Shenzhen Huatongwei International Inspection Co., Ltd.
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
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TEST REPORT

Report Reference No. :	**TRE1504001501 R/C……: 70967**
Applicant's name..... :	**RCA Communications Systems**
Address.....:	133 West Market Street Suite 227 Indianapolis IN USA
Manufacturer.....:	**RCA Communications Systems**
Address.....:	133 West Market Street Suite 227 Indianapolis IN USA
Test item description ..... :	**VHF Marine Two-Way Radio**
Trade Mark .....:	RCA
Model/Type reference.....:	MRM400
List Model(s) .....:	RS-507M
Standard ..... :	**ETSI EN 301 025-1 V1.5.2:2013-05** **ETSI EN 301 025-2 V1.5.1:2013-09** **ETSI EN 301 025-3 V1.5.1:2013-09** **IEC 62238:2003**
Date of receipt of test sample……..:	Apr 7, 2015
Date of testing……:	Apr 8, 2015- Apr 28, 2015
Date of issue……...:	Apr 28, 2015
Result..... ……..:	**PASS**

Compiled by (position+printed name+signature)..:	File administrators Shayne Zhu	Shayne Zhu
Supervised by (position+printed name+signature)..:	Project Engineer Cary Luo	Cary Luo
Approved by (position+printed name+signature)..:	RF Manager Hans Hu	Hans Hu

Testing Laboratory Name ..... :	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address.....:	Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

Contents

1. TEST STANDARDS AND TEST DESCRIPTION

1.1. Test Standards

The tests were performed according to following standards:
ETSI EN 301 025-1 V1.5.2:2013-05-Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF radiotelephone equipment for general communications and associated equipment for Class "D" Digital Selective Calling (DSC);Part 1: Technical characteristics and methods of measurement
ETSI EN 301 025-2 V1.5.1:2013-09-Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF radiotelephone equipment for general communications and associated equipment for Class "D" Digital Selective Calling (DSC);Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
ETSI EN 301 025-3 V1.5.1:2013-09-Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF radiotelephone equipment for general communications and associated equipment for Class "D" Digital Selective Calling (DSC);Part 3: Harmonized EN covering the essential requirements of article 3.3(e) of the R&TTE Directive
ETSI EN 301 843-2 V1.2.1:2004-06-Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for marine radio equipment and services; Part 2: Specific conditions for VHF radiotelephone transmitters and receivers.
ETSI EN 300 338-3 V1.1.1 2010-02-Electromagnetic compatibility and Radio spectrum Matters (ERM); Technical characteristics and methods of measurement for equipment for generation, transmission and reception of Digital Selective Calling (DSC) in the maritime MF,MF/HF and/or VHF mobile service Part 3: Class D DSC.
IEC 62238:2003-Maritime navigation and radiocommunication equipment and systems –VHF radiotelephone equipment incorporating Class "D" Digital Selective Calling (DSC) – Methods of testing and required test results

1.2. Test Description

Transmitter Requirement		
Test item	Standards requirement	Result
Frequency error	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.1	N/A
Carrier power	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.2	N/A
Frequency deviation	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.3	N/A
Sensitivity of the modulator, including microphone	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.4	N/A
Audio frequency response	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.5	N/A
Audio frequency harmonic distortion of the emission	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.6	N/A
Adjacent channel power	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.7	N/A
Conducted spurious emissions conveyed to the antenna	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.8	N/A
Cabinet radiation and conducted spurious emissions other than those conveyed to the antenna	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.9	N/A
Transient frequency behaviour of the transmitter	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.10	N/A
Residual modulation of the transmitter	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.11	N/A
Frequency error (demodulated DSC signal)	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.12	PASS
Modulation index for DSC	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.13	PASS
Modulation rate for DSC	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.14	PASS
Testing of free channel transmission on DSC channel 70	IEC 62238&ETSI EN 301 025-1 Sub-clause 8.15	PASS
Radiotelephone receiver Requirement		
Test item	Standards requirement	Result
Harmonic distortion and rated audio-frequency	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.1	N/A

