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Report No.: SZEM180700692203  
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## **TEST REPORT**

**Application No. :** SZEM1807006922CR  
**Applicant:** Navico Inc.  
**Address of Applicant:** 4500 S. 129th East Avenue, Ste. 200, Tulsa, Oklahoma, 74134 United States  
**Manufacturer:** Navico Auckland Limited  
**Address of Manufacturer:** Arrenway Drive, Rosedale, Auckland, 0632 New Zealand  
**Factory:** Shenzhen Hytera Communications Corporation Limited  
**Address of Factory:** Hytera Technology Park, Baolong Industrial City, Longgang District, Shenzhen, China

**Equipment Under Test (EUT):**  
**EUT Name:** Marine VHF Radio  
**Model No.:** Link-9  
**Trade mark:** LOWRANCE  
**Standards:** IEC 62238:2003  
**Date of Receipt:** 2018-07-31  
**Date of Test:** 2018-08-10 to 2018-08-29  
**Date of Issue:** 2018-09-25

|                      |              |
|----------------------|--------------|
| <b>Test Result :</b> | <b>Pass*</b> |
|----------------------|--------------|

\* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EU Directives.



Keny Xu

EMC Laboratory Manager



The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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| Revision Record |         |            |          |          |
|-----------------|---------|------------|----------|----------|
| Version         | Chapter | Date       | Modifier | Remark   |
| 01              |         | 2018-09-25 |          | Original |
|                 |         |            |          |          |
|                 |         |            |          |          |

|                          |  |                                                                                     |  |  |
|--------------------------|--|-------------------------------------------------------------------------------------|--|--|
| Authorized for issue by: |  |                                                                                     |  |  |
|                          |  |    |  |  |
|                          |  | Edison Li /Project Engineer                                                         |  |  |
|                          |  |  |  |  |
|                          |  | Eric Fu /Reviewer                                                                   |  |  |



## 2 Test Summary

| Transmitter                                                                                 |                   |                          |                           |        |
|---------------------------------------------------------------------------------------------|-------------------|--------------------------|---------------------------|--------|
| Item                                                                                        | Standard          | Method                   | Requirement               | Result |
| Frequency error                                                                             | EN 301 025 V2.2.1 | EN 301 025 clause 8.1.2  | EN 301 025 clause 8.1.1   | Pass   |
| Carrier power                                                                               | EN 301 025 V2.2.1 | EN 301 025 clause 8.2.2  | EN 301 025 clause 8.2.1   | Pass   |
| Frequency deviation                                                                         | EN 301 025 V2.2.1 | EN 301 025 clause 8.3.2  | EN 301 025 clause 8.3.1   | Pass   |
| Reduction of frequency deviation at modulation frequencies above 3 kHz                      | EN 301 025 V2.2.1 | EN 301 025 clause 8.3.3  | EN 301 025 clause 8.3.3.1 | Pass   |
| Sensitivity of the modulator, including microphone                                          | EN 301 025 V2.2.1 | EN 301 025 clause 8.4.2  | EN 301 025 clause 8.4.1   | Pass   |
| Audio frequency response                                                                    | EN 301 025 V2.2.1 | EN 301 025 clause 8.5.2  | EN 301 025 clause 8.5.1   | Pass   |
| Audio frequency harmonic distortion of the emission                                         | EN 301 025 V2.2.1 | EN 301 025 clause 8.6.2  | EN 301 025 clause 8.6.1   | Pass   |
| Adjacent channel power                                                                      | EN 301 025 V2.2.1 | EN 301 025 clause 8.7.2  | EN 301 025 clause 8.7.1   | Pass   |
| Conducted spurious emissions conveyed to the antenna                                        | EN 301 025 V2.2.1 | EN 301 025 clause 8.8.2  | EN 301 025 clause 8.8.1   | Pass   |
| Cabinet radiation and conducted spurious emissions other than those conveyed to the antenna | EN 301 025 V2.2.1 | EN 301 025 clause 8.9.2  | EN 301 025 clause 8.9.1   | Pass   |
| Transient frequency behaviour of the transmitter                                            | EN 301 025 V2.2.1 | EN 301 025 clause 8.10.2 | EN 301 025 clause 8.10.1  | Pass   |
| Residual modulation of the transmitter                                                      | EN 301 025 V2.2.1 | EN 301 025 clause 8.11.2 | EN 301 025 clause 8.11.1  | Pass   |
| Frequency error (demodulated DSC signal)                                                    | EN 301 025 V2.2.1 | EN 301 025 clause 8.12.2 | EN 301 025 clause 8.12.1  | Pass   |
| Modulation index for DSC                                                                    | EN 301 025 V2.2.1 | EN 301 025 clause 8.13.2 | EN 301 025 clause 8.13.1  | Pass   |
| Modulation rate for DSC                                                                     | EN 301 025 V2.2.1 | EN 301 025 clause 8.14.2 | EN 301 025 clause 8.14.1  | Pass   |
| Testing of free channel transmission on DSC channel 70                                      | EN 301 025 V2.2.1 | EN 301 025 clause 8.15.2 | EN 301 025 clause 8.15.1  | Pass   |

| Radiotelephone receiver                                    |                   |                         |                         |      |
|------------------------------------------------------------|-------------------|-------------------------|-------------------------|------|
| Harmonic distortion and rated audio-frequency output power | EN 301 025 V2.2.1 | EN 301 025 clause 9.1.2 | EN 301 025 clause 9.1.1 | Pass |
| Audio frequency response                                   | EN 301 025 V2.2.1 | EN 301 025 clause 8.7.2 | EN 301 025 clause 9.2.1 | Pass |
| Maximum usable sensitivity                                 | EN 301 025 V2.2.1 | EN 301 025 clause 9.3.2 | EN 301 025 clause 9.3.1 | Pass |
| Co-channel rejection                                       | EN 301 025 V2.2.1 | EN 301 025 clause 9.4.2 | EN 301 025 clause 9.4.1 | Pass |



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|                                      |                   |                          |                          |      |
|--------------------------------------|-------------------|--------------------------|--------------------------|------|
| Adjacent channel selectivity         | EN 301 025 V2.2.1 | EN 301 025 clause 9.5.2  | EN 301 025 clause 9.5.1  | Pass |
| Spurious response rejection          | EN 301 025 V2.2.1 | EN 301 025 clause 9.6.2  | EN 301 025 clause 9.6.1  | Pass |
| Intermodulation response             | EN 301 025 V2.2.1 | EN 301 025 clause 9.7.2  | EN 301 025 clause 9.7.1  | Pass |
| Blocking or desensitization          | EN 301 025 V2.2.1 | EN 301 025 clause 9.8.2  | EN 301 025 clause 9.8.1  | Pass |
| Spurious emissions                   | EN 301 025 V2.2.1 | EN 301 025 clause 9.9.2  | EN 301 025 clause 9.9.1  | Pass |
| Receiver radiated spurious emissions | EN 301 025 V2.2.1 | EN 301 025 clause 9.10.2 | EN 301 025 clause 9.10.1 | Pass |
| Receiver residual noise level        | EN 301 025 V2.2.1 | EN 301 025 clause 9.11.2 | EN 301 025 clause 9.11.1 | Pass |
| Squelch operation                    | EN 301 025 V2.2.1 | EN 301 025 clause 9.12.2 | EN 301 025 clause 9.12.1 | Pass |
| Squelch hysteresis                   | EN 301 025 V2.2.1 | EN 301 025 clause 9.13.2 | EN 301 025 clause 9.13.1 | Pass |
| Multiple watch characteristic        | EN 301 025 V2.2.1 | EN 301 025 clause 9.14.2 | EN 301 025 clause 9.14.1 | Pass |

| <b>Receiver for DSC decoder</b>         |                   |                          |                          |               |
|-----------------------------------------|-------------------|--------------------------|--------------------------|---------------|
| <b>Item</b>                             | <b>Standard</b>   | <b>Method</b>            | <b>Requirement</b>       | <b>Result</b> |
| Maximum usable sensitivity              | EN 301 025 V2.2.1 | EN 301 025 clause 10.1.2 | EN 301 025 clause 10.1.1 | Pass          |
| Co-channel rejection                    | EN 301 025 V2.2.1 | EN 301 025 clause 10.2.2 | EN 301 025 clause 10.2.1 | Pass          |
| Adjacent channel selectivity            | EN 301 025 V2.2.1 | EN 301 025 clause 10.3.2 | EN 301 025 clause 10.3.1 | Pass          |
| Spurious response and blocking immunity | EN 301 025 V2.2.1 | EN 301 025 clause 10.4.2 | EN 301 025 clause 10.4.1 | Pass          |
| Intermodulation response                | EN 301 025 V2.2.1 | EN 301 025 clause 10.5.2 | EN 301 025 clause 10.5.1 | Pass          |
| Dynamic range                           | EN 301 025 V2.2.1 | EN 301 025 clause 10.6.2 | EN 301 025 clause 10.6.1 | Pass          |
| Spurious emissions                      | EN 301 025 V2.2.1 | EN 301 025 clause 10.7.2 | EN 301 025 clause 10.7.1 | Pass          |
| Simultaneous reception                  | EN 301 025 V2.2.1 | EN 301 025 clause 10.8.2 | EN 301 025 clause 10.8.1 | Pass          |

N/A: Not applicable.



EN 301 025, Electromagnetic compatibility and Radio Spectrum Matters (ERM); Technical characteristics and methods of measurement for VHF radiotelephone equipment for general communications and associated equipment for Class "D" Digital Selective Calling (DSC).

- The requirement for a dedicated channel 70 watchkeeping receiver for DSC decoder has been replaced by a channel 70 watchkeeping facility in order to permit alternative design methods. This facility, however, is still required to achieve continuous DSC monitoring (except when the transmitter is in use). A new test has been added to test that DSC reception is achieved simultaneously with radiotelephone reception.
- The requirement for a Numeric Keypad has been replaced by a more general means of easily entering a MMSI to allow more flexibility in design.
- The requirement for the transmitter to work for 30 min continuously in the high power transmit condition has been replaced by a period of 5 min to permit the use of a lower cost transmitter. Facilities have also been added to limit transmission time to 5 min.
- The requirement to protect information in volatile memories from interruptions in the power supply of up to 60 s duration has been removed as not being of practical benefit.
- A requirement to transmit and receive enhanced position information with a distress call has been added.
- EMC requirements have been added.



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## 4 General Information

### 4.1 Details of E.U.T.

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|--------------------------------|------------------------------------------------------------|
| Power supply:                  | 12 VDC battery system                                      |
| Cable:                         | DC cable: longer than 300cm unshielded                     |
| Sample Type:                   | Mobile device                                              |
| Transmitter Frequency Range:   | 156.025MHz-157.425MHz                                      |
| Receiver Frequency Range:      | 156.05MHz-163.275MHz                                       |
| AIS Receiver Frequency Range:  | 161.975MHz(CH87), 162.025MHz(CH88)                         |
| GNSS Receiver Frequency Range: | 1559MHz-1610MHz(GLONASS:G1, GPS:L1)                        |
| Modulation Type:               | Analog Voice: FM;<br>GNSS: BPSK                            |
| Frequency Spacing:             | 25KHz                                                      |
| Emission Type:                 | 16K0G3E, 16K0G2B                                           |
| Max Power:                     | 43.98dBm/30dBm                                             |
| VHF Antenna Connectors:        | SO-239(50 ohm, External Antenna)                           |
| VHF Antenna Gain:              | 6dBi                                                       |
| GPS Antenna Connector:         | SMA for External antenna;<br>Integral for Internal antenna |
| GPS Antenna Gain:              | 1.5dBi                                                     |

Test Channel

| Modulation Type | Channel Separation | Test Channel  | Test Frequency (MHz) |         |
|-----------------|--------------------|---------------|----------------------|---------|
|                 |                    |               | TX                   | RX      |
| Analog/FM       | 25KHz              | L             | 156.025              | 156.050 |
|                 |                    | M(Channel 16) | 156.800              | 156.800 |
|                 |                    | H             | 157.425              | 163.275 |
|                 |                    | Channel 70    | 156.525              | 156.525 |



## 4.2 Description of Support Units

| Description        | Manufacturer       | Model No. | Serial No.      |
|--------------------|--------------------|-----------|-----------------|
| DC power           | ZHAOXIN            | RXN-305D  | REF. No.SEA2700 |
| Coaxial Attenuator | Provided by client | TS4       | HYT168793       |

## 4.3 Test Environment

| Environment Parameter | Selected Values During Tests |            |
|-----------------------|------------------------------|------------|
| Relative Humidity     | Ambient                      |            |
| Value                 | Temperature(°C)              | Voltage(V) |
| TNVN                  | 25                           | 12         |
| TLVL                  | -20                          | 13.2       |
| TLVH                  | -20                          | 15.6       |
| THVL                  | 55                           | 13.2       |
| THVH                  | 55                           | 15.6       |

Note:

- The EUT just work in such extreme temperature of -20°C~+55°C and the extreme voltage of 10.8V~15.6V, so here the EUT is tested in the temperature of -20°C~+55°C and the voltage of 10.8V~15.6V.
- |                                  |                                   |
|----------------------------------|-----------------------------------|
| VN: Normal Voltage               | TN: Normal Temperature            |
| VL: Low Extreme Test Voltage     | VH: High Extreme Test Voltage     |
| TL: Low Extreme Test Temperature | TH: High Extreme Test Temperature |

## 4.4 Measurement Uncertainty

| No. | Item                            | Measurement Uncertainty |
|-----|---------------------------------|-------------------------|
| 1   | Radio Frequency                 | 7.25 x 10-8             |
| 3   | Duty cycle                      | 0.37%                   |
| 4   | Occupied Bandwidth              | 3%                      |
| 5   | RF conducted power              | 0.75dB                  |
| 6   | Conducted Spurious emissions    | 0.75dB                  |
| 7   | Radiated Spurious emission test | 4.5dB (30MHz-1GHz)      |
|     |                                 | 4.8dB (1GHz-18GHz)      |
| 8   | Temperature test                | 1 °C                    |
| 9   | Humidity test                   | 3%                      |
| 10  | Supply voltages                 | 1.5%                    |
| 11  | Time                            | 3%                      |



#### **4.5 Test Location**

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.  
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

#### **4.6 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

#### **4.7 Deviation from Standards**

None

#### **4.8 Abnormalities from Standard Conditions**

None



## 5 Equipment List

| RF conducted test  |                 |                 |               |            |              |
|--------------------|-----------------|-----------------|---------------|------------|--------------|
| Test Equipment     | Manufacturer    | Model No.       | Inventory No. | Cal Date   | Cal Due Date |
| Cell Site Test Set | HP              | 8921A           | 3715A04970    | 2018.04.11 | 2019.04.10   |
| DC Power Supply    | HP              | 6652A           | 3347A01324    | 2018.04.11 | 2019.04.10   |
| Spectrum Analyzer  | R&S             | FSV             | 103067        | 2017.11.09 | 2018.11.08   |
| Spectrum Analyzer  | R&S             | FSU             | 101389        | 2018.04.12 | 2019.04.11   |
| Signal Generator   | HP              | 8656B           | 7076166       | 2018.04.12 | 2019.04.11   |
| Signal Generator   | R&S             | SMB100A         | 102316        | 2018.04.12 | 2019.04.11   |
| Frequency Meter    | Agilent         | 53220A          | MY50000312    | 2018.03.17 | 2019.03.16   |
| Attenuator         | Huaxiang        | WDTS500-40dB-8G | 16051603      | N/A        | N/A          |
| SPLITTER           | Mini-Circuits   | ZFSC-3-+        | BUU47601527   | N/A        | N/A          |
| High-pass Filter   | Mini-Circuits   | NHP-300+        | N/A           | N/A        | N/A          |
| Cell Site Test Set | HP              | 8921A           | 3633A04615    | 2018-04-11 | 2019-04-10   |
| Signal Generator   | HP              | 8656B           | 3334U13373    | 2018-04-12 | 2019-04-11   |
| Signal Generator   | R&S             | SMA100A         | 102174        | 2018-04-12 | 2019-04-11   |
| Audio Analyzer     | Rohde & Schwarz | UPV             | SEM008-03     | 2018-09-25 | 2019-09-24   |
| Oscilloscope       | Tektronix       | MSO 4104        | SEM022-02     | 2018-09-25 | 2019-09-24   |

| Transmitter unwanted emissions  |                      |                   |              |            |              |
|---------------------------------|----------------------|-------------------|--------------|------------|--------------|
| Equipment                       | Manufacturer         | Model No          | Inventory No | Cal Date   | Cal Due Date |
| Fully-Anechoic Chamber 1        | SAEMC                | MFAC              | SEM001-04    | 2018-05-13 | 2021-05-13   |
| Measurement Software            | Rohde & Schwarz      | EMC32<br>V9.21.00 | N/A          | N/A        | N/A          |
| Coaxial Cable                   | SGS                  | N/A               | SEM027-01    | 2018-07-13 | 2019-07-12   |
| FSV-Signal Analyzer(10Hz-40GHz) | Rohde & Schwarz      | FSV40             | SEM008-04    | 2018-04-14 | 2019-04-13   |
| BiConiLog Antenna (30MHz-3GHz)  | Schwarzbeck          | VULB9163          | SEM003-05    | 2018-10-17 | 2021-10-16   |
| Pre-amplifier (100MHz-18GHz)    | Black Diamond Series | BDLNA-0118-352810 | SEM005-06    | 2017-09-27 | 2018-09-26   |
| Active Loop Antenna             | ETS-Lindgren         | 6502              | SEM003-08    | 2017-08-22 | 2020-08-21   |



| <b>Receiver spurious emissions</b>  |                         |                       |                     |                 |                     |
|-------------------------------------|-------------------------|-----------------------|---------------------|-----------------|---------------------|
| <b>Equipment</b>                    | <b>Manufacturer</b>     | <b>Model No</b>       | <b>Inventory No</b> | <b>Cal Date</b> | <b>Cal Due Date</b> |
| Fully-Anechoic Chamber 1            | SAEMC                   | MFAC                  | SEM001-04           | 2018-05-13      | 2021-05-13          |
| Measurement Software                | Rohde & Schwarz         | EMC32<br>V9.21.00     | N/A                 | N/A             | N/A                 |
| Coaxial Cable                       | SGS                     | N/A                   | SEM027-01           | 2018-07-13      | 2019-07-12          |
| FSV-Signal Analyzer<br>(10Hz-40GHz) | Rohde & Schwarz         | FSV40                 | SEM008-04           | 2018-04-14      | 2019-04-13          |
| BiConiLog Antenna<br>(30MHz-3GHz)   | Schwarzbeck             | VULB9163              | SEM003-05           | 2018-10-17      | 2021-10-16          |
| Horn Antenna<br>(800MHz-18GHz)      | Rohde & Schwarz         | HF907                 | SEM003-06           | 2018-06-14      | 2021-06-13          |
| Pre-amplifier<br>(100MHz-18GHz)     | Black Diamond<br>Series | BDLNA-0118-<br>352810 | SEM005-06           | 2017-09-27      | 2018-09-26          |
| Active Loop Antenna                 | ETS-Lindgren            | 6502                  | SEM003-08           | 2017-08-22      | 2020-08-21          |

| <b>General used equipment</b>      |                                                 |                 |                     |                 |                     |
|------------------------------------|-------------------------------------------------|-----------------|---------------------|-----------------|---------------------|
| <b>Equipment</b>                   | <b>Manufacturer</b>                             | <b>Model No</b> | <b>Inventory No</b> | <b>Cal Date</b> | <b>Cal Due Date</b> |
| Humidity/ Temperature<br>Indicator | Shanghai<br>Meteorological<br>Industry Factory  | ZJ1-2B          | SEM002-03           | 2018-09-29      | 2019-09-28          |
| Humidity/ Temperature<br>Indicator | Shanghai<br>Meteorological<br>Industry Factory  | ZJ1-2B          | SEM002-04           | 2018-09-29      | 2019-09-28          |
| Humidity/ Temperature<br>Indicator | Mingle                                          | N/A             | SEM002-08           | 2018-09-29      | 2019-09-28          |
| Barometer                          | Changchun<br>Meteorological<br>Industry Factory | DYM3            | SEM002-01           | 2018-04-18      | 2019-04-17          |

## 6 Radio Spectrum Matter Test Results

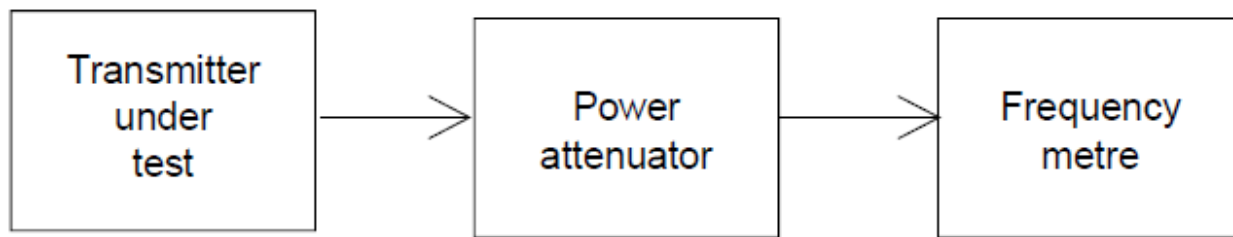
### 6.1 Frequency error

Test Requirement: EN 301 025 clause 8.1.1  
 Test Method: EN 301 025 clause 8.1.2  
 Limit: The frequency error shall be within  $\pm 1,5$  kHz.

#### 6.1.1 E.U.T. Operation

Operating Environment:  
 Temperature: 25.0 °C Humidity: 54 % RH Atmospheric Pressure: 1015 mbar  
 Test mode d: TX mode, Keep the EUT in transmitting mode.

#### 6.1.2 Test Setup Diagram



#### 6.1.3 Measurement Data

The detailed test data see: Appendix 301 025.

## 6.2 Carrier power

Test Requirement: EN 301 025 clause 8.2.1

Test Method: EN 301 025 clause 8.2.2

Limit: Normal test conditions

The rated output power of the equipment shall be between 6 W and 25 W.

With the output power switch set at maximum, the carrier power shall be within  $\pm 1,5$  dB of the rated output power under normal test conditions. The output power shall never however exceed 25 W.

With the output power switch set at minimum the carrier power shall remain between 0,1 W and 1 W.

The maximum continuous transmission time shall be between 5 min and 6 min.

### Extreme test conditions

With the output power switch set at maximum, the carrier power shall remain between 6 W and 25 W and be within +2 dB, -3 dB of the rated output power under extreme conditions. The output power shall never however exceed 25 W.

With the output power switch set at minimum the carrier power shall remain between 0,1 W and 1 W.

The maximum continuous transmission time shall be between 5 min and 6 min.

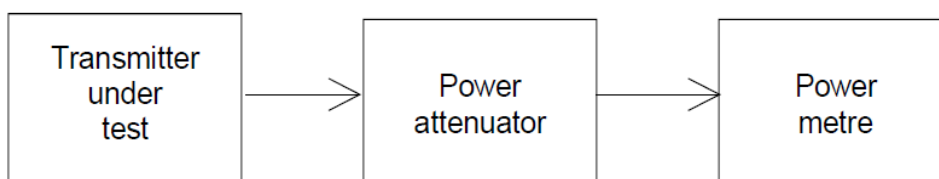
### 6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C      Humidity: 54 % RH      Atmospheric Pressure: 1015 mbar

Test mode      d: TX mode, Keep the EUT in transmitting mode.

### 6.2.2 Test Setup Diagram



### 6.2.3 Measurement Data

The detailed test data see: Appendix 301 025.

### 6.3 Frequency deviation

|                  |                                                                                                                                                                                                            |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 8.3.1                                                                                                                                                                                    |
| Test Method:     | EN 301 025 clause 8.3.2                                                                                                                                                                                    |
| Limit:           | The maximum permissible frequency deviation shall be: <ul style="list-style-type: none"> <li>• 25 kHz channels: <math>\pm 5</math> kHz.</li> <li>• 12,5 kHz channels: <math>\pm 2,5</math> kHz.</li> </ul> |

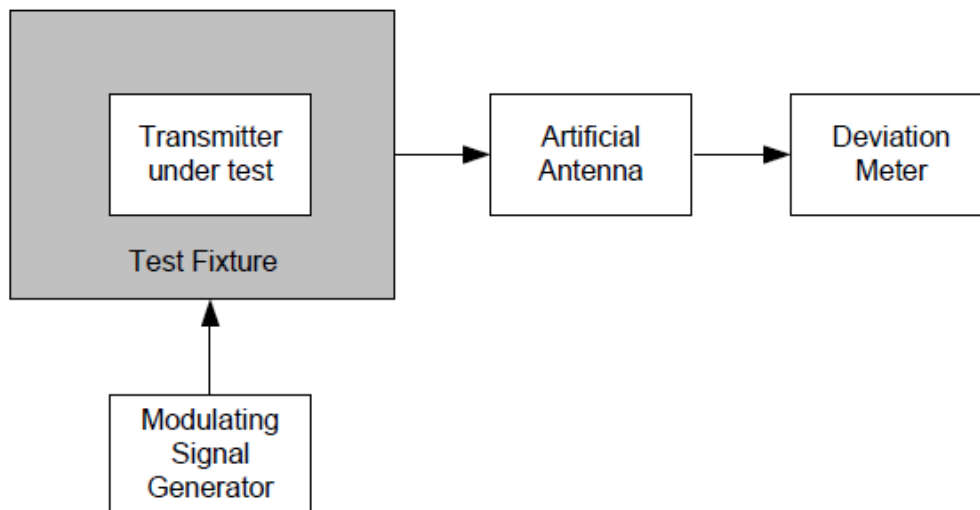
#### 6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C      Humidity: 56 % RH      Atmospheric Pressure: 1015 mbar

Test mode: d: TX mode, Keep the EUT in transmitting mode.

#### 6.3.2 Test Setup Diagram



#### 6.3.3 Measurement Data

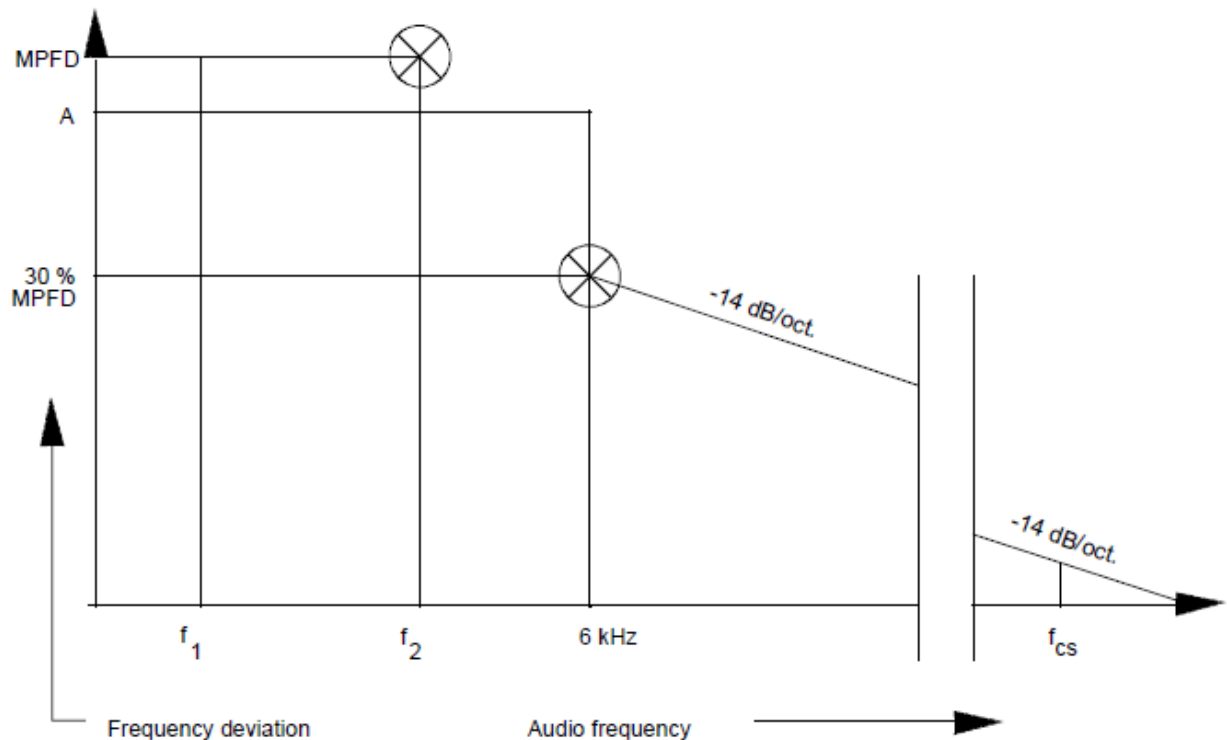
The detailed test data see: Appendix 301 025.

