



A Textron Company

November 9, 2020

**Federal Communications Commission 445 12th Street SW
Washington, DC 20554**

Title: Bell Textron License Request – STA – 2.3 GHz – Graford, TX

Dear FCC,

This request for Special Temporary Authority (STA) is submitted pursuant to 47 CFR 5.61 to request frequency authorization.

Bell plans to conduct testing of a small model aircraft known as the Micro-UAV with a weight of less than one pound. Testing is planned at Wrangler Field (Bell Textron) just south of Graford, Texas in Palo Pinto County. The STA is for frequency licensing of the bi-directional datalink controlling the Micro-UAV. The datalink hardware is from Microhard as model pMDDL2350 which is a single frequency communication device operating within the band of 2.304 GHz to 2.390 GHz. Bell would like to perform testing within the two different bandwidths indicated by the emission designators below. In the interest of resolving any potential frequency conflict, Bell is requesting licensing for the indicated band; however, only one frequency (channel) will be used at any given time.

Location:

Wrangler Field – Bell Textron
Graford, TX 76449
Palo Pinto County
Maximum Flight Altitude 600 ft AGL
Test Area Center Point: 32° 53' 34.9" N 98° 14' 06.1" W
MIRAD: 4.2 Km (3 miles)
Reference figures 1 and 2 below.

Dates of operation:

12/07/2020 to 05/15/2021

Frequency:

2.304 GHz to 2.390 GHz

Emission Designators:

- 4M23D1D
- 8M38D1D

Power:

1 Watt (Max) [30 dBm]

Effective Radiated Power (ERP):

1 Watt (Max)

Antenna:

Linear polarized whip antenna (unity gain).

Operations:

Flight operations will be performed during daylight hours in clear and calm weather conditions. Most flights will be limited to the Wrangler Field identified as the Primary Test Area in **Figure 2** below.

Figure 1 shows a graphical depiction of the test coverage area centered at Wrangler Field. **Figure 2** shows areas of trees and structures surrounding test area that would help to attenuate or contain the radio frequency emissions.

Exhibit A contains technical information regarding the Micro-Hard data link module.

