

COMPREHENSIVE TECHNICAL EXHIBIT
APPLICATION FOR MODIFICATION OF CONSTRUCTION PERMIT

NON-COMMERCIAL EDUCATIONAL FM STATION
KRTU-FM - SAN ANTONIO, TEXAS
FACILITY ID: 68128
FM CHANNEL 219 / 91.7 MHz

TRINITY UNIVERSITY

AUGUST, 2016

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8.12.2016

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APPLICATION FOR MODIFICATION OF CONSTRUCTION PERMIT

The following engineering statement and attached exhibits have been prepared for **Trinity University** ("Trinity"), licensee of NCE FM station KRTU-FM at San Antonio, Texas, and are in support of their application for modification of construction permit.¹ This application seeks to modify the current construction permit for KRTU-FM, which is under FCC File No.BPED-20130516AOC.

Trinity seeks to make minor changes to the current construction permit. This application was prompted by the identification of a guy wire elevation within the authorized antenna aperture. As a result of this guy wire being within the authorized antenna aperture, Trinity proposes a small increase in the center of radiation elevation. The increase in the center of radiation will be offset by a reduction in the maximum effective radiated power, and nominal changes to the directional pattern envelope. This application does not propose any changes to the channel or class of operation, community of license, or physical location.

The proposed facility would operate with a maximum effective radiated power of 30 kW at a center of radiation of 194.2 meters above average terrain. Average terrain is calculated to be 314.8 meters above mean sea level, which is derived from a 360-radial sample of the NED 3-second linearly interpolated terrain database. The site elevation is 280.7 meters above mean sea level, and the center of radiation elevation is 228.3 meters above ground level, which results in a center of radiation of 509.0 meters above mean sea level.

¹ The Facility ID for KRTU-FM at San Antonio, Texas is 68128.

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The modified directional antenna pattern envelope complies with the relevant provisions of the Commission's Rules. The slope of the directional antenna pattern does not exceed 2 dB per 10 degrees of azimuth along any arc. Additionally, the front-to-back ratio of the modified directional pattern envelope does not exceed 15 dB.

The main studio for the facility would continue to comply with the provision of Section 73.1125 of the Commission's Rules. The main studio for KRTU is located on the campus of Trinity University. The campus of Trinity University is located within the corporate boundaries of the city of San Antonio. As a result, the main studio is located not only within the principal community coverage contour of a facility licensed to San Antonio, but also within the city of license itself.

The facility would continue to comply with the community coverage requirements detailed in Section 73.515 of the Commission's Rules. Exhibit E-1 illustrates the predicted 60 dBu service contour of the proposed facility. As this map demonstrates, the 60 dBu service contour would fully encompass the city of San Antonio.

Under the original application, Trinity sought, and obtained, from the Commission a waiver of Section 73.509 of the Commission's Rules, pursuant to the *Raleigh Waiver* concept. As was demonstrated in the construction permit application, implementation of that waiver would allow KRTU-FM to significantly increase its service area, with any potential interference to be experienced in a limited area. The waiver request was the complement to the *Raleigh Waiver*

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requested by Educational Media Foundation for KZLV at Lytle, Texas.² The facility proposed under this modification application would continue to comply with the conditions of the *Raleigh Waiver*.

Exhibit E-2 is a tabular interference study for the proposed facility. This study demonstrates that the proposed facility would comply with the contour overlap provisions of Section 73.509 to all relevant broadcast facilities in the vicinity with the exception of KZLV, which is the subject of the afore mentioned *Raleigh Waiver*. The Exhibit E-2 tabulation is depicted graphically in Exhibit E-3. Detail of the contour relationships between KRTU-FM and KBLC and between KRTU-FM and KOOP are respectively illustrated in Exhibits E-4 and E-5.

In Exhibit E-6, the subject of the *Raleigh Waiver*, the contour overlap between KRTU-FM and KZLV, is depicted. The proposed 60 dBu service contour for KRTU-FM would have a resident population of 1,894,894 persons within an area of 7,894 square kilometers. The KZLV 100 dBu F(50,10) interference contour has a resident population of 7,581 persons in an area of 91 square kilometer. The population within the KZLV 100 dBu F(50,10) contour is 0.400 percent of the total population within the KRTU-FM 60 dBu service contour, while the land area is 1.15 percent of the total land area within the proposed KRTU 60 dBu service contour. As was previously stated, these values remain in compliance with the *Raleigh Waiver* criteria. It is respectfully submitted that the small area of contour overlap that would result is greatly outweighed by the vast increase in population and area that would be served by the KRTU-FM. The modification of the KRTU-FM based on the parameters proposed in this application would be consistent with the public interest.

² The Facility ID for KZLV at Lytle, Texas is 66441.

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As was previously stated, this application proposes no change to the physical location of the KRTU-FM transmitter site. As a result, there are no changes to the facility that would impact any existing spacing relationship to any other facility.