#### 6.4 Reduction of frequency deviation at modulation frequencies above 3 kHz

Test Requirement EN 301 025 clause 8.3.3  
 Test Method: EN 301 025 clause 8.3.3.1  
 Limit:

The frequency deviation at modulation frequencies between 3,0 kHz (for equipment operating with 20 kHz or 25 kHz channel separations) and 2,55 kHz (for equipment operating with 12,5 kHz channel separation) and 6,0 kHz shall not exceed the frequency deviation at a modulation frequency of 3,0 kHz/2,55 kHz. At 6,0 kHz the deviation shall be not more than 30,0 % of the maximum permissible frequency deviation.

The frequency deviation at modulation frequencies between 6,0 kHz and a frequency equal to the channel separation for which the equipment is intended shall not exceed that given by a linear representation of the frequency deviation (dB) relative to the modulation frequency, starting at the 6,0 kHz limit and having a slope of -14,0 dB per octave. These limits are illustrated in figure 1.



**NOTE:**

**Abbreviations:**

- $f_1$  lowest appropriate frequency
- $f_2$  3,0 kHz (for 25 kHz channel separation), or  
2,55 kHz (for 12,5 kHz channel separation)
- MPFD maximum permissible frequency deviation, clause 8.3.2.1
- A measured frequency deviation at  $f_2$
- $f_{cs}$  frequency equal to channel separation

**Figure 1: Frequency deviation**

#### 6.4.1 E.U.T. Operation

Operating Environment:

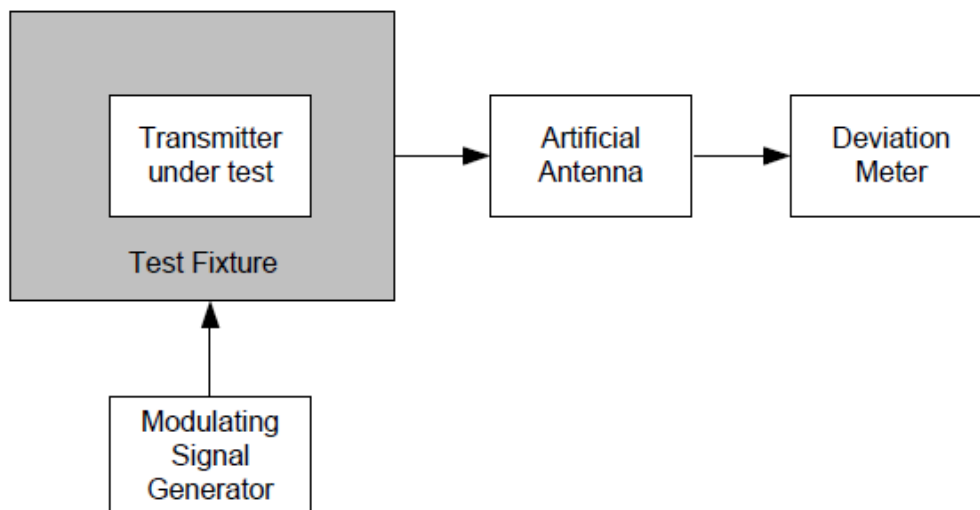
Temperature: 25.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

Test mode: d: TX mode, Keep the EUT in transmitting mode.

#### 6.4.2 Test Setup Diagram

The transmitter shall be placed in the test fixture connected as below. The frequency deviation shall be measured by means of a deviation meter capable of measuring the maximum permissible frequency deviation, including that due to any harmonics and intermodulation products, which may be produced in the transmitter. The deviation meter bandwidth shall be suitable to accommodate the highest modulating frequency and to achieve the required dynamic range.

The transmitter shall be operated under normal test conditions.



Response of the transmitter to modulation frequencies above 3 kHz

a) The modulation frequency shall be varied between  $f_2$  (see note) and a frequency equal to the channel separation for which the equipment is intended. The level of this signal shall correspond to a deviation at 1 000 Hz of 12 % of the channel separation.

b) The maximum (positive or negative) frequency deviation shall be measured by means of the deviation meter.

NOTE:  $f_2$  is equal to 3 kHz, for transmitters intended for 20 kHz and 25 kHz channel separation, or to 2,55 kHz for transmitters intended for 12,5 kHz channel separations.

#### 6.4.3 Measurement Data

The detailed test data see: Appendix 301 025.

## 6.5 Sensitivity of the modulator, including microphone

Test Requirement EN 301 025 clause 8.4.1

Test Method: EN 301 025 clause 8.4.2

Limit: The resulting frequency deviation shall be between  $\pm 1,5$  kHz and  $\pm 3$  kHz.

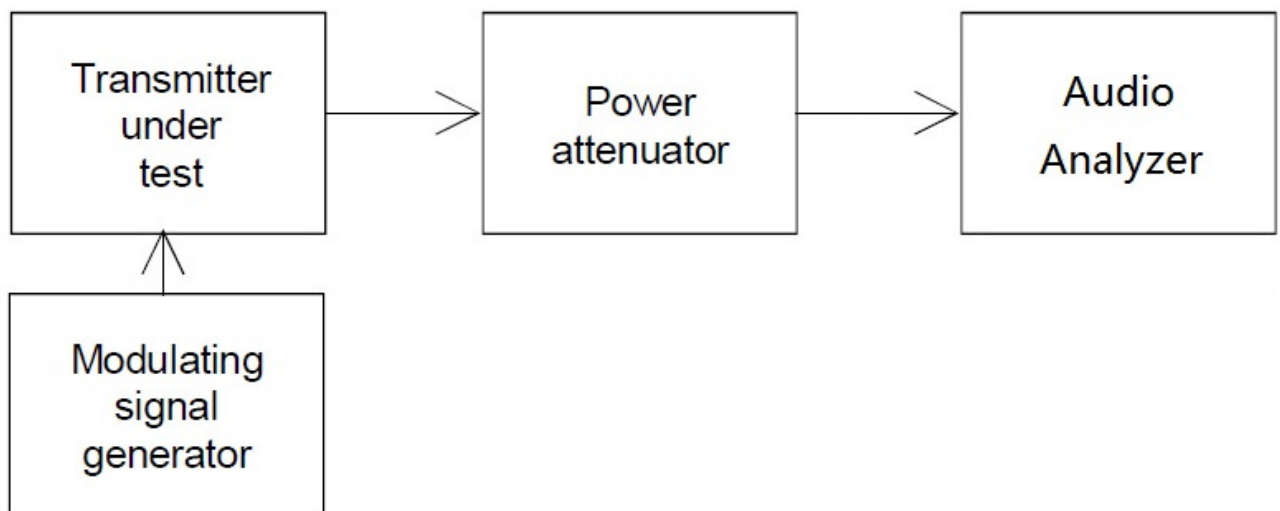
### 6.5.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

Test mode: d: TX mode, Keep the EUT in transmitting mode.

### 6.5.2 Test Setup Diagram



### 6.5.3 Measurement Data

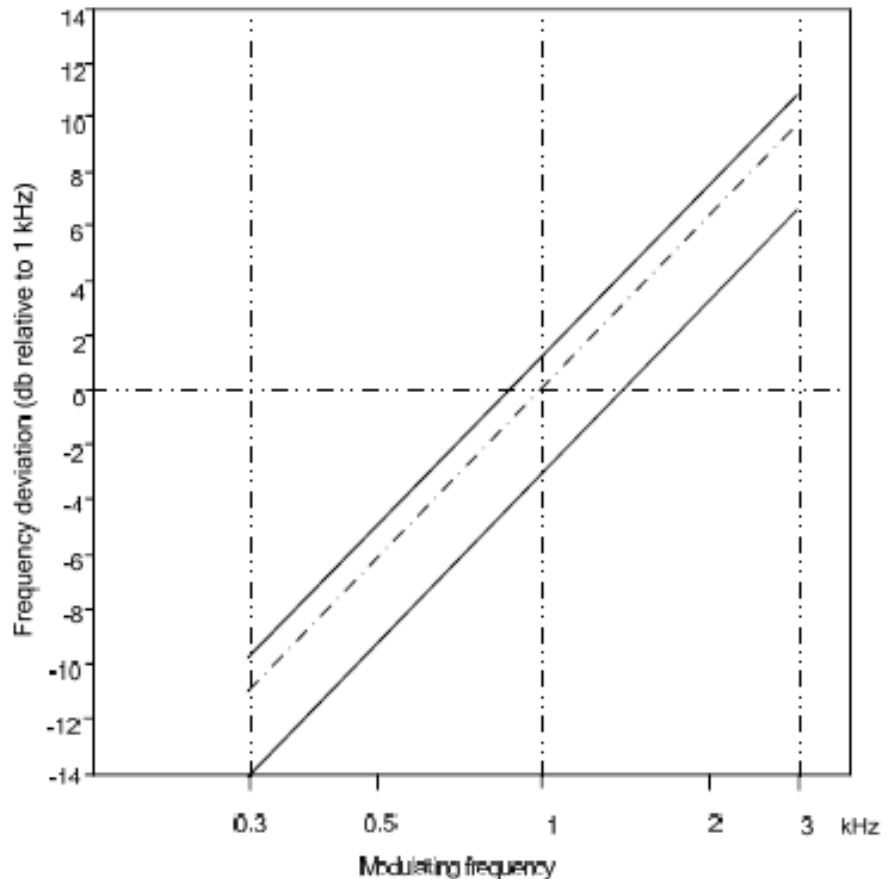
The detailed test data see: Appendix 301 025.

## 6.6 Audio frequency response

Test Requirement EN 301 025 clause 8.5.1

Test Method: EN 301 025 clause 8.5.2

Limit: The audio frequency response shall be within +1 dB and -3 dB of a 6 dB/octave line passing through the reference point. The upper limit frequency shall be 2,55 kHz for 12,5 kHz channels.



**Figure 2: Audio frequency response**

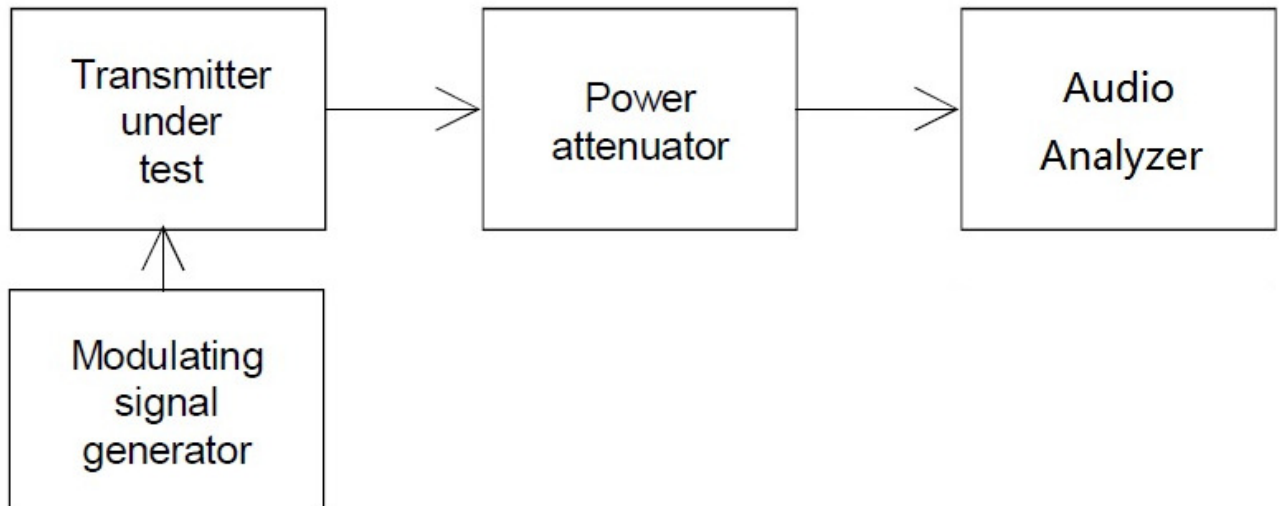
#### 6.6.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

Test mode: d: TX mode, Keep the EUT in transmitting mode.

#### 6.6.2 Test Setup Diagram



#### 6.6.3 Measurement Data

The detailed test data see: Appendix 301 025.

## 6.7 Audio frequency harmonic distortion of the emission

|                  |                                                |
|------------------|------------------------------------------------|
| Test Requirement | EN 301 025 clause 8.6.1                        |
| Test Method:     | EN 301 025 clause 8.6.2                        |
| Limit:           | The harmonic distortion shall not exceed 10 %. |

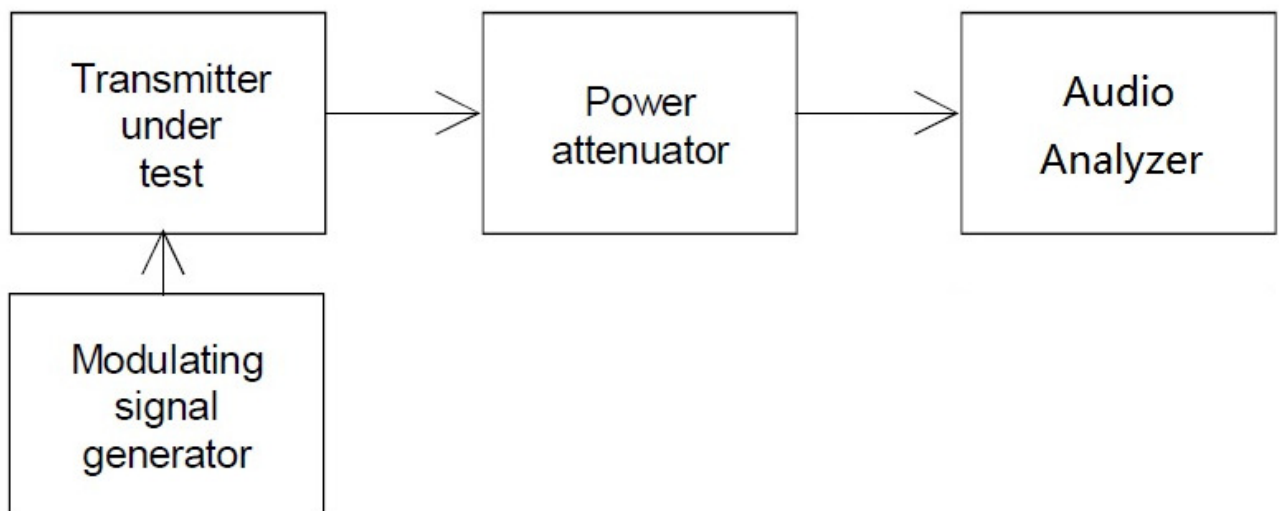
### 6.7.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C      Humidity: 56 % RH      Atmospheric Pressure: 1015 mbar

Test mode: d: TX mode, Keep the EUT in transmitting mode.

### 6.7.2 Test Setup Diagram



### 6.7.3 Measurement Data

The detailed test data see: Appendix 301 025.

## 6.8 Adjacent channel power

Test Requirement EN 301 025 clause 8.7.1

Test Method: EN 301 025 clause 8.7.2

Limit: The adjacent channel power shall not exceed a value of:

- 25 kHz channel: 70 dB below the carrier power of the transmitter without any need to be below the spurious emission limit of 0,25 uW.
- 12,5 kHz channel: 60 dB below the carrier power of the transmitter without any need to be below the spurious emission limit of 0,25 uW.

### 6.8.1 E.U.T. Operation

Operating Environment:

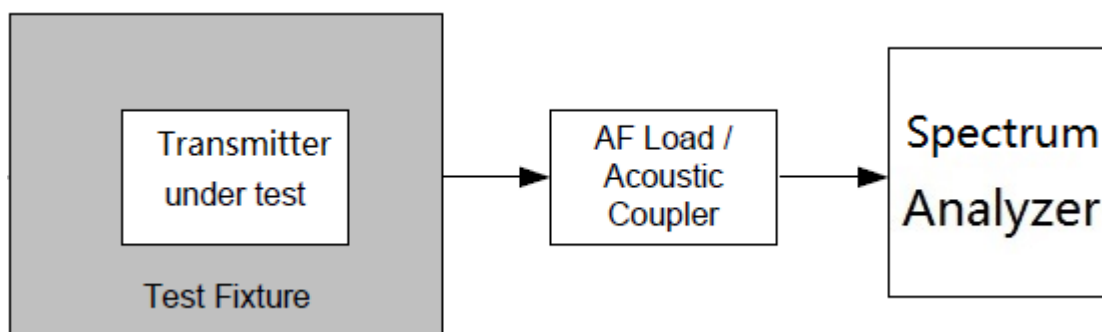
Temperature: 23.0 °C

Humidity: 56 % RH

Atmospheric Pressure: 1015 mbar

Test mode: f: TX mode, Keep the EUT in tx mode.

### 6.8.2 Test Setup Diagram



### 6.8.3 Measurement Data

The detailed test data see: Appendix 301 025.

## 6.9 Conducted spurious emissions conveyed to the antenna

|                  |                                                                                                  |
|------------------|--------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 8.8.1                                                                          |
| Test Method:     | EN 301 025 clause 8.8.2                                                                          |
| Limit:           | The power of any conducted spurious emission on any discrete frequency shall not exceed 0,25 uW. |

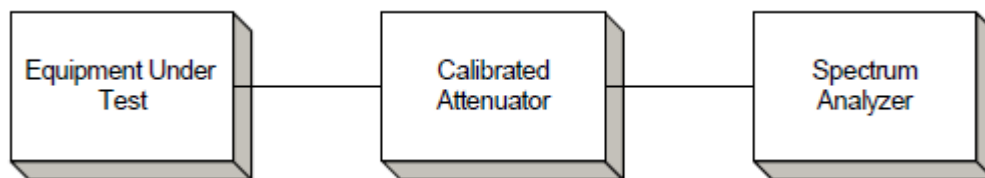
### 6.9.1 E.U.T. Operation

Operating Environment:

Temperature: 18.7 °C Humidity: 41.1 % RH Atmospheric Pressure: 1015 mbar

Test mode: d: TX mode, Keep the EUT in transmitting mode.

### 6.9.2 Test Setup Diagram



### 6.9.3 Measurement Procedure and Data

The detailed test data see: Appendix 301 025.

## 6.10 Cabinet radiation spurious emissions

Test Requirement EN 301 025 clause 8.9.1

Test Method: EN 301 025 clause 8.9.2

Measurement Distance: 3m

Limit: When the transmitter is in stand-by the cabinet radiation and spurious emissions shall not exceed 2 nW.

When the transmitter is in operation the cabinet radiation and spurious emissions shall not exceed 0,25 uW.

### 6.10.1 E.U.T. Operation

Operating Environment:

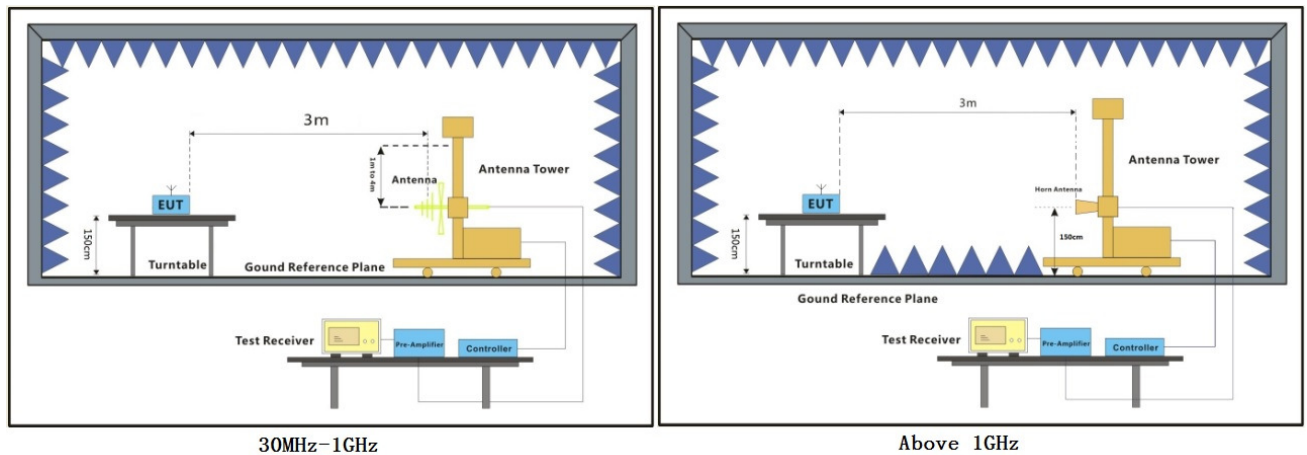
Temperature: 23.0 °C

Humidity: 56 % RH

Atmospheric Pressure: 1015 mbar

Test mode: d: TX mode, Keep the EUT in transmitting mode.

### 6.10.2 Test Setup Diagram





### 6.10.3 Measurement Data

1. Scan from 30MHz to 12.75GHz, find the maximum radiation frequency to measure.
2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.

Below 1GHz test procedure as below:

- 1) The EUT was powered on and placed on a table in the chamber. The antenna of the transmitter was extended to its maximum length. modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- 2) Rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3) Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 5) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.
- 6) The output power into the substitution antenna was then measured.
- 7) Steps 5) and 6) were repeated with both antennas vertically polarized.
- 8) Calculate power in dBm by the following formula:

$$\text{ERP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

where:

Pg is the generator output power into the substitution antenna.

Above 1GHz test procedure as below:

- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber.
- 2) Calculate power in dBm by the following formula:

$$\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

$$\text{EIRP} = \text{ERP} + 2.15\text{dB}$$

where:

Pg is the generator output power into the substitution antenna.

The detailed test data see: Appendix 301 025.

## 6.11 Transient frequency behaviour of the transmitter

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 8.10.1                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Test Method:     | EN 301 025 clause 8.10.2                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Limit:           | <p>During the periods of time t1 and t3 the frequency difference shall not exceed <math>\pm 25</math> kHz.</p> <p>The frequency difference after the end of t2 shall be within the limit of the frequency error given in clause 8.1.</p> <p>During the period of time t2 the frequency difference shall not exceed <math>\pm 12,5</math> kHz.</p> <p>Before the start of t3 the frequency difference shall be within the limit of the frequency error given in clause 8.1.</p> |

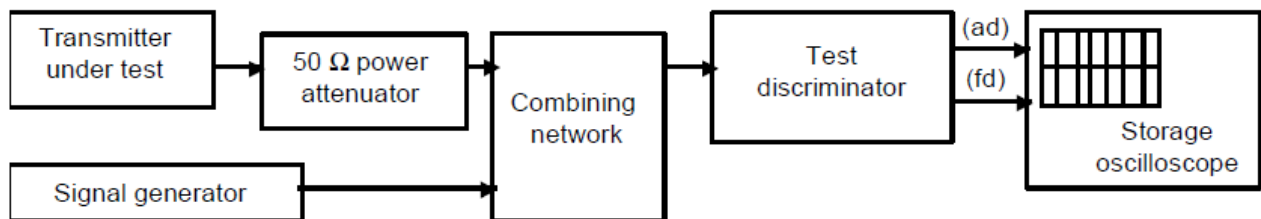
### 6.11.1 E.U.T. Operation

Operating Environment:

Temperature: 18.7 °C Humidity: 41.1 % RH Atmospheric Pressure: 1015 mbar

Test mode: d: TX mode, Keep the EUT in transmitting mode.

### 6.11.2 Test Setup Diagram



### 6.11.3 Measurement Procedure and Data

The detailed test data see: Appendix 301 025.

## 6.12 Residual modulation of the transmitter

|                  |                                                                                        |
|------------------|----------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 8.11.1                                                               |
| Test Method:     | EN 301 025 clause 8.11.2                                                               |
| Limit:           | The residual modulation shall not exceed -40 dB on either 12,5 kHz or 25 kHz channels. |

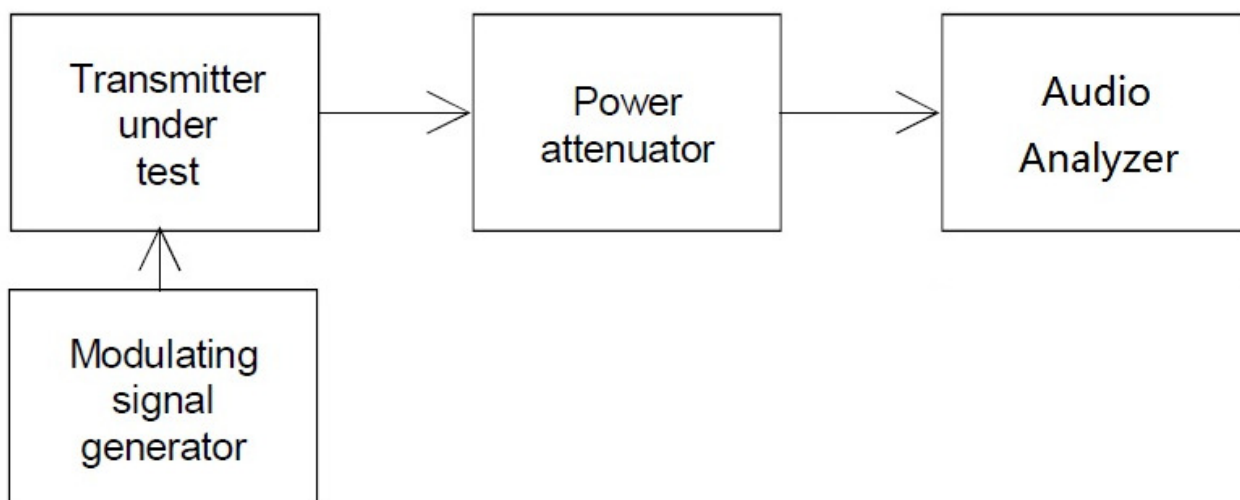
### 6.12.1 E.U.T. Operation

Operating Environment:

Temperature: 18.7 °C Humidity: 41.1 % RH Atmospheric Pressure: 1015 mbar

Test mode: d: TX mode, Keep the EUT in transmitting mode.

### 6.12.2 Test Setup Diagram



### 6.12.3 Measurement Procedure and Data

The detailed test data see: Appendix 301 025.

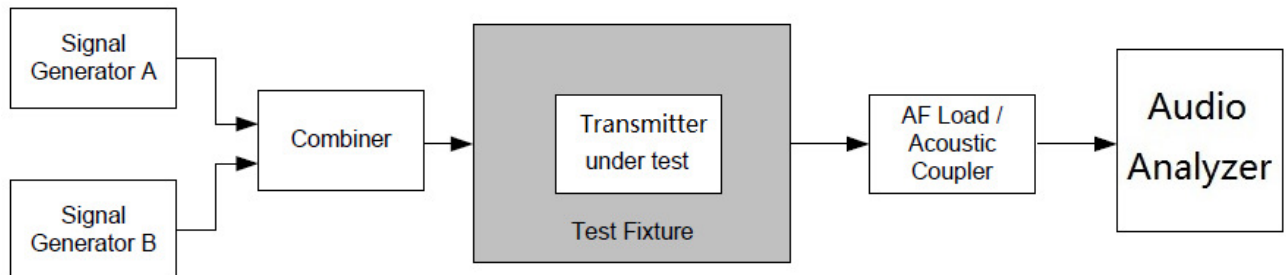
### 6.13 Frequency error (demodulated DSC signal)

Test Requirement: EN 301 025 clause 8.12.1  
 Test Method: EN 301 025 clause 8.12.2  
 Limit: The measured frequency from the demodulator at any time for the B-state shall be within  $2\ 100\ \text{Hz} \pm 10\ \text{Hz}$  and for the Y-state within  $1\ 300\ \text{Hz} \pm 10\ \text{Hz}$ .

#### 6.13.1 E.U.T. Operation

Operating Environment:  
 Temperature: 25.0 °C Humidity: 54 % RH Atmospheric Pressure: 1015 mbar  
 Test mode d: TX mode, Keep the EUT in transmitting mode.

#### 6.13.2 Test Setup Diagram



#### 6.13.3 Measurement Data

The detailed test data see: Appendix 301 025.