Figure 1: Test Site Location Wrangler Field – Bell Textron

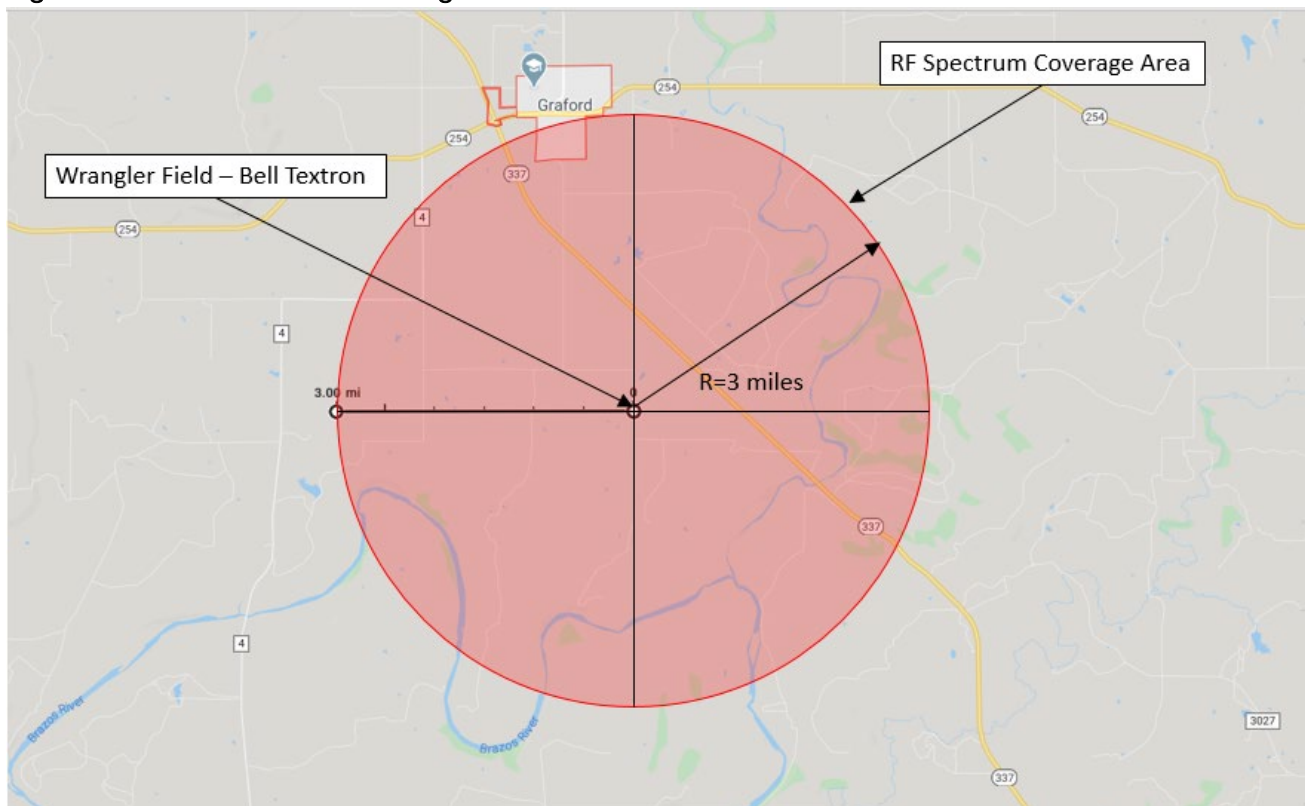
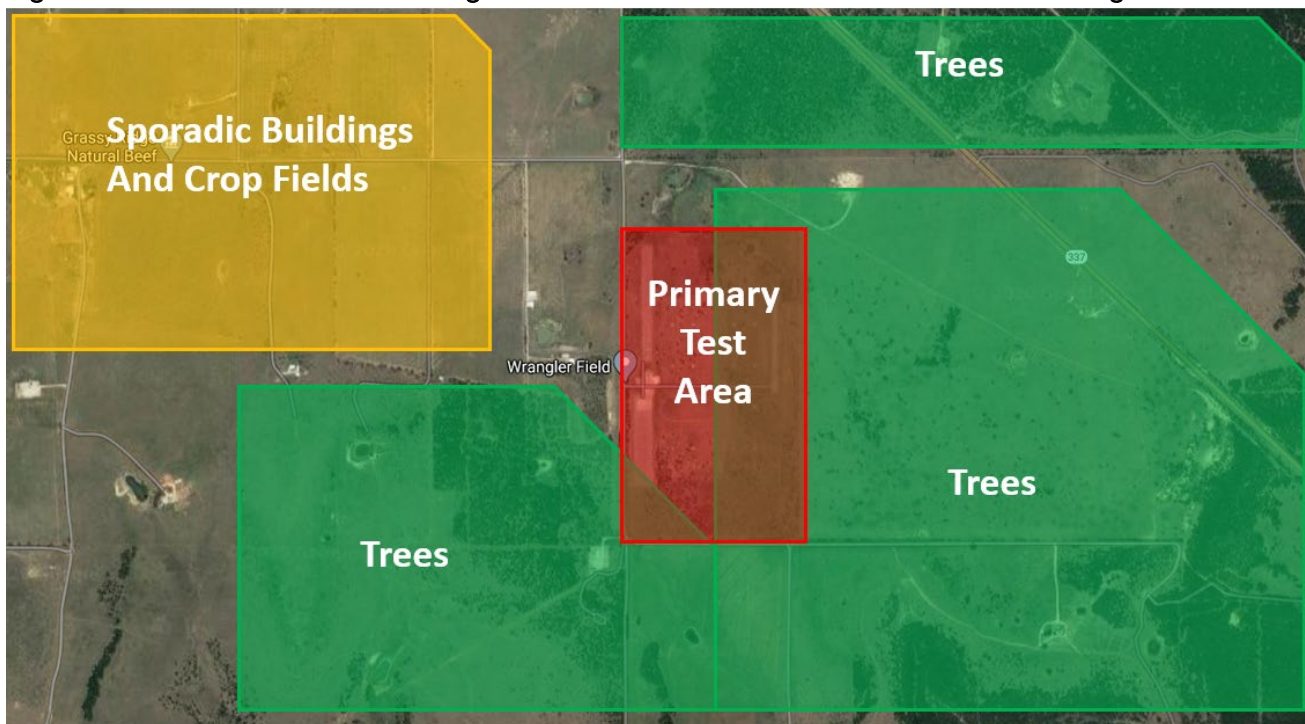


Figure 2: Test Site Location Showing Areas of Trees and Structures in the Surrounding Area



Stop Buzzer Contact:
Mark Stoufflet
Bell Textron
(817) 280-7984

Kind Regards,



Mark Stoufflet
Bell Frequency Coordinator

EXHIBIT A:

Hardware Specifications

Miniature OEM Wireless Digital Data Link

The all new Pico MIMO Digital Data Link is a miniature OEM, high power, 2x2 MIMO 2.3GHz wireless OEM solution that provides the bandwidth and range needed for complex data intensive applications. The Pico MIMO DDL features 2x2 MIMO Digital Data Link, using Maximal Ratio Combining (MRC), Maximal Likelihood (ML) decoding and Low-Density Parity Check (LDPC) to achieve robust RF performance. The pMDDL features secure & simultaneous Ethernet and Serial Data communications.

Only 7 grams!