The proposed facility continues to be located within 320 kilometers of the common border between the United States and Mexico. As indicated previously in this technical exhibit, Trinity proposes a change in the maximum effective radiated power, as well as the directional antenna envelope. Exhibits E-7 and E-8 provide a comparison between the authorized and proposed 34 dBu F(50,10) interference contours. As these maps demonstrate, the proposed 34 dBu F(50,10) contour from KRTU would extend no further in the direction of the Mexican border than the current authorized contour would.

The proposed facility would not constitute a significant environmental impact, and is exempt from environmental processing. The proposed facility would utilize an existing structure that is registered with the Commission. The addition of the proposed facility to the existing structure would not increase the existing environmental impact already present from the structure.

In addition, the proposed facility would not constitute an RF exposure hazard to persons at the site. KRTU would utilize a six bay ERI roto-tiller style antenna with one-wavelength spacing between the elements, which is considered a type-3 antenna. The Commission's *FM Model* utility calculates a predicted power density of $22.6 \mu\text{W}/\text{cm}^2$ at 40 meters from the tower base. This is considerably less than the upper limit permissible under the uncontrolled environment condition of the applicable safety standard. The facility will not constitute a hazard to the general public.

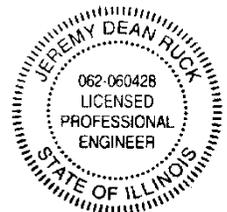
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Trinity certifies that it will coordinate with all other present and future users of the facility to ensure that workers and other personnel are not exposed to levels of radiofrequency radiation in excess of the applicable safety standards. Such coordination will include, but is not necessarily limited to, a reduction in power or cessation of operation.

The preceding statement and attached exhibits have been prepared by me, or under my direction, and are true and accurate to the best of my belief and knowledge.



Above signature is digitized copy of actual signature
License Expires November 30, 2017

Jeremy D. Ruck, PE
August 12, 2016

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KRTU-FM.X

BPED20130516AOC
Latitude: 29-31-25.40 N
Longitude: 098-43-25.40 W
ERP: 30.00 kW
Channel: 219
Frequency: 91.7 MHz
AMSL Height: 509.0 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

Jeremy Ruck & Associates, Inc.

Proposed KRTU-FM
60 dBu Service Contour

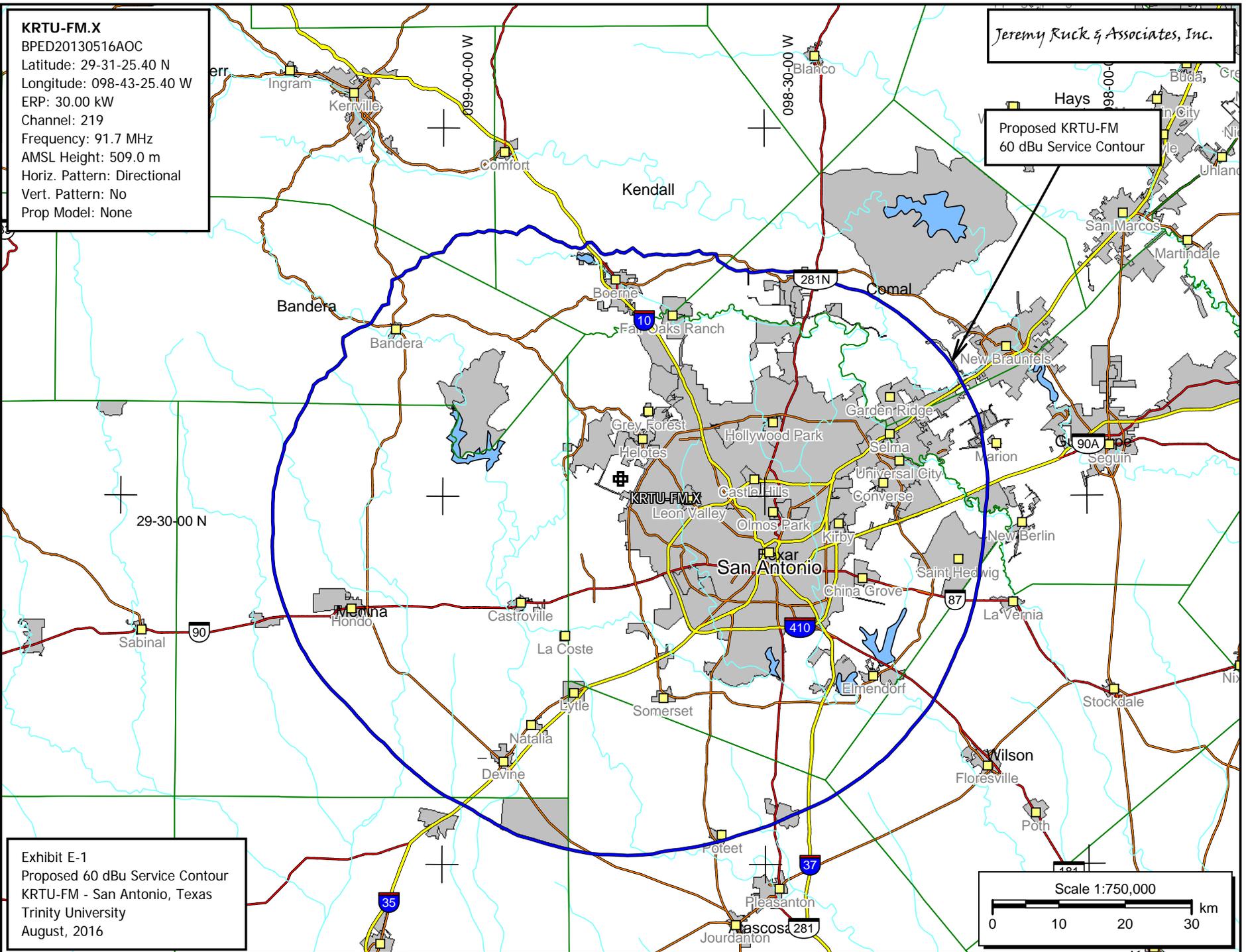
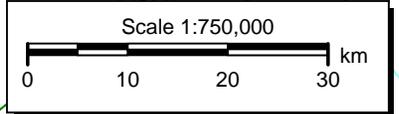


