

Engineering Exhibit: Telemundo Las Vegas LLC Application for Experimental STA

Description

Telemundo Las Vegas requests special temporary authority to construct and operate a distributed transmission system to facilitate a real-world demonstration of mobile wireless video service in and around the Las Vegas Convention Center and on the Las Vegas strip during the National Association of Broadcasters Convention (NAB), April 18 through April 23, 2009. As this will be the first on-air demonstration of this technology for broadcasting ATSC Candidate Standard A/153 mobile/handheld compliant data streams STA is requested commencing April 10, 2009 for testing prior to the NAB Convention. This demonstration will be shut down no later than 4 PM, April 23, 2009.

The distributed transmission system will consist of the licensed KBLR-DT facility operating at its authorized effective radiated power of 230 kW from Black Mountain with horizontal polarization, a temporary synchronized transmitter on top of the Stratosphere Tower at 2000 South Las Vegas Boulevard using vertical polarization with an effective radiated power not to exceed 1,000 watts, and a synchronized transmitter in the Central Hall of the Las Vegas Convention Center transmitting a vertically polarized signal with an effective radiated power not exceeding 20 watts. Both transmitters will be located inside the KBLR-DT service contour.

KBLR programming and the mobile wireless video programming will be transmitted via the AMC-18 satellite to the KBLR Black Mountain transmitter and the transmitter at the Convention Center. The transmitter at the Stratosphere will receive its signal either by terrestrial microwave or satellite. The system will be controlled at the KBLR studio and in the event of problems with the system or interference, KBLR will be able to immediately turn off the distributed transmission system and return to normal single transmitter operation using its existing STL to Black Mountain.

The drawing on page 3 shows the system configuration.

Interference

Both low power transmitters will operate with vertical polarization only. This reduces interference to KBLR fixed ATSC reception while improving mobile and handheld reception.

An interference study using the FCC LPTV pre-transition OET Bulletin 69 methodology showed no interference from the low power transmitter at the Stratosphere Tower to any station other than KBLR-DT. This is a worst case analysis because the methodology is based on all stations being horizontally polarized. A copy of the OET-69 study can be provided on request.

Because KBLR-DT will be part of the distributed transmission system, the only interference to it will be in areas where ATSC receiver equalizers are unable to correct for signals from the multiple transmitters. The timing of the Stratosphere transmitter will be adjusted to minimize this interference. Interference from the low power transmitter inside the Convention Center was not studied as it will be insignificant due to its low effective radiated power and location within 2 km of the Stratosphere transmitter. It will, however, be locked to the other two transmitters in the system to reduce self-interference around the Convention Center. Preliminary analysis indicates minimum interference with the two low power transmitters delayed approximately 30 microseconds from the KBLR-DT full power transmitter.

Interference will be checked at various locations as part of the testing prior to the NAB Convention. Should any unacceptable interference result, the demonstration will be shut down if interference cannot be resolved by reducing transmitter power at the Stratosphere or Convention Center.

Antenna System

The transmitter at the Stratosphere will use two Kathrein-Scala CL-1469 log periodic antennas oriented at 164 degrees and 213 degrees true with the combined main beam at 189 degrees true. The antenna array will be tilted down a maximum of 8 degrees at 169 degrees true, resulting in the horizontal plane azimuth pattern attached. A polar plot of the elevation pattern at 189 degrees true is attached. The horizontal plane (azimuth) 3-dB beamwidth (without tilt) is 64 degrees and the vertical plane (elevation) 3-dB beamwidth is 67 degrees. The antenna array will be mounted approximately 909 feet above ground.

The indoor transmitter at the Convention Center will use a Kathrein K-72-20-4 Type Number 767-006 omnidirectional antenna with a vertical plane 3-dB beamwidth of approximately 22 degrees. This antenna will be mounted at least 20 feet above the floor of the Convention Center.

Manufacturer data sheets on both antennas are attached.

RF Exposure

RF exposure from the two low power transmitters in the distributed transmission system was studied using the formulas in OET Bulletin 65.