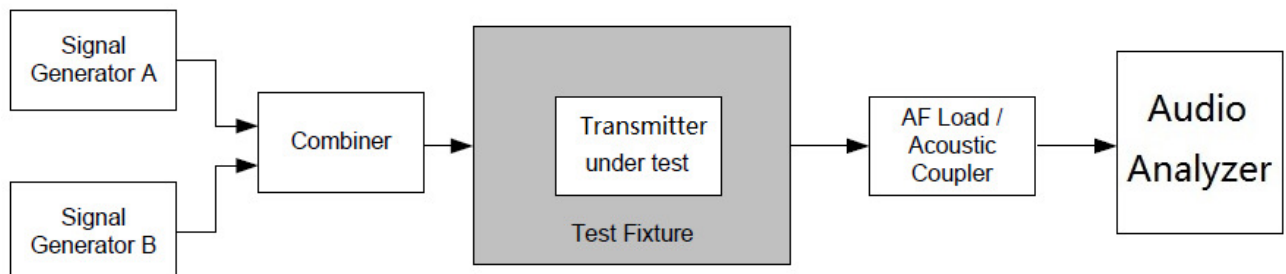
## 6.14 Modulation index for DSC

Test Requirement: EN 301 025 clause 8.13.1  
Test Method: EN 301 025 clause 8.13.2  
Limit: The modulation index shall be  $2,0 \pm 10 \%$ .

### 6.14.1 E.U.T. Operation

Operating Environment:  
Temperature: 25.0 °C Humidity: 54 % RH Atmospheric Pressure: 1015 mbar  
Test mode d: TX mode, Keep the EUT in transmitting mode.

### 6.14.2 Test Setup Diagram



### 6.14.3 Measurement Data

The detailed test data see: Appendix 301 025.

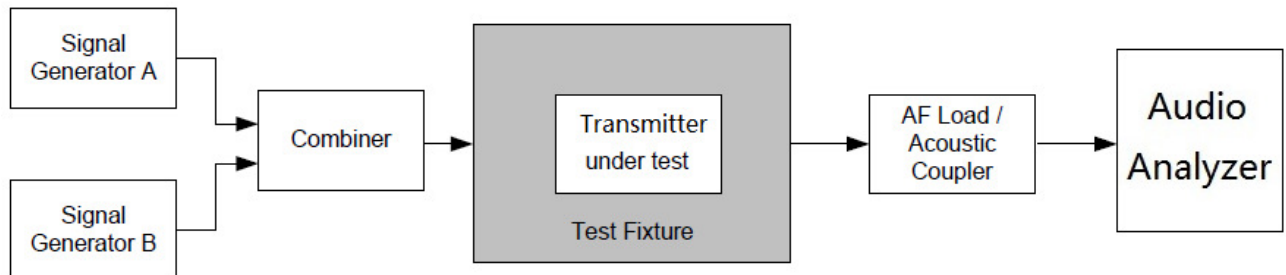
## 6.15 Modulation rate for DSC

Test Requirement: EN 301 025 clause 8.14.1  
 Test Method: EN 301 025 clause 8.14.2  
 Limit: The frequency shall be 600 Hz  $\pm$  30 ppm corresponding to a modulation rate of 1 200 baud.

### 6.15.1 E.U.T. Operation

Operating Environment:  
 Temperature: 25.0 °C Humidity: 54 % RH Atmospheric Pressure: 1015 mbar  
 Test mode d: TX mode, Keep the EUT in transmitting mode.

### 6.15.2 Test Setup Diagram



### 6.15.3 Measurement Data

The detailed test data see: Appendix 301 025.

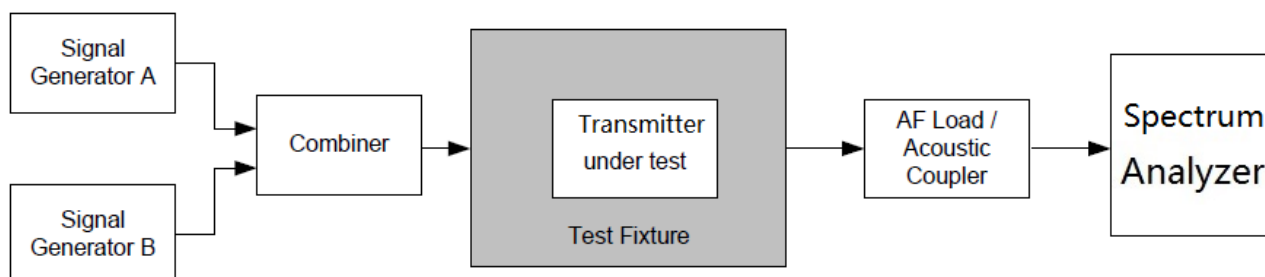
## 6.16 Testing of free channel transmission on DSC channel 70

|                   |                                                                                                                                                                                                                                                                                                        |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | EN 301 025 clause 8.15.1                                                                                                                                                                                                                                                                               |
| Test Method:      | EN 301 025 clause 8.15.2                                                                                                                                                                                                                                                                               |
| Limit:            | If the format specifier is distress or the category is either distress, urgency or safety in the transmitted DSC call, the call shall be transmitted while the signal generator output is still on. Otherwise the call shall not be transmitted until the signal generator output has been turned off. |

### 6.16.1 E.U.T. Operation

|                        |                                                |                       |           |
|------------------------|------------------------------------------------|-----------------------|-----------|
| Operating Environment: |                                                |                       |           |
| Temperature:           | 25.0 °C                                        | Humidity:             | 54 % RH   |
|                        |                                                | Atmospheric Pressure: | 1015 mbar |
| Test mode              | d: TX mode, Keep the EUT in transmitting mode. |                       |           |

### 6.16.2 Test Setup Diagram



### 6.16.3 Measurement Data

It shall be verified that, after transmission of a DSC call, the transmitter re-tunes to the original channel. However in the case of a distress call the transmitter shall tune to channel 16 and automatically select the maximum power.

## 6.17 Harmonic distortion and rated audio-frequency output power

Test Requirement: EN 301 025 clause 9.1.1  
 Test Method: EN 301 025 clause 9.1.2  
 Limit: The rated audio-frequency output power shall be at least:

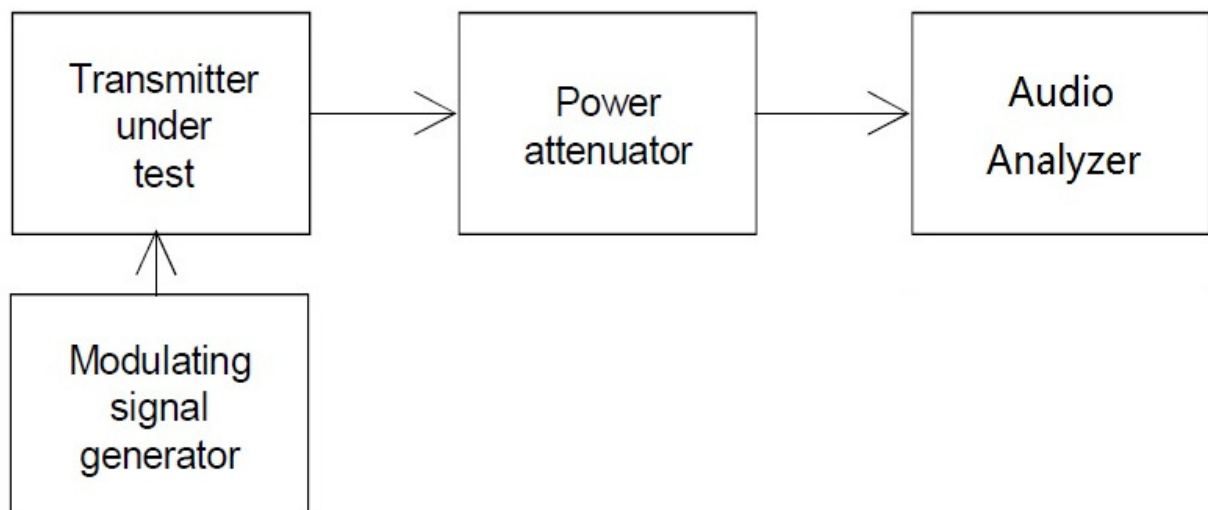
- 2 W in a loudspeaker;
- 1 mW in the handset earphone.

The harmonic distortion shall not exceed 10 %.

### 6.17.1 E.U.T. Operation

Operating Environment:  
 Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar  
 Test mode: e: RX mode, Keep the EUT in receiving mode.

### 6.17.2 Test Setup Diagram



### 6.17.3 Measurement Data

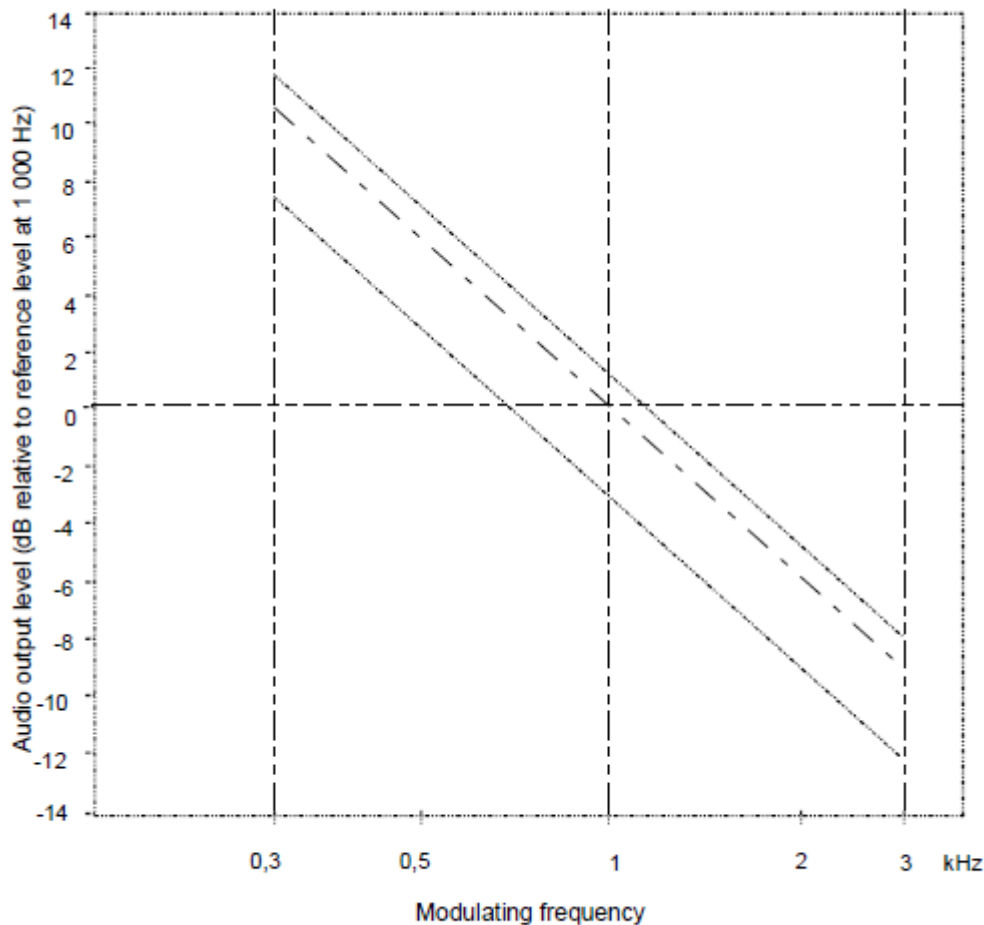
The detailed test data see: Appendix 301 025.

## 6.18 Audio frequency response

Test Requirement: EN 301 025 clause 9.2.1

Test Method: EN 301 025 clause 9.2.2

Limit: The audio frequency response shall not deviate by more than +1 dB or -3 dB from a characteristic giving the output level as a function of the audio frequency, decreasing by 6 dB per octave and passing through the measured point at 1 kHz (see figure 5).



**Figure 5: Audio frequency response**

#### 6.18.1 E.U.T. Operation

Operating Environment:

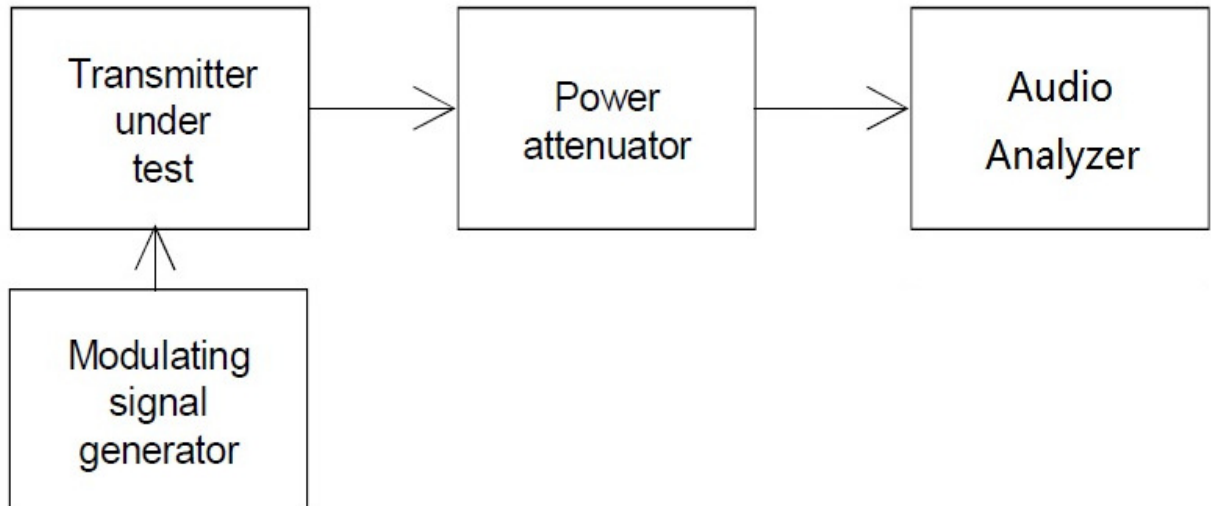
Temperature: 23.0 °C

Humidity: 56 % RH

Atmospheric Pressure: 1015 mbar

Test mode: e: RX mode, Keep the EUT in receiving mode.

#### 6.18.2 Test Setup Diagram



A test signal of +60 dB  $\mu$  V (e.m.f.), at a carrier frequency equal to the nominal frequency of the receiver and modulated with normal test modulation (see clause 6.4) shall be applied to the receiver antenna port under the conditions specified in clause 6.1.

The receiver's audiofrequency power control shall be set so as to produce a power level equal to 50 % of the rated output power (see clause 9.1). This setting shall remain unchanged during the test.

The frequency deviation shall then be reduced to  $\pm 1$  kHz and the audio output is the reference point in figure 5 (1 kHz corresponds to 0 dB).

The frequency deviation shall remain constant while the modulation frequency is varied between 300 Hz and 3 kHz and the output level shall then be measured.

The measurement shall be repeated with a test signal at frequencies 1,5 kHz above and below the nominal frequency of the receiver.

#### 6.18.3 Measurement Data

The detailed test data see: Appendix 301 025.

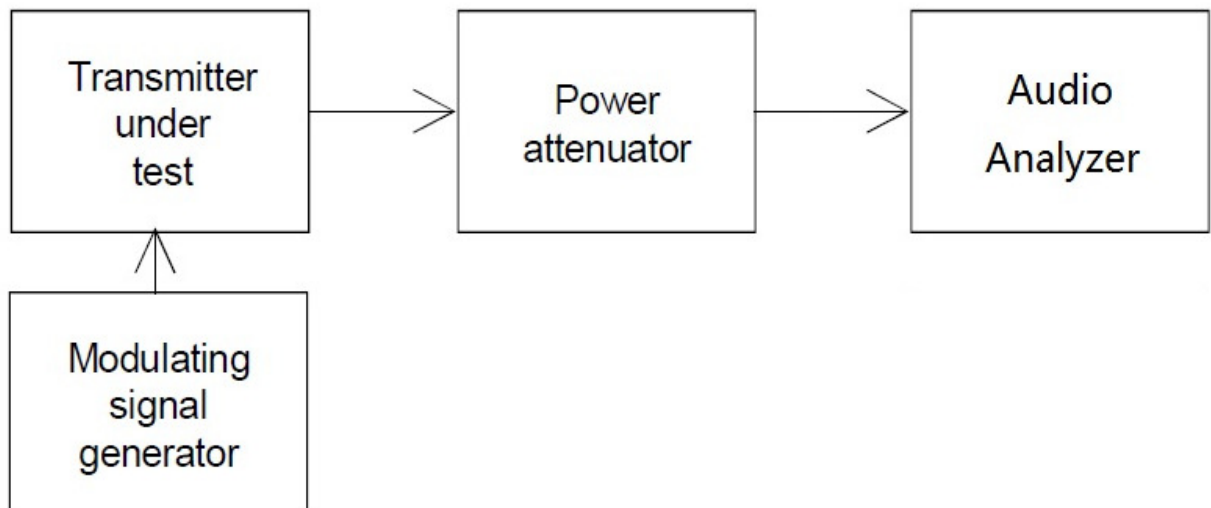
## 6.19 Maximum usable sensitivity

|                   |                                                                                                                                                                                           |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | EN 301 025 clause 9.3.1                                                                                                                                                                   |
| Test Method:      | EN 301 025 clause 9.3.2                                                                                                                                                                   |
| Limit:            | The maximum usable sensitivity for either 25 kHz or 12,5 kHz channels shall not exceed +6 dBuV (e.m.f.) under normal test conditions and +12 dBuV (e.m.f.) under extreme test conditions. |

### 6.19.1 E.U.T. Operation

|                        |                                             |                       |           |
|------------------------|---------------------------------------------|-----------------------|-----------|
| Operating Environment: |                                             |                       |           |
| Temperature:           | 23.0 °C                                     | Humidity:             | 56 % RH   |
|                        |                                             | Atmospheric Pressure: | 1015 mbar |
| Test mode:             | e: RX mode, Keep the EUT in receiving mode. |                       |           |

### 6.19.2 Test Setup Diagram



A test signal at a carrier frequency equal to the nominal frequency of the receiver, modulated by the normal test modulation (see clause 6.4) shall be applied to the receiver input. An audio frequency load and a measuring instrument for measuring SINAD ratio (through a psophometric network as specified in clause 9.3.1) shall be connected to the receiver output terminals.

The level of the test signal shall be adjusted until a SINAD ratio of 20 dB is obtained, using the psophometric network and with the receiver's audio-frequency power control adjusted to produce 50 % of the rated output power. Under these conditions, the level of the test signal at the input is the value of the maximum usable sensitivity.

The measurements shall be made under normal test conditions (see clause 6.13) and under extreme test conditions (see clauses 6.14.1 and 6.14.2 applied simultaneously).

A receiver output power variation of  $\pm 3$  dB relative to 50 % of the rated output power may be allowed for sensitivity measurements under extreme test conditions.

### 6.19.3 Measurement Data

The detailed test data see: Appendix 301 025.

## 6.20 Co-channel rejection

|                  |                                                                                                                                                                                                                                                                  |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 9.4.1                                                                                                                                                                                                                                          |
| Test Method:     | EN 301 025 clause 9.4.2                                                                                                                                                                                                                                          |
| Limit:           | The co-channel rejection ratio, at any frequency of the unwanted signal within the specified range, shall be between: <ul style="list-style-type: none"> <li>• -10 dB and 0 dB for 25 kHz channels;</li> <li>• -12 dB and 0 dB for 12,5 kHz channels.</li> </ul> |

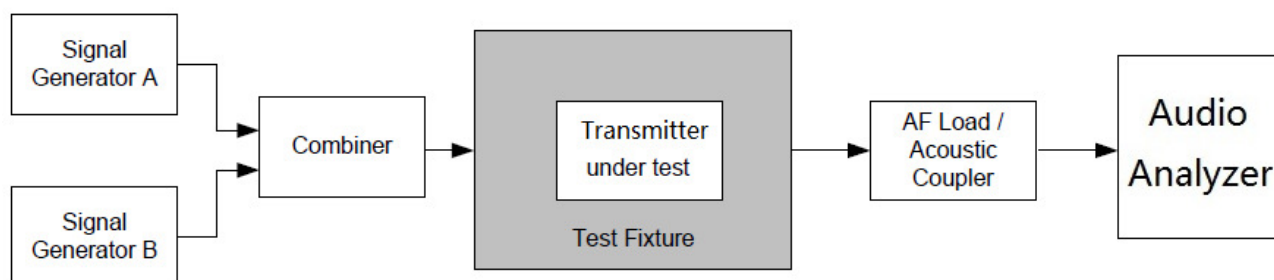
### 6.20.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C      Humidity: 56 % RH      Atmospheric Pressure: 1015 mbar

Test mode: e: RX mode, Keep the EUT in receiving mode.

### 6.20.2 Test Setup Diagram



### 6.20.3 Measurement Data

The detailed test data see: Appendix 301 025.

## 6.21 Adjacent channel selectivity

|                  |                                                                                                                                                                                                                                                                                                                                                       |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 9.5.1                                                                                                                                                                                                                                                                                                                               |
| Test Method:     | EN 301 025 clause 9.5.2                                                                                                                                                                                                                                                                                                                               |
| Limit:           | <p>25 kHz channels: the adjacent channel selectivity shall be not less than 70 dB under normal test conditions and not less than 60 dB under extreme test conditions.</p> <p>12,5 kHz channels: the adjacent channel selectivity shall be not less than 60 dB under normal test conditions and not less than 50 dB under extreme test conditions.</p> |

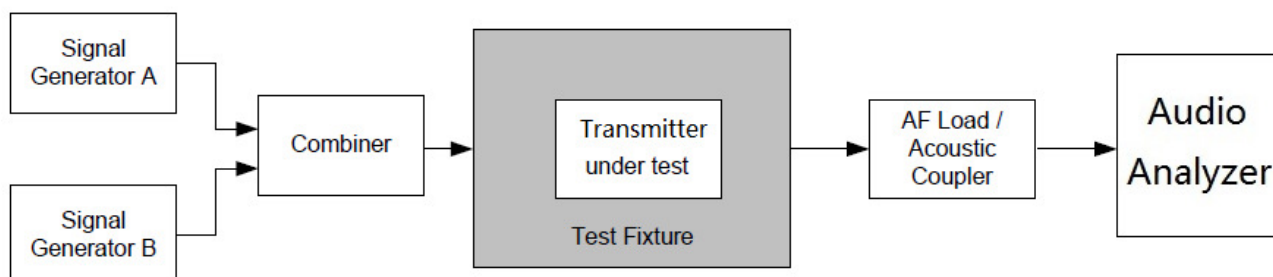
### 6.21.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C      Humidity: 56 % RH      Atmospheric Pressure: 1015 mbar

Test mode: e: RX mode, Keep the EUT in receiving mode.

### 6.21.2 Test Setup Diagram



### 6.21.3 Measurement Data

The detailed test data see: Appendix 301 025.

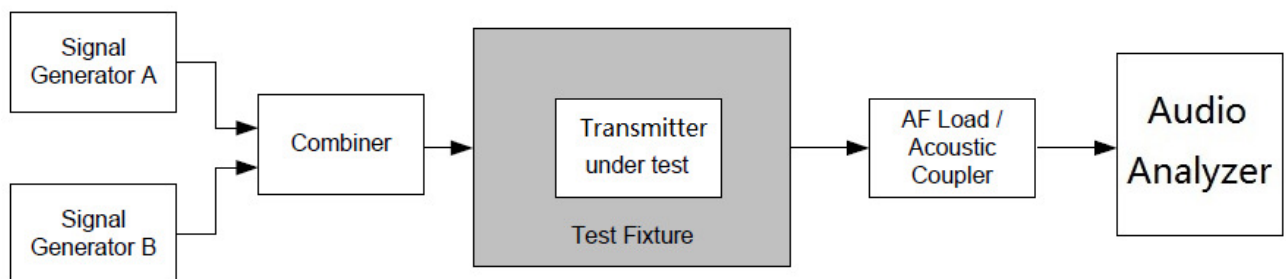
## 6.22 Spurious response rejection

|                  |                                                                                                                                                                |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 9.6.1                                                                                                                                        |
| Test Method:     | EN 301 025 clause 9.6.2                                                                                                                                        |
| Limit:           | At any frequency separated from the nominal frequency of the receiver by more than 25 kHz, the spurious response rejection ratio shall be not less than 70 dB. |

### 6.22.1 E.U.T. Operation

|                        |                                             |                       |           |
|------------------------|---------------------------------------------|-----------------------|-----------|
| Operating Environment: |                                             |                       |           |
| Temperature:           | 23.0 °C                                     | Humidity:             | 56 % RH   |
|                        |                                             | Atmospheric Pressure: | 1015 mbar |
| Test mode:             | e: RX mode, Keep the EUT in receiving mode. |                       |           |

### 6.22.2 Test Setup Diagram



### 6.22.3 Measurement Data

The detailed test data see: Appendix 301 025.

## 6.23 Intermodulation response

|                  |                                                                 |
|------------------|-----------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 9.7.1                                         |
| Test Method:     | EN 301 025 clause 9.7.2                                         |
| Limit:           | The intermodulation response ratio shall be greater than 68 dB. |

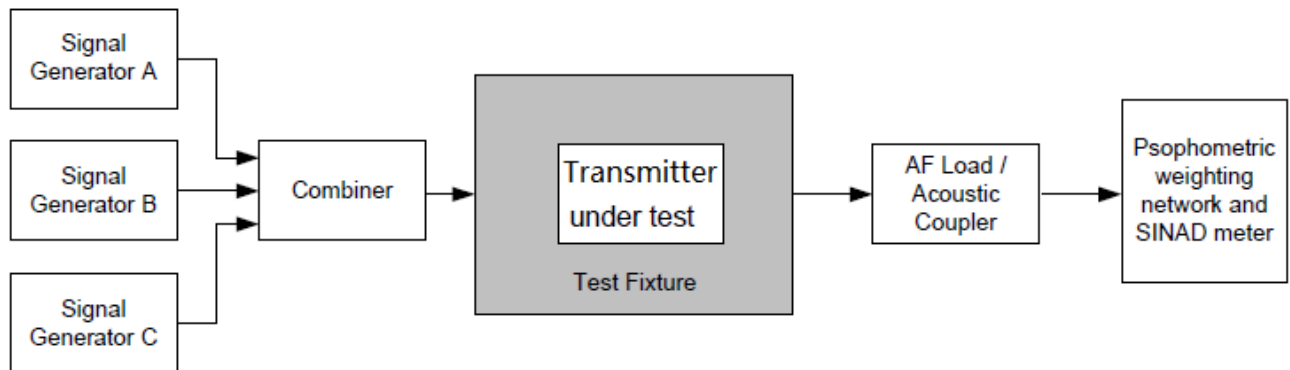
### 6.23.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

Test mode: e: RX mode, Keep the EUT in receiving mode.

### 6.23.2 Test Setup Diagram



### 6.23.3 Measurement Data

The detailed test data see: Appendix 301 025.

## 6.24 Blocking or desensitization

|                  |                                                                                                                                                                         |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 9.8.1                                                                                                                                                 |
| Test Method:     | EN 301 025 clause 9.8.2                                                                                                                                                 |
| Limit:           | The blocking level for any frequency within the specified ranges, shall be not less than 90 dBuV (e.m.f.), except at frequencies on which spurious responses are found. |

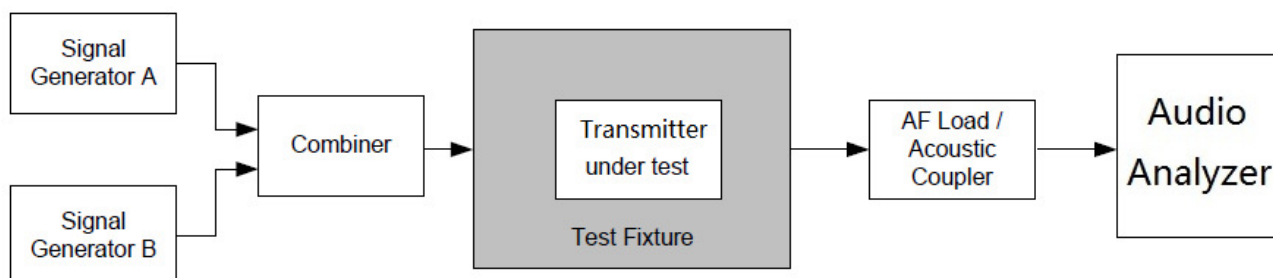
### 6.24.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C      Humidity: 56 % RH      Atmospheric Pressure: 1015 mbar

Test mode: e: RX mode, Keep the EUT in receiving mode.

### 6.24.2 Test Setup Diagram



### 6.24.3 Measurement Data

The detailed test data see: Appendix 301 025.