Exhibit E-1
Proposed 60 dBu Service Contour
KRTU-FM - San Antonio, Texas
Trinity University
August, 2016



Jeremy Ruck & Associates, Inc.
 Consulting Engineers - Canton, Illinois

Exhibit E-2 - Tabular Interference Study

KRTU - San Antonio, Texas

CH# 219C2 - 91.7 MHz, Pwr= 30 kW DA, HAAT= 194.6 M, COR= 509 M

Average Protected F(50-50)= 52.29 km

Standard Directional

DISPLAY DATES

DATA 08-12-16

SEARCH 08-12-16

REFERENCE
 29 31 25.0 N.
 98 43 25.0 W.

CH CITY	CALL	TYPE STATE	ANT TX	AZI <--	DI ST FILE #	LAT LNG	PWR(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
219C2 San Antonio	KRTU-FM	CP	DCX TX	0.0 0.0	0.00 BPED20130516AOC	29 31 25.0 98 43 25.0	32.000 190	98.6 501	33.4 Trinity University	-132.7*	-132.1*
219C3 San Antonio	KRTU-FM	LIC	_CX TX	105.7 285.9	24.27 BLED20011024AAV	29 27 51.0 98 28 56.0	8.900 36	77.7 259	17.6 Trinity University	-109.5*	-132.4*
217C2 Lytle	KZLV	LIC	DCX TX	183.1 3.1	31.11 BLED20021002ACB	29 14 39.0 98 44 27.0	50.000 150	4.4 353	42.3 Educational Media Foundati	-29.9*	-17.8*
218A Fredericksburg	KBLC	LIC	_CX TX	6.2 186.3	75.30 BLED20081003ABF	30 11 49.0 98 38 19.0	3.100 120	32.3 615	19.2 Houston Christian Broadcas	8.4	0.8
219A Hornsby	KOOP	LIC	_CN TX	50.5 231.0	130.59 BLED19950103KA	30 16 00.0 97 40 27.0	3.000 26	53.3 193	13.2 Texas Educational Broadcas	29.2	1.6
219A Austin	KVRX	LIC	_CN TX	50.5 231.0	130.59 BLED19941123KA	30 16 00.0 97 40 27.0	3.000 26	53.3 193	13.2 The University Of Texas At	29.2	1.6
221A New Braunfels	KNBT«	LIC	ZCX TX	68.3 248.6	62.79 BLH20030501AAZ	29 43 50.0 98 07 12.0	6.000 95	2.8 327	21.9 New Braunfels Communicati	54.5R	8.3M
222C2 Kerrville	KRNH«	LIC	NCX TX	331.5 151.3	68.02 BLH20070406AAQ	30 03 42.0 99 03 43.0	20.000 203	5.8 753	52.2 Radio Ranch, LIc	57.5R	10.5M
220A Gonzales	VA8855	VAC	_N TX	90.7 271.4	122.89	29 30 12.0 97 27 13.0	6.000 100	42.9 199	26.9 25.5	13.9	
219A Encinal	KOBI	LIC	_CX TX	201.0 20.7	164.33 BLED20130628AIR	28 08 32.0 99 19 26.0	3.000 18	53.3 173	13.2 Centro Cristiano De Vida E	55.5	15.0
220A Dripping Springs	KLLR	LIC	NCX TX	34.2 214.5	91.00 BLED20150825AAC	30 11 58.0 98 11 28.0	2.000 86	21.8 456	12.7 Educational Media Foundati	27.8	15.9
219A Llano	KVHL	LIC	DCX TX	6.7 186.8	129.08 BLED20130923AKI	30 40 36.0 98 33 59.0	1.500 153	37.3 494	10.8 Texas Public Radio	56.6	21.3
216A Kerrville	KHKV	LIC	_CN TX	326.5 146.3	69.39 BLED19980416KA	30 02 37.0 99 07 17.0	0.300 63	1.2 615	14.8 Houston Christian Broadcas	24.0	49.6
218C Ciudad Acuna	AL8899^	AL	___ CI	264.7 83.6	214.86	29 19 33.0 100 55 51.0	100.000 600	136.7 913	92.0 26.0	45.9	
219A Piedras Negras	R16743«	VAC	___ CI	242.9 62.0	197.91	28 41 57.0 100 31 46.0	3.000 100	76.0 348	24.0 163.0R	34.9M	
219A Brady	VA0199	VAC	_N TX	342.0 161.7	188.49	31 08 06.0 99 20 04.0	6.000 100	89.3 641	30.5 57.4	43.9	
218C2 Bloomington	KHVT	LIC	_CX TX	108.8 289.6	176.85 BLED20060509AAA	29 00 04.0 97 00 05.0	46.000 147	74.1 192	48.7 Houston Christian Broadcas	46.3	44.9
218A Beville	VA4177	VAC	_N TX	142.5 323.0	156.80	28 24 03.0 97 44 53.0	6.000 100	37.2 172	24.0 62.4	47.1	