The study showed that power density from the antenna at the Convention Center will not exceed FCC maximum permissible exposure level (0.419 mW/cm^2) for an uncontrolled environment at any angle, including the main beam, if the antenna is mounted at least 6.1 meters (20 feet) from areas accessible to the public, as is proposed.

At a maximum effective radiated power of 1,000 watts, the antenna at the Stratosphere is not predicted to produce power density exceeding the maximum permissible exposure level for an uncontrolled environment at any location 6.1 meters (20 feet) below the antenna on the Stratosphere. The antenna will not be mounted in an area accessible to the public. Due to the complex structure on top of the Stratosphere, a site survey will be performed to determine the distance and angle to the areas closest to the antenna accessible to the public. In the event the predicted power density exceeds 5 percent of the allowable exposure level for an uncontrolled environment, measurements will be taken in these areas to verify that the power density does not exceed maximum permissible exposure.

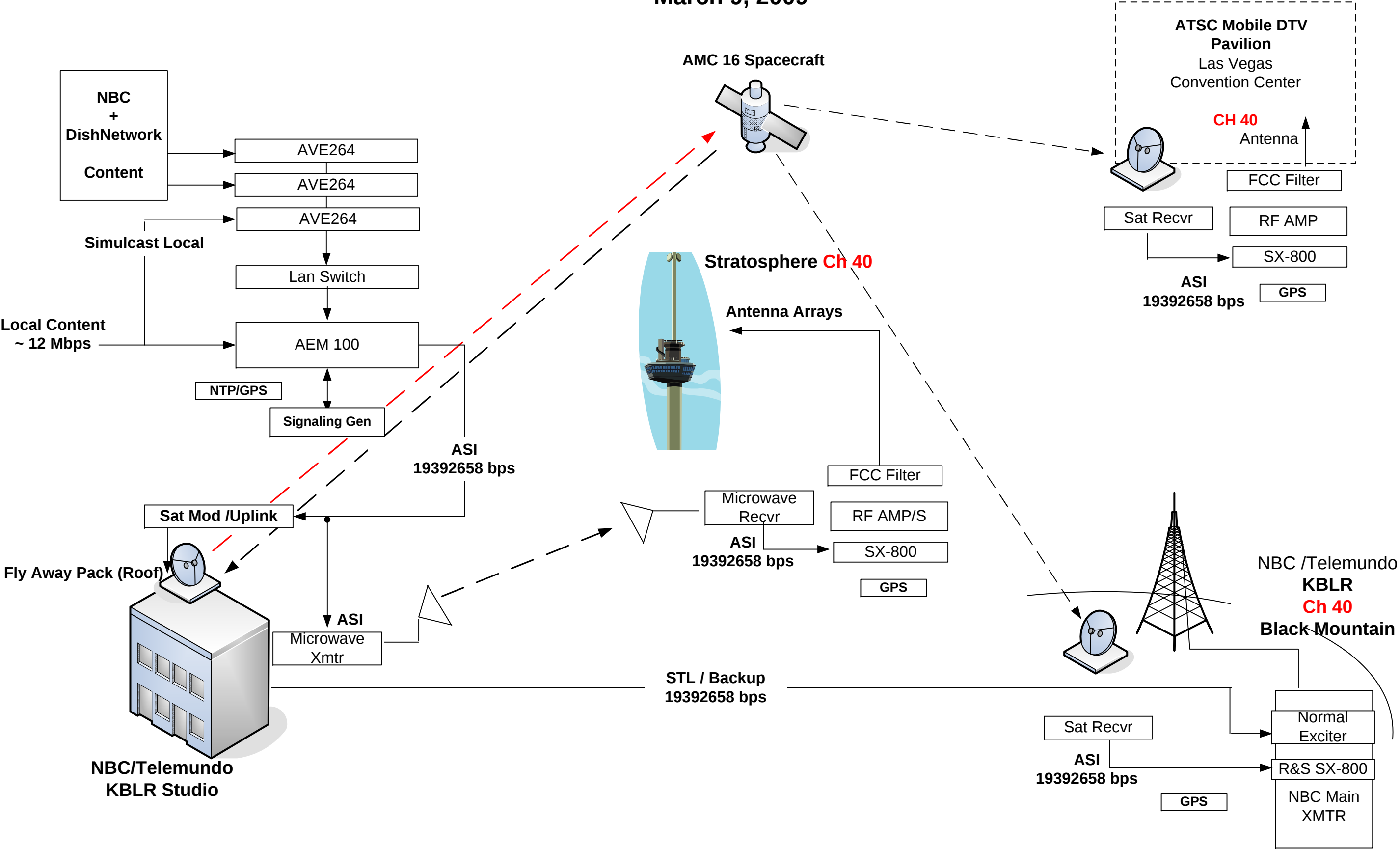
A copy of the Excel interactive spreadsheet used to analyze RF exposure from these antennas can be provided on request.

