

MPE CALCULATION REPORT FROM RFI GLOBAL SERVICES LTD

Evaluation of: Harris Stratex Networks
StarMAX 8200-36 Base Station

To:
FCC OET Bulletin 65 Edition 97-01

Report Serial No:
RFI/REGA1/TP76424D01A

**This Test Plan Is Issued Under The Authority
Of Nick Hooper, Head of Inspection**

A handwritten signature in blue ink, appearing to read 'N Hooper', is written over a light blue rectangular background.

Written By: John Bellairs

A handwritten signature in blue ink, appearing to read 'J. Bellairs', is written over a light blue rectangular background.

Checked By:

A handwritten signature in blue ink, appearing to read 'N Hooper', is written over a light blue rectangular background.

Report Copy No: PDF01

Issue Date: 28 October 2009

This report may be reproduced in full. Partial reproduction may only be made with the written consent of RFI Global Services Ltd.

This report is produced on the basis of our understanding of the information supplied. If our understanding of the information supplied is incorrect, this may affect the response given. In the event that our understanding of the matter is incorrect, you should not place any reliance up on it until you have advised the correct nature of the problem and we have been able to reconsider the matter.

This report is issued in Portable Document Format (PDF) and may only be copied in full.

RFI Global Services Ltd

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire RG23 8BG

Telephone: +44 (0)1256 312000 Facsimile: +44 (0)1256 312001

Email: info@rfi-global.com Website: www.rfi-global.com

Registered in England and Wales. Company number: 2117901

For: Harris Stratex Networks
Product: StarMAX 8200-36 Base Station

This page has been left intentionally blank.

For: Harris Stratex Networks
Product: StarMAX 8200-36 Base Station

Table of Contents

1. Client Information..... 4

2. Equipment Under Evaluation..... 5

3. Applicable FCC Rule Parts: 6

4. MPE Calculation for the StarMAX 8200-36..... 7

5. Conclusion..... 8

For: Harris Stratex Networks
Product: StarMAX 8200-36 Base Station

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

For: Harris Stratex Networks
Product: StarMAX 8200-36 Base Station

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 8200-36
FCC ID	VPX-8200-36A
Equipment Category:	WiMax™ Base Station
Serial Number:	No specific equipment
Frequency of Operation:	3.65GHz
Transmitting Power:	See section 2.2
Antenna Gain	+16.5dBi maximum
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 StarMAX 8200-36 WiMax™ base station. This evaluation covers operation at 3.65GHz.

The StarMAX 8200-36 can utilise single or two transceiver operation.

Antenna gain details have been supplied by Harris Stratex. 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(a) EIRP requirement.

For: Harris Stratex Networks
Product: StarMAX 8200-36 Base Station

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.

For: Harris Stratex Networks
Product: StarMAX 8200-36 Base Station

4. MPE Calculation for the StarMAX 8200-36

TX max. power is specified as 40dBm (10W) with 5 or 10MHz channel bandwidth.

The StarMAX 8200-36 TX power for single Tx transmit or 2X2 MIMO will be adjusted to provide the FCC maximum permitted EIRP from any antenna system 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:

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

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

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

Where S = Power density

EIRP = Effective Isotropic Radiated Power

R = distance to the centre of radiation of the antenna

Values for StarMAX 8200-36 at 5MHz bandwidth :

EIRP = 5W per transmitter

For 2 transmitters @ 5W and 74% TDD duty cycle:

$$P = 5 \times 2 \times 0.74 = 7.4\text{W}$$

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

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

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

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

$$R = 24.2\text{cm}$$

$$R = 0.24\text{m}$$

For: Harris Stratex Networks
Product: StarMAX 8200-36 Base Station

Values for StarMAX 8200-36 at 10MHz bandwidth :

EIRP = 10W per transmitter

For 2 transmitters @ 10W and 74% TDD duty cycle:

$P = 10 \times 2 \times 0.74 = 14.8W$

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

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

$$1 = 14.8 \times 10^3 / (12.56 \times R^2)$$

$$R^2 = 14.8 \times 10^3 / 12.56$$

$$R = 34.32\text{cm}$$

$$\mathbf{R = 0.34m}$$

5. Conclusion

The required RF exposure limits for General Population/ Uncontrolled Exposure FCC Rule Part 1.1310 will not be exceeded for the StarMAX 8200-36 base station with maximum transmitter power set for Part 90.1321 requirements at safe operating distances greater than 0.24 metres for operation at 5MHz bandwidth and 0.34metres for operation at 10MHz bandwidth.