Terrain database is NED 03 SEC , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM
 In & Out distances between contours are shown at closest points. Reference zone= - Zone 2, Co to 3rd adjacent.
 All separation margins (if shown) include rounding. Call signs with strikeout need not be protected.

Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, _= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)
 "*"affixed to 'IN' or 'OUT' values = site inside restricted contour.

« = Station meets FCC minimum distance spacing for its class.

^ = Power and antenna height 'Max classed' as per Sec 73.215 protection requirements

Reference station has protected zone issue: Mexico

- 60 dBu F(50,50) Service Contour
- 40 dBu F(50,10) Interference Contour
- 54 dBu F(50,10) Interference Contour
- 100 dBu F(50,10) Interference Contour

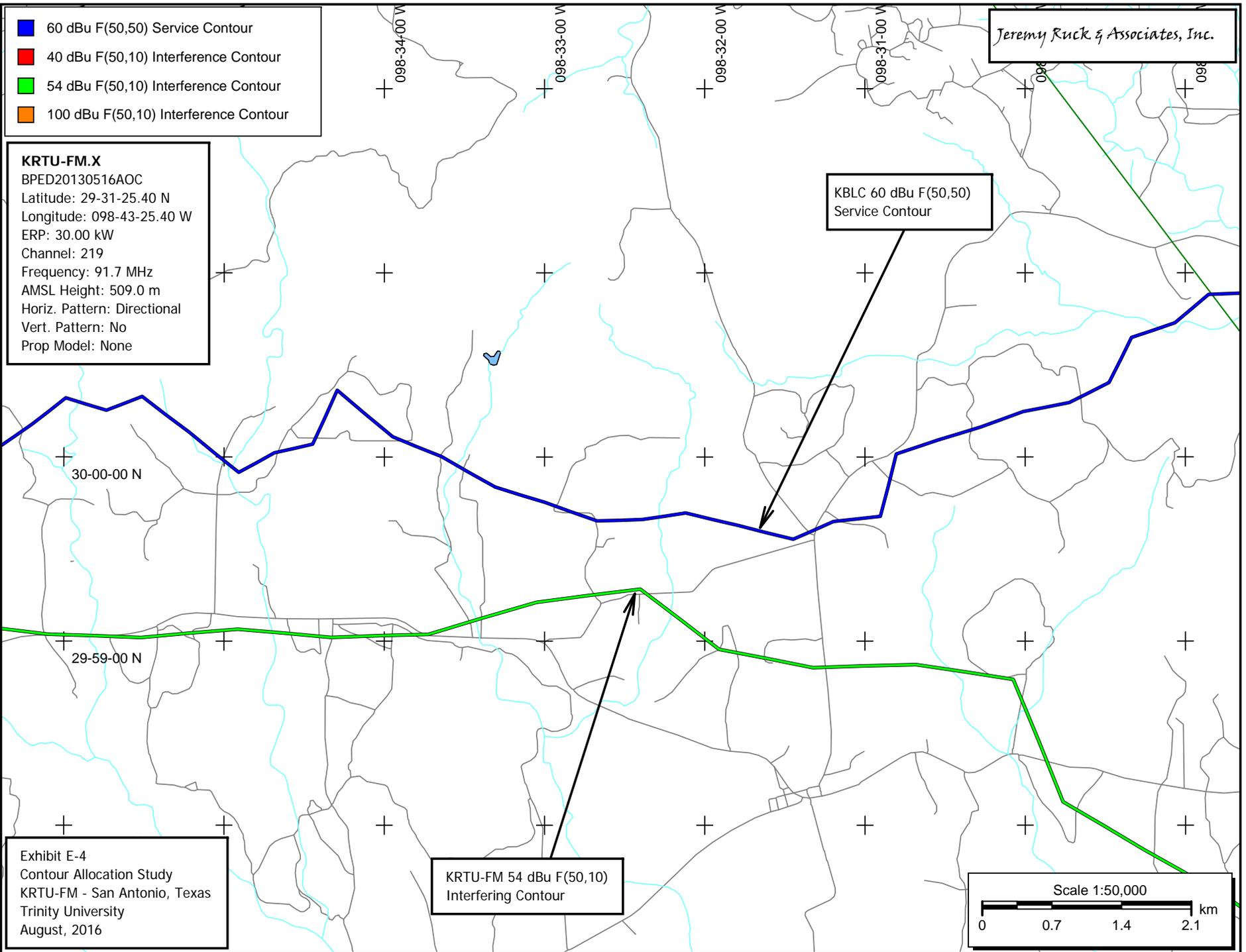
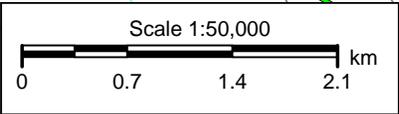
KRTU-FM.X
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 Latitude: 29-31-25.40 N
 Longitude: 098-43-25.40 W
 ERP: 30.00 kW
 Channel: 219
 Frequency: 91.7 MHz
 AMSL Height: 509.0 m
 Horiz. Pattern: Directional
 Vert. Pattern: No
 Prop Model: None

