Exhibit 36 - Univision Engineering Statement
U.S.A.F. Interference Considerations
& Interference Analysis
Univision Radio Stations Group, Inc.
KRGT(FM) Indian Springs, NV
99.3 MHz Class CO 35 kW 657 m

Background

This exhibit presents an analysis of interference to USAF communication systems from KRGT(FM) at the Angel Peak communications site. KRGT(FM) transmits on a frequency of 99.3 MHz from a tower located at 36° 19' 16.00" N, 115° 34' 15.00" W located in Clark county Nevada. KRGT(FM) utilizes a non-directional 8-bay full wavelength spaced circularly polarized antenna at a licensed ERP of 35 kW. The radiation center of the KRGT antenna is 2658m AMSL.

The USAF operates a tactical/LMR communications facility from the same site on adjacent towers with multiple receive antennas located 135-140 meters to the West-Southwest at an azimuth of 245 degrees. The USAF utilizes broadband "Discone" type receive antennas with a radiation center of 2651m ASML within the 225 – 400 MHz frequency band. The radiation pattern depression angle between the USAF receive and KRGT transmit antennas is 2.9°. The corresponding relative field of the KRGT antenna is 0.8 (-1.9 dB), placing the USAF within the main horizontal lobe.

Interference from the 3nd and 4rd harmonics (297.9 and 397.2 MHz) of KRGT(FM) were first reported to KRGT's staff on July 15th, 2015. Extensive filtering, shielding, and directionalization have been attempted to mitigate this interference. These methods have not satisfactorily resolved the interference for either party. The close horizontal antenna spacing, lack of isolation and high-power levels involved have precluded a solution to the interference and leaves both parties in agreement that increasing transmitter to receiver isolation by relocating the KRGT(FM) transmitter is the only practical technical solution.

Interference Measurements

On July 15th, 2015, the USAF reported interference to USAF receivers operating at Angel Peak. Interference was reported on center frequencies of 297.9 MHz and 397.2 MHz and carried the modulation of the KRGT(FM) signal. These frequencies correspond to the 3rd and 4th harmonics of KRGT(FM). The interference levels reported by USAF personnel on July 15th, 2015 and subsequent dates are contained in Table 1.

Date	3rd Harmonic (dBm)	4th Harmonic (dBm)	ERP (kW)
7/15/15	-86	-100	35
11/2/15	-77	-118	35
11/12/15	-75	-105.6	35

Table 1 USAF Interference Measurements

KRGT(FM) and USAF personnel immediately took a series of steps to resolve the interference. These steps included: installation of additional harmonic filtering on the KRGT(FM) transmitter, installation of additional shielding on the KRGT(FM) transmitter cabinet to reduce radiated harmonics, reducing KRGT(FM) transmitter to 33% of licensed output (2500 W) and installation of preselector filters on the USAF receive equipment to prevent receiver front end overloading. These measures had limited effect on the 3rd harmonic interference. While the 4th harmonic was attenuated adequately only while KRGT(FM) operated at reduced power.

