| Comport | loper Sti t Own F | udio - A sine q Vofile Equipment | ua non product designed t Under Test Standard Test Env | and developed by w fronment Editors RECC | ww.aiste.st)RD Analytic | t s Tile Cl | aar Screen | Веер | Version | | | | | | | | | |
|----------|--------------------------|---|---|--|----------------------------------|---|--|---|--|---|---|---------|-------|--|--|--|--|----------|
| Signal (| Generat | or No Channel | I Data : Log 27 : Slot : 000 | 0 : UserID : 000000 | 000 : Deskt | top Utc 0 | 0:00:00:0 | 0000 | | | | | | | | | | |
| 1111 | | | | | | | | | | | | | | | | | | |
| | UserID : | 30b : MMSI nun | nber, see Article 19 of the Ri | and Recommendation | n ITU-R M.SE | 85 | | | | | | | | | | | | |
| | Msg | Navigational st | atus is indicated using value | 015, a null field indic | ates = unch | anged (re | i. ITU- R M | .1371, 1 | lessage 1, | Navigatio | onal statu | s param | eter) | | | | | |
| | 1 | Msg TSP | N = B = C = D = 0 (default). N | ull field for A indicates | that the pre | viously e | ntered dim | ension | for that pa | rameter i | s unchan | ged | | | | | | 8 |
| | | VSD | M: This is used to bind the | contents of the ACA a | nd ACS sente | ences tog | ether. 09 | (| | | | | | | | | | × |
| | Msg | | Msg SeqNum NEL | at N/S NELng B | E/W SWL | at N/S | SWLng | E/W | TrZneSz | ChA | ChABw | / ChB | ChBBw | v TxRx | PwrLvI | Info | InUse | Time |
| | 5 | \$AIVSD | ACA 3 9159.9 | 9 N 18159.99 | E 9159. | 99 S | 18159.99 | w | 8 | 2087 | 0 | 2088 | 0 | 5 | 5 | M | 0 | 0 |
| | Degre Minute 1/100 | CommState 3 | Ster, Regione a | R4 E/W N/S Region Northea n Northeast corner under | N/S Region Sout ast corner | E/I Region S thwest co longitu | chann Fransiti Vouthwest orner la | Chan hannel el A on Zon corne titude | Ini Power Tx/Rx r Channel B nel B A bandwi e Size r longitu | formatic r level node cor 3 bandwi idth ude | n sourc control itrol idth | e | | \$- | sinec -I -G - P | - Emai o@ais ndividu eorge F egistra PMG2 Presen | ri co za I - te.st Jal - Tyte tion - 2 | nterface |
| VDM | ccc | 1 - UTC indirec 2 - Synchronize 3 - Synchronize | ed to a base station ed to another station | 3, 5, 7 - Receive 2, 4, 6 - Slot num 1 - UTC hour and 0 - Slot offset | a stations ber d minute | 0 1040 0 | | C 2 fra C 3 fra C 4 fra C 5 fra C 6 fra | ames left u ames left u ames left u ames left u ames left u | ntil slot c ntil slot c ntil slot c ntil slot c ntil slot c | hange hange hange hange hange | | si | - Con nequar - Er info@ - Indiv Georg - Regi PN | npany - nonth.co.za nail - aiste.st vidual - ge Fyfe stration - 4G2 | a | | |

Release Version 1.0

ITU-R M.1371-5 Technology

TEST ENVIRONMENT MODULE

NOTICE

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Objective

The objective for the use of the AIS Developer Studio is to create a general VDL environment using a PC and optional external RF signal generator / power pad. Where the choice of the base-band VDL / VDO and VDM data is easily analyzed and defined. As an AID to AIS

This product should only be used for the purposes intended by its developers and then only according to acceptable reference standards and operating procedures.

Any deviation from this may well be in conflict with competent regional authorities in your area.

The AIS Developer Studio and or Interface/s should not be used to alter the operational status of any AIS unit unless authorized by a competent authority.

Under no circumstances should the AIS Developer Studio and or Interface/s be used to create any signal content outside the scope of this document using any procedure or method offered by the AIS Developer Studio Interface.

© AIS Test.



AISTE.ST formerly Sine Qua Non would like to take this opportunity to congratulate you on the purchase of one of the AIS Developer Studio suite of products. We want to assure you that this product range is designed using over 22 Years of AIS experience and thoroughly tested to ensure your complete satisfaction.