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KBLC 60 dBu F(50,50)
 Service Contour

KRTU-FM 54 dBu F(50,10)
 Interfering Contour

Exhibit E-4
 Contour Allocation Study
 KRTU-FM - San Antonio, Texas
 Trinity University
 August, 2016



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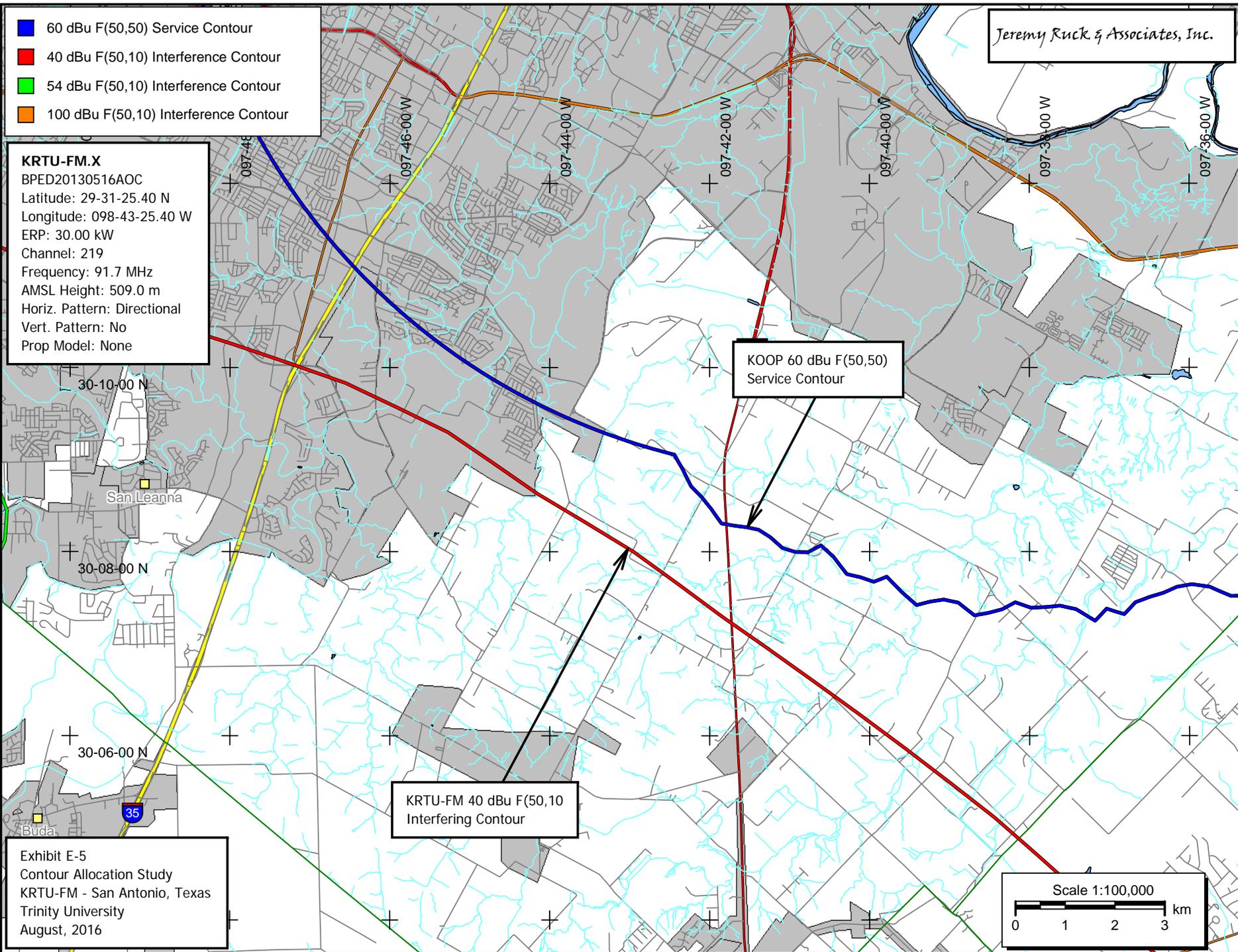
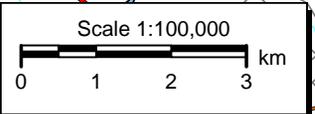
- 60 dBu F(50,50) Service Contour
- 40 dBu F(50,10) Interference Contour
- 54 dBu F(50,10) Interference Contour
- 100 dBu F(50,10) Interference Contour

