



June 15, 2000

Mr, Ed Jennings,
EnGenius Technologies, Inc.
1580 Scenic Avenue
Costa Mesa, CA 92626

Subject: Cordless Range Testing of the EnGenius Model SN.920 Cordless Telephone
Reference: Wyle Laboratories Job No. 44432

Dear Mr. Jennings;

Wyle Laboratories received two samples (and one additional Handset, hand delivered to Wyle) of the EnGenius Model SN-920 900 MHz Digital Spread Spectrum (DSS) Cordless Telephone for performing Open Air Cordless Range and Building Penetration Testing as described in Wyle Quotation Number HSV/545004612. The specimen descriptions and the results of testing are summarized in the following section.

SPECIMEN DESCRIPTION

The specimens provided for Open Air Cordless Range and Building Penetration Testing were as follows.

Table 1: Test Specimen Description Table

Device Type	Manufacturer	Model Number	Serial Number ⁽¹⁾
900 MHz Digital Spread Spectrum	EnGenius	SN-920	44432-1
900 MHz Digital Spread Spectrum	EnGenius	SN-920	44432-2
900 MHz Digital Spread Spectrum	EnGenius	SN-920	44432-3

Note: 1) The units were not labeled with production serial numbers; therefore, serial numbers were applied by Wyle for tracking purposes during testing.

Test results are being provided for one unit/system and one additional Handset, The additional units (Base and Handset units) were provided as backup and to facilitate testing since the model provided the capability to communicate Handset-to-Handset

OPEN AIR CORDLESS RANGE PERFORMANCE DATA

Since the cordless range of the EnGenius Model SN-920 exceeded the limits of the test site used for direct line-of-sight ground level testing (Open Field Testing), the samples were subjected to maximum open air cordless range testing above ground level with direct line of-site maintained (ie, above the tree line and other large physical obstructions). Testing was performed utilizing various test site/ranges on Redstone Arsenal Military Installation and expanded to the Wyle facility, both located in Huntsville, Alabama. However, with the test area extending across a large area, it was not possible to restrict or eliminate radio frequency interference generated by the military or cellular traffic.

Test locations were tracked using the Global Positioning System (GPS) with coordinates. provided in the Universal Transverse Mercator (UTM) coordinate system. The starting point (the location of the Base unit, additional stationary Handset, Central Office Simulator and baseline corded telephone) was the top of the Redstone Forward Area Alerting Defense (FAAD) test site with coordinates for the, starting point of: N - 3826380.20m, EW – 532775.43m The results obtained are provided in the following table.

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OPEN AIR CORDLESS RANGE PERFORMANCE DATA (Continued)

Table 2. Line-of-Site Maximum Range Performance Summary Table

Location (End Point)	Coordinates (End Point)	Parameter Tested	Performance Results	Distance
Test Area 3 Control Tower	N-1833796.18 m, EW-527471.47 m	Base-to- Handset	Establish calls with minimal breakup/ muting in communications, good receive and transmit sound Quality	= 5.7 miles
Test Area 3 Control Tower	N-3833796.18 m, EW-527471.47 m	Handset- to-Handset	Establish calls with minimal breakup/ muting in communications, usable receive and transmit sound quality.	~ 5.7 miles
Test Area 3 1.5 Km Point	UTM coordinates were not available,	Base-to- Handset	Establish calls with marginal breakup/muting in communications marginal receive and transmit sound quality	~ 6.6 miles (Tower +1.5 Km)
Tent Area 3 1.5 km Point	UTM coordinates were not available	Handset- to- Handset	Establish calls with high levels of Breakup/muting in communications, poor receive and transmit sound Quality	~ 6.6 miles (Tower + 1.5 Km)
Wyle Laboratories (Top of office Building)	N-3839041.98 m, EW-526128.94 m	Base-to- Handset	calls with marginal breakup/ muting in communications, marginal receive and transmit sound quality,	~8.9 miles
Wyle (Top of office building)	N-3839041.98 m, EW-526128.94 m	Handset- to-Handset	Establish calls with high levels of Breakup/muting in communications, poor receive and transmit sound quality	~8.9 miles

The samples were subjectively evaluated based on the following criteria:

RATING

Good-----
 Usable ----
 Minimal
 Marginal
 Poor

CRITERIA

Clear sound quality with little distortion and normal voice reproduction
 Some distortion and satisfactory voice reproduction
 Noticeable but not overly distracting, tolerable.
 Significant distortion and fair voice reproduction.
 Maximum distortion and undesirable voice reproduction (usage was difficult).