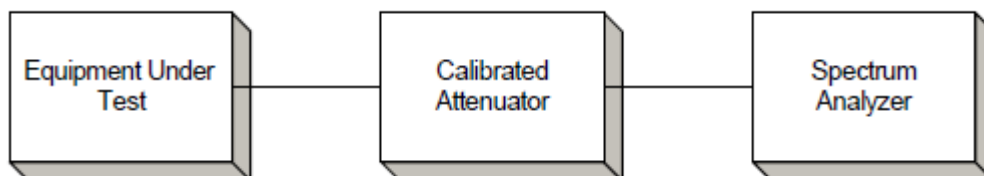
## 6.25 Spurious emission

Test Requirement: EN 301 025 clause 9.9.1  
 Test Method: EN 301 025 clause 9.9.2  
 Limit: The power of any spurious emission shall not exceed 2 nW at any frequency in the range between 9 kHz and 2 GHz.

### 6.25.1 E.U.T. Operation

Operating Environment:  
 Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar  
 Test mode: e: RX mode, Keep the EUT in receiving mode.

### 6.25.2 Test Setup Diagram



### 6.25.3 Measurement Data

The detailed test data see: Appendix 301 025.

## 6.26 Receiver radiated spurious emissions

|                  |                                                                                                                 |
|------------------|-----------------------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 9.10.1                                                                                        |
| Test Method:     | EN 301 025 clause 9.10.2                                                                                        |
| Limit:           | The power of any spurious emission shall not exceed 2 nW at any frequency in the range between 9 kHz and 2 GHz. |

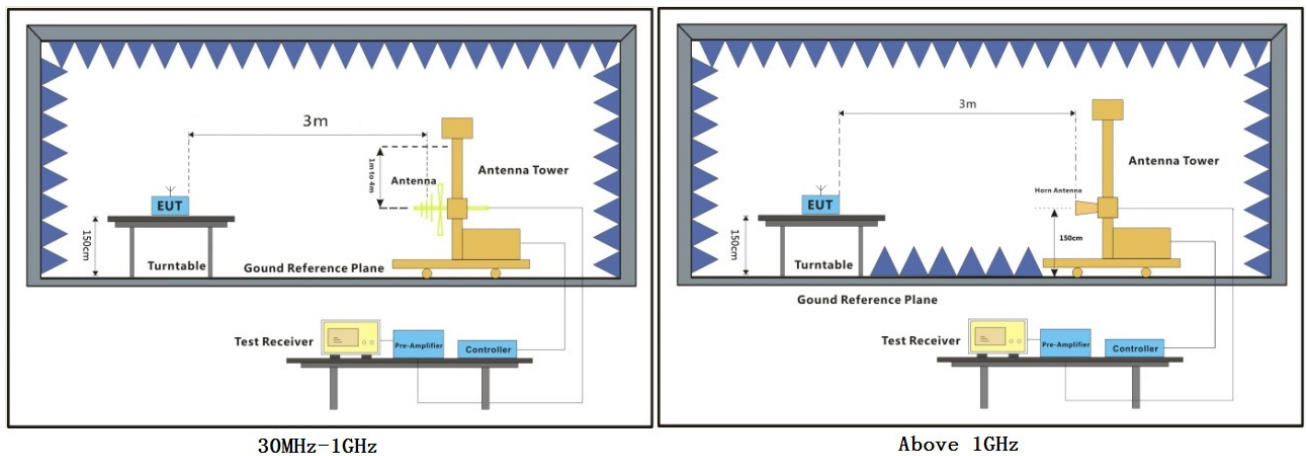
### 6.26.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C      Humidity: 56 % RH      Atmospheric Pressure: 1015 mbar

Test mode: e: RX mode, Keep the EUT in receiving mode.

### 6.26.2 Test Setup Diagram



### 6.26.3 Measurement Data

1. Scan from 30MHz to 2GHz, find the maximum radiation frequency to measure.
2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.

Below 1GHz test procedure as below:

- 1) The EUT was powered on and placed on a table in the chamber. The antenna of the transmitter was extended to its maximum length. Receiver mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- 2) Rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3) Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 5) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.
- 6) The output power into the substitution antenna was then measured.
- 7) Steps 5) and 6) were repeated with both antennas vertically polarized.
- 8) Calculate power in dBm by the following formula:

$$\text{ERP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

where:

Pg is the generator output power into the substitution antenna.

Above 1GHz test procedure as below:

- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber.
- 2) Calculate power in dBm by the following formula:

$$\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

$$\text{EIRP} = \text{ERP} + 2.15\text{dB}$$

where:

Pg is the generator output power into the substitution antenna.

The detailed test data see: Appendix 301 025.

## 6.27 Receiver residual noise level

|                  |                                                            |
|------------------|------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 9.11.1                                   |
| Test Method:     | EN 301 025 clause 9.11.2                                   |
| Limit:           | The receiver residual noise level shall not exceed -40 dB. |

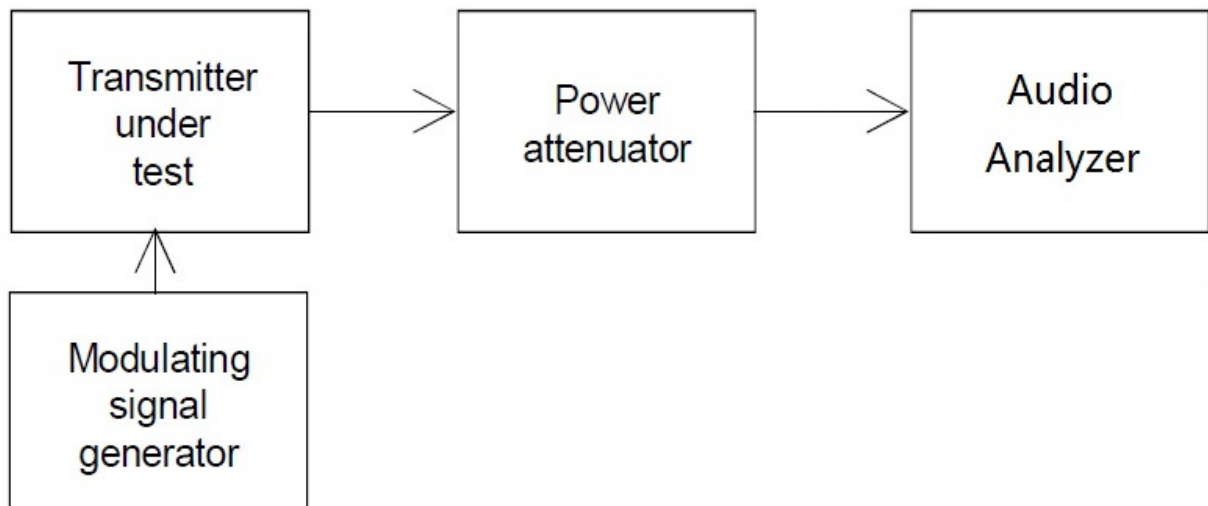
### 6.27.1 E.U.T. Operation

Operating Environment:

Temperature: 18.7 °C Humidity: 41.1 % RH Atmospheric Pressure: 1015 mbar

Test mode: e: RX mode, Keep the EUT in receiving mode.

### 6.27.2 Test Setup Diagram



### 6.27.3 Measurement Procedure and Data

The detailed test data see: Appendix 301 025.

## 6.28 Squelch operation

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 9.12.1                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test Method:     | EN 301 025 clause 9.12.2                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Limit:           | <p>Under the conditions specified in a) clause 9.12.2, the audio frequency output power shall not exceed -40 dB relative to the rated output power.</p> <p>Under the conditions specified in b) clause 9.12.2, the input level shall not exceed +6 dBuV (e.m.f.) and the SINAD ratio shall be at least 20 dB.</p> <p>Under the conditions specified in c) clause 9.12.2, the input signal shall not exceed +6 dBuV (e.m.f.) when the control is set at maximum.</p> |

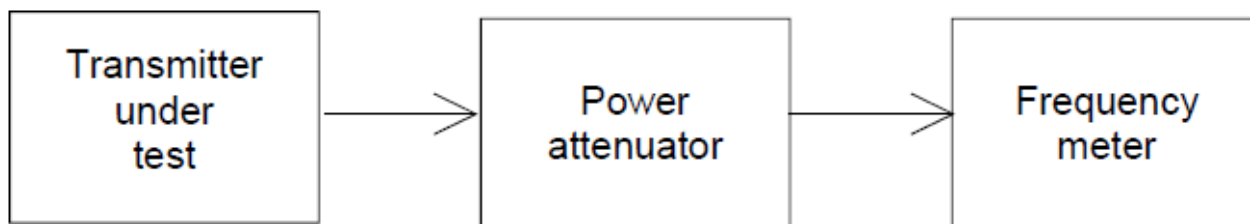
### 6.28.1 E.U.T. Operation

Operating Environment:

Temperature: 18.7 °C Humidity: 41.1 % RH Atmospheric Pressure: 1015 mbar

Test mode: e: RX mode, Keep the EUT in receiving mode.

### 6.28.2 Test Setup Diagram



### 6.28.3 Measurement Procedure and Data

The detailed test data see: Appendix 301 025.

## 6.29 Squelch hysteresis

|                  |                                                        |
|------------------|--------------------------------------------------------|
| Test Requirement | EN 301 025 clause 9.13.1                               |
| Test Method:     | EN 301 025 clause 9.13.2                               |
| Limit:           | The squelch hysteresis shall be between 3 dB and 6 dB. |

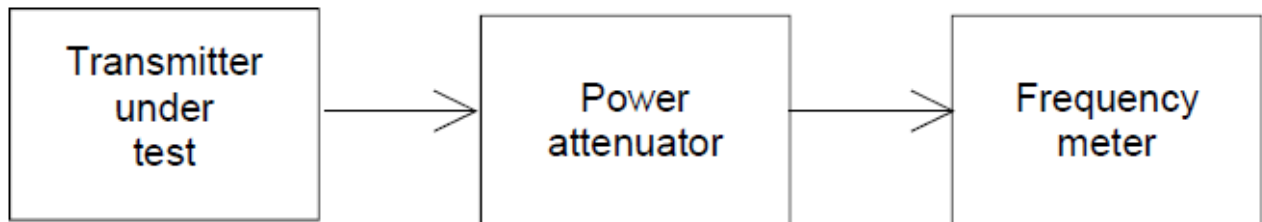
### 6.29.1 E.U.T. Operation

Operating Environment:

Temperature: 18.7 °C Humidity: 41.1 % RH Atmospheric Pressure: 1015 mbar

Test mode: e: RX mode, Keep the EUT in receiving mode.

### 6.29.2 Test Setup Diagram



### 6.29.3 Measurement Procedure and Data

The detailed test data see: Appendix 301 025.

### 6.30 Multiple watch characteristic

|                  |                                                                                                                                                                                                                                                         |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 9.14.1                                                                                                                                                                                                                                |
| Test Method:     | EN 301 025 clause 9.14.2                                                                                                                                                                                                                                |
| Limit:           | The scanning period shall not exceed 2 s.<br>The dwell time on the priority channel shall not exceed 150 ms.<br>The dwell time on the additional channel shall be between 850 ms and 2 s as indicated by the time of the gap between two output bursts. |

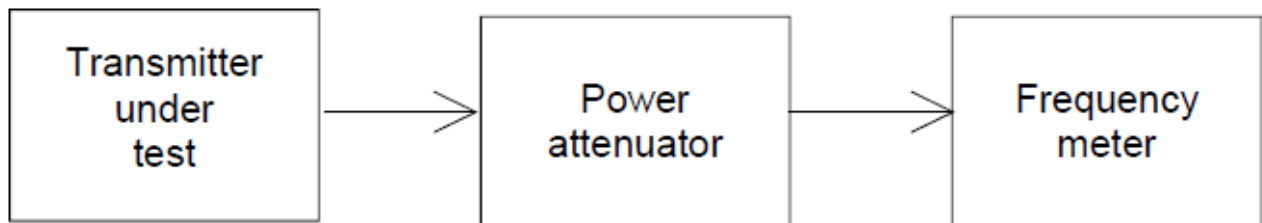
#### 6.30.1 E.U.T. Operation

Operating Environment:

Temperature: 18.7 °C Humidity: 41.1 % RH Atmospheric Pressure: 1015 mbar

Test mode: e: RX mode, Keep the EUT in receiving mode.

#### 6.30.2 Test Setup Diagram



#### 6.30.3 Measurement Procedure and Data

The detailed test data see: Appendix 301 025.



### **6.31 Maximum usable sensitivity**

Test Requirement: EN 301 025 clause 10.1.1  
Test Method: EN 301 025 clause 10.1.2  
Limit: The bit error ratio shall be equal to or less than  $10^{-2}$ .

#### **6.31.1 E.U.T. Operation**

Operating Environment:  
Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar  
Test mode: f: RX mode, Keep the EUT in DSC receiving mode.

#### **6.31.2 Test Setup Diagram**

DSC standard test signal containing DSC calls shall be applied to the receiver input. The input level shall be 0 dBuV under normal test conditions and +6 dBuV under extreme test conditions.

The measurement shall be repeated under normal test conditions at the nominal carrier frequency  $\pm 1.5$  kHz. The bit error ratio in the decoder output shall be determined.

#### **6.31.3 Measurement Data**

The detailed test data see: Appendix 301 025.

## 6.32 Co-channel rejection

|                  |                                                                |
|------------------|----------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 10.2.1                                       |
| Test Method:     | EN 301 025 clause 10.2.2                                       |
| Limit:           | The bit error ratio shall be equal to or less than $10^{-2}$ . |

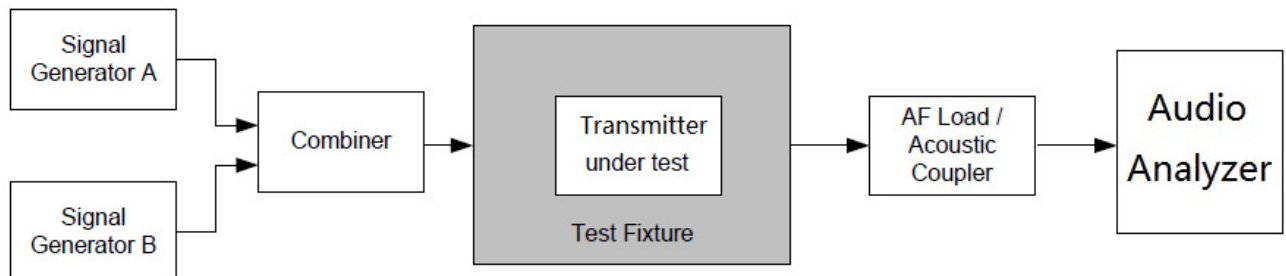
### 6.32.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C      Humidity: 56 % RH      Atmospheric Pressure: 1015 mbar

Test mode: f: RX mode, Keep the EUT in DSC receiving mode.

### 6.32.2 Test Setup Diagram



### 6.32.3 Measurement Data

The detailed test data see: Appendix 301 025.

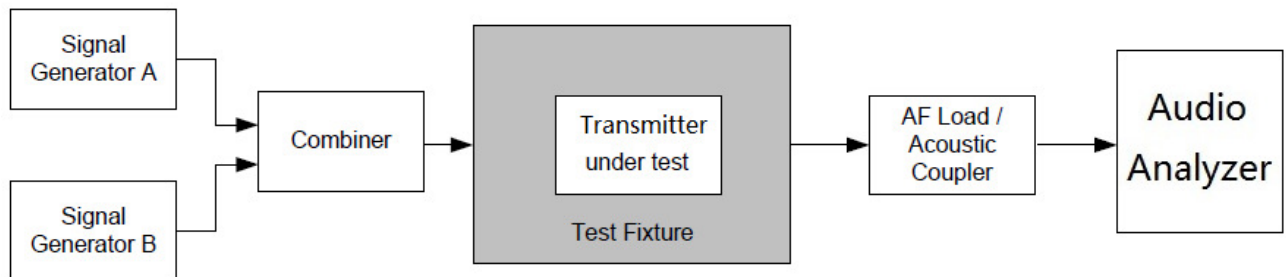
### 6.33 Adjacent channel selectivity

Test Requirement: EN 301 025 clause 10.3.1  
Test Method: EN 301 025 clause 10.3.2  
Limit: The bit error ratio shall be equal to or less than  $10^{-2}$ .

#### 6.33.1 E.U.T. Operation

Operating Environment:  
Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar  
Test mode: f: RX mode, Keep the EUT in DSC receiving mode.

#### 6.33.2 Test Setup Diagram



#### 6.33.3 Measurement Data

The detailed test data see: Appendix 301 025.

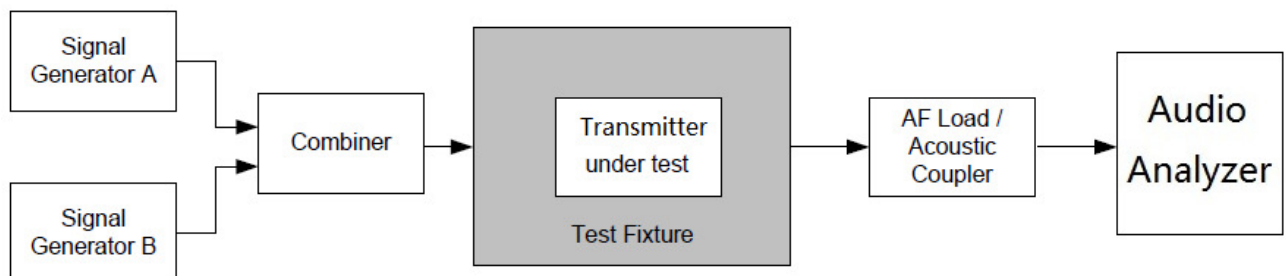
### 6.34 Spurious response and blocking immunity

Test Requirement: EN 301 025 clause 10.4.1  
Test Method: EN 301 025 clause 10.4.2  
Limit: The bit error ratio shall be equal to or less than  $10^{-2}$ .

#### 6.34.1 E.U.T. Operation

Operating Environment:  
Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar  
Test mode: f: RX mode, Keep the EUT in DSC receiving mode.

#### 6.34.2 Test Setup Diagram



#### 6.34.3 Measurement Data

The detailed test data see: Appendix 301 025.

### 6.35 Intermodulation response

Test Requirement EN 301 025 clause 10.5.1  
 Test Method: EN 301 025 clause 10.5.2  
 Limit: The bit error ratio shall be equal to or less than  $10^{-2}$ .

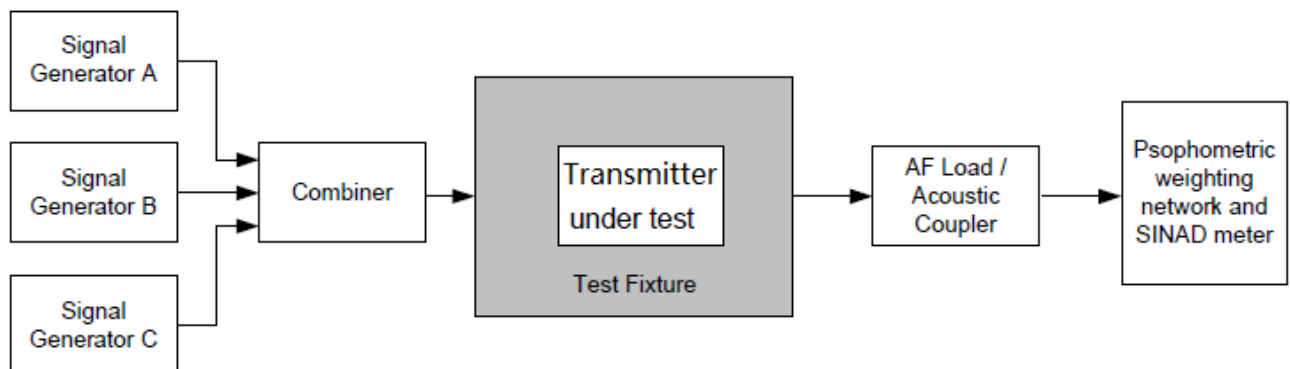
#### 6.35.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

Test mode: f: RX mode, Keep the EUT in DSC receiving mode.

#### 6.35.2 Test Setup Diagram



#### 6.35.3 Measurement Data

The detailed test data see: Appendix 301 025.

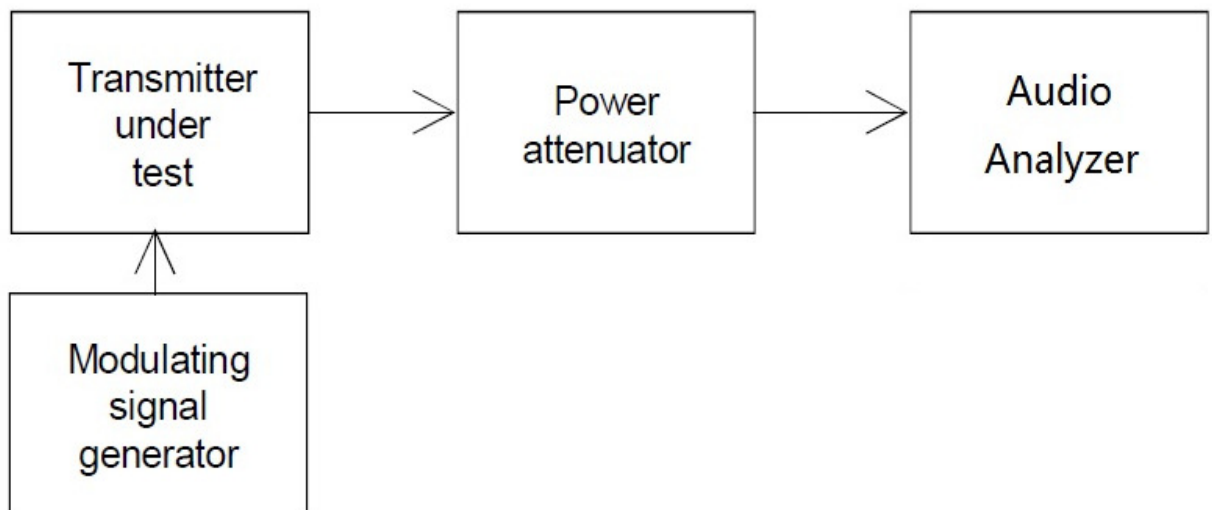
### 6.36 Dynamic range

Test Requirement: EN 301 025 clause 10.6.1  
Test Method: EN 301 025 clause 10.6.2  
Limit: The bit error ratio shall be equal to or less than  $10^{-2}$ .

#### 6.36.1 E.U.T. Operation

Operating Environment:  
Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar  
Test mode: f: RX mode, Keep the EUT in DSC receiving mode.

#### 6.36.2 Test Setup Diagram



A test signal in accordance with the DSC standard test signal containing consecutive DSC calls, shall be applied to the receiver input. The level of the test signal shall alternate between 100 dBuV and 0 dBuV.  
The bit error ratio in the decoder output shall be determined.

#### 6.36.3 Measurement Data

The detailed test data see: Appendix 301 025.

### 6.37 Spurious emissions

|                  |                                                                                                                 |
|------------------|-----------------------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 10.7.1                                                                                        |
| Test Method:     | EN 301 025 clause 10.7.2                                                                                        |
| Limit:           | The power of any spurious emission shall not exceed 2 nW at any frequency in the range between 9 kHz and 2 GHz. |

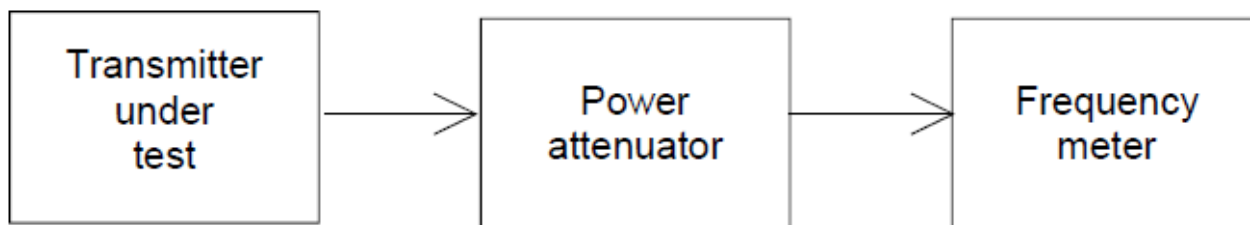
#### 6.37.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

Test mode: f: RX mode, Keep the EUT in DSC receiving mode.

#### 6.37.2 Test Setup Diagram



#### 6.37.3 Measurement Data

The detailed test data see: Appendix 301 025.



### **6.38 Simultaneous reception**

|                  |                                                                                                                                                                                        |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | EN 301 025 clause 10.8.1                                                                                                                                                               |
| Test Method:     | EN 301 025 clause 10.8.2                                                                                                                                                               |
| Limit:           | For radiotelephony operation the SINAD ratio shall be no less than 20 dB in the presence of the DSC test signal.<br>The DSC bit error ratio shall be equal to or less than $10^{-2}$ . |

#### **6.38.1 E.U.T. Operation**

|                        |                                                 |           |         |                       |           |
|------------------------|-------------------------------------------------|-----------|---------|-----------------------|-----------|
| Operating Environment: |                                                 |           |         |                       |           |
| Temperature:           | 23.0 °C                                         | Humidity: | 56 % RH | Atmospheric Pressure: | 1015 mbar |
| Test mode:             | f: RX mode, Keep the EUT in DSC receiving mode. |           |         |                       |           |

#### **6.38.2 Test Setup Diagram**

The radiotelephone shall be set for operation on channel 16.

Two input signals shall be connected to the receiver input terminal via combining network.

The radiotelephone test signal shall be at a carrier frequency equal to the nominal frequency of the receiver, modulated by the normal test modulation shall be applied to the receiver input.

An audiofrequency load and a measuring instrument for measuring SINAD ratio (through a psophometric network) shall be connected to the receiver output terminals.

The radiotelephone test signal level shall be set for +20 dBuV.

The SINAD shall be measured with and without the presence of the DSC test signal.

The DSC standard test signal input level shall be 0 dBuV containing DSC calls.

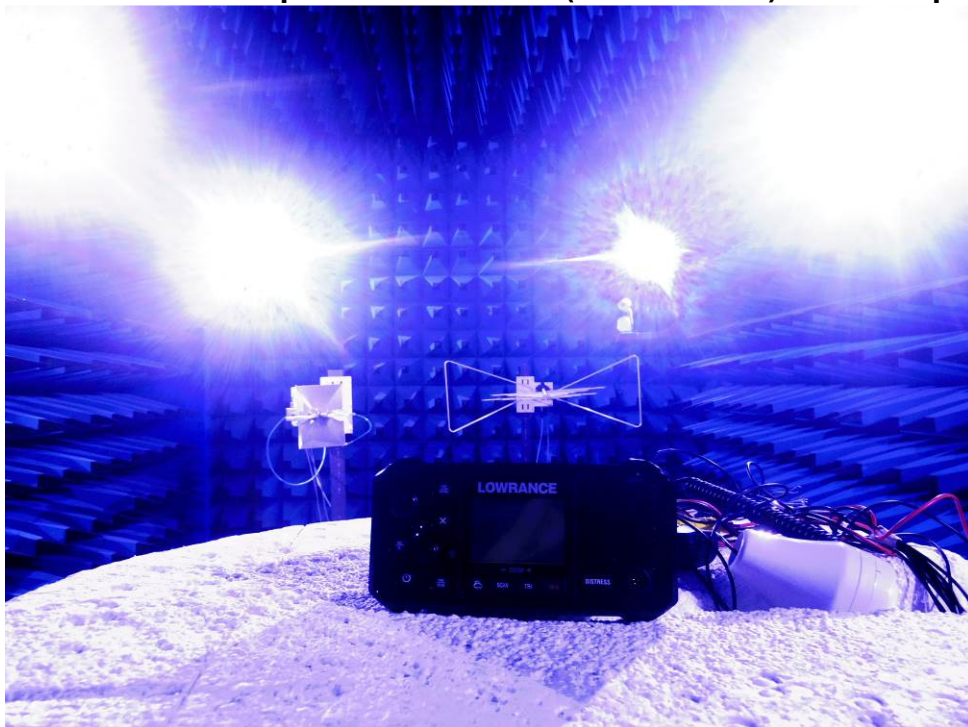
The bit error ratio in the decoder output shall be determined.