KRTU-FM.X
BPED20130516AOC
Latitude: 29-31-25.40 N
Longitude: 098-43-25.40 W
ERP: 30.00 kW
Channel: 219
Frequency: 91.7 MHz
AMSL Height: 509.0 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

KOOP 60 dBu F(50,50)
Service Contour

KRTU-FM 40 dBu F(50,10)
Interfering Contour

Exhibit E-5
Contour Allocation Study
KRTU-FM - San Antonio, Texas
Trinity University
August, 2016



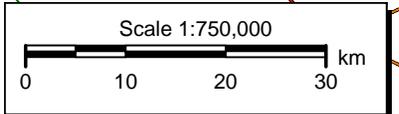
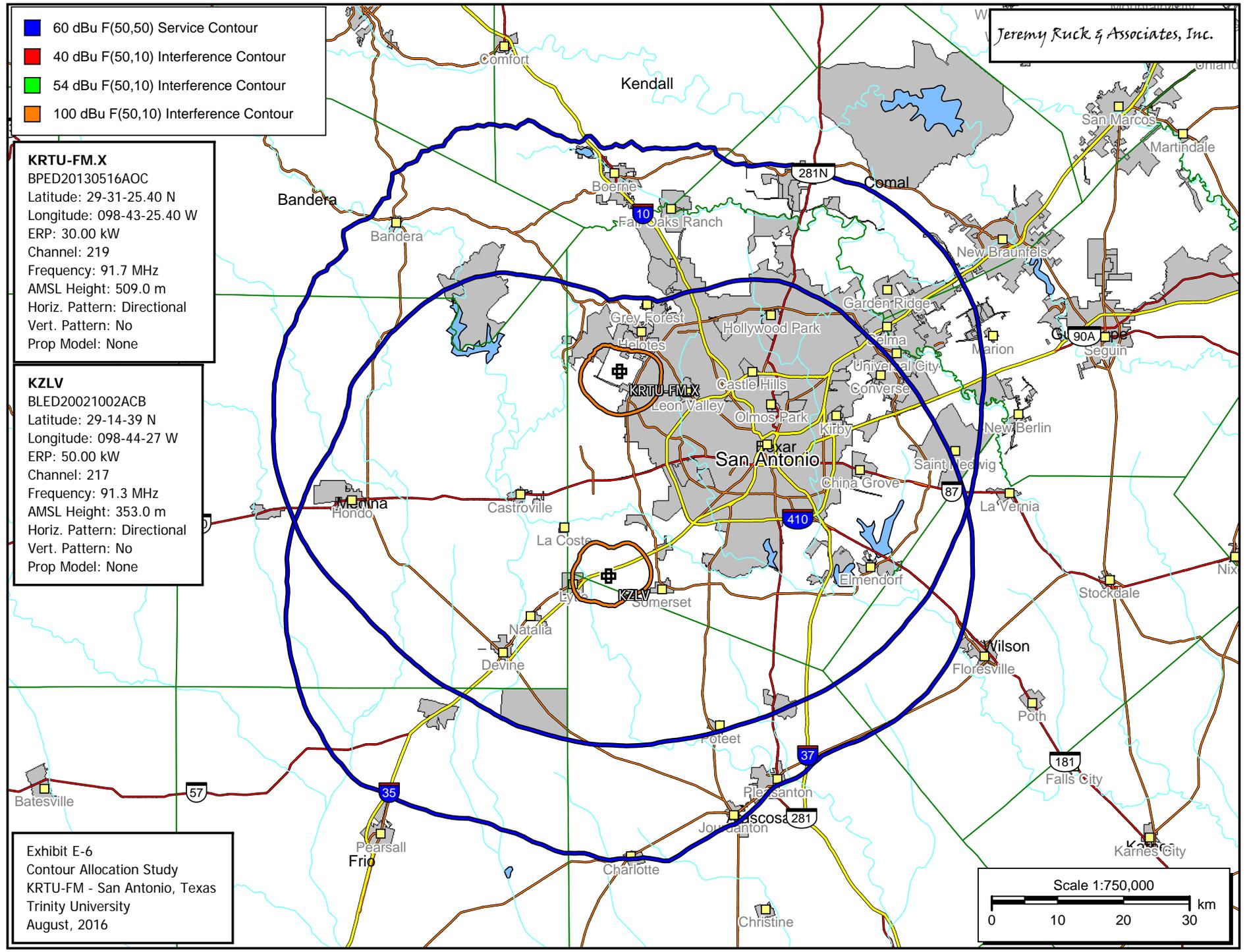
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- 60 dBu F(50,50) Service Contour
- 40 dBu F(50,10) Interference Contour
- 54 dBu F(50,10) Interference Contour
- 100 dBu F(50,10) Interference Contour

