County Information Services, LLC
Application for Renewal of Conventional Experimental Radio License
WN2XCR

Pursuant to Sections 5.51 and 5.53 of the Commission's rules, 47 C.F.R. §§ 5.51, 5.53, COUNTY INFORMATION SERVICES, LLC ("CIS"), hereby respectfully requests renewal of the experimental authority granted by the FCC under call sign WN2XCR. Among other projects, this renewal allows CIS to continue to investigate an invention to improve the cost-effectiveness of fiber over long distances, as well as further improve the reliability, cost, and scalability of previously developed technologies. The invention, a Data Triage Algorithm, distinguishes time-critical data from non-time-critical data and creates a "Fast Event Trigger" sending the time critical information over a non-secure, High Frequency (HF) radio link.

In this application, CIS is seeking an extension of the technical and operational parameters previously granted with no major modifications to the original parameters of the license. The goal of the extension is to continue evaluating changes driven by the efforts to adjust the system for the eventual shift into Part 90 commercial operations, as proposed by the Shortwave Modernization Coalition's Petition for Rulemaking. Additionally, the previous body of testing has not been sufficiently completed in the two-year time window of the original license. Accordingly, CIS requests two years for this second term.

Except as set forth in this renewal application, specifications and explanations contained in the confidential Narrative Statement to CIS's application of November 4th, 2022 remain applicable.

In a separate letter, CIS is requesting confidential treatment of portions of this application pursuant to Section 0.459 of the Commission's rules.

1. SUMMARY OF CIS EXPERIMENTATION TO DATE

CIS has developed and built (from the ground up); hardware, software, and processes, namely:

- MODEM
- High power amplifiers
- Antenna tuning units
- Filters
- Transmitter and link control systems
- HF antenna array designs
- Encoding and selection schemes for data
- Low-noise and low-power receive stations
- Channel selection technology
- Interference detection methods

The company aims to build technology compliant with existing FCC rules in and outside of FCC Part 5. -From meeting standard masks, to compliance with remote station operations, considerable resources have been dedicated to building technology with permanent licensing viability. Through its experimental licenses: WH2XWU, and WN2XCR, (Files Number 0295-EX-CR-2020, 0408-EX-PL-2015, and 1238-EX-CN-2022) CIS has made progress in developing a fixed wireless technology, including several key improvements to operational systems. The technological challenges CIS now faces include further improving the reliability of the system, extending operational hours, and developing the system to further scale.

2. SUMMARY OF PROPOSED FURTHER EXPERIMENTATION

CIS will develop and test modularization and simplifications of certain components, further develop techniques for multi-frequency single site operations, as well as the continued development of new techniques for reliability improvements.

3. SYSTEM SPECIFICATIONS

Location of the proposed experiment in the United States

CIS intends to conduct the proposed experiments using its fixed transmitter and antenna array located in Northwest Indiana, close to a data center the company utilizes to house its analysis tools.

The site is fully dedicated to works related to the experiment.

The address and coordinates of the Transmit station are:

8399 W. 1050 S. Wanatah, IN 46390 41°27'24.29"N 86°51'37.26"W

4. TECHNICAL SPECIFICATIONS

Frequencies Desired
CIS is seeking authority to operate in the range 7.46-24 MHz, specifically:

Proposed Frequencies	Proposed Bandwidth
13.883 MHz	2-12 kHz
14.540 MHz	2-12 kHz
14.645 MHz	2-12 kHz
14.672 MHz	2-24 kHz
14.720 MHz	2-48 kHz
14.975 MHz	2-48 kHz
15.808 MHz	2-12 kHz
16.158 MHz	2-12 kHz
16.222 MHz	2-24 kHz
16.252 MHz	2-12 kHz
16.310 MHz	2-48 kHz
17.418 MHz	2-12 kHz
17.469 MHz	2-12 kHz
18.344 MHz	2-24 kHz
18.426 MHz	2-12 kHz
18.535 MHz	2-48 kHz
18.724 MHz	2-12 kHz
19.030 MHz	2-12 kHz
19.048MHz	2-24 kHz
19.084 MHz	2-48 kHz
19.673 MHz	2-12 kHz
19.922 MHz	2-12 kHz
20.156 MHz	2-24 kHz
20.220 MHz	2-48 kHz
20.250 MHz	2-12 kHz
7.46-8.10 MHz	2-48 kHz
8.147 MHz	2-48 kHz
8.1955-8.4 MHz	2-16 kHz
9.040-9.35 MHz	2-48 kHz
9.950-9.98 MHz	2-20 kHz
10.15-11.175 MHz	2-48 kHz
11.40-11.5 MHz	2-48 kHz
12.11-12.23 MHz	2-48 kHz
13.410-13.57 MHz	2-48 kHz
13.875-14.00 MHz	2-48 kHz
14.35-14.99 MHz	2-48 kHz
14.00-14.345 MHz	2-16 kHz
15.805-16.36 MHz	2-48 kHz
18.168-18.78 MHz	2-48 kHz
20.276-21.0 MHz	2-48 kHz
21.897 MHz	2-48 kHz
22.855 MHz	2-48 kHz
23-23.200 MHz	2-48 kHz
23.35-24.89 MHz	2-48 kHz

- Some frequencies will be used concurrently.

Frequency allocation study

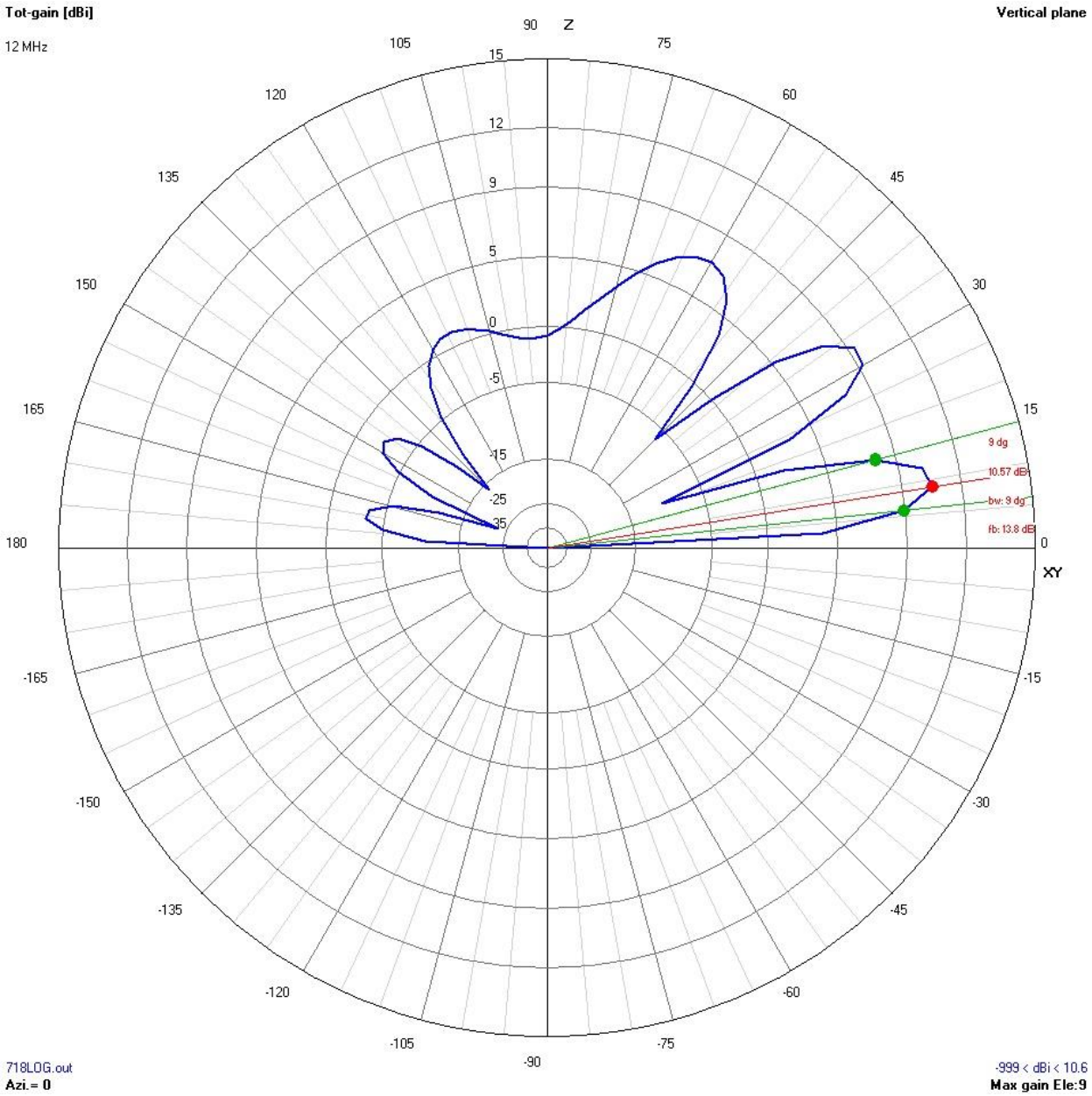
An allocation analysis was completed by reviewing all licensees which have authorizations that could correspond with the requested experimental frequencies. Given the proposed center frequencies and frequency ranges, CIS does not anticipate overlap with other stakeholders in the HF band, and will not use 7.45MHz, 12.1MHz, or 19.02MHz.