#### **6.38.3 Measurement Data**

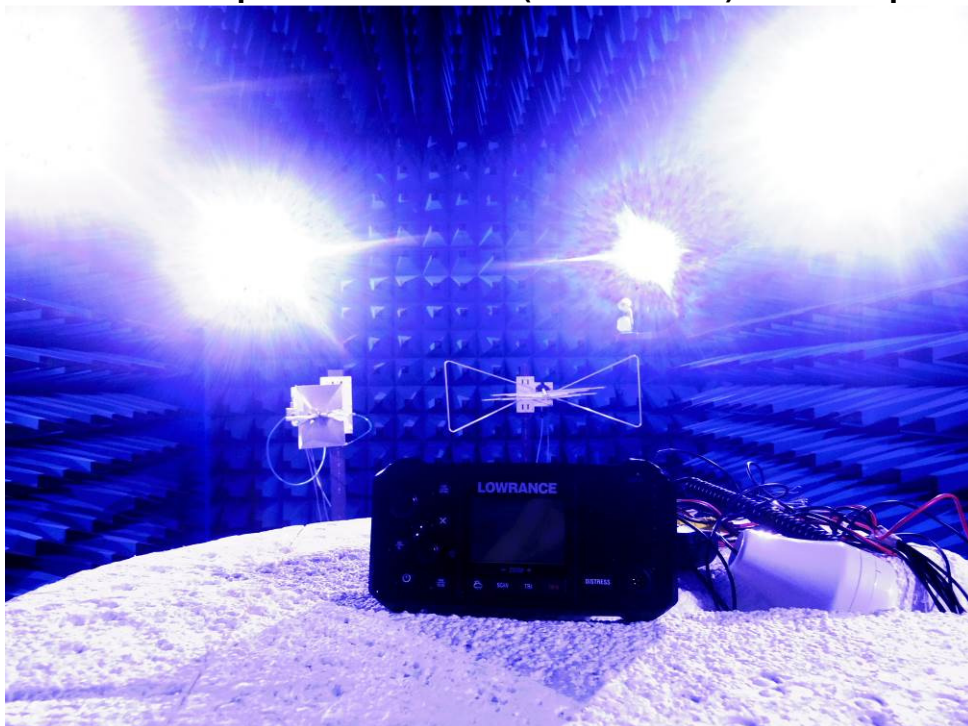
The detailed test data see: Appendix 301 025.

## 7 Photographs

### 7.1 Transmitter spurious emissions(30MHz-2GHz) Test Setup



### 7.2 Receiver spurious emissions(30MHz-2GHz) Test Setup





### **7.3 EUT Constructional Details**

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1807006923CR.

## 8 Appendix

### 8.1 Appendix EN301 025 Test data.

#### 1. Transmitter/Frequency error

| Test Frequency (MHz) | Temperature (°C) | Power Supplied (V Dc) | Measured Result for High Power (KHz) | Measured Result for Low Power (KHz) | Limit (KHz) | Verdict |
|----------------------|------------------|-----------------------|--------------------------------------|-------------------------------------|-------------|---------|
| Normal condition     |                  |                       |                                      |                                     |             |         |
| 156.8                | Tnor=25          | Vnor=12               | 0.013                                | 0.017                               | ±1.5        | Pass    |
| Extreme condition    |                  |                       |                                      |                                     |             |         |
| 156.8                | Tmin=-20         | Vnor=10.8             | 0.071                                | 0.071                               | ±1.5        | Pass    |
|                      | Tmin =-20        | Vmax=15.6             | 0.056                                | 0.056                               | ±1.5        | Pass    |
|                      | Tmax=55          | Vnor=10.8             | -0.038                               | -0.038                              | ±1.5        | Pass    |
|                      | Tmax =55         | Vmax=15.6             | -0.025                               | -0.025                              | ±1.5        | Pass    |

#### 2. Transmitter/Carrier power

| Test Channel                        | Temperature (°C) | Power Supplied (V Dc) | Channel Separation (KHz) | Measured Result (dBm) | Limit (dBm) | Verdict |
|-------------------------------------|------------------|-----------------------|--------------------------|-----------------------|-------------|---------|
| Highest RF output power (conducted) |                  |                       |                          |                       |             |         |
| Normal condition                    |                  |                       |                          |                       |             |         |
| L                                   | Tnor=25          | Vnor=12               | 25                       | 43.151                | 43.26(23W)  | Pass    |
| M                                   |                  |                       |                          | 43.176                | 43.26(23W)  | Pass    |
| H                                   |                  |                       |                          | <b>43.243</b>         | 43.26(23W)  | Pass    |
| Extreme condition                   |                  |                       |                          |                       |             |         |
| L                                   | Tmin=-20         | Vnor=10.8             | 25                       | 42.055                | 43.26(23W)  | Pass    |
|                                     | Tmin =-20        | Vmax=15.6             |                          | 42.840                | 43.26(23W)  | Pass    |
|                                     | Tmax=55          | Vnor=10.8             |                          | 42.489                | 43.26(23W)  | Pass    |
|                                     | Tmax =55         | Vmax=15.6             |                          | 43.019                | 43.26(23W)  | Pass    |
| M                                   | Tmin=-20         | Vnor=10.8             |                          | 42.082                | 43.26(23W)  | Pass    |
|                                     | Tmin =-20        | Vmax=15.6             |                          | 42.973                | 43.26(23W)  | Pass    |
|                                     | Tmax=55          | Vnor=10.8             |                          | 42.443                | 43.26(23W)  | Pass    |
|                                     | Tmax =55         | Vmax=15.6             |                          | 42.989                | 43.26(23W)  | Pass    |



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|                                    |           |           |    |        |            |      |
|------------------------------------|-----------|-----------|----|--------|------------|------|
| H                                  | Tmin=-20  | Vnor=10.8 |    | 42.151 | 43.26(23W) | Pass |
|                                    | Tmin =-20 | Vmax=15.6 |    | 42.988 | 43.26(23W) | Pass |
|                                    | Tmax=55   | Vnor=10.8 |    | 42.381 | 43.26(23W) | Pass |
|                                    | Tmax =55  | Vmax=15.6 |    | 42.931 | 43.26(23W) | Pass |
| Lowest RF output power (conducted) |           |           |    |        |            |      |
| Normal condition                   |           |           |    |        |            |      |
| L                                  | Tnor=25   | Vnor=12   | 25 | 28.6   | 30(1W)     | Pass |
| M                                  |           |           |    | 28.8   | 30(1W)     | Pass |
| H                                  |           |           |    | 28.9   | 30(1W)     | Pass |
| Extreme condition                  |           |           |    |        |            |      |
| L                                  | Tmin=-20  | Vnor=10.8 | 25 | 28.388 | 30(1W)     | Pass |
|                                    | Tmin =-20 | Vmax=15.6 |    | 28.808 | 30(1W)     | Pass |
|                                    | Tmax=55   | Vnor=10.8 |    | 28.325 | 30(1W)     | Pass |
|                                    | Tmax =55  | Vmax=15.6 |    | 29.138 | 30(1W)     | Pass |
| M                                  | Tmin=-20  | Vnor=10.8 |    | 28.195 | 30(1W)     | Pass |
|                                    | Tmin =-20 | Vmax=15.6 |    | 28.751 | 30(1W)     | Pass |
|                                    | Tmax=55   | Vnor=10.8 |    | 28.195 | 30(1W)     | Pass |
|                                    | Tmax =55  | Vmax=15.6 |    | 28.976 | 30(1W)     | Pass |
| H                                  | Tmin=-20  | Vnor=10.8 |    | 28.325 | 30(1W)     | Pass |
|                                    | Tmin =-20 | Vmax=15.6 |    | 28.808 | 30(1W)     | Pass |
|                                    | Tmax=55   | Vnor=10.8 |    | 28.261 | 30(1W)     | Pass |
|                                    | Tmax =55  | Vmax=15.6 |    | 28.976 | 30(1W)     | Pass |

Note: The rated high power: 23W=43.62dBm, The rated low power: 1W=30dBm

### 3. Transmitter/Frequency deviation

| Test Frequency (MHz) | Modulation Frequency (Hz) | Input level | Maximum Deviation(KHz) |           | Limit (KHz) | Verdict |
|----------------------|---------------------------|-------------|------------------------|-----------|-------------|---------|
|                      |                           |             | High Power             | Low Power |             |         |
| 156.8                | 100                       | 20dB 3KHz   | 1.582                  | 1.540     | ±5.0        | Pass    |
|                      | 200                       | 20dB 3KHz   | 4.675                  | 4.732     | ±5.0        | Pass    |
|                      | 300                       | 20dB 3KHz   | 3.667                  | 4.273     | ±5.0        | Pass    |
|                      | 400                       | 20dB 3KHz   | 3.583                  | 4.132     | ±5.0        | Pass    |
|                      | 500                       | 20dB 3KHz   | 3.947                  | 4.367     | ±5.0        | Pass    |
|                      | 1000                      | 20dB 3KHz   | 3.822                  | 3.924     | ±5.0        | Pass    |
|                      | 1500                      | 20dB 3KHz   | 3.625                  | 3.648     | ±5.0        | Pass    |
|                      | 2000                      | 20dB 3KHz   | 3.729                  | 3.715     | ±5.0        | Pass    |
|                      | 2500                      | 20dB 3KHz   | 4.104                  | 4.100     | ±5.0        | Pass    |
|                      | 3000                      | 20dB 3KHz   | 4.100                  | 4.091     | ±5.0        | Pass    |

### 4. Transmitter/Reduction of frequency deviation at modulation freq. above 3kHz

| Test Frequency (MHz) | Modulation Frequency (Hz) | Input level | Maximum Deviation(KHz) |           | Limit (KHz) | Verdict |
|----------------------|---------------------------|-------------|------------------------|-----------|-------------|---------|
|                      |                           |             | High Power             | Low Power |             |         |
| 156.8                | 3000                      | /           | /                      | /         | 5           | /       |
|                      | 3000                      | 3KHz        | 4.095                  | /         | 5           | Pass    |
|                      | 3100                      | 3KHz        | 3.998                  | /         | 5           | Pass    |
|                      | 4000                      | 3KHz        | 2.040                  | /         | 3.92        | Pass    |
|                      | 5000                      | 3KHz        | 0.678                  | /         | 3.92        | Pass    |
|                      | 6000                      | 3KHz        | 0.260                  | /         | 1.5         | Pass    |
|                      | 8000                      | 3KHz        | 0.081                  | /         | 0.77        | Pass    |
|                      | 10000                     | 3KHz        | 0.049                  | /         | 0.46        | Pass    |
|                      | 12000                     | 3KHz        | 0.041                  | /         | 0.30        | Pass    |
|                      | 15000                     | 3KHz        | 0.044                  | /         | 0.18        | Pass    |
|                      | 20000                     | 3KHz        | 0.050                  | /         | 0.09        | Pass    |
|                      | 25000                     | 3KHz        | 0.043                  | /         | 0.05        | Pass    |

**5. Transmitter/Sensitivity of the modulator, including microphone**

| Test Frequency (MHz) | Sound Level dB(A) | Frequency Deviation(KHz) |           | Limit(KHz) |      | Verdict |
|----------------------|-------------------|--------------------------|-----------|------------|------|---------|
|                      |                   | High Power               | Low Power | High       | Low  |         |
| 156.8                | 94                | 2.277                    | 2.038     | ±3.0       | ±1.5 | Pass    |

**6. Transmitter/Audio Frequency Response**

| Test Frequency (MHz) | Modulation Frequency (Hz) | Upper Limit | Lower Limit | Modulation Index(dB) Relative. To 1KHz | Verdict |
|----------------------|---------------------------|-------------|-------------|----------------------------------------|---------|
| 156.8                | 300                       | -9.5        | -13.5       | -12.9                                  | Pass    |
|                      | 500                       | -5          | -9          | -7.2                                   | Pass    |
|                      | 800                       | -0.9        | -4.9        | -2.2                                   | Pass    |
|                      | 1000                      | 1           | -3          | 0.04                                   | Pass    |
|                      | 1500                      | 4.5         | 0.5         | 4.0                                    | Pass    |
|                      | 1800                      | 6.1         | 2.1         | 5.8                                    | Pass    |
|                      | 2000                      | 7           | 3           | 6.8                                    | Pass    |
|                      | 2500                      | 9           | 5           | 8.9                                    | Pass    |
|                      | 3000                      | 10.5        | 6.5         | 9.4                                    | Pass    |

**7. Transmitter/Audio frequency harmonic distortion of the emission**

| Test Frequency<br>(MHz) | Temperature<br>(°C) | Power<br>Supplied<br>(V Dc) | Modulation<br>Frequency<br>(Hz) | AF Distortion(%) |              | Limit<br>(%) | Verdict |
|-------------------------|---------------------|-----------------------------|---------------------------------|------------------|--------------|--------------|---------|
|                         |                     |                             |                                 | High<br>Power    | Low<br>Power |              |         |
| Normal condition        |                     |                             |                                 |                  |              |              |         |
| 156.8                   | Tnor=25             | Vnor=12                     | 300                             | 1.3              | 1.4          | ≤10          | Pass    |
|                         |                     |                             | 500                             | 2.3              | 2.1          | ≤10          | Pass    |
|                         |                     |                             | 1000                            | 0.7              | 0.7          | ≤10          | Pass    |
| Extreme condition       |                     |                             |                                 |                  |              |              |         |
| 156.8                   | Tmin=-20            | Vnor=10.8                   | 1000                            | 5.7              | 5.7          | ≤10          | Pass    |
|                         | Tmin =-20           | Vmax=15.6                   | 1000                            | 5.0              | 4.9          | ≤10          | Pass    |
|                         | Tmax=55             | Vnor=10.8                   | 1000                            | 1.8              | 1.8          | ≤10          | Pass    |
|                         | Tmax =55            | Vmax=15.6                   | 1000                            | 1.8              | 1.8          | ≤10          | Pass    |

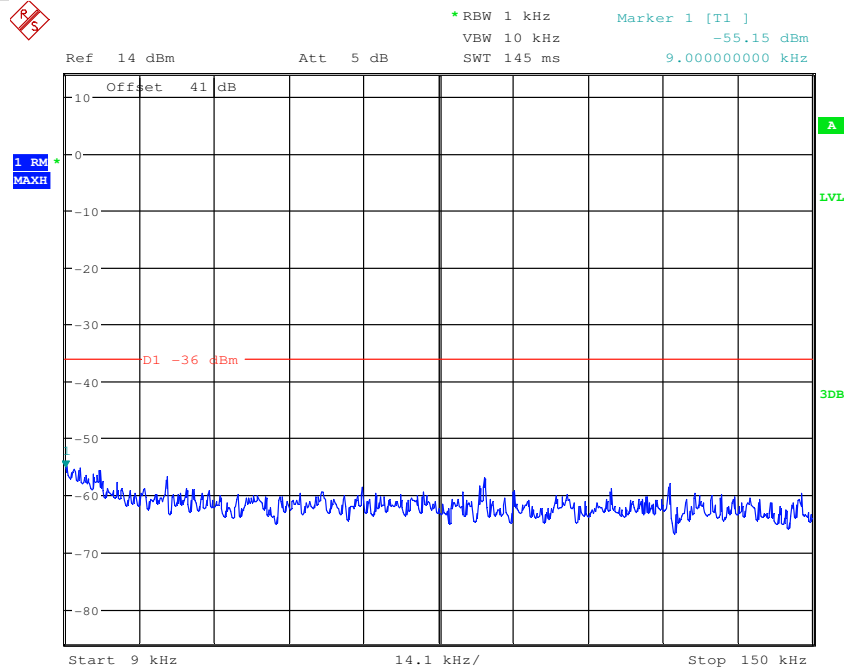
### 8. Transmitter/Adjacent channel power

| Test Channel | Adjacent Channel | Adjacent channel Power(dBc) |          | Limit                                                                                                                                   | Verdict |
|--------------|------------------|-----------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------|---------|
|              |                  | High Power                  | Low High |                                                                                                                                         |         |
| L            | Fn + 25KHz       | -83.4                       | -83.0    | 25 kHz channel: 70 dB below the carrier power of the transmitter without any need to be below the spurious emission limit of 0,25 µW.   | Pass    |
| M            |                  | -84.3                       | -82.9    |                                                                                                                                         | Pass    |
| H            |                  | -82.5                       | -84.1    |                                                                                                                                         | Pass    |
| L            | Fn - 25KHz       | -82.7                       | -83.1    | 12,5 kHz channel: 60 dB below the carrier power of the transmitter without any need to be below the spurious emission limit of 0,25 µW. | Pass    |
| M            |                  | -84.5                       | -83,5    |                                                                                                                                         | Pass    |
| H            |                  | -82.9                       | -83.5    |                                                                                                                                         | Pass    |

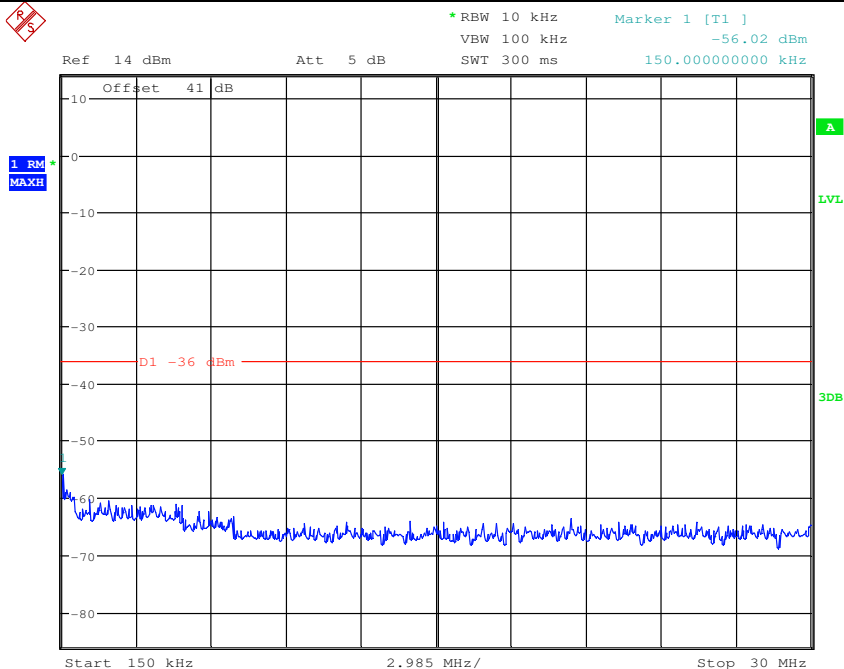


9. Transmitter/Conducted spurious emissions conveyed to the antenna

25KHz, Low Power, Assigned Frequency:156.025MHz, 9KHz-150KHz

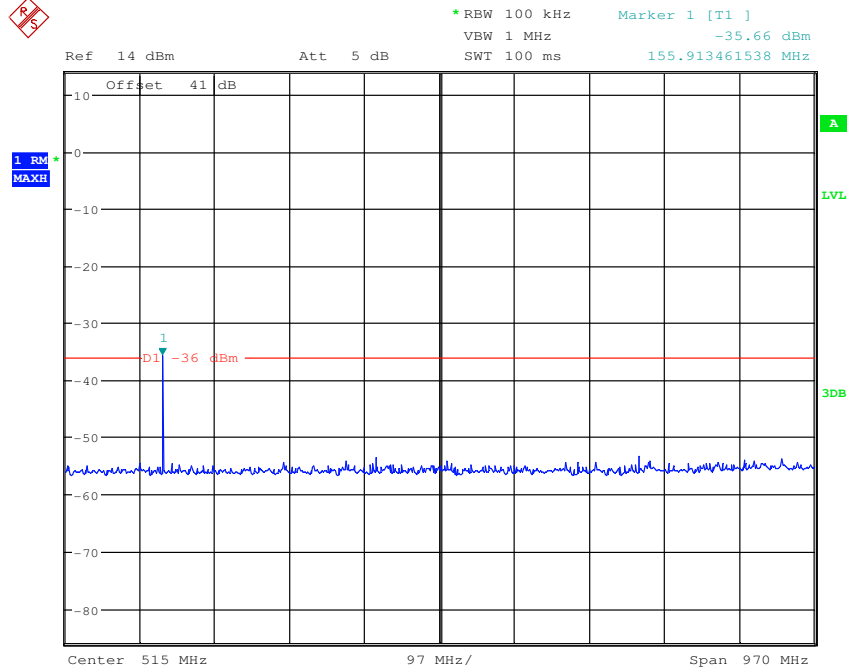


25KHz, Low Power, Assigned Frequency:156.025MHz, 150KHz-30MHz

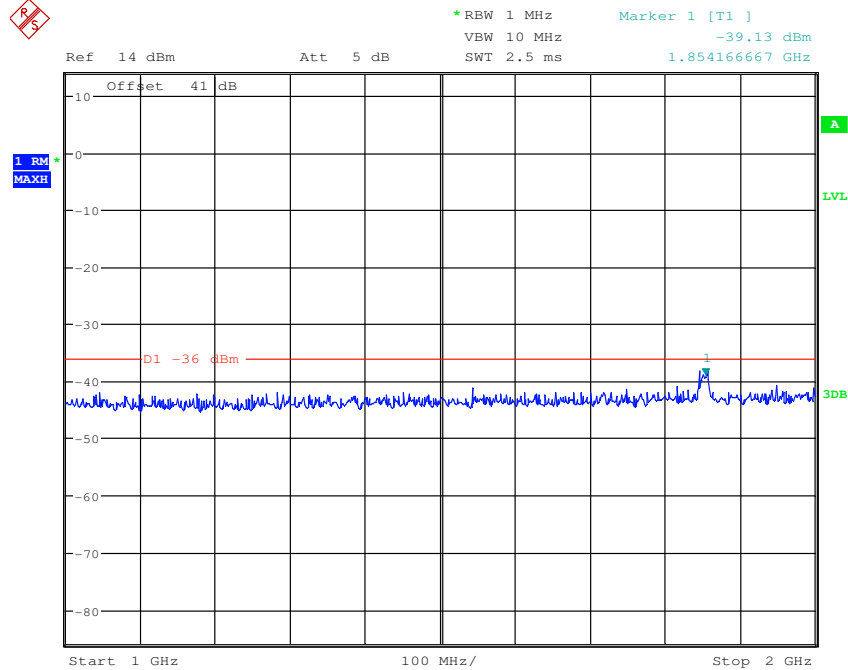




25KHz, Low Power, Assigned Frequency:156.025MHz, 30MHz-1GHz



25KHz, Low Power, Assigned Frequency:156.025MHz, 1GHz-2GHz



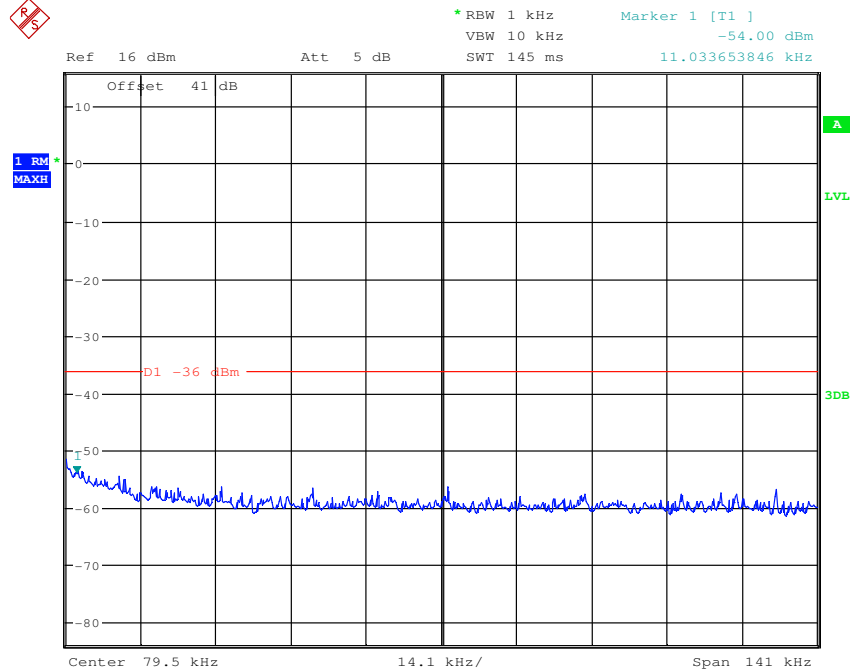


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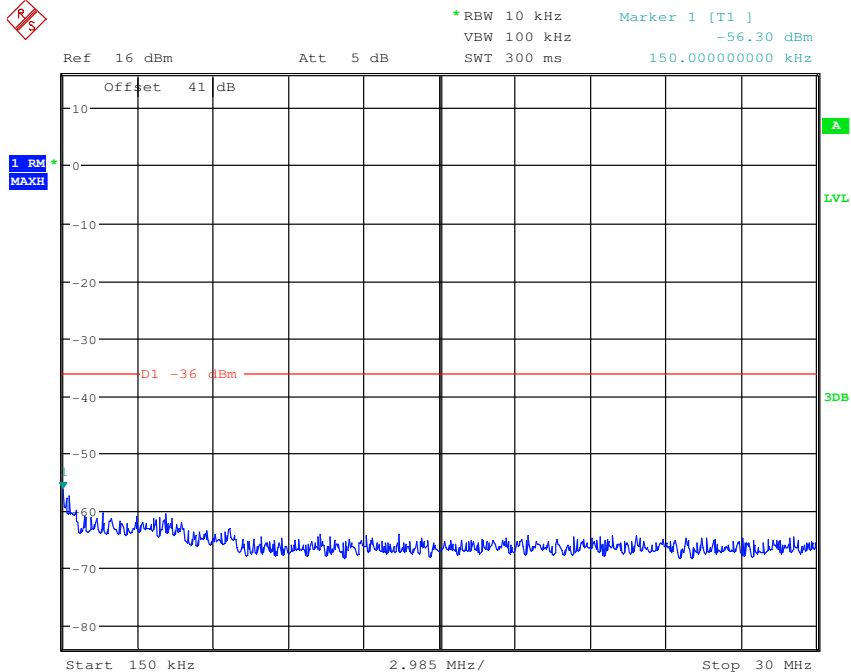
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## 25KHz, Low Power, Assigned Frequency:156.8MHz, 9KHz-150KHz

