



# ESV - EARTH STATIONS ON VESSELS

RF PERFORMANCE CHARACTERISATION  
AND VALIDATION BY EUTELSAT

8 June 2017



eutelsat

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This handbook lists all the ESVs (Earth Stations on Vessels) type-approved or characterized by Eutelsat.

## **Eutelsat type-approval and standard M approval.**

Eutelsat type-approval is granted to antennas that have demonstrated full compliance with the Eutelsat Earth Station Standard M (EESS 502 refers). The type-approval process includes successful witnessed RF tests on at least three units chosen at random during the production phase, a survey of the manufacturing, integration and QA/QC processes, and close follow up of antenna operations for Eutelsat satellites.

For maritime antennas, tracking performance and resistance to shock and vibration tests are essential for completion of the type-approval process.

Antennas that fully meet Eutelsat standards, but for which fewer than three units have undergone RF performance testing, will be considered as “characterized” and will normally be granted Eutelsat standard M approval. Additional verifications and tests, however, may be required on a case-by-case basis.

## **M-x Nomenclature**

The M-x nomenclature applies when individual sidelobe peaks exceed the Eutelsat specified masks (EESS 502 refers) by more than 3 dB (or 6 dB, depending on the  $D/\lambda$  of the antenna) when the azimuth or elevation angle is equal to or smaller than  $9.2^\circ$  and/or by more than 6 dB when this angle is greater than  $9.2^\circ$ . In all cases, the cross-polarisation discrimination value must be at least  $> 20$  dB at the -1 dB contour of the main lobe.

Very small ( $D/\lambda$  in the order of 30) antennas designed for maritime applications will not usually meet the Eutelsat EESS Standards due to physical constraints imposing special shapes, e.g. the need to limit the size of the radome for maritime antennas.

Application of the M-x nomenclature may be considered for such antennas on a case-by-case basis, subject, however, to determining a valid transmission plan where extra bandwidth generally needs to be allocated in order to cater for the deviations from the EESS 502 Standard M observed (usually in the main lobe/sidelobe patterns).

## **RF performance characterization**

The characterization process consists in performing witnessed RF tests at accredited test ranges on at least one antenna subsystem (with radome) selected during the production phase.

Based on the results obtained, the characterization will specify the operating frequency bands, the measured Tx and Rx Gain, the Tx and Rx cross-polarisation discrimination and the value of the maximum allowed eirp density to be transmitted at the 0 dB/K reference contour of the Eutelsat satellites, based on either the highest measured sidelobe or the worst cross-polarisation discrimination, whichever applies.

Where applicable, a note has been added e.g. to specify the recommended type of modulation to be used.

In addition to the technical constraints which are specified in this book, the use of the transmit band from 13.75 GHz to 14.00 GHz for antennas which have a diameter <1.2m is subject to the authorization of the appropriate National Regulatory Agencies, according to laws in force.

The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standard at the inspection date.

Particular care has to be taken during ESV installation to ascertain the correct execution of the mute command issued by the ACU. The compliant function of the related hardware and firmware must be reconfirmed by actual trial to be carried out in the course of the ESV handover.

Any change to the characterized configuration needs to be notified to Eutelsat and may be subject to further tests.

For additional information on type-approval and characterization of ESVs as M or M-x, please send an e-mail to [esapproval@eutelsat.fr](mailto:esapproval@eutelsat.fr).

**Manufacturer:**

C2SAT communications AB  
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SWEDEN

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<mailto:jan.otterling@c2sat.se>  
<http://www.C2SAT.com>

**Antenna model:**

1.2m Ku II

**Antenna aperture dimensions:**

1.2 m

**Standard:**

M

**Characterization date:**

09-01-2012

**Revision 1 date:**

30-07-2012

**System Description:**

Stabilized maritime carbon fiber antenna – prime focus configuration – sandwich composite radome.  
Four axis stabilization platform with conical RF tracking.

BUC: Codan 6908 EX 8W rating

LNB: SMW Q-PLL type C or B.

**Models Characterized:**

Standard configuration: dual linear orthogonal polarization

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):

41.3 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 2.5^\circ$

40.2 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 2.0^\circ$

36.6 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 1.5^\circ$

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.7-12.75 GHz

**Tx Gain:**

42.2 dBi (typical at 14.25 GHz)

**Rx Gain:**

40.5 dBi (typical at 11.7 GHz)

**Tx XPD:**

>30.5 dB within -1 dB contour

**Rx XPD:**

>28.2 dB within -1 dB contour

**G/T (measured with radome)**

19.4 dB/K @ 20 ° elevation

**Remarks:**

1-The characterization uniquely refers to the RF electrical performance.

2-The validation of the performance of the tracking system and operations of the antenna when installed on a vessel is out of the scope of this summary. More information about this can be found on the manufacturer web site <http://www.C2SAT.com>

3-The RF performance characterization was performed on two antenna units with radome, at the Combitech test range of Arboga, Sweden, on the 8 and 15 June 2011.

4-C2SAT will insert in the ITSA (Integrated Tactical and Sensor Assembly) a look-up table with the polarization skew of the Eutelsat satellites, to protect against the mishandling of polarization skew values by installers.

5-The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standard at the inspection date.

**Restriction:**

The isolation at  $1.5^\circ$  of the level of the Rx sidelobes from the level of the boresight is 7.8 dB (worst case at 10.7 GHz, 6.9 dB excess to the EESS Gain mask). The service quality in conjunction with operations in certain Rx bands and/or reduced orbital separations from the adjacent satellites may be impaired. Nevertheless, these operations may be exceptionally authorized according to a valid Eutelsat transmission plan.

**Manufacturer:**

Intellian Technologies, Inc.  
7<sup>th</sup> Floor, Dongik Building,  
98 Nonhyun-Dong Gangnam-Gu,  
Seoul, 135-010  
Korea

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Fax: +82-2-511-2235  
[mailto: wendy@intelliantech.com](mailto:wendy@intelliantech.com)

**Antenna model:**  
V60

**Diameter:**  
60 cm

**Standard:**  
Nomenclature M-x

**Characterisation date:**  
06-04-10

**System Description:**

Stabilised maritime antenna – splash feed cassegrain – composite foam radome. Three axis stabilization platform with conical scanning tracking.  
BUC NJRC or Codan 4-6-8 W with integrated LNB.

**Models Available:**

Standard configuration: 13.75-14.50 GHz linear orthogonal polarization.

**Maximum Allowed EIRP:**

31.5 dBW / 40 kHz for digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502, Issue 12 - Rev.1, § 6.1 refers).

**Tx Frequency:**  
13.75 - 14.50 GHz

**Rx Frequency:**  
10.95 - 12.75 GHz

**Tx Gain:**  
38.1 dBi (typical at 14.25 GHz)

**Rx Gain:**  
35.8 dBi (typical at 12.50 GHz)

**Tx XPD:**  
>26 dB within -1 dB contour

**Rx XPD:**  
>28 dB within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance.  
The validation of the performance of the tracking system and the operations of the antenna when installed on a vessel is out of the scope of this summary. More information about this can be found on the manufacturer web site: <http://www.intelliantech.com>

2

This antenna should normally be used in both transmit and receive sides in conjunction with spread spectrum or CDMA modems. The association of this antenna with SCPC/TDMA modems is conditioned to the existence of a Eutelsat valid transmission plan (e.g. with high efficiency FEC (1/3, 1/4, etc.) and BPSK modulation for the ship-to-shore carrier.

3

The characterization was performed on one antenna unit with radome, at the LACE test range of Politecnico di Torino, Italy, on the 15<sup>th</sup> March 2010.

**Manufacturer:**

Intellian Technologies, Inc.  
7<sup>th</sup> Floor, Dongik Building,  
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[mailto: wendy@intelliantech.com](mailto:wendy@intelliantech.com)

**Antenna model:**  
V80G

**Diameter:**  
83 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
16-12-2011

**System Description:**

Stabilised maritime antenna – ring focus ADE with shaped reflector – honeycomb radome. Three axis stabilization platform with conical scanning tracking.  
BUC NJRC 8W NJT5218NM or Codan 4-6-8 W with integrated LNB SMW, Type H.

**Models Available:**

Standard configuration: 13.75-14.50 GHz linear orthogonal polarisation

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):  
34.8 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 2.5^\circ$   
33.5 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 2.0^\circ$   
32.5 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 1.5^\circ$

**Tx Frequency:**

13.75 - 14.50 GHz

**Tx Gain:**

39.5 dBi (typical at 14.25 GHz)

**Tx XPD:**

$\geq 24.9$  dB within -1 dB contour

**Rx Frequency:**

10.95 - 12.75 GHz

See restrictions below

**Rx Gain:**

36.5 dBi (typical at 11.70 GHz)

**Rx XPD:**

$\geq 22.1$  dB within -1 dB contour

**G/T**

16 dB/K @30° Elevation

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance.