Harmonic Filtering

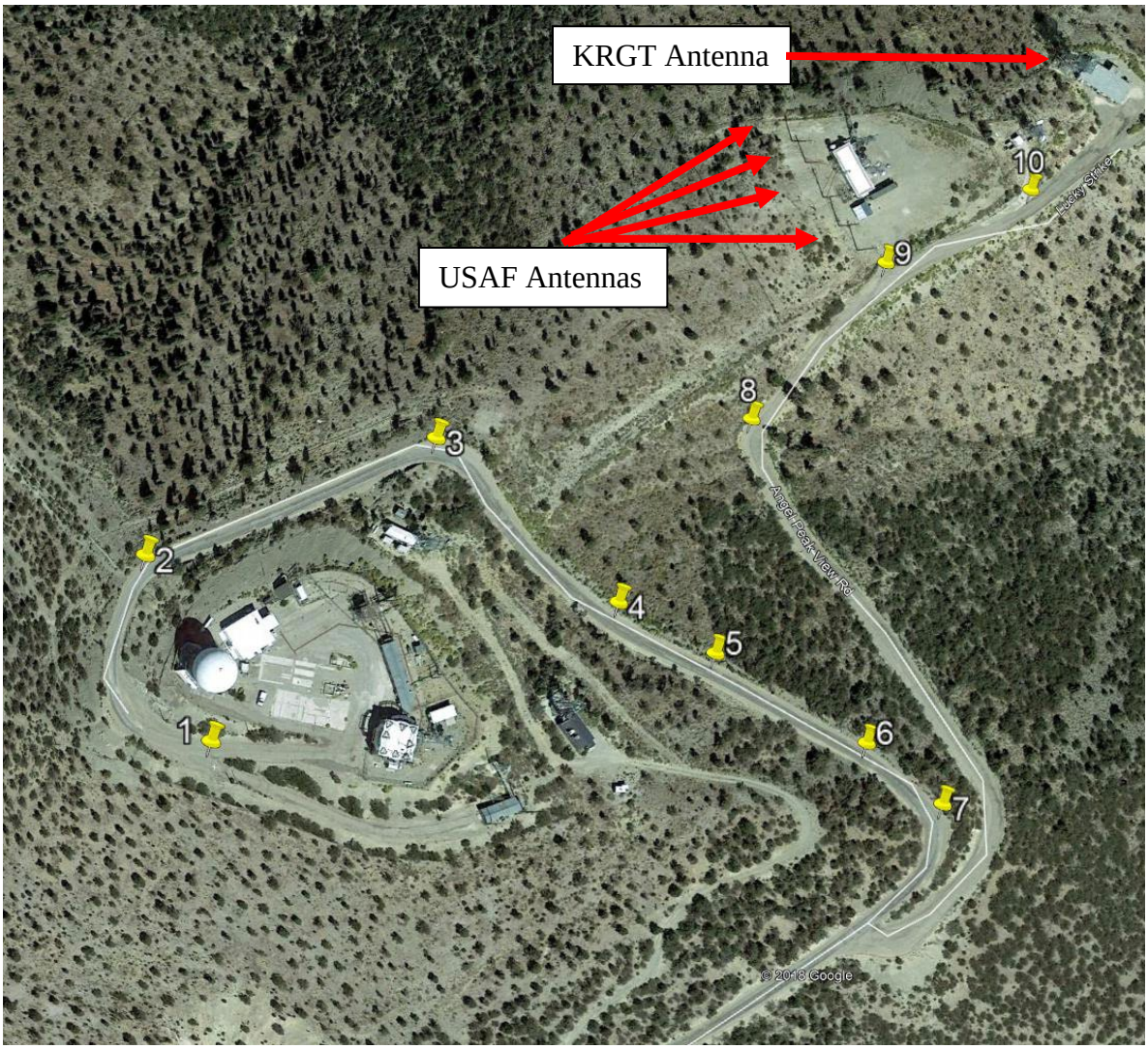
As an initial step at suppressing radiated harmonics KRGT(FM)'s transmitter was fitted with an ERI CF 3002 low pass filter. The filter provides a minimum of 45 dB attenuation of the 2nd through 10th harmonics. Harmonic levels from the KRGT(FM) transmitter were measured with the transmitter on the station load and a directional coupler installed on the transmitter output. The directional coupler was swept and calibrated from 95 to 600 MHz. Measurements were made with a Rohde & Schwarz FSH-4 spectrum analyzer and Microwave Filter Company model 5KHP-120 high pass filter. Analyzer input mixer level was adjusted for maximum second harmonic intercept. The following table shows the worst case measured harmonics.

Harmonic	Tx Power Output (W)	dBc
2	6934	-116.8
3	6934	-111.7
4	6934	-144.7
5	6934	-134.2
6	6934	-148.9

Table 2 - Harmonic levels after harmonic filter

Over the Air Harmonic Measurements

In addition to harmonic levels measured at the transmitter, over the air harmonic levels were measured to identify other possible sources of harmonic signals generated outside of the KRGT (FM) transmitter. These measurements were made with resonant dipoles on the 3rd harmonic frequency, the strongest interfering harmonic. The rugged mountain terrain, and winter snow cover limited the areas accessible for measurement of the harmonics. Further for security purposes KRGT(FM) engineering staff has limited access to the USAF communications facility. The accessible measurement points are identified on the following map and table.



Measurement locations 3, 4, and 5 on the upper access road were the points closest in elevation and azimuth to the USAF receive antennas. The points are between 2685m and 2672m an are in the main lobe of the KRGT(FM) elevation pattern, The points however are considerably further from the KRGT(FM) antenna than the USAF antennas. Accordintly it is expected that actual values are proportionally higher within the USAF facility.

