Prediction of MPE and ERP/ EIRP

As to the TT-3711A BGAN satellite terminal made by Thrane & Thrane A/S, we declare that it complies with the Basic restrictions/Reference levels for electric, magnetic and electromagnetic fields as specified in the following standards for a minimum safety distance of **0.6 m**:

Nr.	Standard	Country/Region
1	47CFR FCC Part 1 (10-1-13 Edition)	USA
2	RSS-102 (Issue 4, March 2010)	Canada
3	EN 62311 / ICNIRP Guideline	EU
4	Radiocommunications (Electromagnetic Radiation-Human Exposure) Standard 2003	AUS/NZ

The compliance is demonstrated based on the following calculation model assessment:

1. The power density according to far-field model is:

$$S = \frac{PG}{4\pi R^2}$$

where:

S = power density (in appropriate units, e.g. mW/cm2)
P = power input to the antenna (in appropriate units, e.g., mW)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

2. For single or multiple RF sources, the calculated power density should comply with the following:

$$\sum_{1}^{n} \frac{S_{eqn}}{S_{\lim n}} = \frac{S_{eq1}}{S_{\lim 1}} + \frac{S_{eq2}}{S_{\lim 2}} + \ldots + \frac{S_{eqn}}{S_{\lim n}} \leq 1$$

where:

S_{eqn} = the power density when *f* is *i*.
$S_{lim\ n}$ = the reference level requirement for power density when *f* is *i*

3. The calculation of the power density or safe distance is:

Note 1	The RF exposure is based on the far-field and the radiation exposure is over-estimated.
Note 2	The maximum output power level is taken into account as a worst case for the purpose of the calculation of power density or safe distance.
Note 3	The minimum antenna feed cable loss (assumed no cable loss) is taken into account as a worst case for the purpose of the calculation of power density or safe distance
Note 4	The maximum antenna radiation exposure orientation and maximum antenna gain is taken into account as a worst case for the purpose of the calculation of power density and safe distance.

Calculation for Inmarsat (frequency band 1626.5 – 1660.5 MHz):

$$S \leq \frac{P \cdot G\,(EIRP) \cdot t \cdot Dc}{4 \cdot \pi \cdot R^2} = \mathbf{9.21\ W/m^2}$$

$$\frac{S}{S_{lim}} \leq \mathbf{0.921\ \ (less\ than\ 1,\ compliant)}$$

Where:

EIRP ($P \cdot G$)	=	33.11 W = 15.2 dBW (45.2 dBm) according to test report 1-8390/14-01-05
t	=	Tune up tolerance (±1.0 dB)
Dc	=	---
R	≥	**0.60 m**
S_{lim}	=	10 W/m²

Calculation for WLAN (frequency band 2402 – 2483 MHz) :

$$S \leq \frac{P \cdot G\,(EIRP) \cdot t \cdot Dc}{4 \cdot \pi \cdot R^2} = \mathbf{0.0080\ W/m^2}$$

$$\frac{S}{S_{lim}} \leq \mathbf{0.00080\ \ (less\ than\ 1,\ compliant)}$$

Where:

EIRP ($P \cdot G$)	=	0.029 W (14.6 dBm) according to test report 1-8390/14-01-09
t	=	Tune up tolerance (±1.0 dB)
Dc	=	1:1
R	≥	**0.60 m**
S_{lim}	=	10 W/m²

Declaration prepared by:

Thomas Vogler

DN: cn=Thomas Vogler, o=CETECOM ICT Services GmbH, ou=VOG-100727, email=thomas.vogler@cetecom.com, c=DE
Datum: 2015.04.23 16:37:45 +02'00'

Thomas Vogler
Professional
Radio Communications & EMC