The validation of the performance of the tracking system and operations of the antenna when installed on a vessel is out of the scope of this summary. More information about this can be found on the manufacturer web site <http://www.intelliantech.com>

2

The RF performance characterization was performed on one antenna unit with radome, at the Politecnico di Torino test range, Italy, on the 27-28 October 2011.

**Restriction:**

The worst excess to the EESS Gain mask at  $1.5^\circ$  is 5.7 dB; the worst excess to the EESS Gain mask at  $3^\circ$  is 1.0 dB at 10.95 GHz, both in Azimuth V Polarization.

The service quality in conjunction with operations in certain Rx bands and/or reduced orbital separations from the adjacent satellites may be impaired. Nevertheless, these operations may be exceptionally authorized according to a valid Eutelsat transmission plan.

**Manufacturer:**

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**Antenna model:**  
v100

**Diameter:**  
103 cm

**Standard:**  
M

**Characterization date:**  
30-04-2013

**Revision Date:**  
18-11-2013

**System Description:**

Stabilised maritime antenna – ring focus with shaped carbon fiber reflector – Sandwich foam pre-preg five layers radome. Three axis stabilization platform with conical RF tracking.  
BUC NJRC 8 W with integrated LNB.

**Models Characterized:**

Standard configuration: 13.75-14.5 GHz linear orthogonal polarization with co-polarized and cross-polarized signal reception.

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):  
40.8 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 2.5^\circ$   
39.7 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 2.0^\circ$   
36.8 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 1.5^\circ$

**Tx Frequency:**  
13.75 – 14.50 GHz

**Rx Frequency:**  
10.70-12.75 GHz

**Tx Gain:**  
41.6dBi (typical at 14.25 GHz)

**Rx Gain:**  
39.4 dBi (typical at 11.7 GHz)

**Tx XPD:**  
31 dB within -1 dB contour

**Rx XPD:**  
>35 dB within -1 dB contour

**G/T (measured with radome)**  
19.6 dB/K @ 12.75 GHz

**Remarks:**

- The manufacturer states that the RMS pointing error is less than  $0.4^\circ$  for the following ship motions:  
Roll =  $\pm 25^\circ$  @ 6 sec periods  
Pitch =  $\pm 15^\circ$  @ 6 sec periods  
Yaw =  $\pm 8^\circ$  @ 6 sec periods
- The RF performance characterization was performed on one antenna unit with radome, at the France Telecom test range of La Turbie, France on the 24-26 April 2013.
- Intellian has inserted in the ACU software a look-up table with the polarization skew of the Eutelsat satellites, to protect against the mishandling of polarization skew values by installers. The transmission of the HPA is muted from the ACU when the maximum pointing error exceeds  $0.4^\circ$ , by sending an ACU command to a BUC capable of M&C functions.
- The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standards.

**Manufacturer:**

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**Antenna model:**

V110

**Diameter:**

105 cm

**Standard:**

M

**Characterization date:**

05-07-2010

**System Description:**

Stabilised maritime antenna – splash feed cassegrain – composite foam radome. Three axis stabilization platform with conical scanning tracking.  
BUC NJRC or Codan 4-6-8 W with integrated LNB.

**Models Available:**

Standard configuration: 13.75-14.50 GHz linear orthogonal polarization.

**Maximum Allowed EIRP:**

40.3 dBW / 40 kHz for digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502, Issue 12 - Rev.1, § 6.1 refers).

**Tx Frequency:**

13.75 - 14.50 GHz

**Tx Gain:**

41.7 dBi (typical at 14.25 GHz)

**Tx XPD:**

&gt;28 dB within -1 dB contour

**Rx Frequency:**

12.50 - 12.75 GHz

**See restrictions below (\*)****Rx Gain:**

39.8 dBi (typical at 12.50 GHz)

**Rx XPD:**

&gt;30 dB (\*) within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance.

The validation of the performance of the tracking system and the operations of the antenna when installed on a vessel is out of the scope of this summary. The manufacturer states that operations of the tracking is such that the pointing error is less than +/-0.2° for the following ship motions:

Roll = +/-20° at 8-12 sec periods

Pitch = +/-10° at 6-12 sec periods

2

The characterization was performed on one antenna unit with radome, at the France Telecom test range of La Turbie, France, on the 15-18 June 2010.

**Restrictions:**

(\*) The service quality, in conjunction with operations in Rx bands other than 12.50 – 12.75 GHz, may be significantly impaired. Nevertheless, these operations may be exceptionally authorized according to a valid Eutelsat transmission plan.





**Manufacturer:**  
JOTRON AS

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[web: www.jotron.com](http://www.jotron.com)

**Antenna model:**  
B85

**Antenna aperture dimensions:**  
85 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
05-07-2013

**System Description:**

Stabilised maritime antenna – Ring focus ADE (Axially Displaced Ellipse) with shaped sub-reflector configuration – Sandwich foam radome. Four axis stabilization platform with conical RF tracking.  
BUC various. Maximum rating 8W  
LNB various  
OMT Jotron

**Models Characterized:**

Standard configuration: linear orthogonal polarization with co-polarized or cross-polarized signal reception option.

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):  
35.3 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 2.5^\circ$   
34.0 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 2.0^\circ$   
33.4 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 1.5^\circ$

**Tx Frequency:**  
13.75 – 14.50 GHz

**Rx Frequency:**  
10.95-12.75 GHz

**Tx Gain:**  
40.33 (typical at 14.25 GHz)

**Rx Gain:**  
36.6 dBi (typical at 11.7 GHz)

**Tx XPD:**  
26 dB within -1 dB contour

**Rx XPD:**  
26 dB within -1 dB contour

**G/T (measured with radome)**  
16.2 dB/K @ 11.70 GHz @ 30 ° Elevation

**Remarks:**

- The manufacturer states that the RMS pointing error is less than  $0.30^\circ$  for the following ship motions:  
Roll =  $\pm 24^\circ$  in a period of 10 sec  
Pitch =  $\pm 10^\circ$  in a period of 8 sec  
Yaw =  $\pm 8^\circ$  in a period of 20 sec
- The RF performance characterization was performed on one antenna unit with radome, at the Politecnico of Torino, Italy on the 28-29 May 2013.
- The transmission of the HPA is muted from the ACU via a DC switch when the maximum pointing error exceeds  $0.5^\circ$ .
- The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standards.

**Restrictions:**

The worst excess in the receive side ( $\pm 10^\circ$ ) to the EESS Gain mask is 4.7 dB.  
The service quality in conjunction with operations in certain Rx bands and/or reduced orbital separations from the adjacent satellites may be impaired due to excessive Rx sidelobe levels. Nevertheless, to achieve the required service quality the level of the outroute carrier may need to be increased according to a valid Eutelsat transmission plan.

**Manufacturer:**

KNS Inc.  
1314 Gwanpyeong-dong, Yuseong-gu,  
Daejeon, 305-509

S. KOREA

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Fax: +82 42 932 0353  
mailto :[bwjin@kns-kr.com](mailto:bwjin@kns-kr.com)

**Antenna model:**  
Supertrack Z6Mk2

**Diameter:**  
60 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
24-04-09

**System Description:**

Interactive maritime antenna -splash feed cassegrain – composite foam radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

30.4 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.95 - 12.75 GHz

**Tx Gain:**

36.4 dBi (typical at 14.25 GHz)

**Rx Gain:**

35.0 dBi (typical at 12.50 GHz)

**Tx XPD:**

>27 dB within -1 dB contour

**Rx XPD:**

>27 dB within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance which was assessed in a professional test range facility.

The validation of the performance of the tracking subsystem and the operations of the antenna when installed on a ship is out of the scope of this summary. More information about this can be found on the manufacturer's web site: <http://www.kns-kr.com>

2

This antenna should normally be used in both transmit and receive sides in conjunction with spread spectrum or CDMA modems. The association of this antenna with SCPC/TDMA modems is conditioned to the existence of a Eutelsat valid transmission plan (e.g. with high efficiency FEC (1/3, 1/4, etc) and BPSK modulations for the ship-to-shore carrier).

**Manufacturer:**

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Daejeon, 305-509

S. KOREA

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**Antenna model:**  
Supertrack Z8

**Diameter:**  
85 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
27-03-08

**System Description:**

Interactive maritime antenna -splash feed cassegrain – composite foam radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

32.3 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**  
13.75 - 14.50 GHz

**Tx Gain:**  
38.3 dBi (typical at 14.25 GHz)

**Tx XPD:**  
>35 dB within -1 dB contour

**Rx Frequency:**  
10.95 - 12.75 GHz

**Rx Gain:**  
38 dBi (typical at 12.50 GHz)

**Rx XPD:**  
>32 dB within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance which was assessed in a professional test range facility.