Location	Bearing	Distance (m)	Elevation (m)
1	231°	482	2700
2	240°	464	2695
3	237°	339	2685
4	220°	328	2675
5	212°	322	2672
6	199°	329	2667
7	192°	347	2664
8	222°	234	2640
9	223°	140	2632
10	202°	72	2622

Table 3 Measurement Locations

The fundamental and 3rd harmonic signal strength were measured using a Rohde & Schwarz FSH-4 spectrum analyzer and resonant dipoles. The analyzer was fitted with a high pass filter for measurement of the harmonics to maximize the second harmonic intercept (SHI) of the analyzer and reduce internal, instrument generated harmonic products below the noise floor. Results of the measurements presented in Table 4 show the over-the-air 3rd harmonic levels relative to carrier increased 21 to 39 dB over the level measured at the transmitter and filter output. The increase in relative harmonic levels indicates harmonics generated by other sources in the environment and not being generated directly by the transmitter. These harmonic sources cannot be eliminated with filtering on the transmitter or filtering on the USAF receivers.

Location	F_0 - 99.3 MHz (dBm)	3rd Harmonic (dBm)	3rd Harmonic (dBc)	3rd Harmonic Increase (dB)
1	-30.0	Noise limited	-	
2	-14.6	Noise limited	-	
3	5.9	-82.0	-87.9	23.8
4	13.8	-62.0	-75.8	35.9
5	14.3	-76.0	-90.3	21.4
6	15.5	-64.0	-79.5	32.2
7	9.5	-88.0	-97.5	14.2
8	11.3	-75.0	-86.3	25.5
9	6.5	-70.0	-76.5	35.2
10	10.6	-62.0	-72.6	39.1

Table 4 Over-the-air carrier and 3rd harmonic levels

Other harmonic sources include surrounding tower structures, fencing, and buildings with poorly bonded metallic joints, as well as other transmitters. Harmonics from the sources can be reduced with grounding and bounding of dissimilar metallic joints, equipping other transmitters with filters and isolators or isolating unintentional radiators. Isolation can be accomplished with shielding, RF absorbing materials, or directionalization. Multiple attempts were made to identify other source of harmonic radiation using direction finding techniques. There was no dominant source or directional fix that could be obtained on the harmonic radiation. Grounding and bonding at the KRGT(FM) transmitter and tower were inspected for proper installation and tightening.

Environmentally Generated Harmonics

To demonstrate the complex RF environment, two measurements made near the test equipment truck are presented in Table 5.

Carrier Level (dBm)	3rd Harmonic (dBm)	Equipment Truck Separation
14.9	-61.9	2’
14.9	-94.6	20’

Table 5 Equipment truck effects on harmonic levels

These measurements show a worst-case difference in the harmonic level of 32.7dB depending on the separation of the equipment truck from the measuring receiver. Direction finding identified the equipment truck as a source of unintentional harmonic radiation. The measurements were repeated on multiple occasions and when the truck was in areas with the strongest field strength it became a source of harmonic radiation. These measurements demonstrate how equipment and structures in the areas of KRGT(FM) maximum field strength may become unintended radiators of harmonics that cannot be filtered. While relocating the equipment truck is easily accomplished to eliminate radiated harmonics, identifying other harmonic radiators and mitigating them is not feasible at such a complicated multi-operator site.

KRGT(FM) Antenna Directionalization Tests

While there are methods to reduce harmonics and intermodulation products from unintentional passive radiators[1], the extensive area and large number of sources located in the area made any of these methods unrealizable. As a potential solution, decreasing the RF field strength impinging on equipment and structures that are potential sources of harmonic radiation was identified as the most effective method to reduce harmonic interference at the site.

To test the effectiveness of the potential solution a Shively 6016 circularly polarized panel antenna was temporarily installed at the KRGT(FM) transmitter site. The antenna was oriented with the main lobe over KRGT(FM)’s community of license at an azimuth of 343° degrees, placing the USAF site approximately 98° CCW from the main lobe. The relative field at this azimuth is < 0.2 (-14 dB) for both horizontal and vertical polarization. The antenna was limited to a maximum power of 5000 W, the ERP was accordingly reduced 1.7 dB to 14 kW. Harmonic measurements were taken with results shown in Table 6 and Table 7.

[1] Anritsu Corporation, *Identifying Sources of External PIM*, and *PIM Hunter*, www.anritsu.com

Location	Carrier panel antenna 14 kW ERP (dBm)	3rd Harmonic panel antenna (dBm)	3rd Harmonic relative level (dBc)
1	-50.0	Noise limited	-
2	-35.4	Noise limited	-
3	-34.5	-95.5	-79.3
4	-14.5	-100.0	-86.1
5	-13.2	-107.5	-94.3
6	-22.0	-108.5	-90.2
7	-6.3	-95.5	-89.2
8	-21.9	-105.5	-82.4
9	-13.4	-96	-81.6
10	-6.3	-89	-82.7