2X2 MIMO

Up to 25Mbps

Small Footprint

Ethernet + Serial

PTP | Multipoint | Relay



1.3" X 1.05" X 0.30"

pMDDL2350 Features

- Robust 2X2 MIMO 2.3 GHz Operation
- Maximal Ratio Combining (MRC), Maximal Likelihood (ML) decoding
- Low-Density Parity Check (LDPC)
- Up to 25 Mbps Iperf Throughput @ 8MHz channel (-78dBm)
Up to 2 Mbps IPerf Throughput @ 4 MHz channel (-102dBm)
- Extremely small foot print and very lightweight
- Serial Communication Port
- Dual 10/100 Ethernet Ports (LAN/WAN)
- Supports Point-to-Point and Point-to-Multipoint Networks
- Master, Remote, Relay Operating Modes.
- Adjustable total transmit power (up to 1W)
- Interface through local console, telnet, and web browser
- Local and remote wireless firmware upgrading through FTP

Interface Options



pMDDL Motherboard

◆ Video ◆ 2X2 MIMO ◆ Ethernet ◆ Serial ◆ Security

Specifications

Frequency	2.304 - 2.39 GHz	Optimal Performance Specifications			
Error Detection	32 bits of CRC, ARQ	Modulation	IPerf Throughput (Mbps)	Optimal MRC Sensitivity (dBm)	Total Tx Power (dBm) +/- 1dB
Encryption (Requires Export Permit)	128-bit AES (Optional 256-bit)	8 MHz (2X2 MIMO ON)			
Ports Serial Data/Console Ethernet USB	RS232 TTL level (300bps to 921kbps) Dual 10/100BaseT IEEE802.3 (LAN/WAN) 2.0 (Future Development)	BPSK_1/2	3	-99.5	30dBm
		QPSK_1/2	5.9	-98	30dBm
		QPSK_3/4	8.8	-96	30dBm
Firewall	Port Forwarding, Access Control, IP/MAC List.	16QAM_1/2	11.6	-92	30dBm
Operating Modes	Point-to-Point, Point-to-Multipoint, Relay	16QAM_3/4	17.1	-90	30dBm
Diagnostics	Remote Diagnostics, Ping, Traceroute, ARP table, DHCP active leases, IPerf, RSSI	64QAM_2/3	22.8	-85	30dBm
Management	Local Serial Port Console, Telnet, WebUI, SNMP, FTP Upgrade, TFTP, CLI (Command Line Interface)	64QAM_3/4	25.5	-83.5	30dBm
		64QAM_5/6	27.8	-81	30dBm
		4 MHz (2X2 MIMO ON)			
Rejection	Excellent strong signal interference & rejection characteristics	BPSK_1/2	1.51	-102.5	30dBm
Input Voltage OEM Motherboard	Digital Voltage = 3.3V / RF Voltage = 5V 7 - 30 VDC	QPSK_1/2	2.98	-101	30dBm
		QPSK_3/4	4.4	-99	30dBm
		16QAM_1/2	5.8	-95.5	30dBm
Connectors: OEM Motherboard	Antenna: UFL x2 (ANT1, ANT2) Data: 80 Pin SMT Antenna: UFL x2 (ANT1, ANT2) Data: RJ-45 x2 (Ethernet) Female DB9 (Serial) USB Type A Micro-AB USB (Console) 4 PIN Interlock (Vin)	16QAM_3/4	8.6	-93	30dBm
		64QAM_2/3	11.4	-88	30dBm
		64QAM_3/4	12.8	-86	30dBm
		64QAM_5/6	14	-83.5	30dBm
		Modulation	IPerf Throughput (Mbps)	Optimal MRC Sensitivity (dBm)	Total Tx Power (dBm) +/- 1dB
		8 MHz (MIMO OFF)			
Environmental Temperature Humidity	-40°F to 185°F (-40°C to +85°C) 5-95%, non-condensing	BPSK_1/2	3	-96.5	30dBm
		QPSK_1/2	5.8	-95	30dBm
		QPSK_3/4	8.6	-93	30dBm
Weight OEM Motherboard	Approx. 7 grams Approx. 50 grams	16QAM_1/2	11.5	-89	30dBm
		16QAM_3/4	16.9	-87	30dBm
		64QAM_2/3	22.2	-82	28dBm
Dimensions OEM Motherboard	Approx. 1.05" x 1.3" x .15" (27mm x 33mm x 4mm) Approx. 2.0" x 3.0" x 0.70" (50mm x 76mm x 18mm)	64QAM_3/4	24.7	-80.5	28dBm
		64QAM_5/6	27.4	-78	27dBm
		4 MHz (MIMO OFF)			
Order Options pMDDL2350	2X2 MIMO 2.3GHz OEM DDL Module	BPSK_1/2	1.5	-99.5	30dBm
		QPSK_1/2	2.9	-98	30dBm
		QPSK_3/4	4.3	-96	30dBm
		16QAM_1/2	5.7	-92.5	30dBm
		16QAM_3/4	8.4	-90	30dBm
		64QAM_2/3	11.3	-85	28dBm
		64QAM_3/4	12.5	-83	28dBm
		64QAM_5/6	14	-80.5	27dBm

Order Options

Contact Information

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