Effective radiated power

The transmitter site will be configured to operate at a mean power level of 5kW per channel. Together with a maximum 21dBi antenna gain in the main beam, this leads to a max 384kW effective radiated power ("ERP").

Antenna information

7.5-24MHz antenna systems (Azimuth 50 degrees and Azimuth 335 degrees)



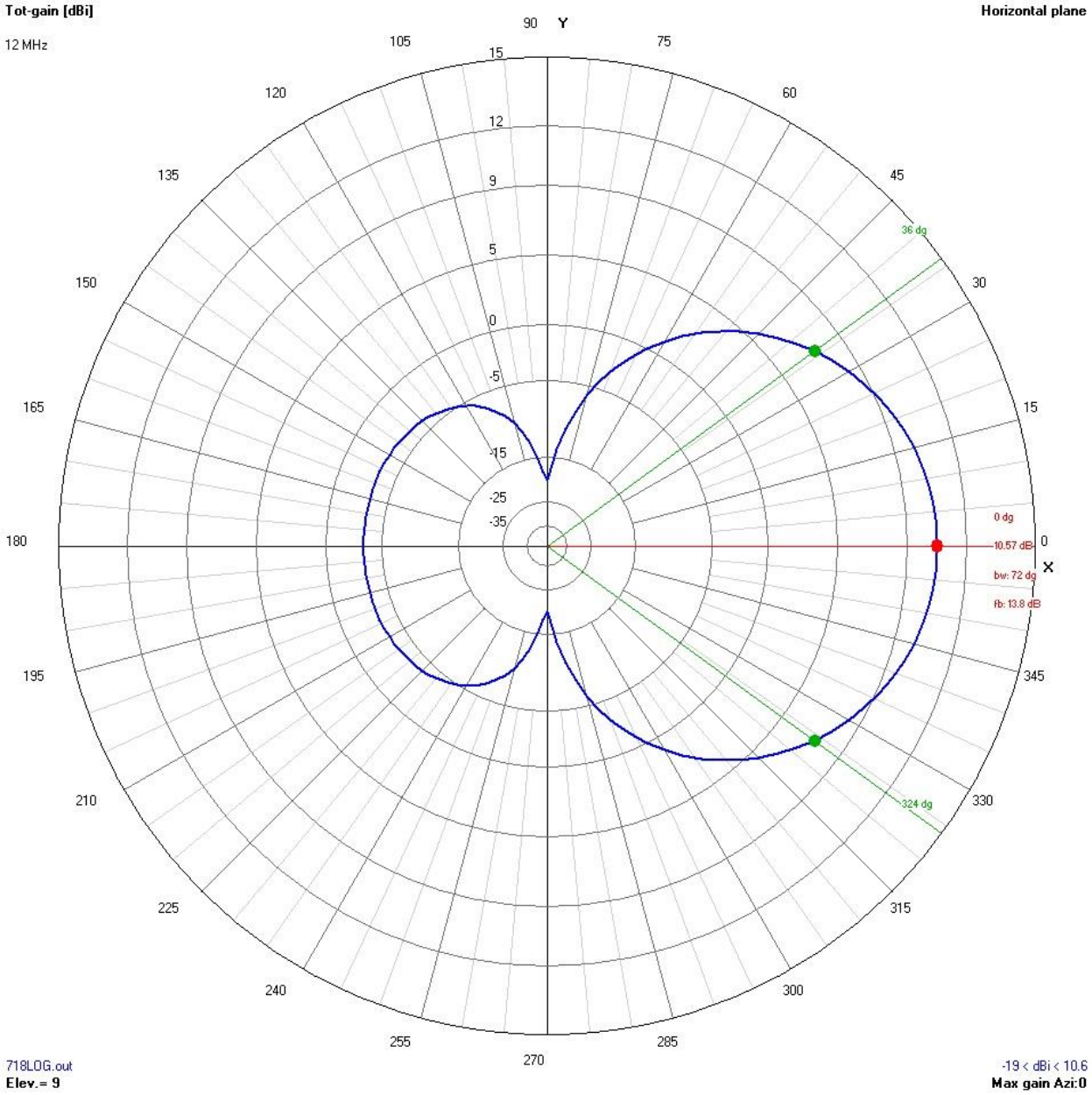
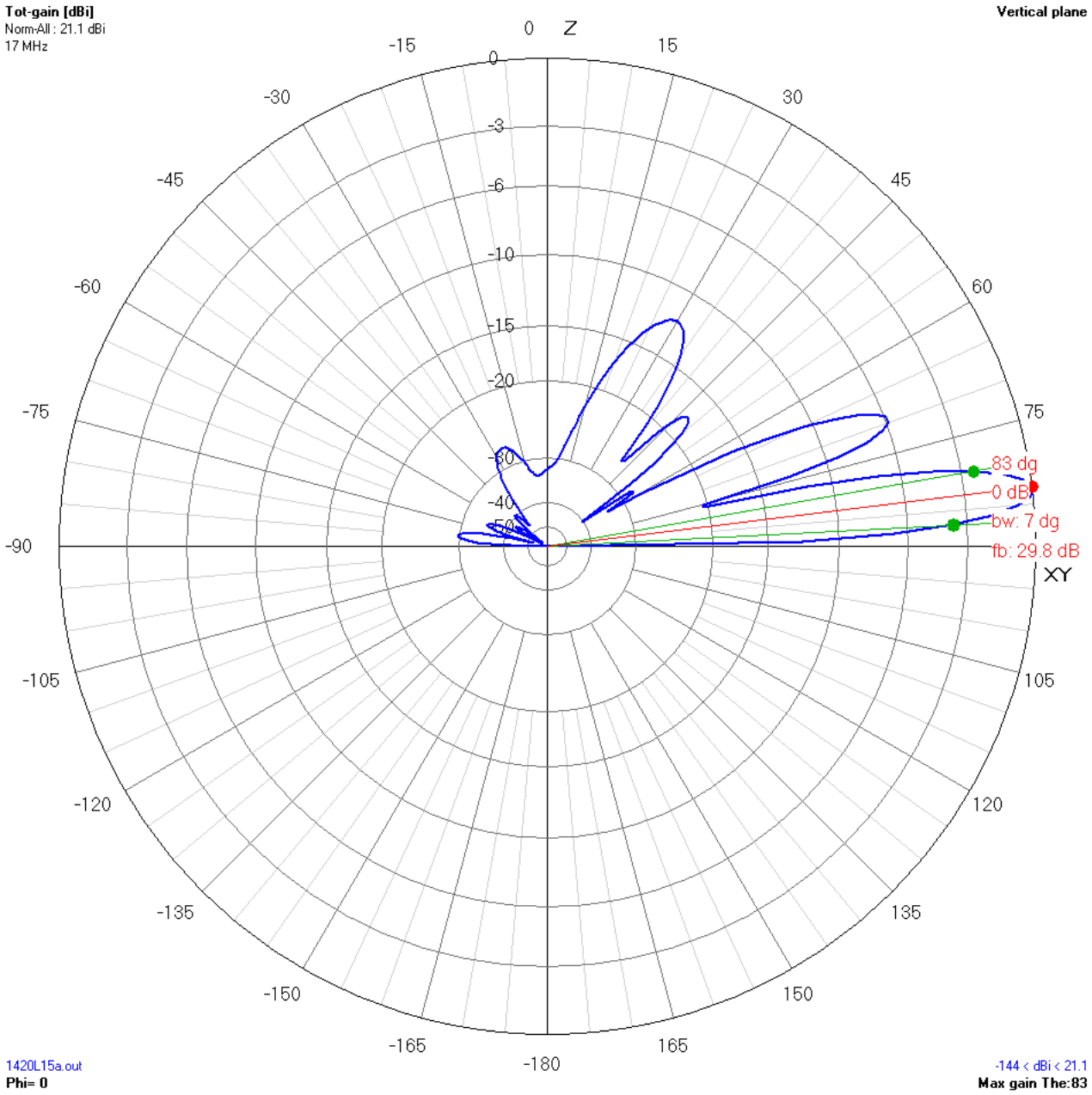