A demonstration program is provided free of charge. AISTE.ST requires that the user download the demo program and documentation from <u>www.aiste.st</u> and validate it for their respective use prior to placing an order for the un-encumbered licensed version.

Limited Warranty.

Where software discrepancies are identified and or module operational bugs are found. These should immediately be brought to the attention of AISTE.ST. The warranty is limited to the rectification of the discrepancy or bug by software upgrade, and should not exceed the original operational and technical specification as defined by AISTE.ST in the respective AIS Developer Studio module.

If you have any questions, queries or customisation requests related to this product, please do not hesitate to contact us by email:

Physical Address: 28 Mustang Ave Pierre Van Ryneveld Centurion Gauteng South Africa

Postal Address: 28 Mustang Ave Pierre Van Ryneveld Centurion Gauteng South Africa

- Email: <u>support@aiste.st</u> info@sinequanonth.co.za
- Website: <u>www.aiste.st</u> <u>www.sinequanonth.co.za</u>

Telephone: +27 0722253467

Thanking you,

AISTE.ST



Installation

The installation of AIS Developer Studio is as follows. Obtain the latest version of ADSV2.exe and license.txt from <u>www.aiste.st</u>. Create a new folder. Save the downloaded files in the folder. Run the application. This will allow the unit to run in demo mode.

Certain modulation formats will not run in demo mode.

AIS Developer Studio is not freeware.

Once you have evaluated it for your purpose please purchase your license file from <u>www.aiste.st</u>. Save your purchased license.txt file in the above-mentioned folder. This will allow the application to run in full un-unencumbered mode.

The license file will provide full user registration details.

Registered users will receive support if any problems with AIS Developer Studio arise.

ALL requests for support should be addressed to <u>support@aiste.st</u> explaining any bug or discrepancy as well as a screenshot.

It is the intention of AISTE.ST through the current and further development of the AIS Developer Studio suite of components to continue to supply a cost effective method for development, production, integration and verification of protocols as used by AIS, ASM and VDE.

It is the intention of AISTE.ST to supply upgrades to the AIS Developer suite user group if and when they become available.

Users may subscribe to this upgrade service.



Verification set-up A







Verification set-up C





Method of measurement

Setup hardware as per Verification set-up A / B / C

Procedure

Initiate the following steps in order.

- Please follow order correctly.
- Once you have setup the signal generator modulation and created 5 separate identities you must save a system profile file.
- Save this file with a unique name so that you can re-use it and do not overwrite it.
- Step through all the following procedures.

WARNING

Many different signal generators and test sets are used to test radio communications transceivers. Some of these devices contain both signal generator and monitor receivers, which share a common output connector to the EUT path. If the signal generator is connected to the antenna connector to test the receiver, and the transmitter keys, then serious damage can result to the signal generator.

Higher quality instruments provide architectures with EUT reverse power protection. This circuitry will prevent damage to the signal source if a high RF power level is applied to its output connector from the EUT. Generally speaking...An AIS transmission may be to fast to correctly activate some of these protection circuit.

Make use of EXTERNAL RF POWER PADS.



Start AIS Developer Studio

- Select and open license file
- AIS Developer Studio main time line window is displayed.



• If a "System Profile File" was previously created then select and open it.

| AIS Develop | er Studio | - A sine qua | non produ | uct designed and de | veloped by www.aiste. | st | | | |
|---------------------|-----------|--------------|-------------|----------------------|---------------------------|----------------|--------------------------|----------------------|--------------------------|
| System Profile File | Comport | Sound Card | Own Profile | Equipment Under Test | Standard Test Environment | Editors RECORD | Analytics Process Graphs | Tile Clear Screen Be | eep Version Licence File |
| open save | | 00 00 00 00 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Select Sound Card Menu Item

| AIS Developer Studio - A sine qua non product designed and developed by www.aiste.st | |
|--|--|
| System Profile File Comport Sound Card Own Profile Equipment Under Test Standard Test Environment Editors RECORD | Analytics Process Graphs Tile Clear Screen Beep Version Licence File |
| Sound Card WAVE FORMAT Setup | 3 |
| closed | |
| USB Audio Device Realtek HD Audio output Virtual Cable 1 VB-Audio Point | |
| OPEN SOUND CARD | |
| CLOSE SOUND CARD | |
| | |