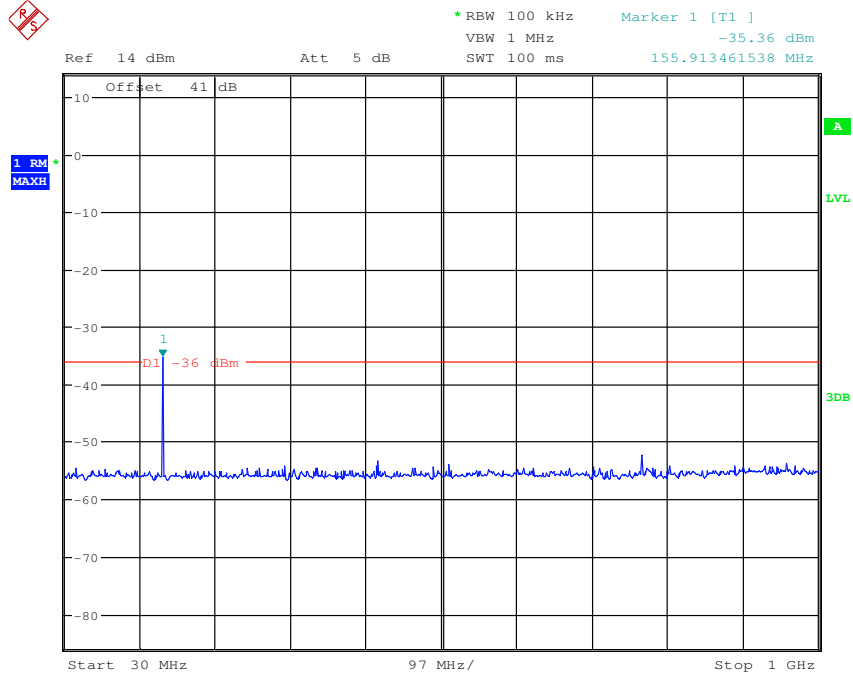


## 25KHz, Low Power, Assigned Frequency:156.8MHz, 150KHz-30MHz

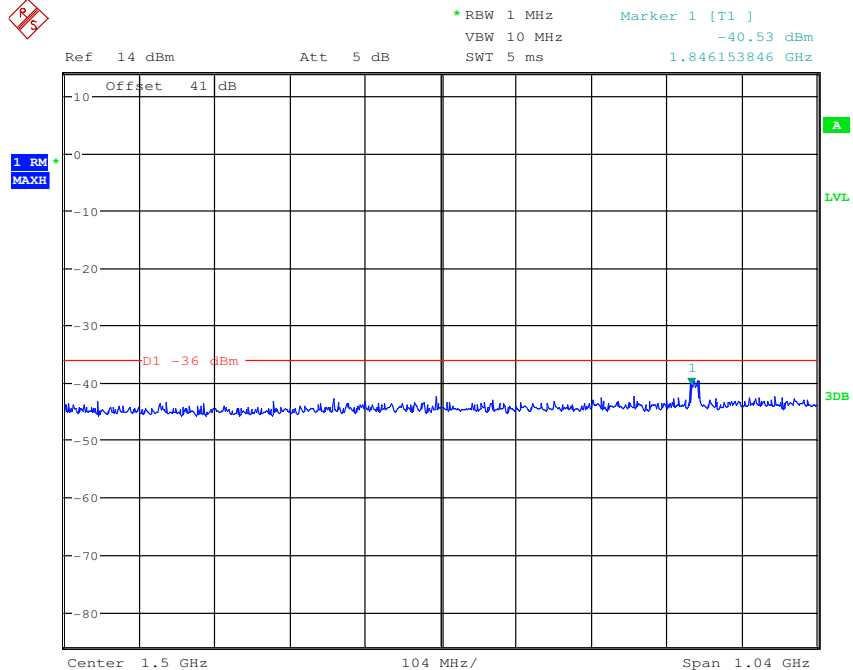




25KHz, Low Power, Assigned Frequency:156.8MHz, 30MHz-1GHz



25KHz, Low Power, Assigned Frequency:156.8MHz, 1GHz-2GHz



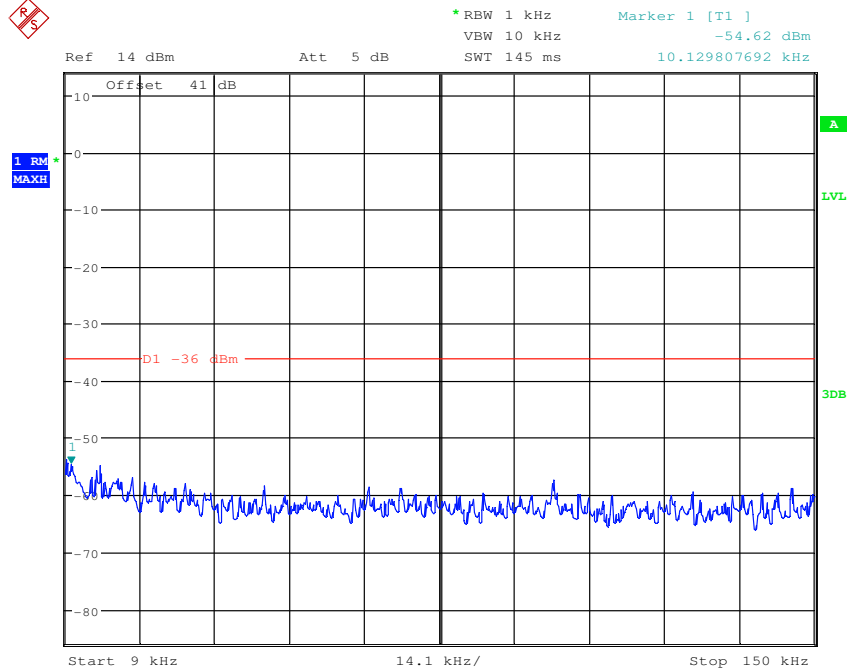


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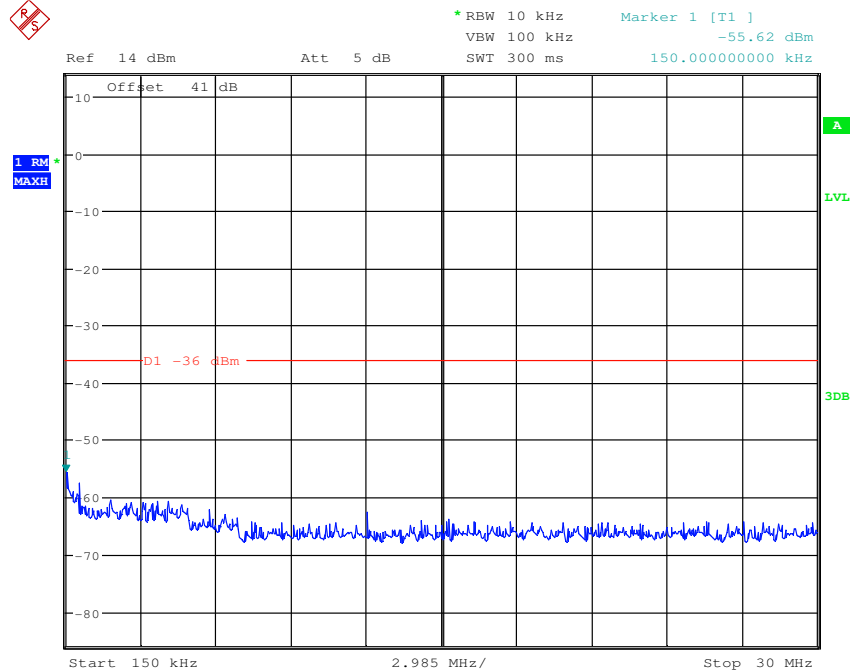
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## 25KHz, Low Power, Assigned Frequency:157.425MHz, 9KHz-150KHz

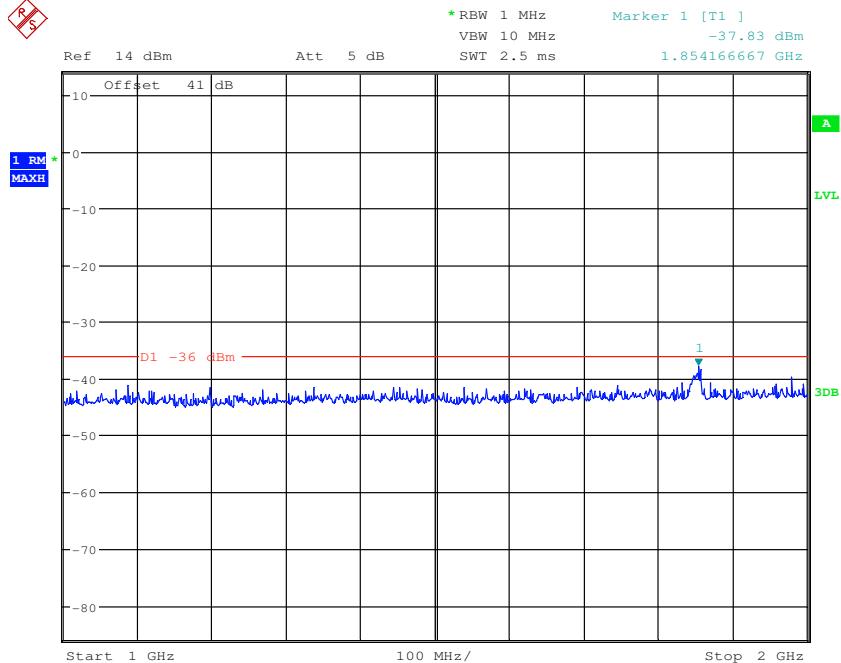
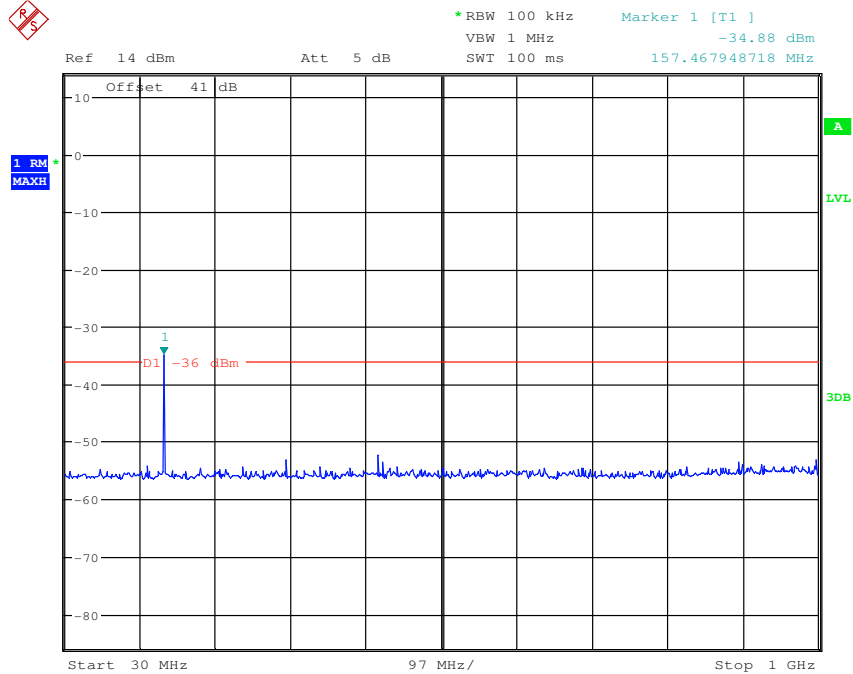


## 25KHz, Low Power, Assigned Frequency:157.425MHz, 150KHz-30MHz





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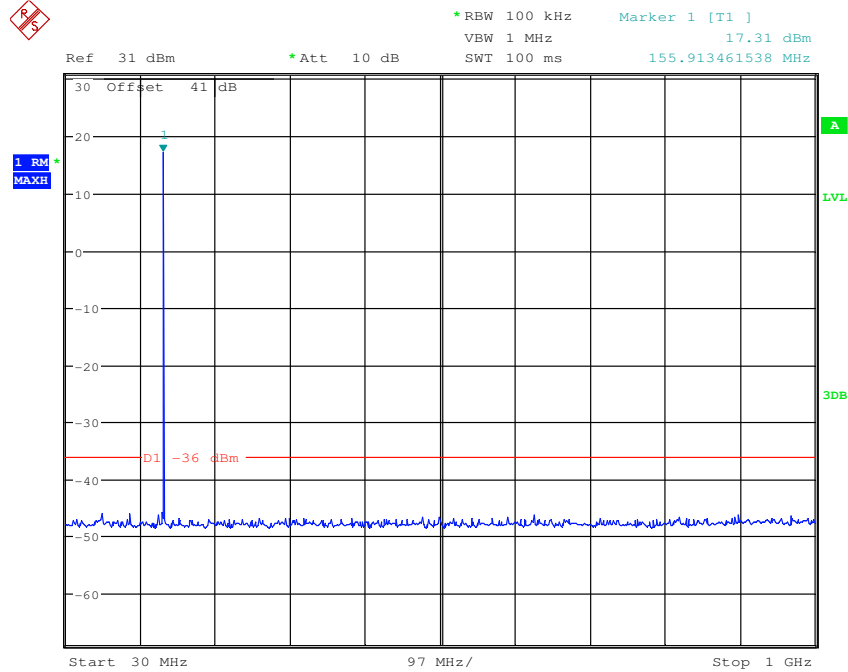


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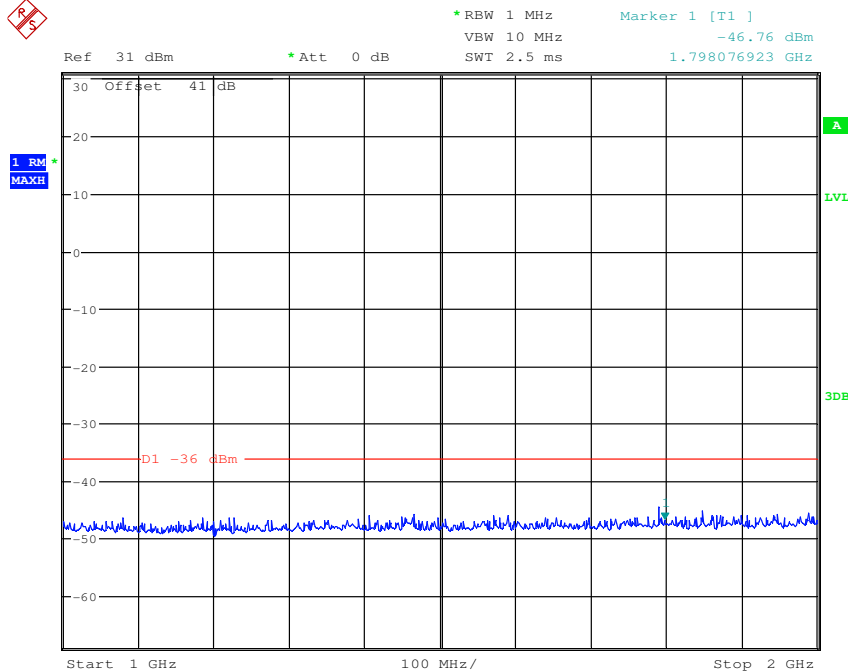




25KHz, High Power, Assigned Frequency:156.025MHz, 30MHz-1GHz



25KHz, High Power, Assigned Frequency:156.025MHz, 1GHz-2GHz



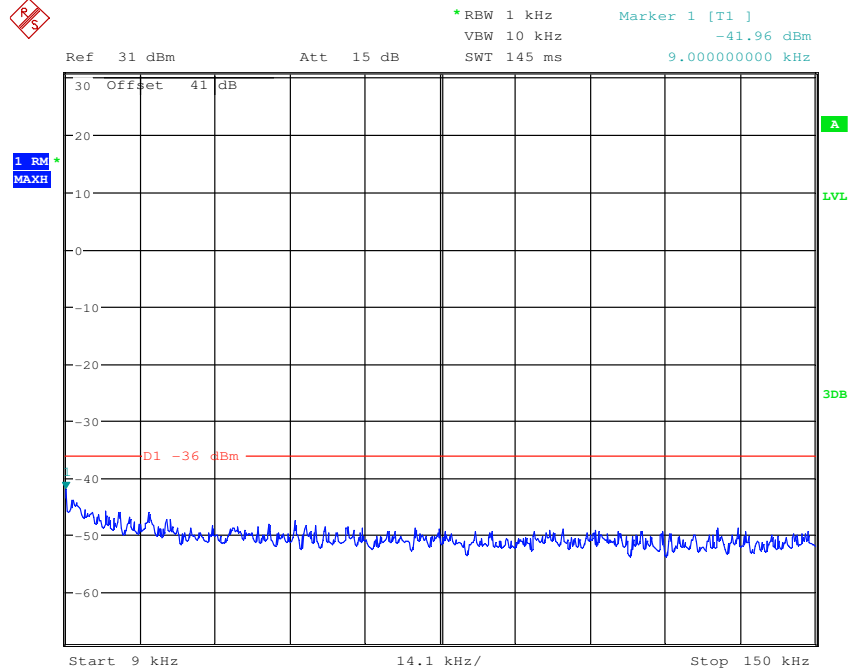


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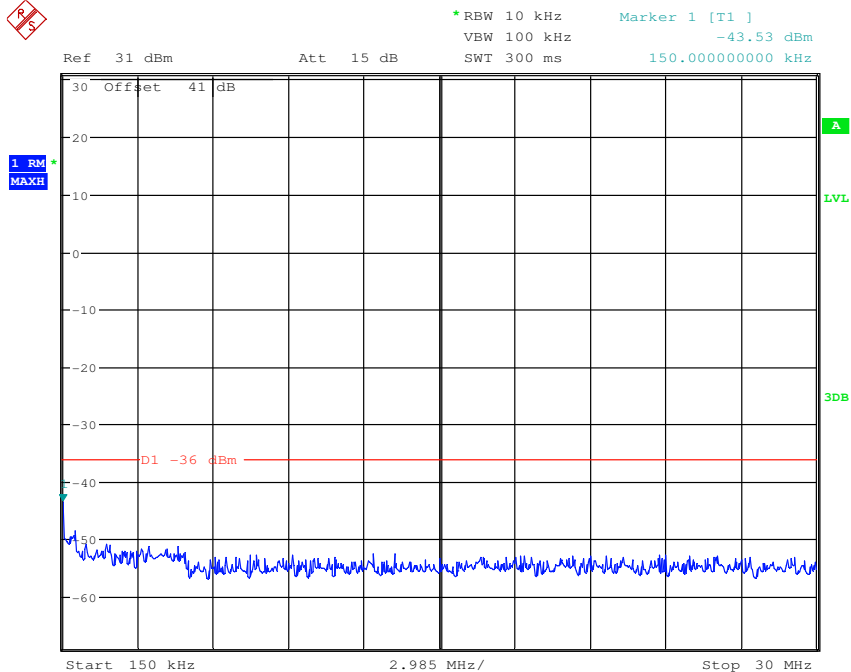
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## 25KHz, High Power, Assigned Frequency:156.8MHz, 9KHz-150KHz

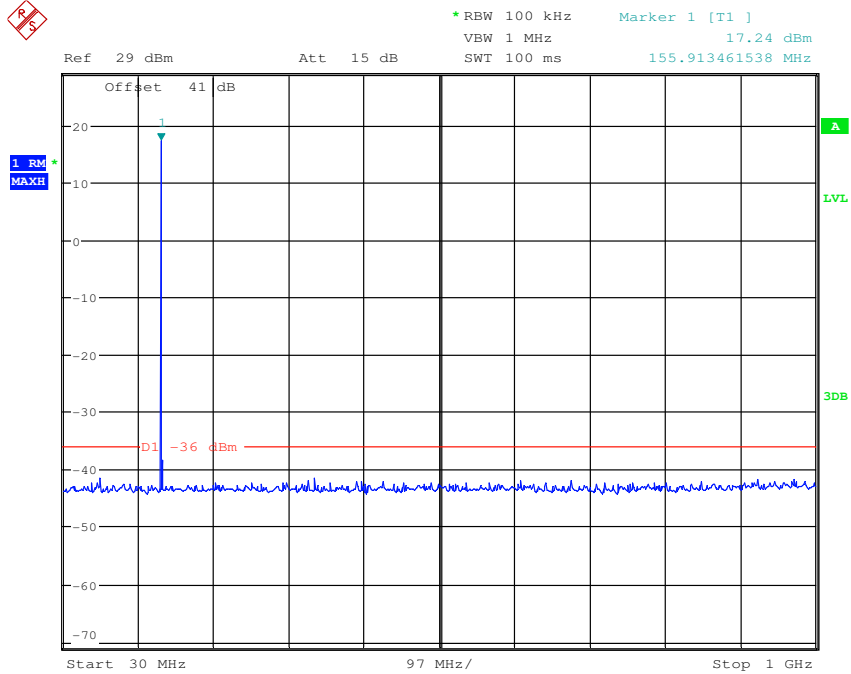


## 25KHz, High Power, Assigned Frequency:156.8MHz, 150KHz-30MHz

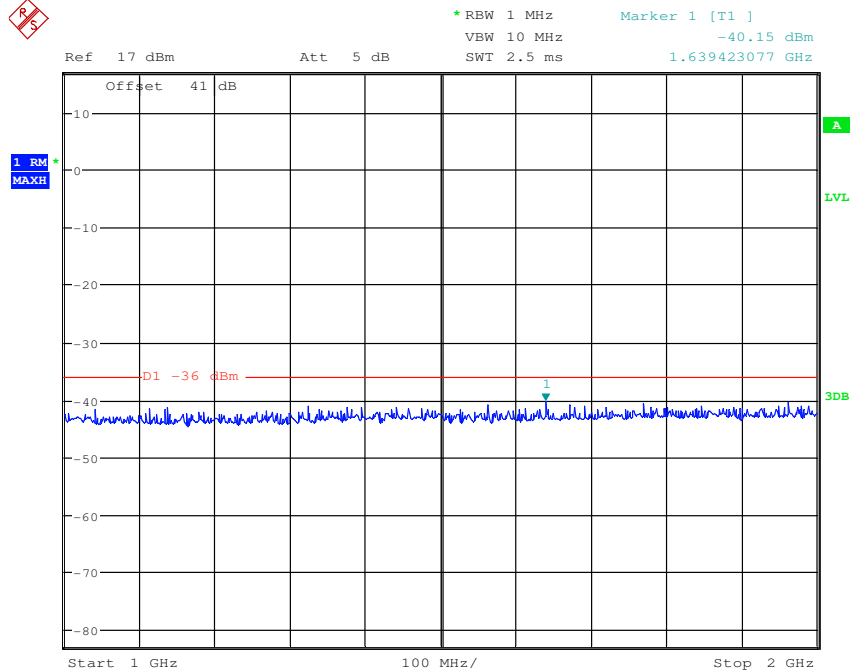




25KHz, High Power, Assigned Frequency:156.8MHz, 30MHz-1GHz

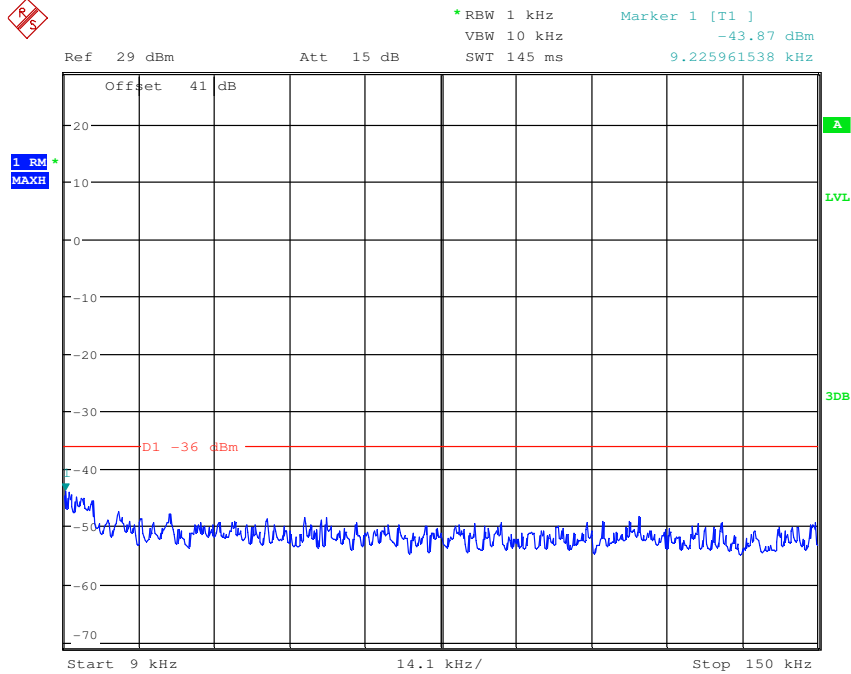


25KHz, High Power, Assigned Frequency:156.8MHz, 1GHz-2GHz

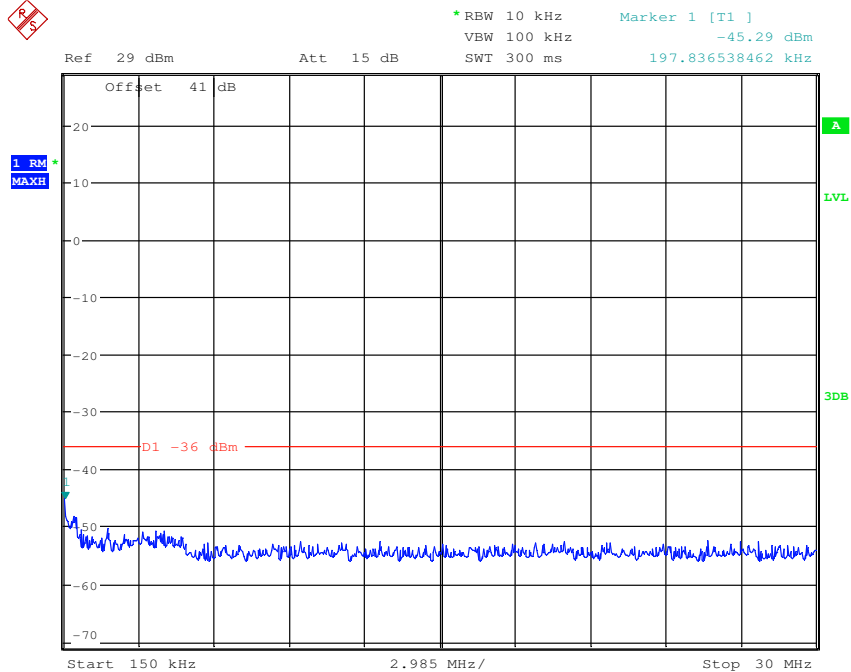




25KHz, High Power, Assigned Frequency:157.425MHz, 9KHz-150KHz



25KHz, High Power, Assigned Frequency:157.425MHz, 150KHz-30MHz





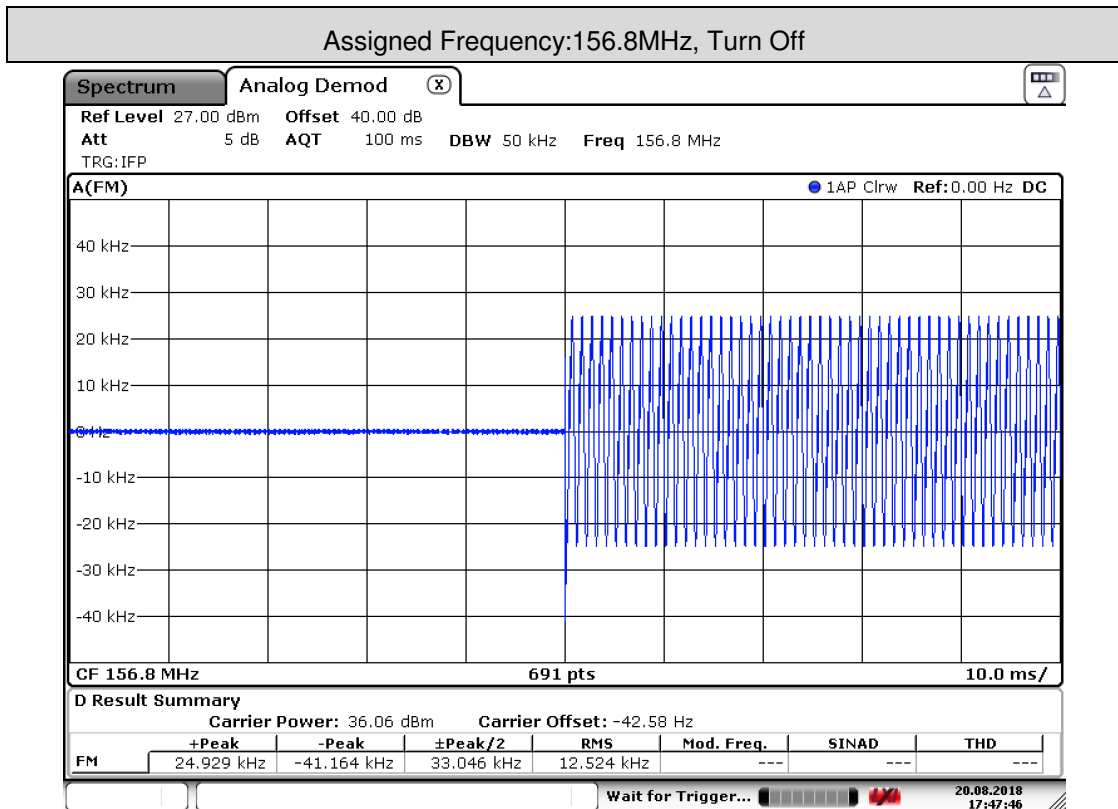
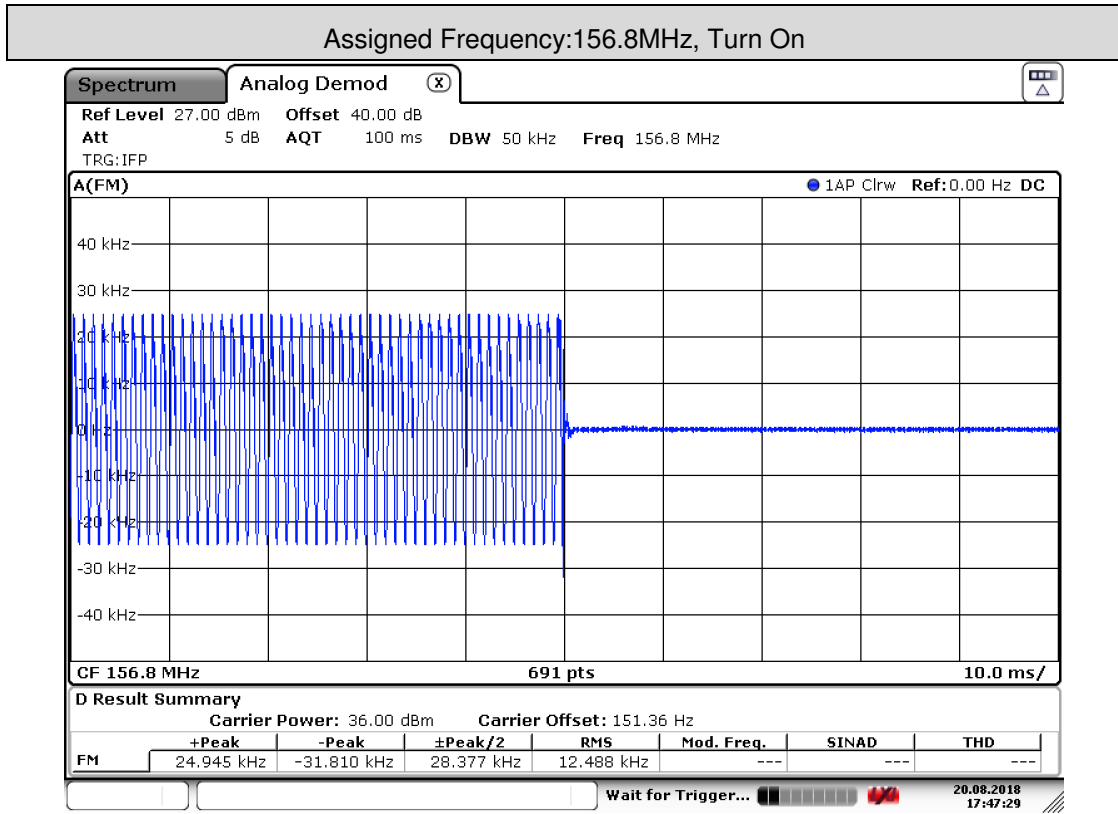