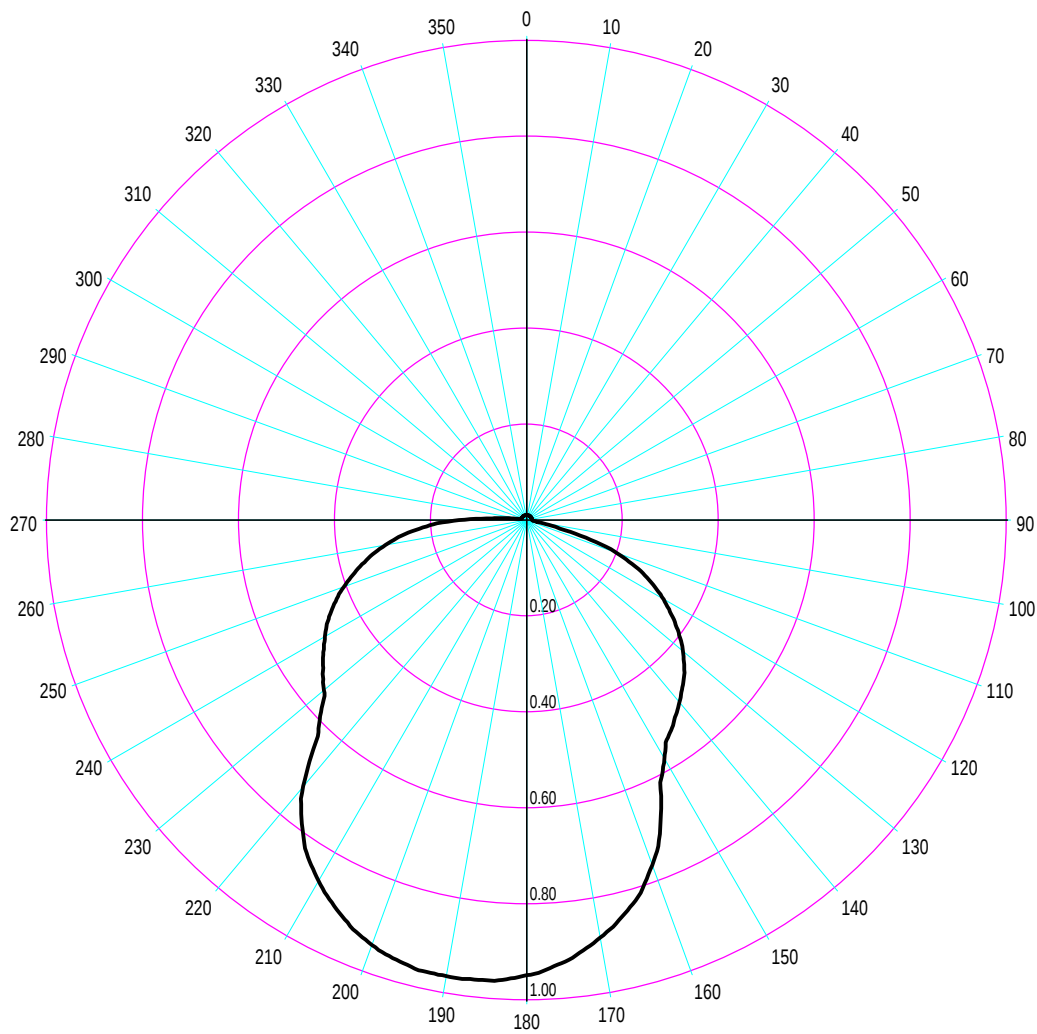
Telemundo Las Vegas certifies it will turn off these transmitters as required to protect workers from excessive RF exposure.