- A list of available devices will be shown.
- Dialogue device indication indicates, "closed"



 Select the "audio output device". This will be different for every user and will depend on the internal / external soundcard/s in your system.

| AIS Developer Studio - A sine qua non product designed and developed by www.aiste.st | |
|--|--|
| System Profile File Comport Sound Card Own Profile Equipment Under Test Standard Test Environment Editors RECORD A | Analytics Process Graphs Tile Clear Screen Beep Version Licence File |
| Sound Card WAVE FORMAT Setup | |
| closed | |
| USB Audio Device | |
| Realtek HD Audio output | |
| Virtual Cable 1 VB-Audio Point | |
| OPEN SOUND CARD | |
| CLOSE SOUND CARD | |
| | |

- Select your "Audio Output Device"
- Select "Open Sound Card"
- The dialogue will automatically close if the requested device could be opened.

If you want to view your selection re-select Sound Card Menu Item.

| 🐱 AIS Developer Studio - A sine qua non product designed and developed by www.aiste.st | | | | | |
|---|-------------|---|--------------------|--------------|--------------|
| System Profile File Comport Sound Card Own Profile Equipment Under Test Standard Test Environment Editors RECOR | RD Analytic | s Process Graphs Tile | e - Clear Screen - | Beep Version | Licence File |
| Sound Card WAVE FORMAT Setup | | | | | |
| Realtek HD Audio output | _ ₩ | | | | |
| USB Audio Device | | | | | |
| Realtek HD Audio output | | | | | |
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| VB-Audio Point | | | | | |
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| OPEN SOOND CARD | | | | | |
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| | | ***** | | | |
| CLOSE SOLIND CARD | | | | | |
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| | | +++++++++++++++++++++++++++++++++++++++ | | | |
| | | | | | |
| | | | | | |

You can see that:

- Your previous selection is highlighted.
- If successfully opened the dialogue device string indicates the device you selected.
- Close the dialogue the conventional Windows way or use the escape key.





Set up a test environment of at least 5 test targets as follows.

• Select Standard Test Environment Menu Item.

| 🐱 AIS Developer Studio - A sine qua non product designed and de | veloped by www.ai | ste.st | |
|---|------------------------|--|---|
| System Profile File Comport Sound Card Own Profile Equipment Under Test | Standard Test Environn | nent Editors RECORD Analytics Process Graphs | Tile Clear Screen Beep Version Licence File |
| ABK Analyser : tEvent 00 00 00 0000 | setup | Track 1 Track 2 | |
| | vdl 🕨 | Track 3 | |
| | eut filename.txt 🕨 | Track 4 Track 5 | |
| | | Profile 5 Targets Using License Defaults | |
| | | | |

- Select setup-> Profile 5 Targets Using License Defaults
- This will automatically format the 5 virtual targets with the license defaults.
- The MMSI for each individual track will be equal to the (licence.txt)BaseMmsi + (1...5).

You need to individually select and format each virtual track.

- Select Standard Test Environment.
- Select setup-> Track 1
- Select Standard Test Environment.
- Select setup-> Track 2
- Select Standard Test Environment.
- Select setup-> Track 3
- Select Standard Test Environment.
- Select setup-> Track 4
- Select Standard Test Environment.
- Select setup-> Track 5