KRTU-FM.X
BPED20130516AOC
Latitude: 29-31-25.40 N
Longitude: 098-43-25.40 W
ERP: 30.00 kW
Channel: 219
Frequency: 91.7 MHz
AMSL Height: 509.0 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

KZLV
BLED20021002ACB
Latitude: 29-14-39 N
Longitude: 098-44-27 W
ERP: 50.00 kW
Channel: 217
Frequency: 91.3 MHz
AMSL Height: 353.0 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

Exhibit E-6
Contour Allocation Study
KRTU-FM - San Antonio, Texas
Trinity University
August, 2016



KRTU-FM.C
 BPER20130516AOC
 Latitude: 29-31-25 N
 Longitude: 098-43-25 W
 ERP: 32.00 kW
 Channel: 219
 Frequency: 91.7 MHz
 AMSL Height: 501.0 m
 Horiz. Pattern: Directional
 Vert. Pattern: No
 Prop Model: None

KRTU-FM.X
 BPER20130516AOC
 Latitude: 29-31-25.40 N
 Longitude: 098-43-25.40 W
 ERP: 30.00 kW
 Channel: 219
 Frequency: 91.7 MHz
 AMSL Height: 509.0 m
 Horiz. Pattern: Directional
 Vert. Pattern: No
 Prop Model: None

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■ Proposed KRTU 34 dBu F(50,10) Contour
■ Authorized KRTU 34 dBu F(50,10) Contour

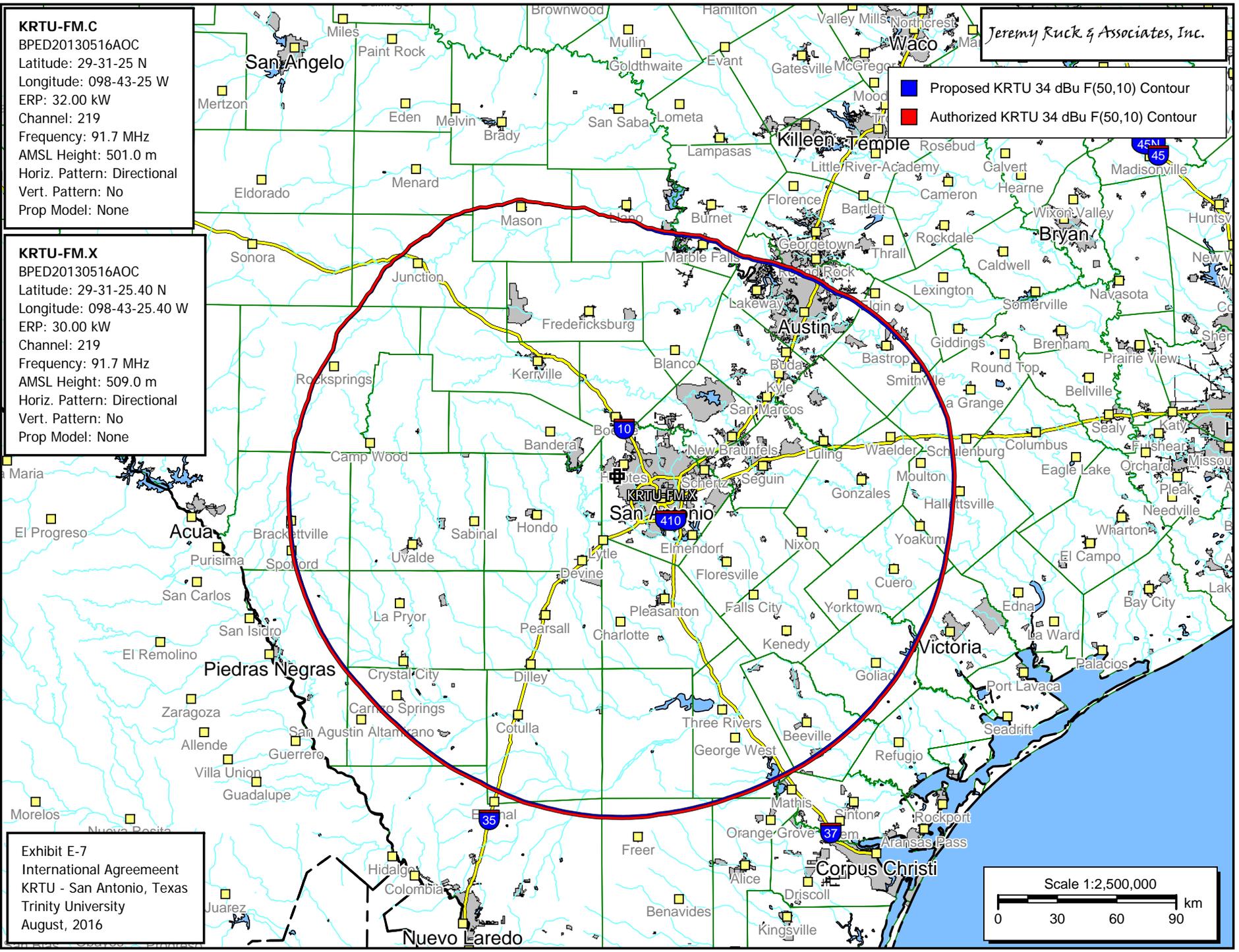
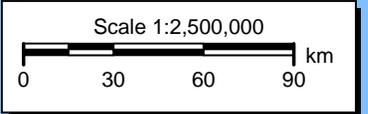


