

**DESCRIPTION OF PROGRAM OF RESEARCH
AND EXPERIMENTATION**

InterDigital, Inc. (“InterDigital”) respectively requests the issuance of an experimental license using the equipment and operating parameters set forth in this application. Grant of this license will enable InterDigital to conduct research and experimentation using vacant spectrum in the television broadcast bands (the “white spaces”) for indoor testing of fixed and portable white space devices.

InterDigital’s goal is to develop technology and enable products for efficient use of bandwidth by combining the advantages of multiple radio access technologies and frequency bands. White space is a potential source of significant new spectrum that when combined with legacy systems such a cellular and Wi-Fi may provide new options for supporting more users and providing improved quality of service (“QoS”) for existing users. InterDigital plans to test technology that provides cost effective options for wireless distribution of various data types including, for example, broadband content (video) and machine-to-machine packets. In some cases the QoS requirements may emphasize high data rates; in others, data rate may be secondary to data reliability.

As noted in the Application, InterDigital seeks experimental authorization to operate indoors at our facility in King of Prussia, PA, with a radius of operation of 150 meters. Other system parameters are provided in the table below.

Parameter	Fixed Device	Portable device
Frequency band	54 – 72 MHz	512 – 608 MHz
	76 – 88 MHz	614 – 698 MHz
	174 – 216 MHz	
	470 – 608 MHz	
	614 – 698 MHz	
ERP	≤ 1 Watt	≤ 100 Milliwatts
Range	≤ 150 meters	
Frequency tolerance	< 1ppm	
Manufacturer	InterDigital	
Number of units	Total of 12 including fixed and portable	
Location	Indoors at 781 3 rd Ave King of Prussia Pennsylvania 19406-1409 Lat: 40. 100542; Long: -75. 400797	

Emission Designator for each of the modulation types and Bandwidths requested

Modulation	1 channel 6 MHz BW	2 channels 12 MHz BW	3 channels 18 MHz BW	Maximum bandwidth
MPSK	6M00G7W	12M0G7W	18M0G7W	22M0G7W
QAM	6M00D7W	12M0D7W	18M0D7W	22M0D7W
OFDM	6M00W7W	12M0W7W	18M0W7W	22M0W7W

The experimental system will comprise at least one fixed device connected to the Internet (and/or InterDigital's corporate intranet) that communicates using white space spectrum with at least one fixed or portable device located elsewhere in InterDigital's facility. The fixed device will have a spectrum scanning capability and a protocol, either manual or automatic, to coordinate the channel selection of the fixed and portable devices. The fixed and portable devices will include power control, either manual or automatic, to keep the radius of transmission within the specified range. As part of the experimentation, InterDigital expects to synthesize signals representative of TV, wireless microphones, and other signals that may occupy white spaces. One goal of the experimentation is to reliably identify signals, and avoid or rapidly vacate white space channels on which they operate.

Another goal of the experimentation is to develop and validate cognitive radio technology, including bandwidth, modulation, and frequency programmable communications. As part of bandwidth programmability, there will be modes that fit into a single 6 MHz channel. Where multiple white space channels are available, the system may occupy contiguous channels up to 22 MHz or aggregate signals across noncontiguous 6 MHz channels. The modulating signal will use one or more conventional digital amplitude, phase, or frequency modulation techniques in a single or multi-carrier (*i.e.*, OFDM) structure.

A further goal of the experimentation is to develop and validate technology for equipment that may operate in white space compliant with FCC regulations, including the need to query a white space database. During the experimentation, InterDigital will investigate television contours to assure that the equipment only operates on available channels and does not interfere with licensed operation or otherwise impact an incumbent television licensee entitled to interference protection.

InterDigital believes this work will further the development of radio art and promote the deployment of new services by helping to establish the advantages of using white space on a non-interfering basis as a source of new spectrum.