**10. Cabinet radiation and conducted spurious emissions other than those conveyed to the antenna**

| Assigned Frequency:156.8MHz, High Power, Stand-by mode |                 |                       |              |                   |
|--------------------------------------------------------|-----------------|-----------------------|--------------|-------------------|
| Frequency<br>MHz                                       | Polarity<br>H/V | Emission Level<br>dBm | Limit<br>dBm | Over Limit<br>dBm |
| 48.672                                                 | H               | -74.34                | -57.00       | -17.35            |
| 104.536                                                | H               | -77.43                | -57.00       | -20.44            |
| 207.85                                                 | H               | -73.66                | -57.00       | -16.67            |
| 431.032                                                | H               | -72.62                | -57.00       | -15.63            |
| 586.844                                                | H               | -68.17                | -57.00       | -11.18            |
| 1744.866                                               | H               | -65.69                | -57.00       | -8.7              |
| 169.599                                                | V               | -75.53                | -57.00       | -18.54            |
| 207.85                                                 | V               | -73.86                | -57.00       | -16.87            |
| 351.708                                                | V               | -74.19                | -57.00       | -17.2             |
| 485.609                                                | V               | -71.27                | -57.00       | -14.28            |
| 684.745                                                | V               | -68.07                | -57.00       | -11.08            |
| 1830.4                                                 | V               | -66.36                | -57.00       | -9.37             |

| Assigned Frequency:156.8MHz, High Power, Operation mode |                 |                       |              |                   |
|---------------------------------------------------------|-----------------|-----------------------|--------------|-------------------|
| Frequency<br>MHz                                        | Polarity<br>H/V | Emission Level<br>dBm | Limit<br>dBm | Over Limit<br>dBm |
| 46.995                                                  | H               | -74.06                | -36.00       | -38.06            |
| 66.967                                                  | H               | -70.54                | -36.00       | -34.54            |
| 313.276                                                 | H               | -54.66                | -36.00       | -18.66            |
| 470.523                                                 | H               | -49.64                | -36.00       | -13.64            |
| 782.345                                                 | H               | -49.98                | -36.00       | -13.98            |
| 1942.131                                                | H               | -43.73                | -36.00       | -7.73             |
| 46.995                                                  | V               | -74.17                | -36.00       | -38.17            |
| 69.845                                                  | V               | -81.03                | -36.00       | -45.03            |
| 313.276                                                 | V               | -56.09                | -36.00       | -20.09            |
| 470.523                                                 | V               | -53.59                | -36.00       | -17.59            |
| 782.345                                                 | V               | -51.34                | -36.00       | -15.34            |
| 1942.131                                                | V               | -45.71                | -36.00       | -9.71             |

# 11. Transmitter/Transient frequency behaviour of the transmitter



## 12. Transmitter/Residual modulation of the transmitter

| Test Frequency<br>(MHz) | Residual modulation<br>(dB) | Residual modulation limit<br>(dB) | Verdict |
|-------------------------|-----------------------------|-----------------------------------|---------|
| 156.8                   | -40.95                      | ≤-40                              | Pass    |

## 13. Transmitter/Frequency error (demodulated DSC signal)

| Test State                                                   | Temperature<br>(°C) | Power<br>Supplied<br>(V Dc) | Measured<br>Frequency<br>(Hz) | Tolerance | Measured<br>Result<br>(Hz) | Verdict |
|--------------------------------------------------------------|---------------------|-----------------------------|-------------------------------|-----------|----------------------------|---------|
| Normal condition, Assigned Frequency:156.525MHz(Channel 70)  |                     |                             |                               |           |                            |         |
| B-state                                                      | Tnor=25             | Vnor=12                     | 2100                          | ±10       | 2098                       | Pass    |
| Y-state                                                      | Tnor=25             | Vnor=12                     | 1300                          | ±10       | 1302                       | Pass    |
| Extreme condition, Assigned Frequency:156.525MHz(Channel 70) |                     |                             |                               |           |                            |         |
| B-state                                                      | Tmin=-20            | Vnor=10.8                   | 2100                          | ±10       | 2098                       | Pass    |
|                                                              | Tmin =-20           | Vmax=15.6                   | 2100                          | ±10       | 2098                       | Pass    |
|                                                              | Tmax=55             | Vnor=10.8                   | 2100                          | ±10       | 2098                       | Pass    |
|                                                              | Tmax =55            | Vmax=15.6                   | 2100                          | ±10       | 2098                       | Pass    |
| Y-state                                                      | Tmin=-20            | Vnor=10.8                   | 1300                          | ±10       | 1301                       | Pass    |
|                                                              | Tmin =-20           | Vmax=15.6                   | 1300                          | ±10       | 1301                       | Pass    |
|                                                              | Tmax=55             | Vnor=10.8                   | 1300                          | ±10       | 1301                       | Pass    |
|                                                              | Tmax =55            | Vmax=15.6                   | 1300                          | ±10       | 1301                       | Pass    |

## 14. Transmitter/Modulation index for DSC

| Test State                                                  | Temp.<br>(°C) | Power<br>Supplied<br>(V Dc) | Measured<br>Frequency<br>(Hz) | Measured<br>Result<br>(Hz) | Modulation<br>index | Limit | Verdict |
|-------------------------------------------------------------|---------------|-----------------------------|-------------------------------|----------------------------|---------------------|-------|---------|
| Normal condition, Assigned Frequency:156.525MHz(Channel 70) |               |                             |                               |                            |                     |       |         |
| B-state                                                     | Tnor=25       | Vnor=12                     | 2100                          | 4220                       | 2.01                | 2±10% | Pass    |
| Y-state                                                     | Tnor=25       | Vnor=12                     | 1300                          | 2612                       | 2.01                | 2±10% | Pass    |

## 15. Transmitter/Modulation rate for DSC

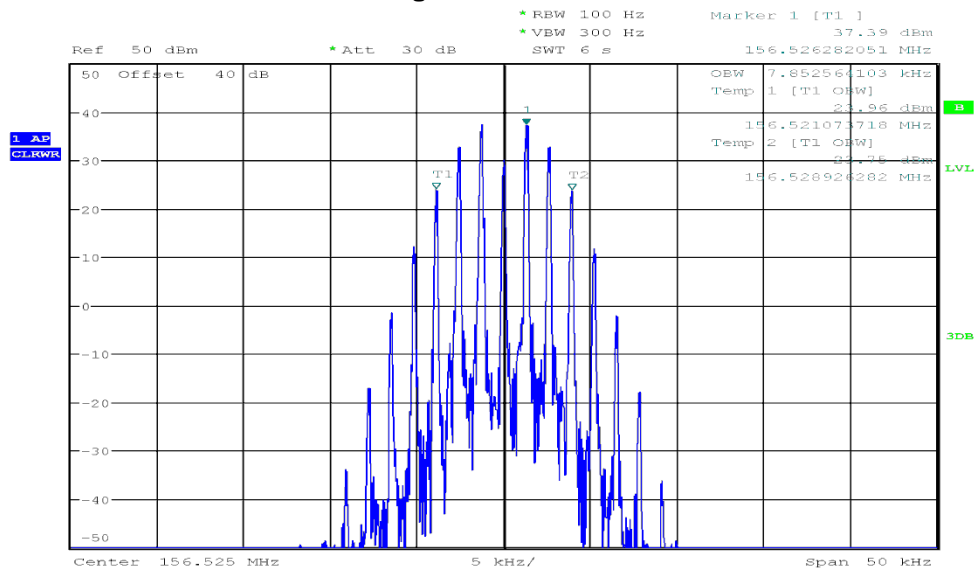
| Test<br>Frequency<br>(MHz) | Temperature<br>(°C) | Power<br>Supplied<br>(V Dc) | Modulation<br>Rate<br>(bit/s) | Frequency<br>Error<br>(ppm) | Limit<br>(ppm) | Verdict |
|----------------------------|---------------------|-----------------------------|-------------------------------|-----------------------------|----------------|---------|
| 156.525                    | Tnor=25             | Vnor=12                     | 1200                          | 20.0                        | ≤30            | Pass    |



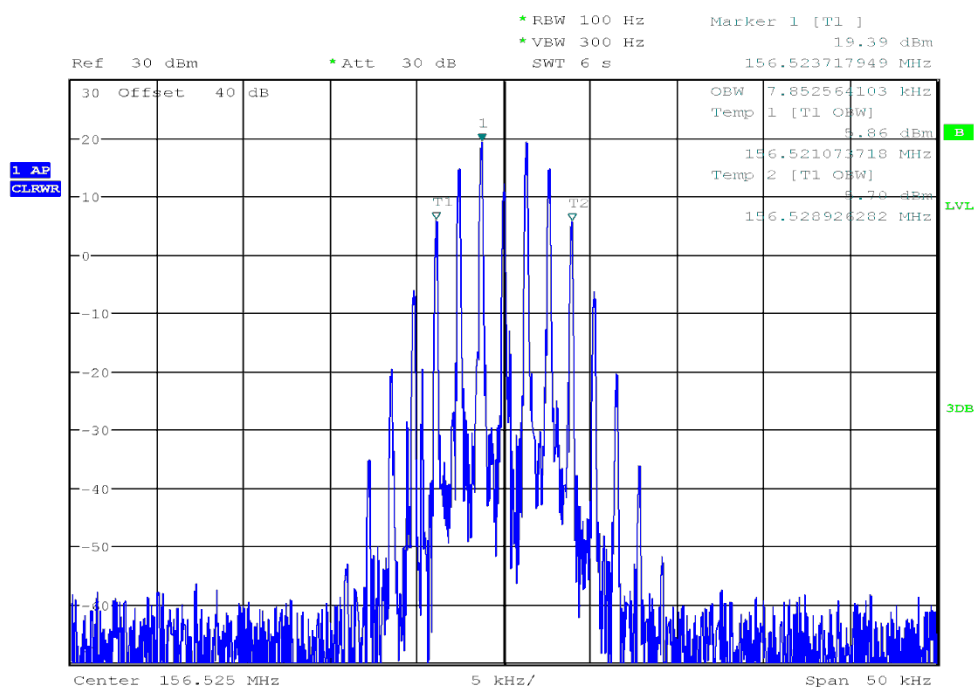
16. Transmitter/Occupied Bandwidth(Testing of free channel transmission on DSC channel 70)

DSC mode, Assigned Frequency:156.525MHz

High-dsc-1300Hz



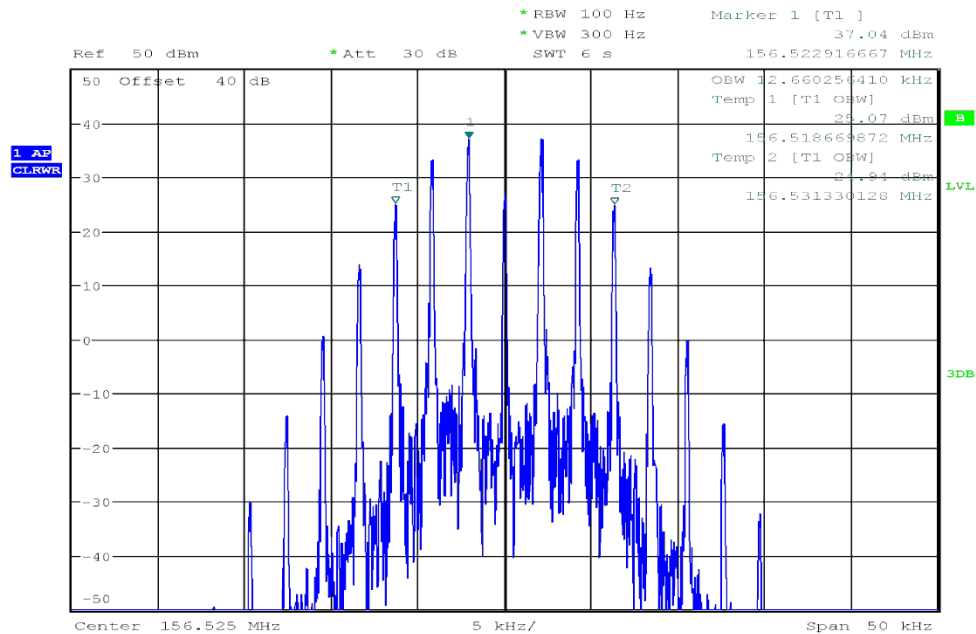
Low-dsc-1300Hz



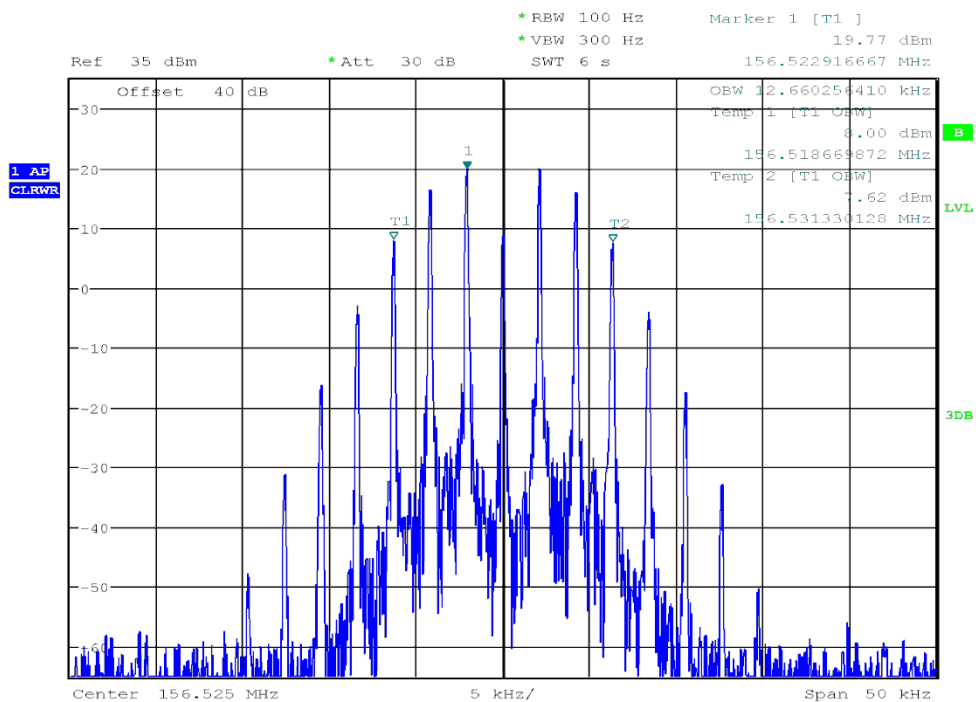


DSC mode, Assigned Frequency:156.525MHz

### High-dsc-2100Hz



### Low-dsc-2100Hz





**17. Receiver/Harmonic distortion and rated audio-frequency output power**

| Signal Level (dbuV)                           | Modulation Frequency (Hz) | AF Loudspeaker |          | Limit           |                   | Verdict |
|-----------------------------------------------|---------------------------|----------------|----------|-----------------|-------------------|---------|
|                                               |                           | Pout(W)        | Dist.(%) | Output Power(W) | AF Distortion (%) |         |
| Normal condition, Assigned Frequency:156.8MHz |                           |                |          |                 |                   |         |
| 60                                            | 300                       | 2.3            | 6.6      | >2              | ≤10               | Pass    |
|                                               | 500                       | 2.3            | 6.5      | >2              | ≤10               | Pass    |
|                                               | 1000                      | 2.1            | 1.5      | >2              | ≤10               | Pass    |

**18.Receiver/Audio Frequency Response for receiver**

| Modulation<br>Frequency<br>(Hz)               | Upper<br>Limit<br>(dB) | Lower<br>Limit<br>(dB) | Relative Audio Power |                             |                             | Max<br>Level | Min<br>Level | Verdict |
|-----------------------------------------------|------------------------|------------------------|----------------------|-----------------------------|-----------------------------|--------------|--------------|---------|
|                                               |                        |                        | F <sub>n</sub> (dB)  | F <sub>n</sub><br>(-1.5KHz) | F <sub>n</sub><br>(+1.5KHz) |              |              |         |
| Normal condition, Assigned Frequency:156.8MHz |                        |                        |                      |                             |                             |              |              |         |
| 300                                           | 11.5                   | 7.5                    | 9.11                 | 7.60                        | 7.84                        | 9.11         | 7.60         | Pass    |
| 500                                           | 7                      | 3                      | 6.32                 | 6.00                        | 6.1                         | 6.32         | 6.00         | Pass    |
| 800                                           | 2.9                    | -1.1                   | 2.46                 | 2.38                        | 2.36                        | 2.46         | 2.36         | Pass    |
| 1000                                          | 1                      | -3                     | 0.02                 | 0                           | 0                           | 0.02         | 0            | Pass    |
| 1500                                          | -1.5                   | -5.5                   | -4.09                | -3.9                        | -3.83                       | -3.83        | -4.09        | Pass    |
| 2000                                          | -5                     | -9                     | -7.31                | -6.92                       | -6.73                       | -6.73        | -7.31        | Pass    |
| 3000                                          | -8.5                   | -12.5                  | -12.20               | -11.5                       | -11.08                      | -11.08       | -12.20       | Pass    |

**19. Receiver/Maximum useable sensitivity**

| Test Freq.<br>(MHz) | Temp.<br>(°C)         | Power Supplied<br>(V Dc) | Receiver Sensitivity<br>(dBuV) | Sensitivity Limit<br>(dBuV) | Verdict |
|---------------------|-----------------------|--------------------------|--------------------------------|-----------------------------|---------|
| Normal condition    |                       |                          |                                |                             |         |
| 156.8               | T <sub>nor</sub> =25  | V <sub>nor</sub> =12     | -12.8                          | ≤6                          | Pass    |
| Extreme condition   |                       |                          |                                |                             |         |
| 156.8               | T <sub>min</sub> =-20 | V <sub>nor</sub> =10.8   | -14.0                          | ≤12                         | Pass    |
|                     | T <sub>min</sub> =-20 | V <sub>max</sub> =15.6   | -14.1                          | ≤12                         | Pass    |
|                     | T <sub>max</sub> =55  | V <sub>nor</sub> =10.8   | -12.8                          | ≤12                         | Pass    |
|                     | T <sub>max</sub> =55  | V <sub>max</sub> =15.6   | -12.6                          | ≤12                         | Pass    |

**20. Receiver/Co-channel rejection**

| Test Freq. (MHz) | Unwanted signal Frequency (MHz) | Rated AF output power (W)@4 ohms | Rejection Ratio (dB) | Upper Limit (dB) | Lower Limit (dB) | Verdict |
|------------------|---------------------------------|----------------------------------|----------------------|------------------|------------------|---------|
| Normal condition |                                 |                                  |                      |                  |                  |         |
| 156.8            | F <sub>n</sub> + 3KHz           | 2                                | -8.3                 | 0                | -10              | Pass    |
|                  | F <sub>n</sub>                  | 2                                | -8.5                 | 0                | -10              | Pass    |
|                  | F <sub>n</sub> - 3KHz           | 2                                | -9.8                 | 0                | -10              | Pass    |

**21. Receiver/Adjacent channel selectivity**

| Test Freq.<br>(MHz) | Temperature<br>(°C) | Power Supplied<br>(V Dc) | Ratio of Unwanted to Wanted signal(dB) |            | Limit<br>(dB) | Verdict |
|---------------------|---------------------|--------------------------|----------------------------------------|------------|---------------|---------|
|                     |                     |                          | Fn + 25KHz                             | Fn - 25KHz |               |         |
| Normal condition    |                     |                          |                                        |            |               |         |
| 156.8               | Tnor=25             | Vnor=12                  | 77.7                                   | 78.5       | ≥70           | Pass    |
| Extreme condition   |                     |                          |                                        |            |               |         |
| 156.8               | Tmin=-20            | Vnor=10.8                | 78.4                                   | 78.1       | ≥60           | Pass    |
|                     | Tmin =-20           | Vmax=15.6                | 77.8                                   | 78,3       | ≥60           | Pass    |
|                     | Tmax=55             | Vnor=10.8                | 76.5                                   | 75.2       | ≥60           | Pass    |
|                     | Tmax =55            | Vmax=15.6                | 75.3                                   | 76.1       | ≥60           | Pass    |

**22. Receiver/Spurious response rejection**

| Test Freq. (MHz)                                             | Defintion             | Frequency of spurious Responses (MHz) | Rated AF output power (W) @ 4 ohms | Rejection ratio (dB) | Rejection ratio Limit (dB) | Verdict |
|--------------------------------------------------------------|-----------------------|---------------------------------------|------------------------------------|----------------------|----------------------------|---------|
| Normal condition(T <sub>nor</sub> =25, V <sub>nor</sub> =12) |                       |                                       |                                    |                      |                            |         |
| 156.8                                                        | 1 <sup>st</sup> IF    | 21.4                                  | 2                                  | 84.8                 | ≥70                        | Pass    |
|                                                              | Image                 | 114.0                                 | 2                                  | 84.8                 | ≥70                        | Pass    |
|                                                              | 'Half IF'             | 146.1                                 | 2                                  | 84.8                 | ≥70                        | Pass    |
|                                                              | 2 <sup>nd</sup> image | 157.7                                 | 2                                  | 84.8                 | ≥70                        | Pass    |
|                                                              | 2 <sup>nd</sup> LO    | 249.4                                 | 2                                  | 84.8                 | ≥70                        | Pass    |
|                                                              | 3 <sup>rd</sup> LO    | 384.8                                 | 2                                  | 84.8                 | ≥70                        | Pass    |

**23. Receiver/Intermodulation response**

| Test Freq. (MHz) | Temperature (°C) | Power Supplied (V Dc) | Test Condition | Rejection ratio (dB) | Rejection ratio Limit (dB) | Verdict |
|------------------|------------------|-----------------------|----------------|----------------------|----------------------------|---------|
| Normal condition |                  |                       |                |                      |                            |         |
| 156.8            | Tnor=25          | Vnor=13.6             | Upper Side     | 75.6                 | ≥68                        | Pass    |
|                  |                  |                       | Lower Side     | 75.2                 | ≥68                        | Pass    |

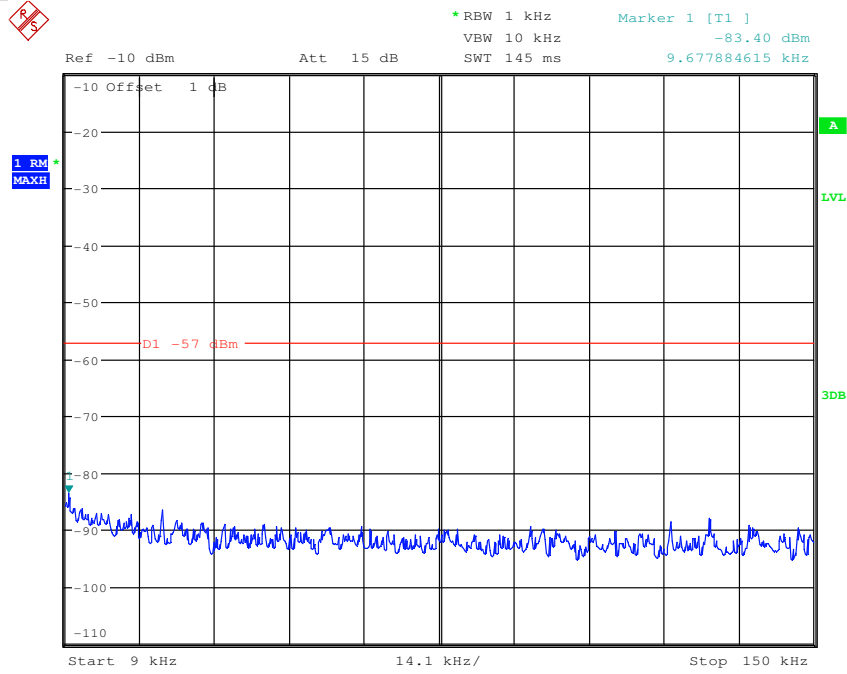
**24. Receiver/Blocking or desensitisation**

| Frequencies of the signal          |                            |       | Blocking Level<br>(dBuV) | Block Limit<br>(dBuV) | Verdict |
|------------------------------------|----------------------------|-------|--------------------------|-----------------------|---------|
| Wanted signal A<br>(MHz)           | Unwanted signal B<br>(MHz) |       |                          |                       |         |
| Normal condition(Tnor=25, Vnor=12) |                            |       |                          |                       |         |
| 156.8                              | -10                        | 146.8 | 97.5                     | ≥90                   | Pass    |
|                                    | -5                         | 151.8 | 96.1                     | ≥90                   | Pass    |
|                                    | -2                         | 154.8 | 95.4                     | ≥90                   | Pass    |
|                                    | -1                         | 155.8 | 94,1                     | ≥90                   | Pass    |
|                                    | +1                         | 157.8 | 94,5                     | ≥90                   | Pass    |
|                                    | +2                         | 158.8 | 95.8                     | ≥90                   | Pass    |
|                                    | +5                         | 161.8 | 96.3                     | ≥90                   | Pass    |
|                                    | +10                        | 166.8 | 97.2                     | ≥90                   | Pass    |