Tot-gain [dBi]
12 MHz
Horizontal plane
90 Y
105
75
120
60
135
45
150
30
165
15
180
0
X
195
345
210
330
225
315
240
300
255
285
270
15
12
9
5
0
-5
-15
-25
-35
36 dg
0 dg
10.57 dB
bw: 72 dg
fb: 13.8 dB
324 dg
718LOG.out
Elev.= 9
-19 < dBi < 10.6
Max gain Azi:0

FIGURE 1

14-23MHz Array (Azimuth 50 degrees)

Below in figure 3 are two radiation patterns *typical* of the array's performance in the center of the 14-21 MHz band in the vertical and horizontal orientation at azimuth.



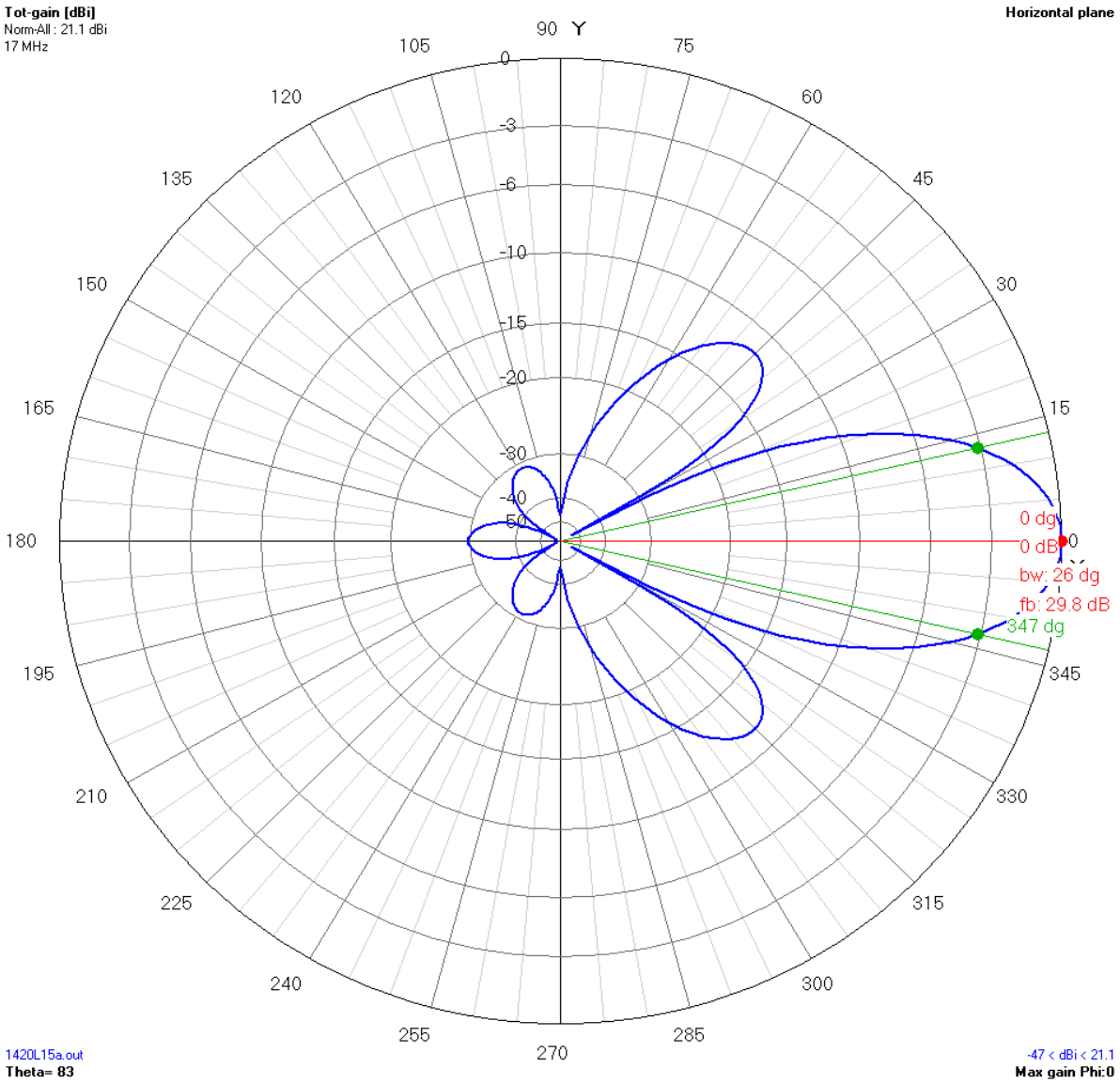
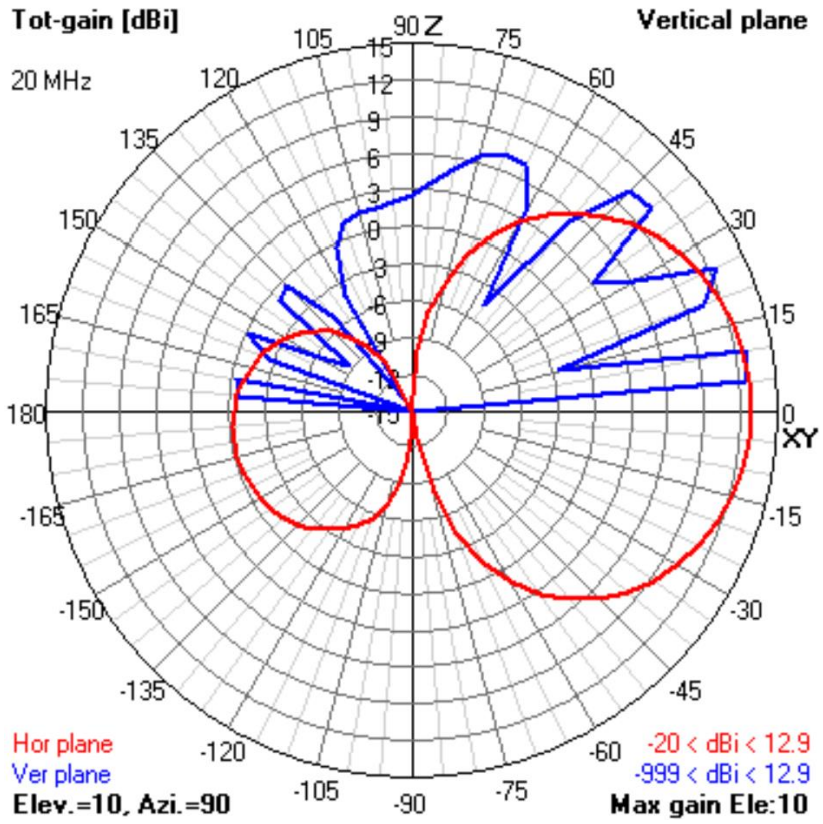

