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Electromagnetic Compatibility
MPE Calculation

For the

Autonet Mobile
Model: HELIO
FCC ID: VOI-ANMHLORTR-01

Tested under

Title 47 of the Code of Federal Regulations (CFR),
Part 15 Subpart C

MET Report: EMCS33418-MPE

April 3, 2012

Prepared For:

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Anderson Soungpanya, Project Engineer
Electromagnetic Compatibility Lab

Jennifer Warnell
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the applicable limits. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Title 47 of the CFR, Part 15, Subpart C under normal use and maintenance.

Shawn McMillen,
Wireless Manager, Electromagnetic Compatibility Lab

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Peak Power Output and RF Exposure

Test Purpose: Co-location of two Radios, Autonet Mobile HELIO (FCC ID: VOI-ANMHLORTR-01) & NYOS LGA CDMA MO6092 (FCC ID: NCMOMO6092)

RF Exposure Requirements: **§1.1307(b)(1) and §1.1307(b)(2):** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

RF Radiation Exposure Limit: **§1.1310:** As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

MPE Calculation – Autonet Mobile HELIO: 2.4GHz

(FCC ID: VOI-ANMHLORTR-01)

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

MPE Limit Calculation: EUT's operating frequency band **2400 – 2483.5MHz**; highest conducted power = 15.69dBm (peak) at 2437MHz therefore, Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2

EUT maximum antenna gain = **1.88 dBi.**

where, S = Power Density (mW/cm^2)
P = Power Input to antenna (37.068mW)
G = Antenna Gain (1.542 numeric)

$S = (37.068*1.542/ 4*3.14*20.0^2) = (57.159 / 5024)$ = **0.011mW/cm^2** @ 20cm separation

MPE Calculation – NYOS LGA CDMA MO6092: 824.2 – 848.80MHz & 1850.20-1908.75MHz

(FCC ID: NCMOMO6092)

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

MPE Limit Calculation: EUT's operating frequencies @ **824.2 – 848.8MHz**; highest conducted power = 24.67dBm (peak) therefore, Limit for Uncontrolled exposure: 0.56 mW/cm^2 or 5.6 W/m^2

EUT maximum antenna gain = **1.4 dBi.**

where, S = Power Density (mW/cm^2)
P = Power Input to antenna (1949.85mW)
G = Antenna Gain (1.38 numeric)

$S = (1949.85*1.38/ 4*3.14*20.0^2) = (2691.34 / 5024) =$ **0.54mW/cm^2** @ 20cm separation

MPE Limit Calculation: EUT's operating frequencies @ **1850.20 – 1908.75MHz**; highest conducted power = 24.04dBm (peak) therefore, Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2

EUT maximum antenna gain = **1.1 dBi.**

where, S = Power Density (mW/cm^2)
P = Power Input to antenna (912.01mW)
G = Antenna Gain (1.29 numeric)

$S = (912.01*1.29/ 4*3.14*20.0^2) = (1174.90 / 5024) =$ **0.23cm^2** @ 20cm separation

MPE Calculation –Autonet Mobile HELIO (FCC ID: VOI-ANMHLORTR-01) & NYOS LGA CDMA MO6092 (FCC ID: NCMOMO6092)

MPE Summary:

Frequency Range	MPE Result (mW/cm^2)	Limit (mW/cm^2)
2.4GHz	0.011	1
824.2 – 848.8MHz	0.54	0.56
1850.2 – 1908.75MHz	0.23	1

Test Requirements: [MPE(f1)/Limit(f1) + MPE(f2)/Limit(f2)] < 1

Test Results:

MPE(f1) Frequency (MHZ)	MPE(f2) Frequency (MHZ)	Calculation [MPE(f1)/Limit(f1) + MPE(f2)/Limit(f2)]	MPE Result (mW/cm^2)
2412 - 2462	824.2 – 848.8	0.011/ 1 + 0.54/ 0.56 = (0.011+ 0.964)	**0.975**
2412 - 2462	1850.2 – 1908.75	0.011 / 1 + 0.23 / 1 = (0.011+0.23)	**0.241**