MPE CALCULATION REPORT
FROM
RFI GLOBAL SERVICES LTD

Evaluation of: Harris Stratex Networks
3.65GHz StarMax 3160 WiMax™ SS

To:
FCC OET Bulletin 65 Edition 97-01

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This Test Plan Is Issued Under The Authority Of Nick Hooper, Head of Inspection 	
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For: Harris Stratex Networks
Product: 3.65GHz StarMax 3160 WiMax™ SS

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1. Client Information

Company Name:	Harris Stratex Networks
Address:	4 Bell Drive Hamilton International Technology Park Blantyre G72 0FB, Scotland
Contact Name:	Ms R French

2. Equipment Under Evaluation

The following information has been supplied by the client:

2.1. Identification of Equipment Under Evaluation

Brand Name:	Harris Stratex Networks.
Model Name or Number:	StarMax 3160; FCC ID: VPX-3160-37A
Equipment Category:	WiMax™ Subscriber Station
Serial Number:	No specific equipment
Frequency of Operation:	3.65GHz
Transmitting Power:	See Section 2.2
Antenna Gain	See Section 2.2
Channel Bandwidth:	5 and 10MHz
Duplex Method	TDD
Max. TDD TX Duty Cycle	74%

2.2. Description of EUT

The equipment under evaluation is the Harris Stratex StarMax WiMax™ 3160 Subscriber Station. This evaluation covers operation at 3.65GHz.

The StarMax WiMax™ 3160 SS is intended to be used in fixed outdoor installations.

The equipment utilises integrated high gain antennas and Harris Stratex has confirmed that for each antenna to be used the transmitter power will be adjusted for conformance to FCC Rule Part 90.1321(c) EIRP requirement.

3. Applicable FCC Rule Parts:

Part 90.1335. Licensees and manufacturers are subject to the radio frequency radiation exposure requirements specified in sections 1.1307(b), 2.1091 and 2.1093.

Part 1.1310. Radiofrequency radiation exposure limits.

Part 90.1321(a).

(a) Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum.

(b) In addition to the provisions in paragraph (a) of this section, transmitters operating in the 3650-3700 MHz band that emit multiple directional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided the emissions comply with the following:

(1) Different information must be transmitted to each receiver.

(2) If the transmitter employs an antenna system that emits multiple directional beams but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device, i.e., the sum of the power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph (a) of this section, as applicable. The directional antenna gain shall be computed as follows:

(i) The directional gain, in dBi, shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain, in dBi, of the individual element or stave having the highest gain.

(ii) A lower value for the directional gain than that calculated in paragraph (b)(2)(i) of this section will be accepted if sufficient evidence is presented, e.g., due to shading of the array or coherence loss in the beam-forming.

(3) If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequency channels and if transmitted beams overlap, the power shall be reduced to ensure that the aggregate power from the overlapping beams does not exceed the limit specified in paragraph (b)(2) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall not exceed the limit specified in paragraph (b)(2) of this section by more than 8 dB.

(4) Transmitters that emit a single directional beam shall operate under the provisions of paragraph (b)(2) of this section.

(c) Mobile and portable stations are limited to 1 watt/25 MHz EIRP. In any event, the peak EIRP density shall not exceed 40 milliwatts in any one-megahertz slice of spectrum.

4. MPE Calculation for the StarMax 3160 SS

The StarMax 3160 SS Tx power will be adjusted to provide the FCC maximum permitted EIRP from any antenna used.

So to comply with FCC Part 90.1321 the maximum EIRP is required to be adjusted to 5W max for 5MHz BW or 10W max for 10MHz BW.

4.1.Calculation for 3.65GHz

From FCC Rule Part 1.1310 table 1 (b) - Limits for General Population/ Uncontrolled Exposure:

$$\mathbf{S = 1.0\ mW/cm^2}$$

The MPE calculation as given in FCC OET Bulletin 65, page 19 is used to calculate the safe operating distance for the user.

$$\mathbf{S = EIRP/4\ \pi\ R^2}$$

Where S = Power density

EIRP = Effective Isotropic Radiated Power

R = distance to the centre of radiation of the antenna

Values for StarMax 3160 SS at 5MHz bandwidth :

EIRP = 5W

For 74% TDD duty cycle:

P = 5 x 0.74 = 3.7W

$S = 1.0\ mW/cm^2$

$S = EIRP/4\ \pi\ R^2$

$1 = 3.7 \times 10^3 /(12.56 \times R^2)$

$R^2 = 3.7 \times 10^3 /12.56$

$R = 17.16cm$

R = 0.17m

Values for StarMax 3160 SS at 10MHz bandwidth :

EIRP = 10W

For 74% TDD duty cycle:

P = 10 x 0.74 = 7.4W

$S = 1.0\ mW/cm^2$

$$S = EIRP/4\ \pi\ R^2$$

$$1 = 7.4 \times 10^3 /(12.56 \times R^2)$$

$$R^2 = 7.4 \times 10^3 /12.56$$

$$R = 24.27cm$$

R = 0.24m

5. Conclusion

The required RF exposure limits for General Population/ Uncontrolled Exposure FCC Rule Part 1.1310 will not be exceeded for the StarMax 3160 SS with maximum transmitter power set for Part 90.1321 requirements at safe operating distances greater than 0.17 metres for operation at 5MHz bandwidth and 0.24 metres for operation at 10MHz bandwidth.