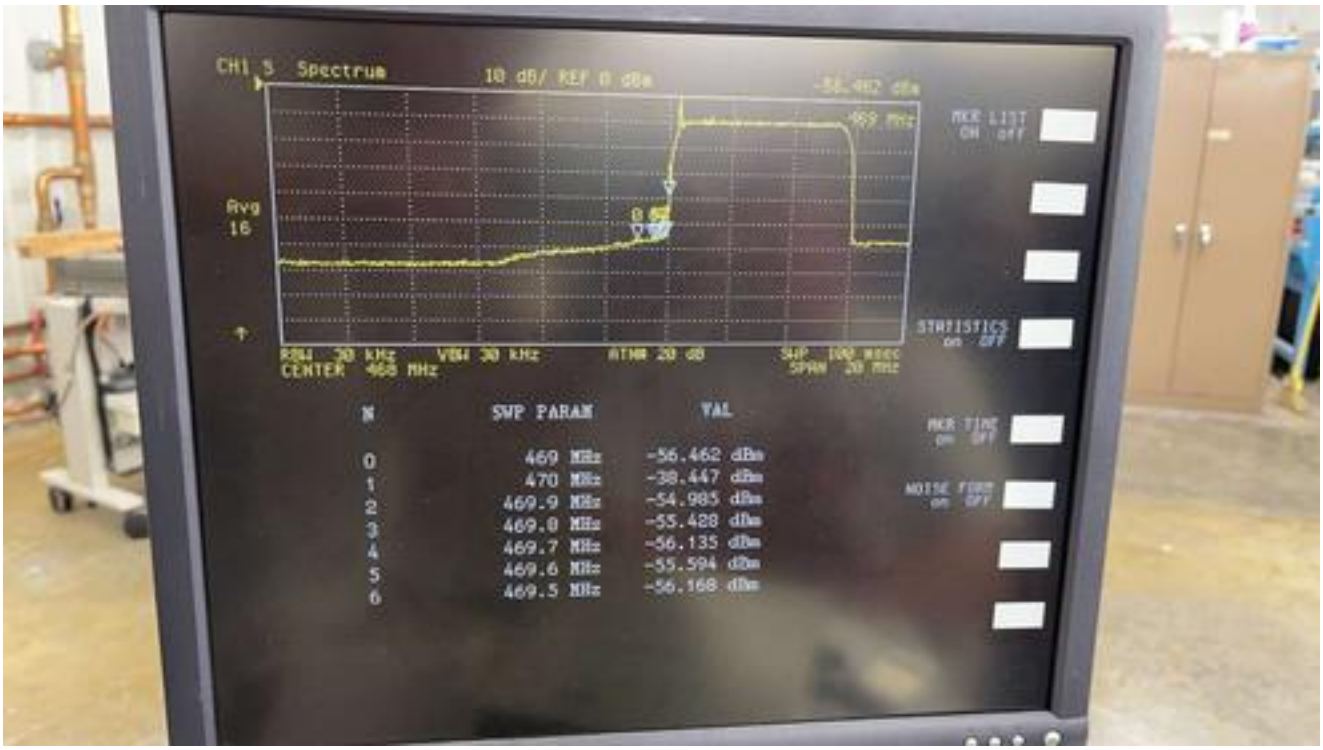
MAY 2021



APPENDIX 1

FACTORY TEST DATA – MAY 2021

BROADCAST ELECTRONICS/ ELENOS GROUP 750 WATT SOLID STATE TRANSMITTER



Spectrum analyzer HP 4396B S/N:JP1KE00775 was used to measure the out of band performance of the ATSC signal.

Com Tec UHF directional coupler at a sample level of -50dB. Calibration of the directional was confirmed by Spectrum Analyzer into dummy load. The directional coupler was also calibrated by the manufacturer within six months.

Power Meter HP 437B S/N 46667812

Rohde and Schwartz NRP Z-51 Power Probe. S/N 100065. Model: 1138.005.02

The following picture shows EUT (Equipment Under Test) BE-600-U Series UHF TV transmitter. The power on the front panel of the transmitter and the power meter are in the same picture and shows the power measurement to be 741 W rms as read by the HP meter. The R&S power meter measured the power level at 745.00 W, which indicates an inaccuracy of 0.54%, or an accuracy of 99.46%.