Table 6 Directional antenna over the air measurements

Location	Carrier Attenuation (dB)	3rd Harmonic Attenuation
1	16.0	Noise limited
2	16.8	Noise limited
3	18.1	9.5
4	23.7	34.0
5	23.5	27.5
6	23.8	27.2
7	17.8	27.5
8	30.4	26.5
9	16.9	22.0
10	6.3	23.0

Table 7 Directional antenna carrier and harmonic suppression

The harmonic attenuation in Table 7 was calculated from the values in Table 4 and Table 6 as the difference of the non-directional antenna absolute harmonic level and the directional antenna

harmonic level less the 3.97 dB difference in ERP. At most locations large reductions in measured harmonic levels were achieved. The 3rd harmonic was attenuated between 9.4 and 34 dB. Location 3, which is the accessible location on the same bearing as the USAF receive antennas showed the lowest reduction in 3rd harmonic level. USAF staff provided supporting measurements on the reduction in 3rd harmonic interference as measured with USAF equipment[2].

Date	Antenna	3rd Harmonic (dBm)	4th Harmonic (dBm)	ERP (kW)
7/15/15	Main	-86	-100	35
11/2/15	Main	-77	-118	35
11/12/15	Main	-75	-105.6	35
5/10/17	Main	-76.9	-	35
5/10/17	Directional Test	-97.6	-	14

Table 8 USAF Measured Harmonic Interference Levels

[2] Rohde & Schwarz EM100 and Rohde &Schwarz PR100 receivers with K&L microwave preselector filters.

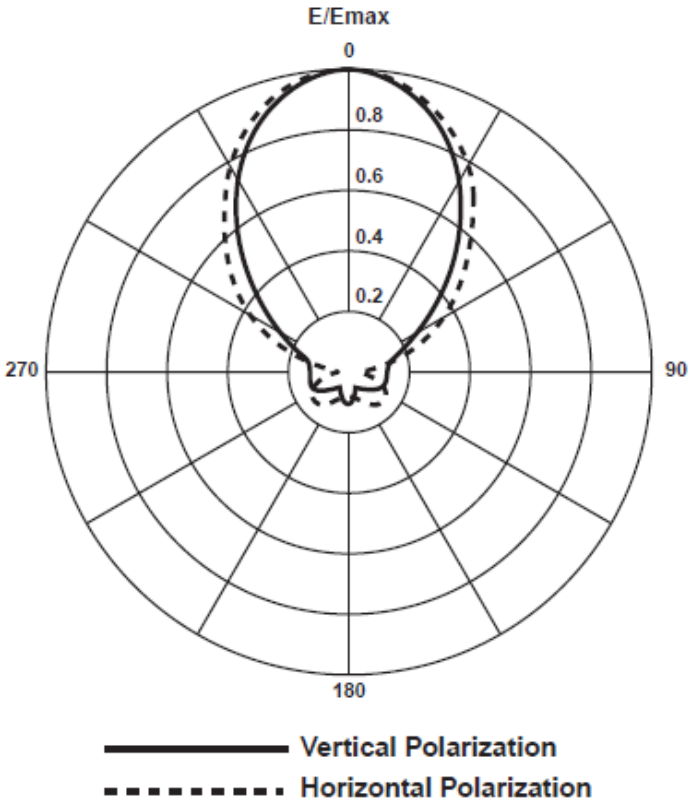


Figure 1 - Directional Test Antenna Pattern

While effective, the tested directional pattern could only reduce the 4th harmonic interference to the noise floor and the 3rd harmonic levels remained 15 dB or more above the USAF receive equipment noise floor. The following factors must also be considered when evaluating the effectiveness of using directionalization to resolve the interference. The USAF received interference was measured with the ERP 3.97 dB below the licensed ERP of the station. Operating at licensed ERP, interference would increase this amount or more. Adjusting for the difference in ERP, the test antenna achieves > 16 dB of suppression towards the USAF receive site while placing the main lobe over KRGT(FM)'s community of license. A practical antenna with the broader beam width necessary to maintain signal over all populated areas within the current KRGT(FM) contour may not be able to achieve the same level of suppression. As reported by USAF staff the absolute level of the 3rd harmonic interference remained greater than 15 dB above the systems noise floor and continued to interfere with communications and generate system errors.

Given the foregoing, the licensee believes it has exhausted all practical methods for eliminating the interference to the USAF communications facility at the current KRGT(FM) transmitter site. Consequently, with this application the licensee seeks to relocate the KRGT(FM) transmitter site as stated in this application. This identified site is the most practical site to maintain the majority of KRGT(FM) 60 dBµ service contour.