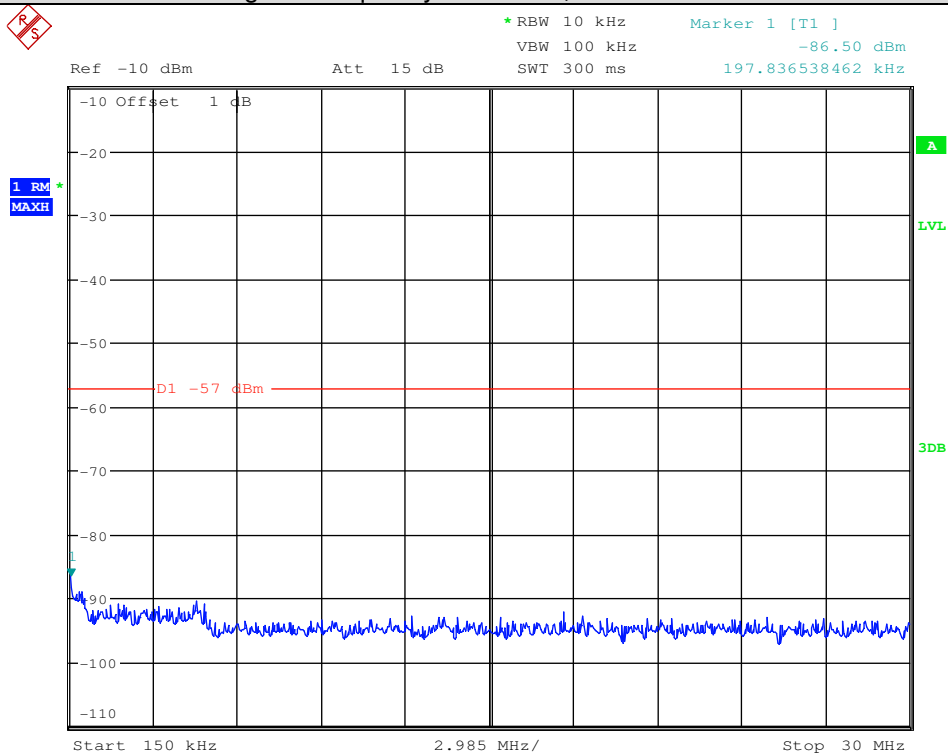


## 25. Receiver/Spurious emissions

Assigned Frequency:156.8MHz, 9KHz-150KHz

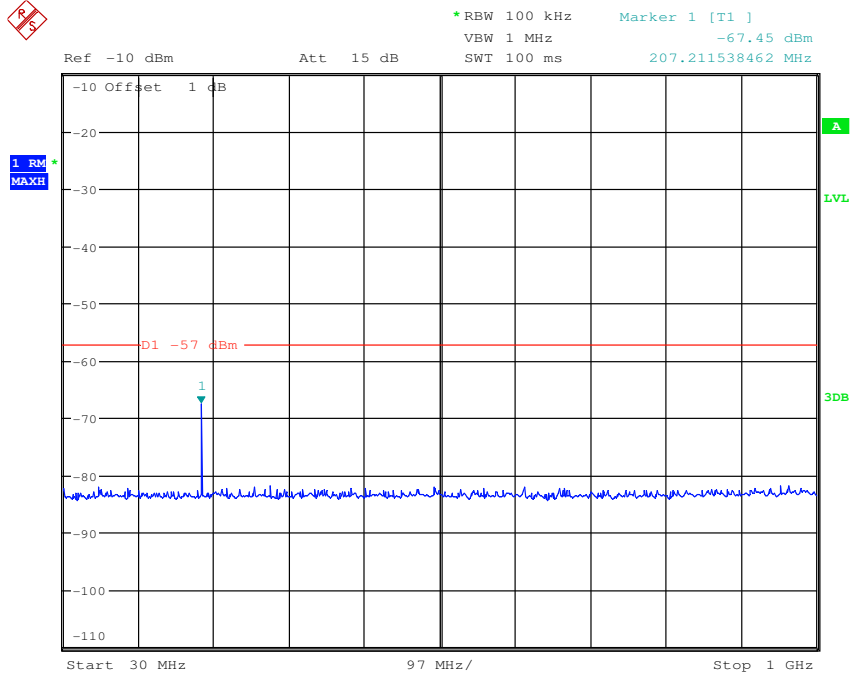


Assigned Frequency:156.8MHz, 150KHz-30MHz

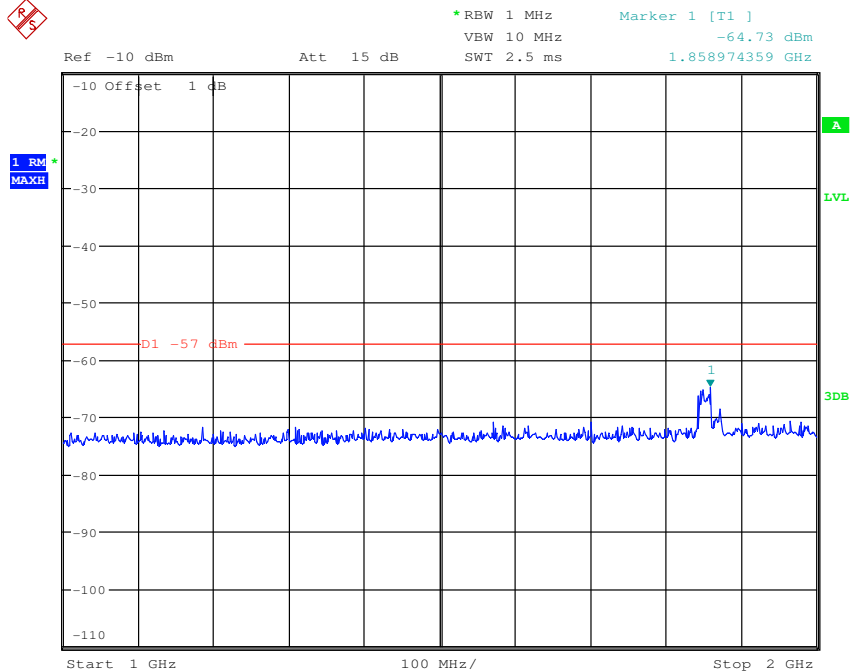




Assigned Frequency:156.8MHz, 30MHz-1GHz



Assigned Frequency:156.8MHz, 1GHz-2GHz



## 26. Receiver radiated spurious emissions

| Assigned Frequency:156.8MHz, receiver mode |                 |                       |              |                   |
|--------------------------------------------|-----------------|-----------------------|--------------|-------------------|
| Frequency<br>MHz                           | Polarity<br>H/V | Emission Level<br>dBm | Limit<br>dBm | Over Limit<br>dBm |
| 191.074                                    | H               | -76.62                | -57.00       | -19.63            |
| 291.036                                    | H               | -74.48                | -57.00       | -17.49            |
| 366.823                                    | H               | -72.66                | -57.00       | -15.67            |
| 531.964                                    | H               | -69.27                | -57.00       | -12.28            |
| 658.836                                    | H               | -66.32                | -57.00       | -9.33             |
| 782.345                                    | H               | -66.05                | -57.00       | -9.06             |
| 48.163                                     | V               | -75.87                | -57.00       | -18.88            |
| 160.909                                    | V               | -76.5                 | -57.00       | -19.51            |
| 245.09                                     | V               | -75.56                | -57.00       | -18.57            |
| 470.523                                    | V               | -70.81                | -57.00       | -13.82            |
| 651.942                                    | V               | -67.26                | -57.00       | -10.27            |
| 766.057                                    | V               | -66.09                | -57.00       | -9.1              |

## 27. Receiver residual noise level

| Test Frequency<br>(MHz) | Temperature<br>(°C) | Power<br>Supplied<br>(V Dc) | Receiver<br>residual noise<br>level (dB) | Receiver residual<br>noise Limit<br>(dB) | Verdict |
|-------------------------|---------------------|-----------------------------|------------------------------------------|------------------------------------------|---------|
| 156.8                   | Tnor=25             | Vnor=12                     | -47.7                                    | ≤-40                                     | Pass    |

## 28. Receiver/Squelch operation

| Relative Output<br>Power(dB)                  | SINAD(dB) | Input Level<br>(dBuV) | AF Output<br>Power<br>Limit(dB) | SINAD<br>Limit(dB) | Input<br>Level<br>Limit<br>(dBuV) | Verdict |
|-----------------------------------------------|-----------|-----------------------|---------------------------------|--------------------|-----------------------------------|---------|
| Normal condition, Assigned Frequency:156.8MHz |           |                       |                                 |                    |                                   |         |
| -63.5                                         | 24        | 5                     | ≤-40                            | N/A                | ≤6                                | Pass    |

### 29. Receiver/Squelch hysteresis

| Squelch Open(dBuV)                            | Squelch Closed(dBuV) | Difference (dB) | Upper Limit (dB) | Lower Limit (dB) | Verdict |
|-----------------------------------------------|----------------------|-----------------|------------------|------------------|---------|
| Normal condition, Assigned Frequency:156.8MHz |                      |                 |                  |                  |         |
| -7.1                                          | -4                   | 3.1             | 6                | 3                | Pass    |

### 30. Receiver/Multiple watch characteristic

| Temperatur<br>e<br>(°C)                        | Power<br>Supplied<br>(V Dc) | Scan<br>Period<br>(s) | Dwell<br>Period<br>(ms) | Dwell<br>Time<br>(s) | Limit                 |                         |                      | Verdict |
|------------------------------------------------|-----------------------------|-----------------------|-------------------------|----------------------|-----------------------|-------------------------|----------------------|---------|
|                                                |                             |                       |                         |                      | Scan<br>Period<br>(s) | Dwell<br>Period<br>(ms) | Dwell<br>Time<br>(s) |         |
| Normal condition, Assigned Frequency:156.8MHz  |                             |                       |                         |                      |                       |                         |                      |         |
| Tnor=25                                        | Vnor=12                     | 1.5                   | 100                     | 1.4                  | ≤2                    | ≤150                    | 0. 85<br>to 2        | Pass    |
| Extreme condition, Assigned Frequency:156.8MHz |                             |                       |                         |                      |                       |                         |                      |         |
| Tmin=-20                                       | Vnor=10.8                   | 1.5                   | 100                     | 1.4                  | ≤2                    | ≤150                    | 0.85<br>to 2         | Pass    |
| Tmin =-20                                      | Vmax=15.6                   | 1.5                   | 100                     | 1.4                  | ≤2                    | ≤150                    |                      | Pass    |
| Tmax=55                                        | Vnor=10.8                   | 1.5                   | 100                     | 1.4                  | ≤2                    | ≤150                    |                      | Pass    |
| Tmax =55                                       | Vmax=15.6                   | 1.5                   | 100                     | 1.4                  | ≤2                    | ≤150                    |                      | Pass    |

### 31. DSC Receiver/Maximum useable sensitivity

| Test Freq.<br>(MHz) | Temp.<br>(°C) | Power Supplied<br>(V Dc) | Carrier Freq.<br>(KHz) | Input Level<br>(dBuV) | BER (%) | BER limit (%) | Verdict |
|---------------------|---------------|--------------------------|------------------------|-----------------------|---------|---------------|---------|
| Normal condition    |               |                          |                        |                       |         |               |         |
| 156.525             | Tnor=25       | Vnor=12                  | Fn                     | 0                     | 0.56    | ≤1            | Pass    |
|                     |               |                          | Fn+1.5                 | 0                     | 0.23    | ≤1            | Pass    |
|                     |               |                          | Fn-1.5                 | 0                     | 0.53    | ≤1            | Pass    |
| Extreme condition   |               |                          |                        |                       |         |               |         |
| 156.525             | Tmin=-20      | Vnor=10.8                | Fn                     | 6                     | 0.23    | ≤1            | Pass    |
|                     | Tmin =-20     | Vmax=15.6                | Fn                     | 6                     | 0.23    | ≤1            | Pass    |
|                     | Tmax=55       | Vnor=10.8                | Fn                     | 6                     | 0.25    | ≤1            | Pass    |
|                     | Tmax =55      | Vmax=15.6                | Fn                     | 6                     | 0.22    | ≤1            | Pass    |

### 32. DSC Receiver/Co-channel rejection

| Test Freq. (MHz) | Unwanted signal Frequency (MHz) | Unwanted signal Level* (dBuV) | Wanted signal Level (dBuV) | BER (%) | BER Limit (%) | Verdict |
|------------------|---------------------------------|-------------------------------|----------------------------|---------|---------------|---------|
| Normal condition |                                 |                               |                            |         |               |         |
| 156.525          | F <sub>n</sub> + 3KHz           | -5                            | +3                         | 0.6     | ≤1            | Pass    |
|                  | F <sub>n</sub>                  | -5                            | +3                         | 0.01    | ≤1            | Pass    |
|                  | F <sub>n</sub> - 3KHz           | -5                            | +3                         | 0.5     | ≤1            | Pass    |

\*:The unwanted signal shall be modulated by 400 Hz with a deviation of ±3 kHz

### 33. DSC Receiver/Adjacent channel selectivity

| Temp.<br>(°C)                                    | Power<br>Supplied<br>(V Dc) | Unwanted<br>signal<br>Frequency<br>(MHz) | Unwanted<br>signal<br>Level*<br>(dBuV) | Wanted<br>signal<br>Level<br>(dBuV) | BER<br>(%) | BER<br>Limit<br>(%) | Verdict |
|--------------------------------------------------|-----------------------------|------------------------------------------|----------------------------------------|-------------------------------------|------------|---------------------|---------|
| Normal condition, Assigned Frequency:156.525MHz  |                             |                                          |                                        |                                     |            |                     |         |
| Tnor=25                                          | Vnor=12                     | Fn + 25KHz                               | 73                                     | 3                                   | 0.6        | ≤1                  | Pass    |
|                                                  |                             | Fn                                       | 73                                     | 3                                   | 0.01       | ≤1                  | Pass    |
|                                                  |                             | Fn - 25KHz                               | 73                                     | 3                                   | 0.5        | ≤1                  | Pass    |
| Extreme condition, Assigned Frequency:156.525MHz |                             |                                          |                                        |                                     |            |                     |         |
| Tmin=-20                                         | Vnor=10.8                   | Fn + 25KHz                               | 63                                     | 6                                   | 0.6        | ≤1                  | Pass    |
|                                                  |                             | Fn                                       | 63                                     | 6                                   | 0.01       | ≤1                  | Pass    |
|                                                  |                             | Fn - 25KHz                               | 63                                     | 6                                   | 0.5        | ≤1                  | Pass    |
| Tmin =-20                                        | Vmax=15.6                   | Fn + 25KHz                               | 63                                     | 6                                   | 0.6        | ≤1                  | Pass    |
|                                                  |                             | Fn                                       | 63                                     | 6                                   | 0.01       | ≤1                  | Pass    |
|                                                  |                             | Fn - 25KHz                               | 63                                     | 6                                   | 0.5        | ≤1                  | Pass    |
| Tmax=55                                          | Vnor=10.8                   | Fn + 25KHz                               | 63                                     | 6                                   | 0.6        | ≤1                  | Pass    |
|                                                  |                             | Fn                                       | 63                                     | 6                                   | 0.01       | ≤1                  | Pass    |
|                                                  |                             | Fn - 25KHz                               | 63                                     | 6                                   | 0.45       | ≤1                  | Pass    |
| Tmax =55                                         | Vmax=15.6                   | Fn + 25KHz                               | 63                                     | 6                                   | 0.6        | ≤1                  | Pass    |
|                                                  |                             | Fn                                       | 63                                     | 6                                   | 0.02       | ≤1                  | Pass    |
|                                                  |                             | Fn - 25KHz                               | 63                                     | 6                                   | 0.45       | ≤1                  | Pass    |

\*:The unwanted signal shall be modulated by 400 Hz with a deviation of ±3 kHz

**34. DSC Receiver/Spurious response and blocking immunity**

| Test Freq.                         | Defintion                                | UnWanted Frequency (MHz) | Wanted signal Level (dBuV) | Unwanted signal Level (dBuV) | BER (%) | BER Limit (%) | Verdict |
|------------------------------------|------------------------------------------|--------------------------|----------------------------|------------------------------|---------|---------------|---------|
| Normal condition(Tnor=25, Vnor=12) |                                          |                          |                            |                              |         |               |         |
| 156.525                            | 1 <sup>st</sup> IF ( <b>Receiver A</b> ) | 21.400                   | 3                          | 73                           | 0.76    | ≤1            | Pass    |
|                                    | 1 <sup>st</sup> LO-Freq. - IF            | 113.725                  | 3                          | 73                           | 0.66    | ≤1            | Pass    |
|                                    | 2 x 1 <sup>st</sup> LO-Freq. - IF        | 248.850                  | 3                          | 73                           | 0.47    | ≤1            | Pass    |
|                                    | 2 x 1 <sup>st</sup> LO-Freq. + IF        | 291.650                  | 3                          | 73                           | 0.47    | ≤1            | Pass    |
|                                    | 3 x 1 <sup>st</sup> LO-Freq. - IF        | 383.975                  | 3                          | 73                           | 0.32    | ≤1            | Pass    |
|                                    | 3 x 1 <sup>st</sup> LO-Freq. + IF        | 426.775                  | 3                          | 73                           | 0.32    | ≤1            | Pass    |

| Test Freq.                         | Defintion                                | UnWanted Frequency (MHz) | Wanted signal Level (dBuV) | Unwanted signal Level (dBuV) | BER (%) | BER Limit (%) | Verdict |
|------------------------------------|------------------------------------------|--------------------------|----------------------------|------------------------------|---------|---------------|---------|
| Normal condition(Tnor=25, Vnor=12) |                                          |                          |                            |                              |         |               |         |
| 156.525                            | 1 <sup>st</sup> IF ( <b>Receiver B</b> ) | 38.855                   | 3                          | 73                           | 0.64    | ≤1            | Pass    |
|                                    | 1 <sup>st</sup> LO-Freq. - IF            | 78.815                   | 3                          | 73                           | 0.64    | ≤1            | Pass    |
|                                    | 2 x 1 <sup>st</sup> LO-Freq. - IF        | 196.485                  | 3                          | 73                           | 0.52    | ≤1            | Pass    |
|                                    | 2 x 1 <sup>st</sup> LO-Freq. + IF        | 274.195                  | 3                          | 73                           | 0.47    | ≤1            | Pass    |
|                                    | 3 x 1 <sup>st</sup> LO-Freq. - IF        | 314.155                  | 3                          | 73                           | 0.33    | ≤1            | Pass    |
|                                    | 3 x 1 <sup>st</sup> LO-Freq. + IF        | 391.865                  | 3                          | 73                           | 0.28    | ≤1            | Pass    |

| Frequencies of the signal          |                            |         | Wanted<br>signal Level<br>A(dBuV) | Unwanted<br>signal Level<br>B(dBuV) | BER<br>(%) | BER<br>Limit<br>(%) | Verdict |
|------------------------------------|----------------------------|---------|-----------------------------------|-------------------------------------|------------|---------------------|---------|
| Wanted signal<br>A* (MHz)          | Unwanted signal B<br>(MHz) |         |                                   |                                     |            |                     |         |
| Normal condition(Tnor=25, Vnor=12) |                            |         |                                   |                                     |            |                     |         |
| 156.525                            | -10                        | 146.525 | 3                                 | 93                                  | 0.32       | ≤1                  | Pass    |
|                                    | -5                         | 151.525 | 3                                 | 93                                  | 0.32       | ≤1                  | Pass    |
|                                    | -2                         | 154.525 | 3                                 | 93                                  | 0.57       | ≤1                  | Pass    |

|  |     |         |   |    |      |    |      |
|--|-----|---------|---|----|------|----|------|
|  | -1  | 155.525 | 3 | 93 | 0.71 | ≤1 | Pass |
|  | +1  | 157.525 | 3 | 93 | 0.67 | ≤1 | Pass |
|  | +2  | 158.525 | 3 | 93 | 0.54 | ≤1 | Pass |
|  | +5  | 161.525 | 3 | 93 | 0.36 | ≤1 | Pass |
|  | +10 | 166.525 | 3 | 93 | 0.36 | ≤1 | Pass |

### 35. DSC Receiver/Intermodulation response

| Frequencies of the signal          |                |                | Wanted<br>signal<br>Level<br>A(dBuV) | Unwanted<br>signal<br>Level*<br>B(dBuV) | Unwanted<br>signal<br>Level*<br>C(dBuV) | BER<br>(%) | BER<br>Limit<br>(%) | Verdict |
|------------------------------------|----------------|----------------|--------------------------------------|-----------------------------------------|-----------------------------------------|------------|---------------------|---------|
| Generator<br>A                     | Generator<br>B | Generator<br>C |                                      |                                         |                                         |            |                     |         |
| Normal condition(Tnor=25, Vnor=12) |                |                |                                      |                                         |                                         |            |                     |         |
| 156.525                            | 156.475        | 156.425        | 3                                    | 68                                      | 68                                      | 0.66       | ≤1                  | Pass    |
|                                    | 156.575        | 156.625        | 3                                    | 68                                      | 68                                      | 0.66       | ≤1                  | Pass    |

\*: Modulated with 400Hz/3KHz deviation

### 36. DSC Receiver/Dynamic range

| Test Freq. (MHz)                                             | Maximum Input Level (dBuV) | Minimum input Level (dBuV) | BER (%) | BER Limit (%) | Verdict |
|--------------------------------------------------------------|----------------------------|----------------------------|---------|---------------|---------|
| Normal condition(T <sub>nor</sub> =25, V <sub>nor</sub> =12) |                            |                            |         |               |         |
| 156.525                                                      | 100                        | 0                          | 0.71    | ≤1            | Pass    |

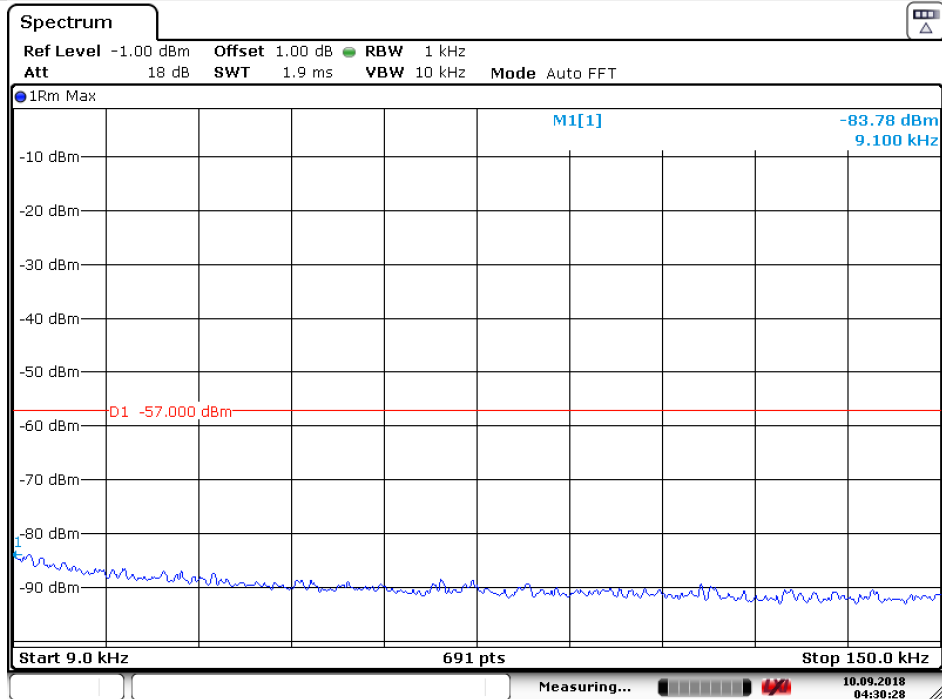
### 37. DSC Receiver/Simultaneous reception

| Test Freq.<br>(MHz)                | Input Freq.<br>(MHz) | Input signal Level<br>(dBuV) | Wanted signal Level<br>(dBuV) | SINAD(dB)          |                       | BER (%) | SINAD Limit (dB) | BER Limit (%) | Verdict |
|------------------------------------|----------------------|------------------------------|-------------------------------|--------------------|-----------------------|---------|------------------|---------------|---------|
|                                    |                      |                              |                               | With Wanted signal | Without Wanted signal |         |                  |               |         |
| Normal condition(Tnor=25, Vnor=12) |                      |                              |                               |                    |                       |         |                  |               |         |
| 156.525                            | 156.8                | 20                           | 0                             | 24                 | 0                     | 0.13    | ≥20              | ≤1            | Pass    |

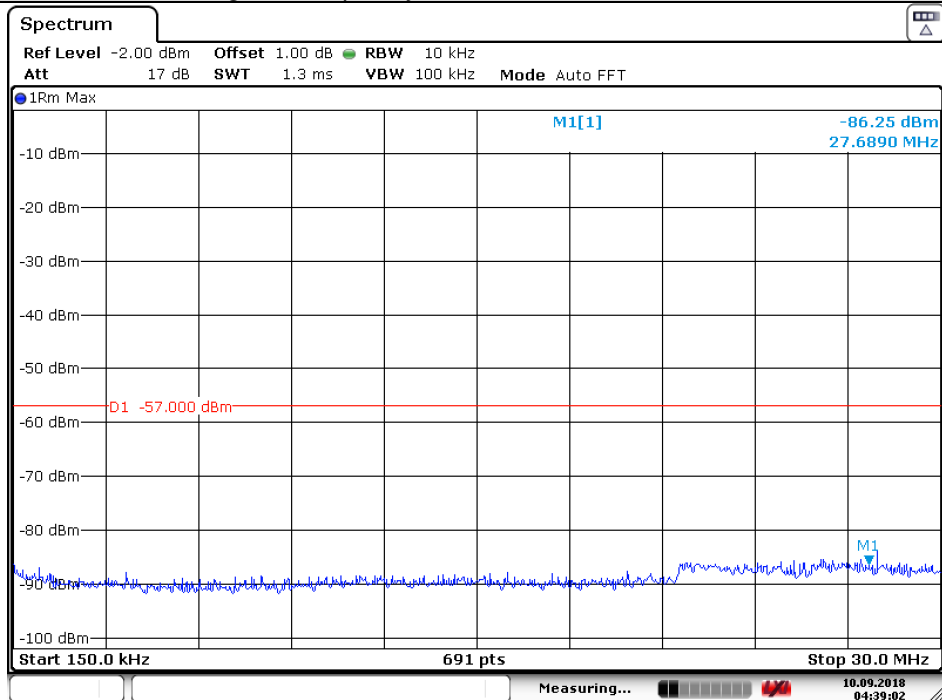


### 38. DSC Receiver/Spurious emissions

Assigned Frequency:156.525MHz, 9KHz-150KHz

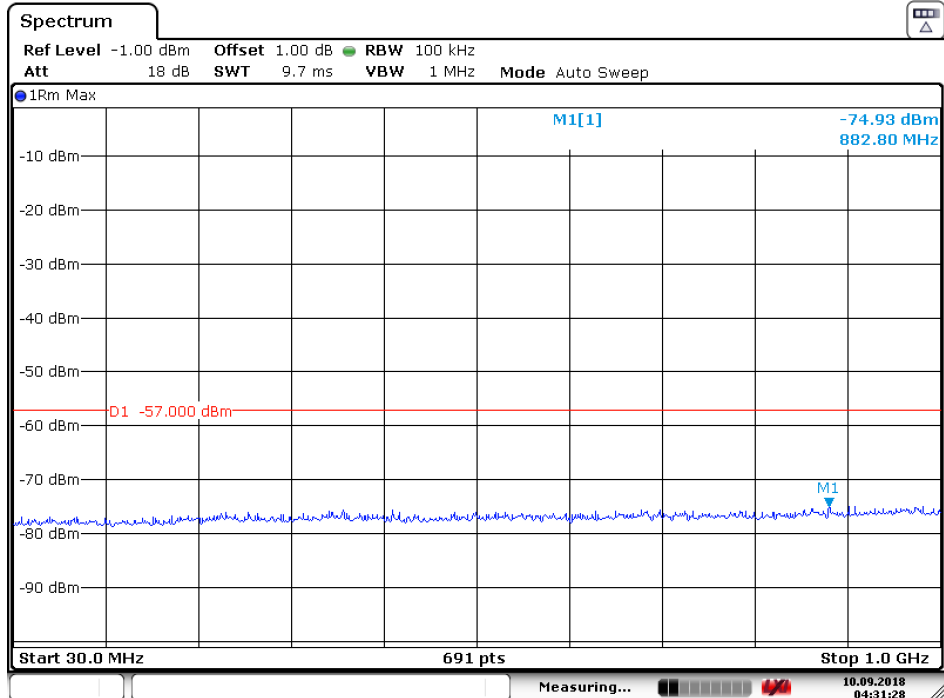


Assigned Frequency:156.525MHz, 150KHz-30MHz

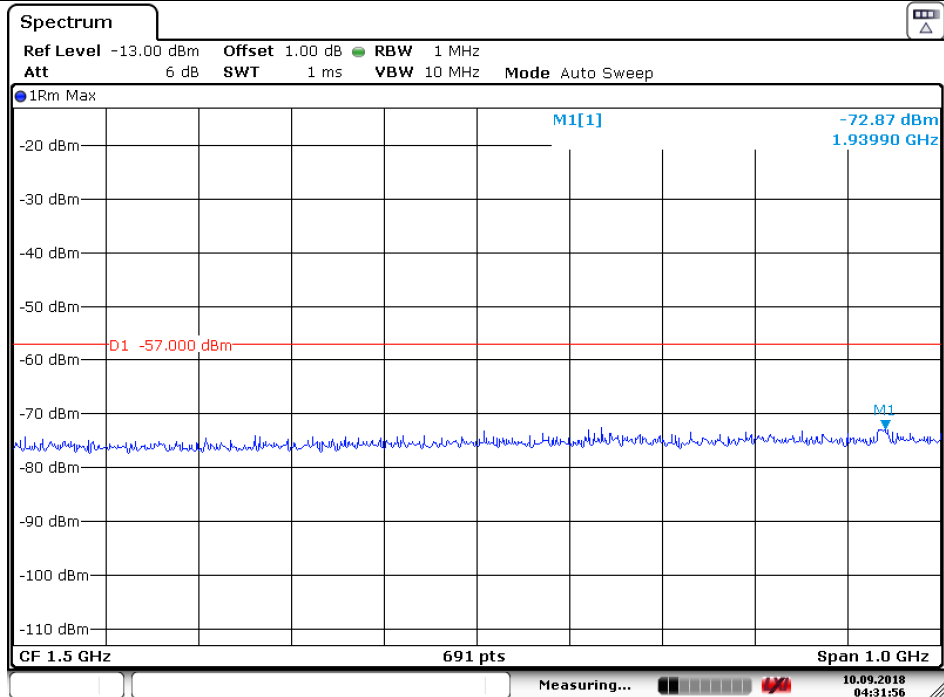




Assigned Frequency:156.525MHz, 30MHz-1GHz



Assigned Frequency:156.525MHz, 1GHz-2GHz



- End of the Report -