Attachments:

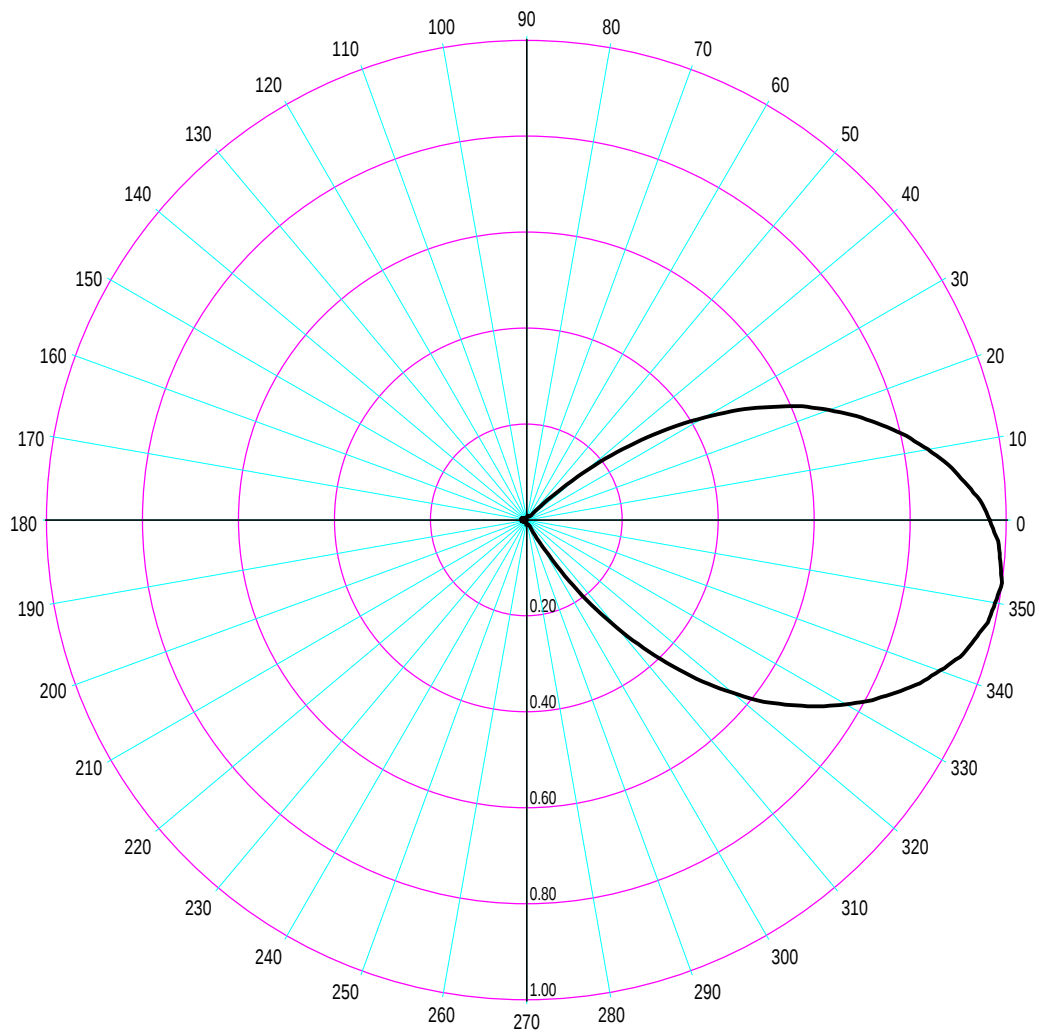
- 1) System configuration
- 2) Stratosphere antenna horizontal plane azimuth pattern (polar plot) with mechanical tilt
- 3) Stratosphere antenna vertical plane elevation pattern (polar plot) at an azimuth of 189 degrees including mechanical tilt
- 4) Kathrein-Scala CL-1469 Data sheet
- 5) Kathrein K-72-20-4 Type Number 767-006 data sheet