The validation of the performance of the tracking subsystem and the operations of the antenna when installed on a ship is out of the scope of this summary. More information about this can be found on the manufacturer's web site: <http://www.kns-kr.com>

2

This antenna should normally be used in both transmit and receive sides in conjunction with spread spectrum or CDMA modems. The association of this antenna with SCPC/TDMA modems is conditioned to the existence of a Eutelsat valid transmission plan (e.g. with high efficiency FEC (1/3, 1/4, etc) and BPSK modulations for the ship-to-shore carrier).

**Manufacturer:**

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USA

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Fax: +1 401-849-0045  
[mailto: info@kvh.com](mailto:info@kvh.com)

**Antenna model:**  
V3

**Diameter:**  
37 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
10-08-2011

**Validity period:**  
See remark 3

**System Description:**

Stabilized maritime antenna – ring focus dual reflector antenna – ABS, single layer radome (∅: 39.4 cm, H: 44.7 cm) . Three axis stabilization platform with conical scanning tracking.  
3 Watt BUC NJRC NJT5116F and Invacom VSAT PLL LNB with Tx reject filter SPV-65SM.

**Models Available:**

Standard configuration: 13.75-14.50 GHz linear orthogonal polarization

**Maximum Allowed EIRP:**

20.7 dBW / 40 kHz  $-10 \cdot \log N$  (where N is the number of carriers transmitted in the same 40 KHz band) for digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers) for any satellite adjacent separation (\*\*).

**Tx Frequency:**

13.75 - 14.50 GHz  
See restrictions below (\*)

**Rx Frequency:**

11.70 - 12.75 GHz  
See restrictions below (\*)

**Tx Gain:**

33.2 dBi (typical at 14.25 GHz)

**Rx Gain:**

30.4 dBi (typical at 11.70 GHz)

**Tx XPD:**

>32.8 dB within -1 dB contour

**Rx XPD:**

>27.1 dB within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance.

The validation of the performance of the tracking system and the operations of the antenna when installed on a vessel is out of the scope of this summary. The manufacturer states that operations of the tracking are such that the pointing error is less than  $\pm 1.5^\circ$  for the following ship motions:

+/- 25 degrees Roll @ 8 second period,  
+/- 15 degrees Pitch @ 5 second period,  
+/- 8 degrees Yaw @ 50 second period.

2

The characterization was performed on one antenna unit with radome, at the LACE Outdoor Test Range of Politecnico of Torino, on the 18-20 May 2011.

3

The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standard at the inspection date.

4

Any change to the characterized configuration needs to be notified to Eutelsat and may be subject to further tests.

**Restrictions:**

(\*) The antenna can only operate in conjunction with spread spectrum systems, e.g. the Viasat ArcLight CDMA.

(\*\*) The Rx isolation from boresight at  $3^\circ$  is 1.2 dB: to ensure the downlink quality of service, the outroute carrier shall use spread spectrum techniques.

**Manufacturer:**

KVH Industries, Inc.  
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Middletown, RI 02842  
USA

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Fax: +1 401-849-0045  
mailto: [info@kvh.com](mailto:info@kvh.com)

**Antenna model:**  
KVH-60 cm

**Diameter:**  
60 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
25-07-08

**System Description:**

Interactive maritime antenna -splash feed cassegrain - plastic radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

31.1 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**

14.00 - 14.50 GHz

**Rx Frequency:**

11.70 - 12.75 GHz

**Tx Gain:**

36.6 dBi (typical at 14.25 GHz)

**Rx Gain:**

35.4 dBi (typical at 12.50 GHz)

**Tx XPD:**

>35 dB within -1 dB contour

**Rx XPD:**

>35 dB within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance which was assessed in a professional test range facility.

The validation of the performance of the tracking subsystem and the operations of the antenna when installed on a ship is out of the scope of this summary. More information about this can be found on the manufacturer's web site: <http://www.kvh.com>

2

This antenna should normally be used in both transmit and receive sides in conjunction with spread spectrum or CDMA modems. The association of this antenna with SCPC/TDMA modems is conditioned to the existence of a Eutelsat valid transmission plan (e.g. with high efficiency FEC (1/3, 1/4, etc) and BPSK modulations for the ship-to-shore carrier).

**Manufacturer:**

MAC  
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**Antenna model:**  
ISA 75

**Diameter:**  
75 cm

**Standard:**  
M

**Characterization date:**  
10-02-09

**System Description:**

Interactive maritime antenna –Axisymmetric circular front fed – General Dynamics OMT - Fiberglass/Honeycomb 100 cm radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

35.7 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.95 - 12.75 GHz

**Tx Gain:**

36.5 dBi (typical at 14.25 GHz)

**Rx Gain:**

35.6 dBi (typical at 12.50 GHz)

**Tx XPD:**

>30 dB within -1 dB contour

**Rx XPD:**

>30 dB within -1 dB contour

**Remarks:**

The characterization uniquely refers to the RF electrical performance which was assessed in a professional test range facility.

The validation of the performance of the tracking subsystem and the operations of the antenna when installed on a ship is out of the scope of this summary. More information about this can be found on this web site: <http://www.sitmar.it>

# Eutelsat s.A. Type Approval Summary Sheet

**Applicant:**

MITSUBISHI ELECTRIC CORPORATION  
2-7-3, Marunouchi Chiyoda-ku  
Tokyo 100-8310  
Japan

Tel : +81 3 3218 3346  
Fax : +81 3 3218 9492  
Website : <http://global.mitsubishielectric.com>

**Certificate:**  
EA-V056**Antenna:**  
Ku Mate**Diameter:**  
1 m**Standard:**  
M**Approval date:**  
21-12-2009**Revision 1 date:**  
17-05-2011**System Description:**

Stabilised maritime antenna consisting of 1 m ring focus Gregorian aluminum antenna with fiberglass radome, with three axis stabilization platform and polarization axis and a conical scanning tracking. BUC 8 W NJRC model NJT5118NT, LNA Mitsubishi RB256718.

**Models Available:**

Standard configuration: 14.00-14.50 GHz linear orthogonal polarisation  
Option 1 : Tx and Rx parallel.  
Option 2 : 13.75 GHz extended band  
Option 3 : Tx and Rx parallel and 13.75 GHz extended band

**Maximum Allowed EIRP:**

39.7 dBW / 40 kHz for digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 § 6.1 refers)

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.70 - 12.75 GHz

**Tx Gain:**

40.9 dBi (typical at 14.25 GHz)

**Rx Gain:**

39.8 dBi (typical at 12.75 GHz)

**Tx XPD:**

>30 dB within -1 dB contour

**Rx XPD:**

>30 dB within -1 dB contour

**Remarks:**

1

Operations of the tracking has been tested on a Sea Simulator, with rms pointing error <0.2°.

Roll = +/-30°/7sec and 24.2°/sec<sup>2</sup>

Pitch = +/-10°/5sec and 15.8°/sec<sup>2</sup>

Yaw = +/-4°/14sec and 0.8°/sec<sup>2</sup>

2

Measured G/T= 18.4 dB/K @ 12.5 GHz, 30° Elevation

# Eutelsat s.A. Type Approval Summary Sheet

**Applicant:**

mitsubishi electric corporation  
2-7-3, Marunouchi Chiyoda-ku, Tokyo  
100-8310, Japan  
Tel : +81-3-3218-3346  
Fax : +81-3-3218-9492  
[Website : http://global.mitsubishielectric.com](http://global.mitsubishielectric.com)

Contact point:  
Sato.Hiroyuki@ea.mitsubishielectric.co.jp

**Certificate:**  
EA-V059**Antenna:**  
SX 5410 Ku Mate**Diameter:**  
1.2 m**Standard:**  
M**Approval date:**  
16-12-2011**System Description:**

Stabilised maritime antenna equipped with three ports feed (one Tx and two Rx) for the standard configuration and option 3; two ports feed for options 1 and 2, consisting of 1.2 m ring focus aluminum antenna with backfire feedhorn, with 1.57 m sandwich foam radome, with three axis stabilization platform and polarization axis and a conical scanning tracking. BUC 8 W NJRC model NJT5118NTME (Standard) and model NJT5218NTME (Option 2 and 3), LNA Mitsubishi Electric RB256718-G01.

**Models Available:**

Standard configuration (SX 5410): 14.00-14.50 GHz linear orthogonal and parallel polarization.  
Option 1 (SX 5400) : Tx and Rx orthogonal.  
Option 2 (SX 5420) : 13.75 GHz extended band orthogonal.  
Option 3 (SX 5430) : Tx and Rx orthogonal and parallel pol. and 13.75 GHz ext. band.

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502, § 6.1 refers):  
38.3 dBW / 40 kHz for satellite orbital separations  $\geq 1.5^\circ$ .  
41.4 dBW / 40 kHz for satellite orbital separations  $\geq 2^\circ$ .