Tot-gain [dBi]
Norm-All : 21.1 dBi
17 MHz
Horizontal plane
90
75
60
45
30
15
0
345
330
315
300
285
270
255
240
225
210
195
180
165
150
135
120
105
0
-3
-6
-10
-15
-20
-30
-40
-50
0 dg
0 dB
bw: 26 dg
fb: 29.8 dB
347 dg
1420L15a.out
Theta= 83
-47 < dBi < 21.1
Max gain Phi:0

FIGURE 2

21-24MHz Array (Azimuth 50 degrees)



Equipment to be used
The table below shows the equipment CIS will utilize during its experiment.
TABLE 1

Item	Manufacturer	Model no. or description	No. of units	Experimental (Y/N)
Modulator	CIS	DSP	2	Y
Transmitter	CIS	Solid State, 5kW	2	Y
Power Splitter	Werlatone	D6774	1	N
Antenna	M2/CIS	14-20LP15	4	N
Antenna	M2/CIS	7-20LP10	2	N
Antenna	M2	17-30LP7-RM-125	1	N

5. Protection against interference

CIS will continue to deploy and further develop its dynamic spectrum management techniques. In addition to deploying these techniques, our interference mitigation plan centers around four pillars:

1. Protection of existing licensees in the band; CIS has taken steps to locate unassigned, non-amateur frequencies.
2. All of our spurious emissions and harmonics are below carrier, well within the limits set in the relevant sections of the Commission's rules. CIS has tested and can demonstrate to the FCC that it will stay within authorized bandwidth. For more information please see section 4 of the Confidential Materials document.
3. CIS has developed and will utilize high directivity antennas designed to minimize both beam-width and side lobes in the vertical and horizontal planes.
4. CIS uses a 'listen-before-speak' system and a continuous channel monitor to detect and mitigate its own interference on other stakeholders in the HF band.

CIS can demonstrate that it is compliant with Section 5.85 of the Commission's rules.

a. CIS is below the 10m V/m field strength restrictions for FCC monitoring stations across the entirety of the United States.

6. PUBLIC INTEREST STATEMENT

CIS respectfully submits that a grant of a new term for WN2XCR as requested is in the public interest, convenience, and necessity. Grant of the application will permit CIS to further develop innovative solutions that will reduce the high cost of inter-continental communications and remove further barriers to trade.

The ultimate purpose of this experimentation is to determine parameters, methods, and rules that would provide for the most efficient use of HF Band frequencies in the point-to-point transmission of data and thus advance the art. Furthermore, the results of these experiments may be useful and serve the public interest through the creation of a standardized licensed data transmission service.

7. HEALTH AND SAFETY MEASURES

The CIS transmitter station is operated only by persons duly authorized and trained by the Company.

CIS has taken steps to ensure environmental factors are compliant with Section 1.1306 of the FCC's rules, 47 C.F.R. § 1.1306, and, in particular, the human exposure requirements set forth in FCC OET Bulletin No. 65, by constructing fenced protections around the perimeter of the site.

8. STATION ID

To comply with 47 C.F.R. 5.115, CIS will include station identification in its experimentation and follow the applicable rules and standard practices for station identification and related requirements under this provision.

9. CONTACT INFORMATION

For questions about this application, or in the unlikely event interference concerns should arise during the period of authorization, please contact:

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