Draft r4 NAB 2009 NBC/Telemundo + DishNetwork/
R&S/ Triveni Demo
March 9, 2009





Azim	Rel.FS ERP [kW]		dBk	Azim	Rel.FS ERP [kW]		dBk	Azim	Rel.FS ERP [kW]		dBk	Azim	Rel.FS ERP [kW]		dBk
0.0	0.011	0.000	-39.172	90.0	0.011	0.000	-39.172	180.0	0.948	0.899	-0.463	270.0	0.141	0.020	-17.015
5.0	0.011	0.000	-39.172	95.0	0.015	0.000	-36.478	185.0	0.962	0.926	-0.336	275.0	0.052	0.003	-25.680
10.0	0.011	0.000	-39.172	100.0	0.032	0.001	-29.897	190.0	0.964	0.929	-0.318	280.0	0.019	0.000	-34.425
15.0	0.011	0.000	-39.172	105.0	0.095	0.009	-20.445	195.0	0.959	0.920	-0.363	285.0	0.012	0.000	-38.416
20.0	0.011	0.000	-39.172	110.0	0.200	0.040	-13.979	200.0	0.942	0.887	-0.519	290.0	0.011	0.000	-39.172
25.0	0.011	0.000	-39.172	115.0	0.272	0.074	-11.308	205.0	0.910	0.828	-0.819	295.0	0.011	0.000	-39.172
30.0	0.011	0.000	-39.172	120.0	0.330	0.109	-9.629	210.0	0.867	0.752	-1.239	300.0	0.011	0.000	-39.172
35.0	0.011	0.000	-39.172	125.0	0.379	0.144	-8.427	215.0	0.810	0.656	-1.830	305.0	0.011	0.000	-39.172
40.0	0.011	0.000	-39.172	130.0	0.425	0.181	-7.432	220.0	0.724	0.524	-2.805	310.0	0.011	0.000	-39.172
45.0	0.011	0.000	-39.172	135.0	0.463	0.214	-6.688	225.0	0.613	0.376	-4.250	315.0	0.011	0.000	-39.172
50.0	0.011	0.000	-39.172	140.0	0.495	0.245	-6.108	230.0	0.551	0.304	-5.177	320.0	0.011	0.000	-39.172
55.0	0.011	0.000	-39.172	145.0	0.528	0.279	-5.547	235.0	0.518	0.268	-5.713	325.0	0.011	0.000	-39.172
60.0	0.011	0.000	-39.172	150.0	0.574	0.330	-4.821	240.0	0.485	0.235	-6.285	330.0	0.011	0.000	-39.172
65.0	0.011	0.000	-39.172	155.0	0.663	0.440	-3.569	245.0	0.449	0.202	-6.955	335.0	0.011	0.000	-39.172
70.0	0.011	0.000	-39.172	160.0	0.765	0.585	-2.326	250.0	0.405	0.164	-7.851	340.0	0.011	0.000	-39.172
75.0	0.011	0.000	-39.172	165.0	0.834	0.696	-1.576	255.0	0.355	0.126	-8.995	345.0	0.011	0.000	-39.172
80.0	0.011	0.000	-39.172	170.0	0.883	0.780	-1.080	260.0	0.299	0.089	-10.486	350.0	0.011	0.000	-39.172
85.0	0.011	0.000	-39.172	175.0	0.923	0.852	-0.696	265.0	0.232	0.054	-12.690	355.0	0.011	0.000	-39.172



Azim	Rel.FS	ERP [W]	dBk
0.0	0.965	58.756	-12.309
5.0	0.916	52.941	-12.762
10.0	0.849	45.479	-13.422
15.0	0.766	37.022	-14.315
20.0	0.671	28.408	-15.466
25.0	0.558	19.646	-17.067
30.0	0.429	11.612	-19.351
35.0	0.291	5.343	-22.722
40.0	0.153	1.477	-28.306
45.0	0.049	0.151	-38.196
50.0	0.012	0.009	-50.416
55.0	0.010	0.006	-52.000
60.0	0.010	0.006	-52.000
65.0	0.010	0.006	-52.000
70.0	0.010	0.006	-52.000
75.0	0.010	0.006	-52.000
80.0	0.010	0.006	-52.000
85.0	0.001	0.000	-72.000