**Tx Frequency:**  
13.75 - 14.50 GHz**Rx Frequency:**  
10.70 - 12.75 GHz**Tx Gain:**  
41.9 dBi (typical at 14.25 GHz)**Rx Gain:**  
41.6 dBi (typical at 11.70 GHz)**Tx XPD:**  
>30 dB within -1 dB contour**Rx XPD:**  
>28 dB within -1 dB contour**G/T:** 20.5 dB/K at 11.70 GHz**Remarks:**

1

Operations of the tracking has been tested on a Sea Simulator, with pointing error <0.2°.

Roll =  $\pm 30^\circ/7$  sec.

Pitch =  $\pm 10^\circ/5$  sec.

Yaw =  $\pm 4^\circ/20$  sec.

In case of tracking error >0.2°, the ACU will directly inhibit transmission of the BUC.

2

The type approval tests were performed on three units with radome at the test range of Ofuna, Japan between the 26 September and the 1 October 2011.

3

The worst excess of the EESS masks in the Rx side is equal to 7.2 dB at 1.5°, 10.70 GHz in Elevation V polarization. The service quality in the receive side may be impaired for operations on satellites with less than 2.5° orbital separation from the adjacent one. Nevertheless, these operations may be exceptionally authorized according to a valid transmission plan.



**Applicant:**

mitsubishi electric corporation  
2-7-3, Marunouchi Chiyoda-ku, Tokyo  
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Tel : +81-3-3218-3346  
Fax : +81-3-3218-9492  
[Website : http://global.mitsubishielectric.com](http://global.mitsubishielectric.com)

**Contact point:**

[Sato.Hiroyuki@ea.mitsubishielectric.co.jp](mailto:Sato.Hiroyuki@ea.mitsubishielectric.co.jp)

**Certificate:**

EA-V060

**Antenna:**

MVA60

**Diameter:**

0.62 m

**Standard:**

M

**Approval date:**

15-06-2012

**System Description:**

Stabilized maritime antenna equipped with linear polarized three ports feed (one Tx and two Rx) for the standard configuration and option 3; two ports feed for options 1 and 2, consisting of 0.6 m ring focus aluminum antenna with backfire feedhorn, with 750 mm diameter sandwich foam radome, with three axis stabilization platform and polarization axis and a conical scanning tracking. BUC 8 W NJRC model NJT5118NTME (Standard) and model NJT5218NTME (Option 2 and 3), LNA Mitsubishi Electric RB256718-G01.

**Models Available:**

Standard configuration (MVA60-DS8):14.00-14.50 GHz Tx and Rx orthogonal and parallel polarization  
Option 1 (MVA60-DE8) :14.00-14.50 GHz Tx and Rx orthogonal polarization  
Option 2 (MVA60-SS8) :13.75-14.50 GHz Tx extended band and Rx orthogonal  
Option 3 (MVA60-SE8) :13.75-14.50 GHz Tx extended band and Rx orthogonal and parallel polarization

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502, § 6.1 refers):  
31.0 dBW / 40 kHz for satellite orbital separations  $\geq 1.5^\circ$   
32.1 dBW / 40 kHz for satellite orbital separations  $\geq 2.5^\circ$   
33.2 dBW / 40 kHz for satellite orbital separations  $\geq 3^\circ$

**Tx Frequency:**

13.75 - 14.50 GHz

**Tx Gain:**

37.3 dBi (typical at 14.25 GHz)

**Tx XPD:**

>30 dB within -1 dB contour

**Rx Frequency:**

10.70 - 12.75 GHz

**Rx Gain:**

35.6 dBi (typical at 11.70 GHz)

**Rx XPD:**

>26 dB within -1 dB contour

**G/T:** 15.0 dB/K at 12.50 GHz (parallel port)

15.5 dB/K at 12.50 GHz (orthogonal port)

**Remarks:**

1-Operations of the tracking has been tested on a Sea Simulator, with pointing error  $<0.2^\circ$ .

Roll =  $\pm 30^\circ/7$  sec; Pitch =  $\pm 10^\circ/5$  sec; Yaw =  $\pm 4^\circ/14$  sec.

In case of tracking error  $>0.2^\circ$ , the ACU will directly inhibit transmission of the BUC.

2-The type approval tests were performed on three units with radome at the test range of Tsukaguchi, Japan between the 9 and 18 May 2012.

3-The worst excess of the EESS masks in the Rx side is equal to 8.4 dB (10.70 GHz) hence the service quality in the receive side may be impaired. Nevertheless, these operations may be exceptionally authorized according to a valid transmission plan.

4-The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standard at the inspection date.

5-Any change to the characterised configuration needs to be notified to Eutelsat and may be subject to further tests.

6- The polarization skew of the Eutelsat satellites is automatically taken into account in the ACU software via pre-programmed look-up tables.

**Manufacturer:**

NAVISYSTEM  
V. Fondacci 269  
Z.I. Montramito  
55054 MASSAROSA (Lu)  
ITALY

Tel: +39 0584-425454  
Fax: +39 0584 434386  
mailto : [b.locatori@navisystem.com](mailto:b.locatori@navisystem.com)

**Antenna model:**  
Navisystem 75

**Diameter:**  
70 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
29-07-08

**System Description:**

Interactive maritime antenna -splash feed cassegrain - VTR radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

29.6 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.95 - 12.75 GHz

**Tx Gain:**

36 dBi (typical at 14.25 GHz)

**Rx Gain:**

35.2 dBi (typical at 12.75 GHz)

**Tx XPD:**

>35 dB within -1 dB contour

**Rx XPD:**

>32 dB within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance which was assessed in a professional test range facility.

The validation of the performance of the tracking subsystem and the operations of the antenna when installed on a ship is out of the scope of this summary. More information about this can be found on the manufacturer web site: <http://www.navisystem.com>.

2

This antenna should normally be used in both transmit and receive sides in conjunction with spread spectrum or CDMA modems. The association of this antenna with SCPC/TDMA modems is conditioned to the existence of a Eutelsat valid transmission plan (e.g. with high efficiency FEC (1/3, 1/4, etc) and BPSK modulations for the ship-to-shore carrier).

**Manufacturer:**

NAVISYSTEM  
V. Fondacci 269  
Z.I. Montramito  
55054 MASSAROSA (Lu)  
ITALY

Tel: +39 0584-425454  
Fax: +39 0584 434386  
mailto : [b.locatori@navisystem.com](mailto:b.locatori@navisystem.com)

**Antenna model:**  
Navisystem 85

**Diameter:**  
81 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
30-07-08

**System Description:**

Interactive maritime antenna -splash feed cassegrain - VTR radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

33.8 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.95 - 12.75 GHz

**Tx Gain:**

37.8 dBi (typical at 14.25 GHz)

**Rx Gain:**

37.5 dBi (typical at 12.50 GHz)

**Tx XPD:**

>30 dB within -1 dB contour

**Rx XPD:**

>26 dB within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance which was assessed in a professional test range facility.

The validation of the performance of the tracking subsystem and the operations of the antenna when installed on a ship is out of the scope of this summary. More information about this can be found on the manufacturer web site: <http://www.navisystem.com>.

2

This antenna should normally be used in both transmit and receive sides in conjunction with spread spectrum or CDMA modems. The association of this antenna with SCPC/TDMA modems is conditioned to the existence of a Eutelsat valid transmission plan (e.g. with high efficiency FEC (1/3, 1/4, etc) and BPSK modulations for the ship-to-shore carrier).

**Manufacturer:**

NAVISYSTEM  
V. Fondacci 269  
Z.I. Montramito  
55054 MASSAROSA (Lu)  
ITALY

Tel: +39 0584-425454  
Fax: +39 0584 434386  
mailto : [b.locatori@navisystem.com](mailto:b.locatori@navisystem.com)

**Antenna model:**  
Navisystem 95

**Diameter:**  
95 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
04-08-08

**System Description:**

Interactive maritime antenna -splash feed cassegrain - VTR radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

34.3 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.95 - 12.75 GHz

**Tx Gain:**

39.3 dBi (typical at 14.25 GHz)

**Rx Gain:**

Not measured

**Tx XPD:**

>30 dB within -1 dB contour

**Rx XPD:**

>30 dB within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance which was assessed in a professional test range facility.

The validation of the performance of the tracking subsystem and the operations of the antenna when installed on a ship is out of the scope of this summary. More information about this can be found on the manufacturer's web site: <http://www.navisystem.com>.

2

This antenna should normally be used in both transmit and receive sides in conjunction with spread spectrum or CDMA modems. The association of this antenna with SCPC/TDMA modems is conditioned to the existence of a Eutelsat valid transmission plan (e.g. with high efficiency FEC (1/3, 1/4, etc) and BPSK modulations for the ship-to-shore carrier).

