

220.6-222.8 /
221.6-221.8
all of these are

Item 4. Particulars of Operation

Frequency MHz	TX Output (Watts)	Power ERP (Watts)	Mean/ Peak	Emission	Modulating Signal	Necessary Bandwidth kHz
(A)	(B)	(C)	(D)	(E)	(F)	(G)
220.7775	100	400	Peak	4K00J2D, 4K00J3E	All frequencies:	4.0
220.7825	100	400	Peak	4K00J2D, 4K00J3E	1.2 to 28.8 k bps	4.0
220.7875	100	400	Peak	4K00J2D, 4K00J3E	MSK, Bell 202,	4.0
220.7925	100	400	Peak	4K00J2D, 4K00J3E	GMSK, BPSK, QPSK,	4.0
220.7975	100	400	Peak	4K00J2D, 4K00J3E	8PSK, 16 QAM or	4.0
221.7775	20	50	Peak	4K00J2D, 4K00J3E	equal.	4.0
221.7825	20	50	Peak	4K00J2D, 4K00J3E		4.0
221.7875	20	50	Peak	4K00J2D, 4K00J3E		4.0
221.7925	20	50	Peak	4K00J2D, 4K00J3E		4.0
221.7975	20	50	Peak	4K00J2D, 4K00J3E		4.0

4(G): The transmitted signal is single (upper) sideband suppressed carrier with pilot tone above band. Audio bandwidth is restricted by a DSP to 300 to 2900 Hz, and the pilot tone is at 3900 Hz (referenced to the suppressed carrier). The transmit audio bandwidth is then 200 to 3900 Hz or 3700 Hz which is within the maximum allowable bandwidth of 4.0 kHz for radio transmitters operating in the 220-222 MHz frequency band, as specified in 47 C.F.R. § 90.209. This is confirmed by the type acceptance tests performed on the SEA radios listed in Item 13, below. Experimental radio transmitters will be similarly tested to confirm that the bandwidth of radiated RF energy does not exceed an occupied bandwidth of 4.0 kHz.

Item 5(c). Area of Operation

The proposed system will consist of temporary fixed base and mobile stations operating in the Chicago, IL area, and specifically in the following counties:

Illinois: Cook, Dupage, Kane, Lake, McHenry, and Will counties;
Indiana: Lake and Porter counties; and
Wisconsin: Racine, Kenosha, Milwaukee, Ozaukee, Washington and Waukesha counties.

Item 13. Transmitting Equipment

Base Stations:

SEA, model ESP1000 / 1000T (FCC ID: BZ68RIESP1000T)
SEA, model ESP1100 / 1100T (FCC ID: BZ6ESP1100)

30x
30x
None T/A

Total No. of Base Units: 60

Mobile Stations:

SEA, model ESP520 / 520D / 520DX (FCC ID: BZ68RIESP504)
SEA, model 504 (FCC ID: BZ68RIESP504)
SEA, model SEA700 (FCC ID: BZ6ESP700)
SOPHIA, model EXPERIMENTAL

None T/A 100x
None T/A 200x

Total No. of Mobile Units: 500

(330x None T/A)
? How many? D

Item 10. Narrative Statement

SOPHIA Communications, Inc. ("Applicant") has developed expertise in the engineering of wireless services. By this application for experimental authority, Applicant seeks to establish the technical and commercial viability of new technology for the provision of mobile radio services in the 220 MHz band.

The purpose for this experimental license authorization is to exploit newly developed technologies in a wide-area, wireless-data network. The developing system will utilize components of TDMA and CDMA techniques in a narrowband, linear environment at 220 MHz. Data rates starting at 9600 bps will migrate during the period of this research to a target rate of 28.8 kbps using a recently developed data protocol that promises increased RF bandwidth efficiency and increased reliability (and therefore increased data throughput) over prevalent data protocols. The research will include a number of related investigations including the management of cellular-like sectoring of packet-data transmissions at VHF frequencies and the end-to-end management of wireless packet data messages.

The research objective is to reduce the delivery costs and improve the reliability of wide-area wireless data transmissions through the combined use of overlapping coverage from multiple channels at multiple sites, an improved data protocol, and linear modulation with digital signal processing; while capitalizing on the advantages of 220 MHz RF propagation over frequencies of 900 MHz or higher. The results of this development will provide valuable assistance to those developing wireless data transmission systems for SMR and public safety networks.

Substantial research concerning propagation, frequency re-use, co-channel interference and cellular sectoring has been conducted at frequencies above 900 MHz, while counterpart research at VHF frequencies has been virtually non-existent due to the limited spectrum available below 900 MHz. The results of these studies will help to limit the risks involved in the deployment of this and similar wireless data systems. Further, the knowledge to be gained by this development will be directly supportive of the FCC's effort to quickly and effectively re-farm the VHF (and UHF) spectrum.

Applicant will conduct its experiments in full coordination with authorized users in the area to ensure that no harmful interference occurs. To this end, Applicant has entered into an agreement with the nationwide 220 MHz licensee authorized to operate on the channels proposed in this application. Applicant otherwise understands that its experimental use of the spectrum is secondary to existing tenants' use and will immediately discontinue experimental activity whenever such activity causes harmful interference to primary users.

Item 15. Antenna Height

The overall height above ground to the antennas will vary. Accordingly, Applicant will determine if notification to the FAA is required prior to constructing and operating the proposed system. If notification is required, Applicant will obtain any necessary clearance or ensure that clearance has already been obtained.