Test site coordinate data was provided by Redstone Arsenal Test Area 3 Range personnel and Wyle coordinates are on file at Wyle Laboratories, During Range Testing, efforts were made to maximize range performance. (ie, orientation of the body and handset were adjusted to obtain maximum data/performance).

IN-BUILDING PENETRATION TESTING

The EnGenius Model SN-920 was tested for the ability to communicate (Base_to_Handset and Handset-to-Handset) between floors of an office building. Testing was performed in the 32-story AmSouthHarbert Plaza, in downtown Birmingham Alabama The units were tested at various locations within the building with the Base unit and stationary Handset located above the mobile Handset unit and below the mobile Handset unit. The results obtained are provided in the following table (refer to the previous section for quality ratings).

Table 3; In-Building Penetration Testing Summary Table

Base & Stationary Handset Location	Mobile Handset Location	Parameter Tested	Performance / Results	
28 th Floor (1)	18 th Floor (2)	Base-to-Handset	Establish calls with good sound quality while stationary and minimal breakup/ Muting while moving	10 Floors
28 th Floor (1)	18' Floor (2)	Handset-to-Handset	Establish calls with good sound quality while stationary and minimal breakup/ muting while moving	10 Floors
28 th Floor (1)	16* Floor (2)	Base-to-Handset	Establish calls with average sound quality and marginal breakup/muting while Stationary and moving	12 Floors
28 th Floor (1)	16' Floor (2)	HandSet-to-Handset	Establish calls with marginal to poor sound quality and marginal breakup/ muting while stationary and moving	12 Floors.
28 th Floor (1)	14" Floor (2)	Base-to-Handset	Establish calls with marginal to poor sound quality and marginal breakup/ muting while stationary and moving	14 Floors
28 th Floor (1)	141h Floor (2)	Handset-to-Handset	Establish calls with poor sound quality and high levels of breakup/muting while stationary and moving	14 Floors
14th Floor (3)	3 14 Floor (4)	Base-to-Handset	Establish calls with good sound quality while stationary and minimal breakup/ muting while moving	17 Floors
14 th Floor (3)	3 1 " Floor (4)	Handset-to-Handset	Establish calls with good to usable sound quality and marginal breakup/ muting while stationary and moving	17 Floors
14 th Floor (3)	Lobby (2)	Base-to-Handset	Establish calls with good to usable sound quality aud minimal breakup/ muting while stationary and moving	13 Floors
14 th Floor (3)	Level I Parking (below Lobby)	Base-to-Handset	Establish calls with poor sound quality and high levels of breakup/muting while stationary and moving	14 Floors
14 th Floor (3)	Level I Parking (below Lobby)	Handset-to-Handset	Establish calls with poor sound quality and very high levels of breakup/muting while stationary	14 Floors

In-Building Penetration Testing Setup Notes:

- 1) The Base and stationary Handset were located in a large vacant office area on the east side of the 28th floor in a centralized location (i.e. away from the elevators, stairwell, windows, etc.)
- 2) The mobile Handset was located in various centralized locations (e.g. in hallways, offices., etc.) within the building and testing was performed, with the Handset stationary and moving.

IN-BUILDING PENETRATION TESTING (continued)

- 3) The Base and stationary Handset were placed in a small office near a window on the south side of the 14th floor.
- 4) The mobile Handset was located near a window on the South side of the 31st floor

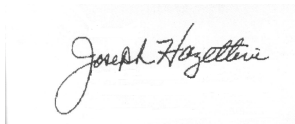
QUALITY ASSURANCE

The Wyle Laboratories, Huntsville Facility, Quality Management System is Registered in compliance with the ISO-9001 International Quality Standard. Registration has been completed by Quality Management Institute (QMI) a Division of Canadian Standards Association (CSA).

TEST SPECIMEN DISPOSITION The test specimens were returned to EnGenius Technologies, Inc., by the on-site representative (Mr, Jennings).

If you have any questions, comments, or concerns regarding this program, please feel free to call me at (256) 837-4411. extension 390.

Sincerely



Joseph T. Hazeltine P.E.
Director, Commercial Operations

PRELIMINARY MARKETING STATEMENT.

The EnGenius Model SN-920 was verified to have a cordless range of up to 8.8 miles (line-of site distance with no physical impairments) and a usable In-Building wall/floor penetration of up to 12 floors.