| UserID : 3 | Ob : M | MSI number, see | Article : | 19 of t | he RR | and Re | comme | endat | tion ITU | -R M.58 | 5 | anness anns | sainte Mailes | - 1989 | indise: | toolli tedi | 1.3 - 322 | 195-100 | in Waltest | 3033-33 | 20141-02 | odest (d). | A Malest Auto | X |
|------------|--------|--|-----------|---------|-------|--------|----------|-------|----------|---------|---------|-------------|---------------|--------|---------|-------------|-----------|--------------|------------|---------|------------|-----------------------------|-----------------------------|---|
| Msg | RI | User ID | NvSt | ROT | ais | SOG | PA | | Longitu | ude | Lat | itude | COG | TI | Head | TSMP | SMI | S | RAIM | SS | STO | Sub | MSG | |
| 3 | 0 | 1 | 15 | 0 | | 010.0 | 1 | 0 | 2814.9 | 718,E | 2550. | 8005,S | 359.9 | 3 | 50.0 | 34 | 0 | 0 | 0 | 0 | | | | |
| Msg | RI | User ID | utcY | utcM | utcD | utcH | utcM | utcS | PA | Long | gitude | Lati | tude | EPFD | TXirb | S | RAIM | 1 SS | STO | Sul | MSG | | | |
| 4 | 0 | 1 | 2019 | 5 | 19 | 5 | 5 | 34 | 1 | 02814 | .9718,E | 2550.8 | 005,S | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |
| Msg | RI | User ID | Altit | ude | SOG | PA | Lon | gitud | e | Lat | itude | COG | TSMP | AS | s | DTE | s | AMF | RAIM | CSSF | SS | STO | SubMSG | |
| 9 | 0 | 1 | 0 |) | 010.0 | 1 | 0281 | 4.971 | 18,E | 2550. | 8005,S | 359.9 | 34 | 0 | 0 | 1 | 0 | 0 | 0 | sel | 0 | 1 | 1 | |
| Degree | es | | | -1- | | | | | | | | | | | | SOG | _ | - <u> </u> - | | | | | | |
| Minute | s | | | | | | | | - | | | | | _ | | COG | _ | | | | | | | |
| 1 / 10 | 000 | | | | | 1 | ŀ | | | | | | | | | HDT | _ | | | | | -1- | | |
| | | | Longit | ude | | | | | | | La | titude | | | | ROT | _ | | | _ | _ | | | |
| Msg | RI | User ID | aisV | in | noN | Ca | ill Sign | | | | Name | Of Ship | | | TShip | dimA | dimB | dim | C dimD | Th | is Pro | duct Is Comp | Licensed T any - | ō |
| 5 | | 1 | 2 | |) | 000 | | 00 | @@ | 0000 | 00000 | 00000 | 00000 | @ | 0 | 0 | 0 | 0 | 0 | | sine | - Em | ail - | |
| | Nomin | Ship 0-14 knots al reporting interv | al 10 s | | EPFD | etaM | etaD | etaH | etaM | Sdraft | | | Destinati | on | | | | DTE | S | | - | nfo@a • Indivi George | iste.st dual - : Fyfe | |
| | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 000 | 00000 | 00000 | 000 | 000 | 000 | J | 1 | | | - | Registi PM | ation - 52 | |

- Characterize each individual track. Dynamic update rate is supported.
- Close the dialogue the conventional Windows way or use the escape key.



Set External Signal Generator Modulation / Deviation Level

Please read your Signal Generator Manual to find out the correct EXT modulation SETUP process for your instrument. It may be unique to your instrument.

If you are unable to correctly setup your own instrument with the manufacturers manual then one of the following procedures may provide a nominally accurate 2.4KHZ deviation.

In FM, the depth of modulation is expressed as the modulation index (β), which is defined as the ratio of the deviation to the modulating frequency, or F_d/f_m . The FM process produces a large number of sidebands and, at certain values of β , the carrier will go to zero. The sidebands are described by mathematical entities called Bessel functions.

- Connect External Signal Generator Output to Spectrum Monitor.
- Setup Frequency = AIS1 / AIS2 / DSC; Span = 60 / 25Khz
- Select FM modulation as required.
- Right click mouse cursor in Programmable Modulation Time Line
- A context menu will be displayed.
- Select Modulation Waveform -> Standard Test Tone 1000HZ.



Set the modulation frequency to 1KHz and zero level / deviation.

| 🔤 AIS Developer Studio - A sine qua non product designed and developed by www.aiste.st | |
|---|--|
| System Profile File Comport Sound Card Own Profile Equipment Under Test Standard Test Environment Editors RECORD Analytic | s Process Graphs Tile Clear Screen Beep Version Licence File |
| Programmable Modulation Generator - Analyser Message Number 13 : Log 070 : UserID 000000000 : tEvent 00 | 00 00 0000 |
| | |
| Set Modulation Level | 3 |
| External Signal Generator Modulation Setup | |
| Left WAVE Channel 00000 | |
| Right WAVE Channel 000 | |
| | |

- Now slowly increase the level of the WAVE output channel / deviation that you connected to the Signal Generator EXT modulation in the "method" and you will see the carrier decrease to zero on the spectrum monitor. Leave the level at maximum null of the carrier.
- Reconnect Signal Generator to VDL "method"
- Save "System Profile File"



Alternatively if your Signal Generator has an automatic leveling EXT modulation setup, then set the Sound Card output level to just under maximum.