# Eutelsat s.A. Type Approval Summary Sheet

**Applicant:**

ORBIT  
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P.O. Box 8657 NETANYA  
42504 ISRAEL

Tel: +972 9 89262739  
Fax: +972 9 892 2820  
mailto : [guy@orbit-ltd.co.il](mailto:guy@orbit-ltd.co.il)

**Certificate:**  
EA-A033**Antenna:**  
OrSat AL-7103-Ku Mk II**Diameter:**  
1.15m**Standard:**  
M**Approval date:**  
06-04-2007**Revision 2 date:**  
02-10-2008**System Description:**

Stabilised maritime antenna consisting of OrSat 1.15m dual offset Gregorian composite material antenna with single piece foam or honeycomb radome, with three axis stabilization platform and a conical scanning tracking. Can support transceivers 4 W, 8 W, 16 and 20 W rating.

**Models Available:**

AL-7103-Ku-Mk II with two standard configurations: with ERA OMT and Tx Reject Filter or Orbit Integrated RF front-end.

**Maximum Allowed EIRP:**

39.3 or 41.3\* dBW / 40 kHz for digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502, Issue 12 - Rev.1, § 6.1 refers)

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.95 - 12.75 GHz

**Tx Gain:**

42.3 dBi (typical at 14.25 GHz)

**Rx Gain:**

41.0 or 40.2\* dBi (typical at 12.50 GHz)

**Tx XPD:**

>30 dB within -1 dB contour

**Rx XPD:**

>35 dB within -1 dB contour

**Remarks:**

1

Operations of the tracking has been tested on a Sea Simulator.

RMS pointing error  $0.12^\circ$  at  $3\sigma$  for the following ship maximum velocity and acceleration:

Roll =  $11^\circ/\text{sec}$  and  $4^\circ/\text{sec}^2$

Pitch =  $18^\circ/\text{sec}$  and  $19^\circ/\text{sec}^2$

Yaw =  $5^\circ/\text{sec}$  and  $0.3^\circ/\text{sec}^2$

2

(\*) applies to the configuration using the Orbit Integrated RF front-end

**Manufacturer:**

ORBIT Communication Ltd  
 8 D Hatzoran St.P.O.B 8657  
 Netanya,  
 42504 ISRAEL  
 Tel: + 972-9-8922-739  
 Fax:+ 972-9-8922-820  
<mailto:guy.naym@orbit-cs.com>

**Antenna model:**

AL-7107

**Antenna aperture dimensions:**

201x220 cm

**Standard:**

M

**Characterization date:**

17-10-2011

**System Description:**

Stabilised maritime antenna – dual optics gregorian – sandwich foam radome. Four axis stabilization platform with conical RF tracking.

BUC Codan 20, 40, W; Terrasat 40 W and Agilis 40 W.

PLL LNB Norsat.

Integrated front end ORBIT.

**Models Characterized:**

Standard configuration: C-Band 5.85-6.425 GHz circular orthogonal polarisation

**Maximum Allowed EIRP:**

37.1 dBW / 40 kHz for digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 §6.1 refers).

**Tx Frequency:**

5.85 – 6.425 GHz

**Rx Frequency:**

3.625 – 4.2 GHz

**Tx Gain:**

38.3 dBi (typical at 6.15 GHz)

**Rx Gain:**

36.7 dBi (typical at 3.95 GHz)

**Tx XPD:**

&gt;19.4 dB within -1 dB contour

**Rx XPD:**

&gt;16.3 dB within -1 dB contour

**G/T (measured with radome)**

17.9 dB/K @ 30 ° Elevation, 3.95 GHz

**Remarks:**

1

The dynamic tests were performed at the 3-axis Orbit sea simulator on the 26 May 2011. The RMS pointing error is less than 0.2° for the following ship motions:

Roll = 10°/sec and 4°/sec<sup>2</sup>

Pitch = 8.9°/sec and 4.7°/sec<sup>2</sup>

Yaw = 3.2°/sec

2

The RF performance characterization was performed on one antenna unit with radome, at the Orbit Test Range in Netanya, Israel on the 4-5 September 2011.

**Restriction:**

The isolation at 3° of the level of the Rx sidelobes from the level of the boresight is comprised between 20 dB and 13.9 dB (worst case at 3.625 GHz, 4.5 dB excess to the EESS Gain mask); the isolation at 1.5° is 3.6 dB (worst case at 3.625 GHz, 7.3 dB excess the EESS Gain mask). The service quality in conjunction with operations in certain Rx bands and/or reduced orbital separations from the adjacent satellites may be impaired. Nevertheless, these operations may be exceptionally authorized according to a valid Eutelsat transmission plan.

**Manufacturer:**

ORBIT Communication Systems Ltd  
 8 D Hatzoran St. P.O.B 8657  
 Netanya,  
 4250608 ISRAEL  
 Tel: + 972-9-8922-739  
 Fax: + 972-9-8922-820  
<mailto:guy.naym@orbit-cs.com>

**Antenna model:**

OceanTRx4-500 (Ku)

**Antenna aperture dimensions:**

1.15 m

**Standard:**

M

**Characterization date:**

05-01-2017

**Validity period:**

See remark 4

**Last test data submitted on:**

09-10-2016

**System Description:**

Stabilized maritime antenna system linear polarization, lighter version of Orsat AL-7103-Ku-Mk II, consisting of a 1.15m dual offset Gregorian composite material antenna, with single piece 5 layers honeycomb sandwich radome type C. Three axis stabilization platform with conical RF tracking. HPA / Block upconverters (BUC) 8, 16, 25 and 40 W rating.

Philtech LNB or equivalent.  
 Integrated front end ORBIT.

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):

**In the 14.00-14.50 GHz band:**

37.9 dBW / 40 kHz for an orbital separation from the adjacent satellite  $\geq 1.5^\circ$

40.6 dBW / 40 kHz for an orbital separation from the adjacent satellite  $\geq 2.0^\circ$

**In the 13.75-14.00 GHz band:**

35.0 dBW / 40 kHz for an orbital separation from the adjacent satellite  $\geq 1.5^\circ$

38.4 dBW / 40 kHz for an orbital separation from the adjacent satellite  $\geq 2.0^\circ$

**Tx Frequency:**

13.75 – 14.50 GHz

**Rx Frequency:**

10.70 – 12.75 GHz

**Tx Gain:**

41.9 dBi (typical at 14.25 GHz)

**Rx Gain:**

40.1 dBi (typical at 11.70 GHz)

**Tx XPD:**

>27 dB within -1 dB contour

**Rx XPD:**

>27.4 dB within -1 dB contour

**G/T (measured with radome)**

19.4 dB/K @ 40° Elevation, 11.70 GHz

**Restrictions and remarks:**

- The manufacturer measured an RMS pointing error less than  $0.16^\circ$  for the following ship motions:  
 Roll = Sinusoidal +/-28° amplitude over 8 second half-period  
 Pitch = Sinusoidal +/-16° amplitude over 6 second half-period  
 Yaw = Linear +/- 80° amplitude over 25 second half-period
- The RF performance characterization was performed on one antenna unit with radome, at the Orbit test range in Netanya during the month of August 2016.
- Orbit has inserted in their ACU software a look-up table with the polarization skew of the Eutelsat satellites, to protect against the mishandling of polarization skew values by installers. The transmission of the HPA (BUC) is muted from the ACU when the maximum pointing error exceeds  $0.5^\circ$ , by initialization of a mute command to the BUC through its M&C.
- The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standards.

**Manufacturer:**

RADIO MARINE S.p.A.  
c/o Sviluppo Italia Liguria  
ex palazzina Omsav - Zona Porto  
17100 - Savona  
ITALY

Tel: +39 019 838 7134  
Fax: +39 019 807 983  
mailto: [fp@radio-marine.com](mailto:fp@radio-marine.com)

**Antenna model:**  
Radiomarine BroadBand80

**Diameter:**  
80 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
07-11-08

**System Description:**

Interactive maritime antenna; splash feed cassegrain. Carbon fibre antenna. fiberglass radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

33.0 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.95 - 12.75 GHz

**Tx Gain:**

39.0 dBi (typical at 14.25 GHz)

**Rx Gain:**

37.9 dBi (typical at 12.50 GHz)

**Tx XPD:**

>30 dB within -1 dB contour

**Rx XPD:**

>35 dB within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance which was assessed in a professional test range facility.

The validation of the performance of the tracking subsystem and the operations of the antenna when installed on a ship is out of the scope of this summary. More information about this can be found on the manufacturer web site: <http://www.radio-marine.com>

2

This antenna should normally be used in both transmit and receive sides in conjunction with spread spectrum or CDMA modems. The association of this antenna with SCPC/TDMA modems is conditioned to the existence of a Eutelsat valid transmission plan (e.g. with high efficiency FEC (1/3, 1/4, etc) and BPSK modulations for the ship-to-shore carrier).