Exhibit E-7
 International Agreement
 KRTU - San Antonio, Texas
 Trinity University
 August, 2016



KRTU-FM.C
BPED20130516AOC
Latitude: 29-31-25 N
Longitude: 098-43-25 W
ERP: 32.00 kW
Channel: 219
Frequency: 91.7 MHz
AMSL Height: 501.0 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

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Latitude: 29-31-25.40 N
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AMSL Height: 509.0 m
Horiz. Pattern: Directional
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Prop Model: None

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■ Authorized KRTU 34 dBu F(50,10) Contour

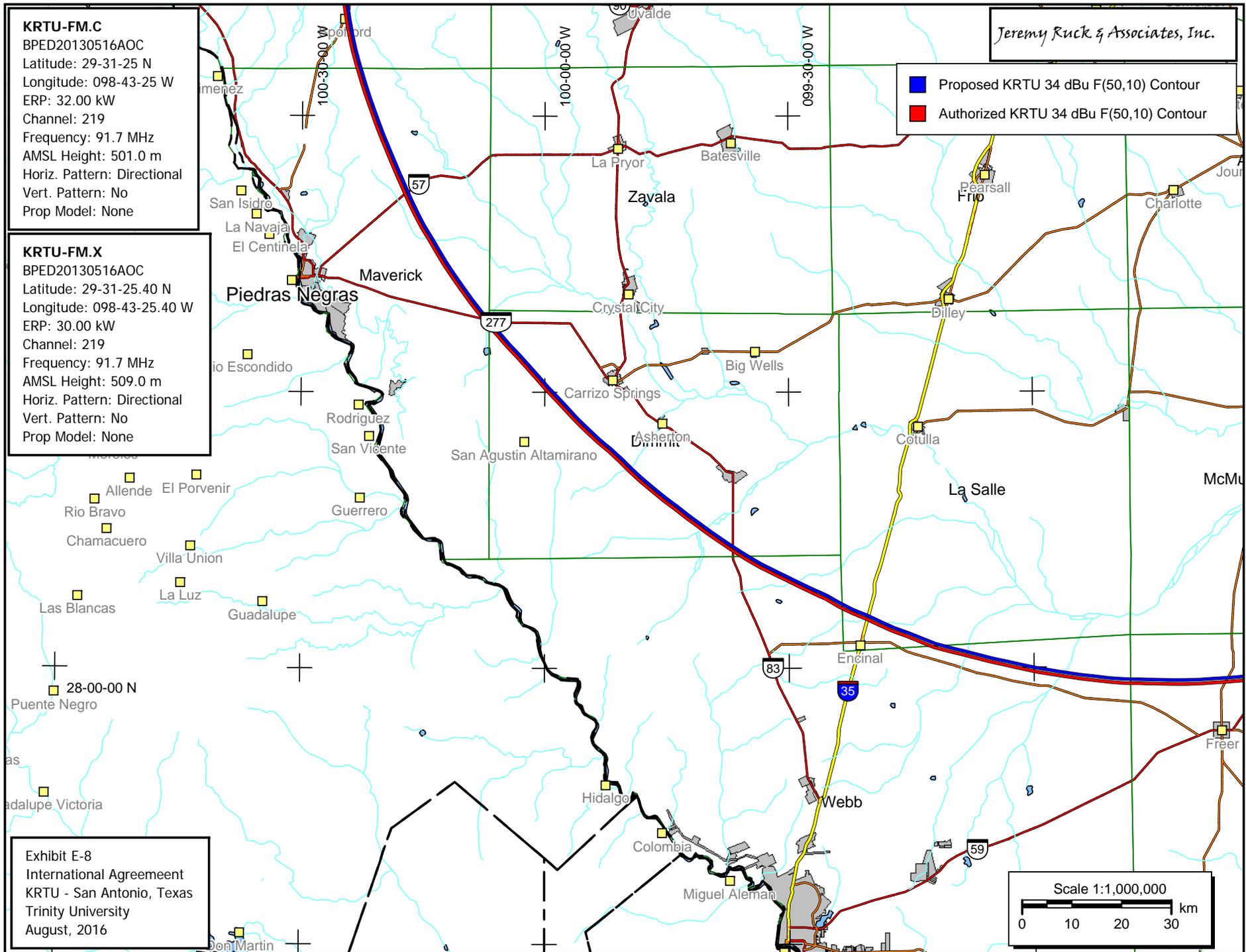


Exhibit E-8
International Agreement
KRTU - San Antonio, Texas
Trinity University
August, 2016