- This will allow the best signal to noise ratio from the sound card DAC.
- Adjust deviation on Signal Generator as required.

| AlS Developer Studio - A sine qua non product designed and developed by www.aiste.st | |
|--|--|
| System Profile File Comport Sound Card Own Profile Equipment Under Test Standard Test Environment Editors RECORD Analytics | Process Graphs Tile Clear Screen Beep Version Licence File |
| Programmable Modulation Generator - Analyser Message Number 13 : Log 070 : UserID 000000000 : tEvent 00 0 | 0 00 0000 |
| | |
| Set Modulation Level | Ŋŧ┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼┼ |
| External Signal Generator Modulation Setup | |
| Left WAVE Channel 00250 | |
| Right WAVE Channel | |
| ╢╪┼┼╴┺ | ┹ |

Alternatively make Use Of The IEC 61993 Transmission Mask for 25KHZ bandwidth as viewed on your Spectrum Monitor.





Starting the Standard Test Environment VDL

- Set Signal Generator Output to a nominal –nn.n dBm output level.
- As we are evaluating operational and not absolute EUT parameters, we create an average VDL level of -67 -> -87dBm) EUT received signal strength.

Open EUT COM Port

| AIS Develope | r Studio - A sine qua | non product designed and dev | eloped by www.aiste.s | st | | | | | | | |
|---------------------|---|---|---------------------------|---------|--------|-----------|----------------|------|--------------|------|---------|
| System Profile File | Comport Sound Card | Own Profile Equipment Under Test S | Standard Test Environment | Editors | RECORD | Analytics | Process Graphs | Tile | Clear Screen | Beep | Version |
| ABK Analyser | signal generator port | • | | | | | | | | | |
| nort rindig out | eut presentation port | ► hardware port ► 38400 ► | select com port 1 | | | | | | | | |
| | epfd sensor port | eut filename.txt | select com port 2 | | | | | | | | |
| | long range port | • | select com port 3 | | | | | | | | |
| | | | select com port 4 | | | | | | | | |
| | | | select com port 5 | | | | | | | | |
| | +++++++++++++++++++++++++++++++++++++++ | +++++++++++++++++++++++++++++++++++++++ | select comport 6 | | +++++ | | | | ++++++ | | |
| | | | select com port 7 | | | | | | | | |
| | | +++++++++++++++++++++++++++++++++++++++ | select com port 9 | | +++++ | | | | ++++++ | | |
| | | | select comport o | | | | | | | | |
| | | | | | | | | | | | |

View EUT network entry – EUT VDO or ADS(B) VDL VDM



Start the Standard Test Environment VDL

| AIS Developer Studio - A sine qua non product designed and de | eveloped by www | w.aiste. | st | | | | | | | | | |
|---|-------------------|-----------|---------|--------|-----------|----------------|-----------|--------------|------|---------|--------------|---|
| System Profile File Comport Sound Card Own Profile Equipment Under Test | Standard Test Env | /ironment | Editors | RECORD | Analytics | Process Graphs | Tile | Clear Screen | Beep | Version | Licence File | |
| ABK Analyser : tEvent 00 00 00 0000 | setup epfd | | | | | | | | | | | |
| | vdl | • s | tart | | | | \square | +++++ | | | +++++ | |
| | eut filename.txt | t⊁ s | top | | | | | | | | +++++ | Ħ |
| | | | | | | | | | | | | |



View the ADS internal VDO communication – Programmable Modulation Generator - VDO.

- Network entry of 5 targets
- After network entry Message 5 from 5 targets repeats every 6 minutes
- Continuous operation phase 5 targets.
- Individual target dynamic update rate can be changed by effecting changes in static navigation state or respective sensor information.

View the ADS PMG->Soundcard->RF Signal Generator VDL communication – EUT Receiver VDM or VDL Receiver - VDO.

What can be seen in the PMG time line is that the color of each log point changes. This is not the case for the VDL – VDM log point.