**Manufacturer:**

SEATEL  
4030 Nelson Avenue  
CONCORD, CA  
94520  
USA

Tel: +1 925 798 7979  
Fax: +1 925 798 7986  
mailto : [Timothy.OConnor@cobham.com](mailto:Timothy.OConnor@cobham.com)

**Antenna model:**  
USAT24

**Diameter:**  
60 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
16-01-09

**System Description:**

Interactive maritime antenna -splash feed cassegrain – three layers 27 inches radome. Two axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

31.9 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.95 - 12.75 GHz

**Tx Gain:**

37.0 dBi (typical at 14.25 GHz)

**Rx Gain:**

35.9 dBi (typical at 12.50 GHz)

**Tx XPD:**

>25 dB within -1 dB contour

**Rx XPD:**

>30 dB within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance which was assessed in a professional test range facility.

The validation of the performance of the tracking subsystem and the operations of the antenna when installed on a ship is out of the scope of this summary. More information about this can be found on the manufacturer web site: <http://www.seatel.com>. The manufacturer advises that this antenna is not suitable for operations in rough seas.

2

This antenna should normally be used in both transmit and receive sides in conjunction with spread spectrum or CDMA modems. The association of this antenna with SCPC/TDMA modems is conditioned to the existence of a Eutelsat valid transmission plan (e.g. with high efficiency FEC (1/3, 1/4, etc) and BPSK modulations for the ship-to-shore carrier).

**Manufacturer:**

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94520  
USA

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mailto : [Timothy.OConnor@cobham.com](mailto:Timothy.OConnor@cobham.com)

**Antenna model:**  
2406

**Diameter:**  
60 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
14-01-09

**System Description:**

Interactive maritime antenna -splash feed cassegrain – three layers 34 inches radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

32.2 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**  
13.75 - 14.50 GHz

**Rx Frequency:**  
10.95 - 12.75 GHz

**Tx Gain:**  
37.2 dBi (typical at 14.25 GHz)

**Rx Gain:**  
36.1 dBi (typical at 12.50 GHz)

**Tx XPD:**  
>25 dB within -1 dB contour

**Rx XPD:**  
>25 dB within -1 dB contour

**Remarks:**

1

The characterization uniquely refers to the RF electrical performance which was assessed in a professional test range facility.

The validation of the performance of the tracking subsystem and the operations of the antenna when installed on a ship is out of the scope of this summary. More information about this can be found on the manufacturer web site: <http://www.seatel.com>.

2

This antenna should normally be used in both transmit and receive sides in conjunction with spread spectrum or CDMA modems. The association of this antenna with SCPC/TDMA modems is conditioned to the existence of a Eutelsat valid transmission plan (e.g. with high efficiency FEC (1/3, 1/4, etc) and BPSK modulations for the ship-to-shore carrier).

**Manufacturer:**

COBHAM SATCOM, SEA TEL PRODUCTS  
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CONCORD, CA  
94520  
USA

Tel: + 1 925 798 7979

Fax: + 1 925 798 7986

Website: <http://www.cobham.com/seatel>

Contact point: [Darren.Manning@cobham.com](mailto:Darren.Manning@cobham.com)

**Antenna model:**

3011W

**Diameter:**

75 cm

**Standard:**

Nomenclature M-x

**Characterization date:**

04-07-2012

**System Description:**

Stabilised maritime antenna – ring focus cassegrain – sandwich composite foam radome. Four axis stabilization platform with conical scanning tracking.

BUC Various (NJRC, Codan, Comtech, Terrasat, Gilat) 4-8-16-20-40 W with integrated SMW Q-PLL LNB.

**Models Available:**

Standard configuration: 13.75-14.50 GHz linear orthogonal polarization

Option 1 : TX and RX parallel

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):

35.1 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 3.0^\circ$

35.1 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 2.5^\circ$

32.4 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 2.0^\circ$

32.3 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 1.5^\circ$

**Tx Frequency:**

13.75 - 14.50 GHz

**Tx Gain:**

38.8 dBi (typical at 14.25 GHz)

**Tx XPD:**

$\geq 27.5$  dB within -1 dB contour

**Rx Frequency:**

10.70 - 12.75 GHz

See restrictions below

**Rx Gain:**

36.8 dBi (typical at 11.70 GHz) side port

37.0 dBi (typical at 11.70 GHz) back port

**Rx XPD:**

$> 30$  dB within -1 dB contour

**G/T**

16.7 dB/K @30° Elevation at 12.2 GHz

**Remarks:**

1-The characterization uniquely refers to the RF electrical performance.

The validation of the performance of the tracking system and operations of the antenna when installed on a vessel is out of the scope of this summary. More information about this can be found on the manufacturer web site <http://www.seatel.com>

2-The RF performance characterization was performed on one antenna unit with radome, at the CTS test range of Leatherhead, UK, on the 8-9 February 2012.

3-The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standard at the inspection date.

**Restriction:**

The worst excess in the receive side to the EESS Gain mask is 8.6 dB.

The service quality in conjunction with operations in certain Rx bands and/or reduced orbital separations from the adjacent satellites may be impaired. Nevertheless, these operations may be exceptionally authorized according to a valid Eutelsat transmission plan.

**Manufacturer:**

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94520  
USA

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Website: <http://www.cobham.com/seatel>

Contact points: [Darren.Manning@cobham.com](mailto:Darren.Manning@cobham.com)

**Antenna model:**

3612

**Diameter:**

90 cm

**Standard:**

Nomenclature M-x

**Characterization date:**

05-07-2013

**System Description:**

Stabilised maritime antenna – splash feed axi-symmetric – three layers 1.27 m diameter radome manufactured by Ace Composites on SEATEL design. Three axis stabilization platform with conical scanning tracking.

BUC Various (NJRC, Codan, Comtech, Terrasat, Gilat) 4-8-16-40 Watt with integrated SMW Q-PLL or NJRC LNB.

**Models Available:**

Standard configuration : 13.75-14.50 GHz linear orthogonal polarization.

Option 1 : Tx and Rx parallel.

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):

38.0 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 2.5^\circ$

35.5 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 2.0^\circ$

34.7 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 1.5^\circ$

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.70 - 12.75 GHz

**Tx Gain:**

40.6 dBi (typical at 14.25 GHz)

**Rx Gain:**

39.3 dBi (typical at 11.70 GHz)

**Tx XPD:**

$\geq 28.5$  dB within -1 dB contour

**Rx XPD:**

$\geq 28.5$  dB within -1 dB contour

**G/T (measured with radome):**

18.1 dB/K @ 12.20 GHz

**Remarks:**

1- The characterization uniquely refers to the RF electrical performance.

The validation of the performance of the tracking system and operations of the antenna when installed on a vessel is out of the scope of this summary. More information about this can be found on the manufacturer web site <http://www.cobham.com/seatel>.

2- The RF performance characterization was performed on one antenna unit with radome, at the ITT Exelis test range of Loop Canyon, California US, on the 10-18 March 2013.

**Restriction:**

The worst excess in the receive side to the EESS Gain mask is 5.4 dB.

The service quality in conjunction with operations in certain Rx bands and/or reduced orbital separations from the adjacent satellites may be impaired due to excessive Rx sidelobe levels. Nevertheless, to achieve the required service quality the level of the outroute carrier may need to be increased according to a valid Eutelsat transmission plan.

**Manufacturer:**

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4030 Nelson Avenue  
CONCORD, CA  
94520  
USA

Tel: +1 925 798 7979  
Fax: +1 925 798 7986  
mailto : [Timothy.OConnor@cobham.com](mailto:Timothy.OConnor@cobham.com)

**Antenna model:**  
4006

**Diameter:**  
1 m

**Standard:**  
M

**Characterization date:**  
25-09-08

**System Description:**

Interactive maritime antenna -splash feed cassegrain – three layers 50 inches radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

39.2 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**  
13.75 - 14.50 GHz

**Rx Frequency:**  
10.95 - 12.75 GHz

**Tx Gain:**  
40.6 dBi (typical at 14.25 GHz)

**Rx Gain:**  
39.8 dBi (typical at 12.50 GHz)

**Tx XPD:**  
>26 dB within -1 dB contour

**Rx XPD:**  
>30 dB within -1 dB contour

**Remarks:**

Operations of the tracking have been tested on a Sea Simulator.

Pointing error less than  $\pm 0.2^\circ$  for the following ship motions:

Roll =  $\pm 20$  degrees at 8-12 sec periods

Pitch =  $\pm 10$  degrees at 6-12 sec periods

**Manufacturer:**

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94520  
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**Antenna model:**  
4009

**Diameter:**  
1 m

**Standard:**  
M

**Characterization date:**  
01-12-09

**System Description:**

Interactive maritime antenna -splash feed cassegrain – three layers 50 inches radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

39.2 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**  
13.75 - 14.50 GHz

**Rx Frequency:**  
10.95 - 12.75 GHz

**Tx Gain:**  
40.6 dBi (typical at 14.25 GHz)

**Rx Gain:**  
39.8 dBi (typical at 12.50 GHz)

**Tx XPD:**  
>26 dB within -1 dB contour

**Rx XPD:**  
>30 dB within -1 dB contour

**Remarks:**

Operations of the tracking have been tested on a Sea Simulator.