Azim	Rel.FS	ERP [W]	dBk
90.0	0.001	0.000	-72.000
95.0	0.001	0.000	-72.000
100.0	0.001	0.000	-72.000
105.0	0.001	0.000	-72.000
110.0	0.001	0.000	-72.000
115.0	0.001	0.000	-72.000
120.0	0.001	0.000	-72.000
125.0	0.002	0.000	-65.979
130.0	0.003	0.001	-62.458
135.0	0.005	0.002	-58.021
140.0	0.007	0.003	-55.098
145.0	0.008	0.004	-53.938
150.0	0.009	0.005	-52.915
155.0	0.010	0.006	-52.000
160.0	0.011	0.008	-51.172
165.0	0.012	0.009	-50.416
170.0	0.012	0.009	-50.416
175.0	0.012	0.009	-50.416

Azim	Rel.FS	ERP [W]	dBk
180.0	0.012	0.009	-50.416
185.0	0.011	0.008	-51.172
190.0	0.010	0.006	-52.000
195.0	0.009	0.005	-52.915
200.0	0.008	0.004	-53.938
205.0	0.007	0.003	-55.098
210.0	0.005	0.002	-58.021
215.0	0.003	0.001	-62.458
220.0	0.002	0.000	-65.979
225.0	0.001	0.000	-72.000
230.0	0.001	0.000	-72.000
235.0	0.001	0.000	-72.000
240.0	0.001	0.000	-72.000
245.0	0.001	0.000	-72.000
250.0	0.001	0.000	-72.000
255.0	0.001	0.000	-72.000
260.0	0.001	0.000	-72.000
265.0	0.010	0.006	-52.000

Azim	Rel.FS	ERP [W]	dBk
270.0	0.010	0.006	-52.000
275.0	0.010	0.006	-52.000
280.0	0.010	0.006	-52.000
285.0	0.010	0.006	-52.000
290.0	0.010	0.006	-52.000
295.0	0.012	0.009	-50.416
300.0	0.050	0.158	-38.021
305.0	0.154	1.496	-28.250
310.0	0.291	5.343	-22.722
315.0	0.429	11.612	-19.351
320.0	0.559	19.716	-17.052
325.0	0.671	28.408	-15.466
330.0	0.767	37.119	-14.304
335.0	0.849	45.479	-13.422
340.0	0.916	52.941	-12.762
345.0	0.965	58.756	-12.309
350.0	0.991	61.965	-12.079
355.0	0.991	61.965	-12.079

CL-1469B

UHF-TV LOG-PERIODIC ANTENNA

8 dBd gain
470–862 MHz (Channels 14–69*)

The Kathrein Scala Division CL-1469B is a ruggedly built, linearly polarized log-periodic antenna designed for professional UHF-TV transmit and receive applications.

Like all Kathrein Scala Division antennas, the CL-1469B is made of the finest materials using state of the art electrical and mechanical designs resulting in superior performance and long service life. The rugged fiberglass radome protects the antenna from icing and assures stable pattern and gain performance under adverse environmental conditions.

The CL-1469B may be used stand alone or in arrays for higher gain, increased side-lobe suppression, or custom azimuth patterns.

*The CL-1469B covers all 6, 7, and 8 MHz UHF-TV channels worldwide (bands IV/V).



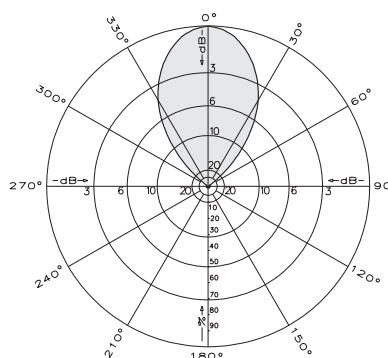
(Shown horizontally polarized)

Specifications:

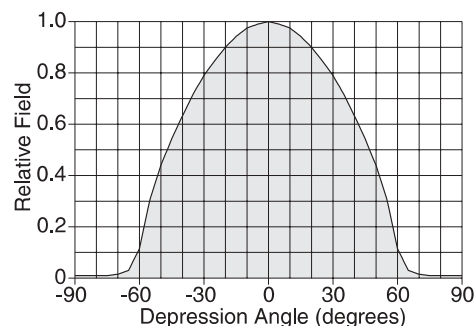
Frequency range	470–862 MHz (broadband)*
Gain	8 dBd
Power gain	6.31
Impedance	50 or 75 ohms
VSWR	< 1.5:1
Polarization	Horizontal or vertical
Front-to-back ratio	>35 dB
Maximum input power	100 watts, type "N" 75 ohm connector 250 watts, type "N" 50 ohm connector
Azimuth pattern	52 degrees (half-power)
Elevation pattern	72 degrees (half-power)
Connector	N female (50 or 75 ohms)
Weight	22 lb (10 kg)
Dimensions	29 x 17 x 12 inches (737 x 432 x 305 mm)
Equivalent flat plate area	2.78 ft ² (.258 m ²)
Wind survival rating*	100 mph (160 kph)
Shipping dimensions	31 x 20 x 14.5 inches (787 x 508 x 368 mm)
Shipping weight	28.0 lb (12.7 kg)
Mounting	Mounting kits available for masts of 2.375 to 4.5 inch (60 to 114 mm) OD.

See reverse for order information.

*Mechanical design is based on environmental conditions as stipulated in EIA-222-F (June 1996) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.



Azimuth pattern (E-plane)



Elevation pattern (H-plane)



K 72 20 4. .

Omnidirectional Antenna

470 – 860 MHz

KATHREIN
Antennen · Electronic

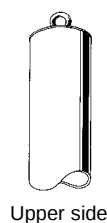
- Broadband omnidirectional antenna.

Type No. / Order No.	767 006	770 881
Number of bays	1	2
Input	7-16 female	7/8" EIA
Frequency range	470 – 860 MHz	
VSWR	< 1.1	
Gain	5 dB at mid-band	8 dB at mid-band
Vertical 3 dB beam width	22°	11°
Impedance	50	
Polarization	Horizontal	
Max. power	1 kW (at 40 °C ambient temperature)	2 kW
Weight	20 kg	40 kg
Wind load (at 160 km/h)	340 N	625 N
Max. wind velocity	225 km/h	
Height H	1.15 m	2.3 m

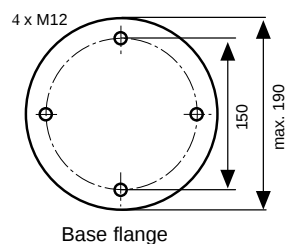
Material: Omnidirectional antenna in protective fiberglass radome with a diameter of 300 mm.
Flange: Aluminum.

Attachment: To tubular masts with a diameter of 100 – 160 mm by using the attachment accessories 768 853 (see photo) or on a flange (see draft).

Grounding: Via mounting parts.

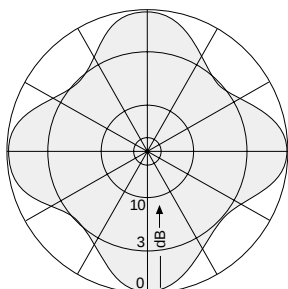


Upper side

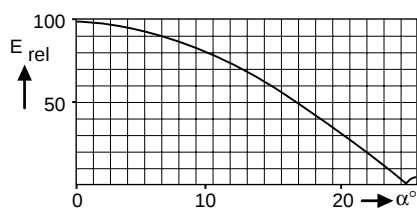


Base flange

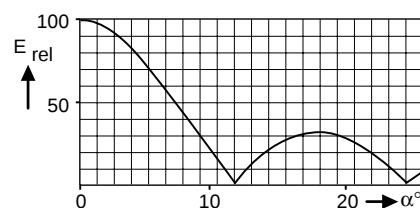
Radiation Patterns (at mid-band)



Horizontal Radiation Pattern



Vertical Radiation Pattern
1 bay (767 006)



Vertical Radiation Pattern
2 bays (770 881)