The reason is twofold:

- The PMG automatically creates and outputs VDO information on alternating AIS channels.
- The PMG Sound Card is connected to the external Signal Generator that is set to one AIS frequency manually.
- This correlates to single channel reception of the VDL. This is correct.



Abbreviations

The following is a list of abbreviations used in the AIS Developer Studio Suite

| 1pps | 1 pulse per second |
|--------|---|
| ACK | Acknowledge |
| AIS | Automatic Identification System |
| AIS1 | Automatic Identification System channel 1 (161.975 MHz) |
| AIS2 | Automatic Identification System channel 2 (162.025 MHz) |
| ANT | Antenna |
| BER | Bit Error Rate |
| BIT | Built In Self Test |
| BS | Base Station |
| BT | Bandwidth Time product |
| COG | Course over Ground |
| DBR | Differential Beacon Receiver |
| DSC | Digital Selective-Calling |
| DTE | Data Terminal Equipment |
| ECDIS | Electronic Chart Display and Information System |
| ECS | Electronic Chart System |
| EPFS/D | Electronic Position Fixing System/Device |
| ETA | Estimated Time of Arrival |
| GPS | Global Positioning System |
| HDLC | High-level Data Link Control |
| IEC | International Electro-technical Commission |
| 10 | Input-Output |
| ITU | International Telecommunication Union |
| KDU | Keyboard Display Unit |
| LR | Long Range |
| MMSI | Maritime Mobile Service Identities |
| PMG | Programmable Modulation Generator |
| PA | Power Amplifier |
| PC | Personal Computer |
| PER | Packet Error Rate |
| PI | Presentation Interface |
| RF | Radio Frequency |
| ROT | Rate of Turn |
| RX | Receive |
| SOG | Speed over Ground |
| TDMA | Time Division Multiple Access |
| ТХ | Transmit |
| UTC | Coordinated Universal Time |
| VDL | VHF Data Link |
| VHF | Very High Frequency |
| VSWR | Voltage Standing Wave Ratio |
| ADS | AIS Developer Studio V2 |
| NTP | Network Time Protocol |
| SNTP | Simple Network Time Protocol |
| ADS | AIS Developer Studio |





Reference Documents

List of standards and specifications

| Document Number | Title |
|---------------------------------------|---|
| IEC 61162-1 | Maritime Navigation and Radio Communication Equipment and Systems - Digital Interfaces: Part 1 - Single Talker and Multiple Listeners. |
| IEC 61162-2 | Maritime Navigation and Radio Communication Equipment and Systems - Digital Interfaces: Part 2 - Single Talker and Multiple Listeners High Speed Transmission. |
| IEC 61993-2 IEC 62287 IEC 62320 | Universal Shipborne Automatic Identification System (AIS). |
| ITU-R M.1084-2 | Interim solutions for improved efficiency in the use of Band 156-174Mhz by stations in the Maritime Mobile Service. |
| ITU-R M.1371-5 | Technical characteristics for a universal ship-borne automatic identification system using time division multiple access in the maritime mobile band. |
| ITU-R M.493 | Digital Selective Calling (DSC) system for use in the Maritime Mobile Service. |
| ITU-R M.823-2 | Technical characteristics of differential transmissions for global navigation satellite systems from maritime radio beacons in the frequency band 283.5 - 315 kHz in region 1 and 285-325 kHz in regions 2 and 3. |
| ITU-R M.825-3 | Characteristics of a transponder system using DSC techniques for use with vessel traffic services and ship-to-ship identification. |
| ITU Manual | ITU Manual for use by the Maritime mobile and Maritime Mobile-Satellite Services. |
| IEC 61108-1 | Global navigation satellite systems (GNSS) - Part 1: Global positioning system (GPS) - Receiver equipment - Performance standards, methods of testing and required test results. |
| IEC/EN 60945 | Maritime Navigation and Radio communication equipment and systems – General requirements-methods of testing and required results |

List of Related Software and Manuals

| Module | | | Description Part number | |
|--------------------|-----------------|----------|---|--|
| AIS | Developer | Studio | A Windows based application for ADSV2.exe | |
| Softw | are for Windows | . | configuring and testing various AIS | |
| Verified to run on | | | products. | |
| WIN | (P and WIN10 | | Various levels of user access available | |
| | | | dependent on licence. | |





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