Pointing error less than  $\pm 0.2^\circ$  for the following ship motions:

Roll =  $\pm 20$  degrees at 8-12 sec periods

Pitch =  $\pm 10$  degrees at 6-12 sec periods

**Manufacturer:**

Cobham SATCOM, Sea Tel Products  
4030 Nelson Avenue  
CONCORD, CA  
94520  
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**Certificate:**  
EA-V058

**Antenna model:**  
5009 StdM Mk2

**Diameter:**  
1.2 m

**Standard:**  
M

**Approval date:**  
08-12-10

**System Description:**

Stabilised maritime antenna – splash feed axi-symmetric cassegrain – feed manufactured by ERA Technology (Cobham Technical Services) - three layers 1.68 m diameter radome manufactured by Ace Composites on Sea Tel design. Three axis stabilization platform with conical scanning tracking.

8 Watt CODAN BUC, referenced as 6908-WE-48EX-CE.

**Models Available:**

Standard configuration: 13.75-14.50 GHz linear orthogonal polarization.  
Option 1 : Tx and Rx parallel.

**Maximum Allowed EIRP:**

40.6 dBW / 40 kHz for digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 § 6.1 refers).

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.70 - 12.75 GHz

**Tx Gain:**

42.4 dBi (typical at 14.25 GHz)

**Rx Gain:**

41.0 dBi (typical at 12.75 GHz)

**Tx XPD:**

>30 dB within -1 dB contour  
>35 dB within maximum pointing error

**Rx XPD:**

>30 dB within -1 dB contour  
>35 dB within maximum pointing error

**Conditions and remarks:**

1

Submission on at least a yearly basis of measurement results for at least one production unit.

2

Operations of the tracking has been tested with the antenna (without radome) on a Sea Simulator, with rms pointing error <0.2°.

Roll = +/-20°/8 sec

Pitch = +/-4°/8 sec

Yaw = +/-6°/8 sec

3

Measured G/T= 19.3 dB/K @ 12.50 GHz, 31.2° Elevation.

**Manufacturer:**

COBHAM SATCOM, SEATEL PRODUCTS  
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Fax: + 1 925 798 7986

Website: <http://www.cobham.com/seatel>

Contact points: [Darren.Manning@cobham.com](mailto:Darren.Manning@cobham.com)

**Antenna model:**

6012

**Diameter:**

1.5 m

**Standard:**

M

**Characterization date:**

05-07-2013

**System Description:**

Stabilised maritime antenna – splash feed axi-symmetric— three layers 1.93 m diameter radome manufactured by Ace Composites on SEATEL design. Three axis stabilization platform with conical scanning tracking.

BUC Various (NJRC, Codan, Comtech, Terrasat, Gilat) 4-8-16-40 Watt with integrated SMW Q-PLL or NJRC LNB.

**Models Available:**

Standard configuration : 13.75-14.50 GHz linear orthogonal polarization.

Option 1 : Tx and Rx parallel.

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):

43.2 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 2.0^\circ$

40.5 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 1.5^\circ$

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.70 - 12.75 GHz

**Tx Gain:**

44.3 dBi (typical at 14.25 GHz)

**Rx Gain:**

42.9 dBi (typical at 11.70 GHz)

**Tx XPD:**

$\geq 28.5$  dB within -1 dB contour

**Rx XPD:**

$\geq 28.5$  dB within -1 dB contour

**G/T (measured with radome):**

21.9 dB/K @ 12.20 GHz

**Remarks:**

1-The characterization uniquely refers to the RF electrical performance.

The validation of the performance of the tracking system and operations of the antenna when installed on a vessel is out of the scope of this summary. More information about this can be found on the manufacturer web site <http://www.cobham.com/seatel>.

2-The RF performance characterization was performed on one antenna unit with radome, at the ITT Exelis test range of Loop Canyon, California US, on the 12-18 March 2013.

**Restriction:**

The worst excess in the receive side to the EESS Gain mask is 4.5 dB.

The service quality in conjunction with operations with reduced orbital separations from the adjacent satellites may be impaired due to excessive Rx sidelobe levels. Nevertheless, to achieve the required service quality the level of the outroute carrier may need to be increased according to a valid Eutelsat transmission plan.



**Manufacturer:**

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19035 SANTO STEFANO MAGRA (SP)  
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Fax: +39 0187 630503  
mailto : [p.salutari@sitep.it](mailto:p.salutari@sitep.it)

**Antenna model:**  
CommSat80

**Diameter:**  
80 cm

**Standard:**  
Nomenclature M-x

**Characterization date:**  
18-09-08

**System Description:**

Interactive maritime antenna - splash feed cassegrain - honeycomb radome. Three axis stabilization platform with conical scanning tracking.

**Maximum Allowed EIRP:**

31.6 dBW/40kHz for digital carriers at the satellite receive contours of 0 dB/K (EESS502, issue 12 rev 1, §6.1 refers).

**Tx Frequency:**

13.75 - 14.50 GHz

**Rx Frequency:**

10.95 - 12.75 GHz

**Tx Gain:**

38.1 dBi (typical at 14.25 GHz)

**Rx Gain:**

36.5 dBi (typical at 12.50 GHz)

**Tx XPD:**

>28 dB within -1 dB contour

**Rx XPD:**

>28 dB within -1 dB contour

**Remarks:**

1

The characterisation uniquely refers to the RF electrical performance which was assessed in a professional test range facility.

The validation of the performance of the tracking subsystem and the operations of the antenna when installed on a ship is out of the scope of this summary. More information about this can be found on the manufacturer web site: <http://www.sitep.it>

2

This antenna should normally be used in both transmit and receive sides in conjunction with spread spectrum or CDMA modems. The association of this antenna with SCPC/TDMA modems is conditioned to the existence of a Eutelsat valid transmission plan (e.g. with high efficiency FEC (1/3, 1/4, etc) and BPSK modulations for the ship-to-shore carrier).

**Applicant:**

THRANE & THRANE A/S trading as COBHAM  
SATCOM  
Lundtoftegaardsvej 93D, 2800 Kgs.  
Lyngby  
DENMARK

Tel : +45 39 55 89 59

Website : [www.cobham.com](http://www.cobham.com)

Email : [info@cobham.com](mailto:info@cobham.com)

**Antenna model:**

SAILOR 600 Ku

**Diameter:**

0.65 m

**Standard:**

Nomenclature M-x

**Characterization date:**

19-05-2017

**Validity period:**

See remark 4

**Last test data submitted on:**

23-02-2017

**System Description:**

Stabilized maritime antenna one Tx port, two (co-polar and cross-polar) Rx ports; splash feed Gregorian. Hydroformed aluminum reflector. Tuned multi-layer sandwich radome. Three axis stabilization platform with conical scanning tracking.

BUC: NexGenWave 6 W; LNB: Thrane & Thrane.

**Maximum Allowed EIRP:** For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):

**In the 14.00-14.50 GHz band:**

31.6 dBW / 40 kHz for an orbital separation from the adjacent satellite  $\geq 1.5^\circ$

31.7 dBW / 40 kHz for an orbital separation from the adjacent satellite  $> 2.0^\circ$

33.5 dBW / 40 kHz for an orbital separation from the adjacent satellite  $> 2.5^\circ$

35.6 dBW / 40 kHz for an orbital separation from the adjacent satellite  $> 3.0^\circ$

**In the 13.75-14.00 GHz band:**

29.6 dBW / 40 kHz for an orbital separation from the adjacent satellite  $\geq 1.5^\circ$

29.7 dBW / 40 kHz for an orbital separation from the adjacent satellite  $> 2.0^\circ$

31.9 dBW / 40 kHz for an orbital separation from the adjacent satellite  $> 2.5^\circ$

32.9 dBW / 40 kHz for an orbital separation from the adjacent satellite  $> 3.0^\circ$

**Tx Frequency:**

13.75 – 14.50 GHz

**Rx Frequency:**

10.70 – 12.75 GHz

**Tx Gain:**

37.6 dBi (average at 14.25 GHz)

**Tx XPD:**

$\geq 35$  dB within -1 dB contour

**Rx Gain (co-polar and cross-polar ports):**

35.8 dBi (average at 11.70 GHz)

**Rx XPD :**

$\geq 30.2$  dB within -1 dB contour (co-polar)

$\geq 31$  dB within -1 dB contour (cross-polar)

**G/T:**

15.9 dB/K typ @ 11.70 GHz at  $30^\circ$  EI

**Restrictions and remarks:**

- The manufacturer states that the RMS pointing error is less than  $0.2^\circ$  for the following ship motions:  
Roll =  $\pm 30^\circ/6s$   
Pitch =  $\pm 15^\circ/5s$   
Yaw =  $\pm 10^\circ/8s$
- The RF performance characterization was performed on one antenna unit with radome, at the Thales Alenia Space test range of Cannes, France on the 21-23 February 2017.
- Cobham has inserted in the ACU software a look-up table with the polarization skew of the Eutelsat satellites, to protect against the mishandling of polarization skew values by installers. The transmission of the HPA is muted from the ACU when the maximum pointing error exceeds  $0.5^\circ$ , by cutting off the 10 MHz reference.
- The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standards.
- The worst sidelobe excess in the near region receive side is 7.15 dB.  
The service quality in conjunction with operations in certain Rx bands and/or reduced orbital separations from the adjacent satellites may be impaired due to excessive Rx sidelobe levels. Nevertheless, to achieve the required service quality the level of the outroute carrier may need to be increased according to a valid Eutelsat transmission plan.
- The transmission in the band 13.75-14.00 GHz for antennas with a diameter  $< 1.2$  m is subject to the ITU radio regulations in force.

**Manufacturer:**

Thrane & Thrane A/S  
trading as Cobham SATCOM  
Lundtoftegaardsvej 93 D  
DK-2800 Kgs. Lyngby  
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Tel: + 45 39 55 88 00  
Fax: + 45 39 55 88 88  
Website: <http://www.cobham.com/lyngby>

**Antenna model:**

SAILOR 800 VSAT 407008A-00500

**Antenna aperture dimensions:**

83 cm

**Standard:**

M

**Characterization date:**

09-10-2013

**System Description:**

Stabilized maritime antenna – ring focus Gregorian configuration – Sandwich foam RTM (Resin Transfer Molding) radome. Three axis stabilization platform with conical RF tracking.  
BUC NextGenWave 6W rating  
LNB PhilTech  
OMT Thrane & Thrane TT 60-131011.

**Models Characterized:**

Standard configuration: linear orthogonal polarization with co-polarized or cross-polarized signal reception option.

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):  
38.6 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 2.5^\circ$   
34.2 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 2.0^\circ$   
34.0 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 1.5^\circ$

**Tx Frequency:**

13.75 – 14.50 GHz

**Tx Gain:**

40.0dBi (typical at 14.25 GHz)

**Tx XPD:**

$\geq 31.7$  dB within -1 dB contour

**Rx Frequency:**

10.70-12.75 GHz

**Rx Gain:**

37.9 dBi (typical at 11.7 GHz)

**Rx XPD:**

$\geq 30.5$  dB within -1 dB contour

**G/T (measured with radome)**

18.2 dB/K @ 12.75 GHz 30 ° Elevation

**Remarks:**

- The manufacturer states that the RMS pointing error is less than  $0.20^\circ$  for the following ship motions:  
Roll =  $30^\circ$  in a period of 6 sec  
Pitch =  $15^\circ$  in a period of 4 sec  
Yaw =  $10^\circ$  in a period of 10 sec
- The RF performance characterization was performed on one antenna unit with radome, at the CTS test range of Leatherhead, UK, on the 21-22 August 2013.
- The transmission of the HPA is muted from the ACU when the maximum pointing error exceeds  $0.5^\circ$ , by inhibiting the 10 MHz reference signal to the BUC.
- Thrane & Thrane has inserted in the ACU software a look-up table with the polarization skew of the Eutelsat satellites, to protect against the mishandling of polarization skew values by installers.
- The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standards.

**Restrictions:**

- The worst excess in the receive side ( $\pm 10^\circ$ ) to the EESS Gain mask is 6.3 dB @  $3^\circ$ .  
The service quality in conjunction with operations in certain Rx bands and/or reduced orbital separations from the adjacent satellites may be impaired due to excessive Rx sidelobe levels. Nevertheless, to achieve the required service quality the level of the outroute carrier may need to be increased according to a valid Eutelsat transmission plan.

**Manufacturer:**

Thrane & Thrane A/S  
Lundtoftegaardsvej 93 D  
DK-2800 Kgs. Lyngby  
DENMARK

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<mailto:info@thrane.com>

**Antenna model:**

SAILOR 900 VSAT 407009B-00500  
and 407009E-00500

**Antenna aperture dimensions:**

1.03 m

**Standard:**

M

**Characterization date:**

30-04-2013

**Last update:**

19-01-2017

**System Description:**

Stabilised maritime antenna – ring focus Gregorian configuration – Sandwich foam pre-preg layers radome. Three axis stabilization platform with conical RF tracking.

BUC 407009B-0500 NextGenWave 8W rating  
407009E-0500 NextGenWave 20W rating

LNB Philtech  
OMT Thrane & Thrane TT 60-131011

**Models Characterized:**

Standard configuration: linear orthogonal polarization with co-polarized or cross-polarized signal reception option.

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):

39.8 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 2.5^\circ$

39.6 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 2.0^\circ$

35.6 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 1.5^\circ$

**Tx Frequency:**

13.75 – 14.50 GHz

**Rx Frequency:**

10.70-12.75 GHz

**Tx Gain:**

41.1dBi (typical at 14.25 GHz)

**Rx Gain:**

40.2 dBi (typical at 11.7 GHz)

**Tx XPD:**

>30 dB within -1 dB contour

**Rx XPD:**

>30 dB within -1 dB contour

**G/T (measured with radome)**

19.9 dB/K @ 12.75 GHz 30 ° Elevation

**Remarks:**

1-The manufacturer states that the RMS pointing error is less than  $0.20^\circ$  for the following ship motions:

Roll =  $30^\circ$  in a period of 6 sec

Pitch =  $15^\circ$  in a period of 4 sec

Yaw =  $10^\circ$  in a period of 10 sec

2-The RF performance characterization was performed on one antenna unit with radome, at the France Telecom test range of La Turbie, France on the 18-20 April 2013.

3-Thrane & Thrane has inserted in the ACU software a look-up table with the polarization skew of the Eutelsat satellites, to protect against the mishandling of polarization skew values by installers.

4-The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standards.

**Restrictions:**

The use of Rx band 10.7 to 10.95 GHz may be subject to impairments because the isolation of the sidelobes at  $3^\circ$  from the boresight is less than 20 dB at 10.70 GHz (17.8 dB). Nevertheless these operations may be exceptionally authorized according to a valid Eutelsat transmission plan.

**Manufacturer:**

Thrane & Thrane A/S  
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DK-2800 Kgs. Lyngby  
DENMARK

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<mailto:info@thrane.com>

**Antenna model:**

SAILOR 900 VSAT 407009A-00500

**Antenna aperture dimensions:**

1.05 m

**Standard:**

M

**Characterization date:**

16-11-2012

**System Description:**

Stabilised maritime antenna – ring focus Gregorian configuration – sandwich foam RTM (Resine Transfer Molding) radome. Three axis stabilization platform with conical RF tracking.

BUC NextGenWave 8W rating

LNB Philtech

OMT Thrane & Thrane TT 60-131011

**Models Characterized:**

Standard configuration: linear orthogonal polarization with co-polarized or cross-polarized signal reception option.

**Maximum Allowed EIRP:**

For digital carriers transmitted at the satellite receive contour of 0 dB/K (EESS 502 refers):

40.0 dBW / 40 KHz for an orbital separation of the adjacent satellite  $\geq 2.0^\circ$

36.1 dBW / 40 kHz for an orbital separation of the adjacent satellite  $\geq 1.5^\circ$

**Tx Frequency:**

13.75 – 14.50 GHz

**Rx Frequency:**

10.7-12.75 GHz

**Tx Gain:**

41.9 dBi (typical at 14.25 GHz)

**Rx Gain:**

40.1 dBi (typical at 11.7 GHz)

**Tx XPD:**

>35 dB within -1 dB contour

**Rx XPD:**

>31.1 dB within -1 dB contour

**G/T (measured with radome)**

19.9 dB/K @ 12.75 GHz 30 ° Elevation

**Remarks:**

1-The manufacturer states that the RMS pointing error is less than  $0.20^\circ$  for the following ship motions:

Roll =  $30^\circ$  in a period of 6 sec

Pitch =  $15^\circ$  in a period of 4 sec

Yaw =  $10^\circ$  in a period of 10 sec

2-The RF performance characterization was performed on one antenna unit with radome, at the France Telecom test range of La Turbie, France on the 23-25 October 2012.

3-Thrane & Thrane will insert in the ACU software a look-up table with the polarization skew of the Eutelsat satellites, to protect against the mishandling of polarization skew values by installers.

4-The characterization's validity is subject to regular submission of patterns to confirm that the system remains compliant with the Eutelsat standards.

**Restriction:**

The use of Rx band 10.7 to 10.95 GHz may be subject to impairments because the isolation of the sidelobes at  $3^\circ$  from the boresight is less than 20 dB at 10.70 GHz (16.4 dB). Nevertheless these operations may be exceptionally authorized according to a valid Eutelsat transmission plan.