output power		
Audio frequency response	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.2	N/A
Maximum usable sensitivity	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.3	N/A
Co-channel rejection	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.4	N/A
Adjacent channel selectivity	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.5	N/A
Spurious response rejection	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.6	N/A
Intermodulation response	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.7	N/A
Blocking or desensitization	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.8	N/A
Spurious emissions	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.9	N/A
Receiver radiated spurious emissions	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.10	N/A
Receiver residual noise level	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.11	N/A
Squelch operation	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.12	N/A
Squelch hysteresis	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.13	N/A
Multiple watch characteristic	IEC 62238&ETSI EN 301 025-1 Sub-clause 9.14	N/A
Receiver for DSC decoder Requirement		
Maximum usable sensitivity	IEC 62238&ETSI EN 301 025-1 Sub-clause 10.1	PASS
Co-channel rejection	IEC 62238&ETSI EN 301 025-1 Sub-clause 10.2	PASS
Adjacent channel selectivity	IEC 62238&ETSI EN 301 025-1 Sub-clause 10.3	PASS
Spurious response and blocking immunity	IEC 62238&ETSI EN 301 025-1 Sub-clause 10.4	PASS
Intermodulation response	IEC 62238&ETSI EN 301 025-1 Sub-clause 10.5	PASS
Dynamic range	IEC 62238&ETSI EN 301 025-1 Sub-clause 10.6	PASS
Spurious emissions	IEC 62238&ETSI EN 301 025-1 Sub-clause 10.7	PASS
Simultaneous reception	IEC 62238&ETSI EN 301 025-1 Sub-clause 10.8	PASS

Note: The measurement uncertainty is not included in the test result.

2. SUMMARY

2.1. Client Information

Applicant:	RCA Communications Systems
Address:	133 West Market Street Suite 227 Indianapolis IN USA
Manufacturer:	RCA Communications Systems
Address:	133 West Market Street Suite 227 Indianapolis IN USA

2.2. Product Description

Name of EUT:	VHF Marine Two-Way Radio	
Trade mark:	RCA	
Model/Type reference:	MRM400	
Listed mode(s):	RS-507M	
Power supply:	DC 13.80V	
Charger information:	/	
Battery information:	/	
Adapter information:	/	
Operation Frequency Range:	156.525MHz(RX:CH70)	
Rated Output Power:	/	
Modulation Type:	Analog Voice:	/
	Digital Data:	FSK
Channel Separation:	Analog Voice:	/
	Digital Data:	25kHz
Emission Designator:	Analog Voice:	/
	Digital Voice:	/
	Digital Data:	16K0G2B
Antenna Type	External	
Maximum Transmitter Power	Analog	/
		/
Hard version:	6PD7-2008BMB	
Soft version:	M-2008BM-B0923	

2.3. Test frequency list

Conformance tests for DSC operation are made on channel 70.(Rx only =156.525MHz)

2.4. EUT operation mode

Description of operation mode	Additional information
FSK+BW25kHz+RX	The equipment is set with FSK modulation and 25kHz bandwidth at receiver or standby,powered by DC 13.80V

Note: DSC operation are made on channel 70.(Rx only =156.525MHz)

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

●	Power Cable	Length (m) :	3.00
		Shield :	Unshielded
		Detachable :	Undetachable
○	Multimeter	Manufacturer :	/
		Model No. :	/

3. Test Environment

3.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd.
Address: Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

3.2. Test Facility

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

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Feb. 28, 2015. Valid time is until February 27, 2018.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept 30, 2015.

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 662850, Renewal date Jul. 01, 2012, valid time is until Jun. 01, 2015.

FCC-Registration No.: 317478

Shenzhen Huatongwei International Inspection Co., Ltd. (Gongming EMC Laboratory) has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 317478, Renewal date July 18, 2014, valid time is until July. 18, 2017.

IC-Registration No.: 5377A

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.

IC-Registration No.: 5377B

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. (Gongming EMC Laboratory) has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on September 3, 2014, valid time is until September 3, 2017.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.:R-2484. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 29, 2015.
Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.
Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.
Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
lative Humidity:	30~60 %
Air Pressure:	950~1050mba

3.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Frequency error	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Adjacent and alternate channel power Conducted	1.20 dB	(1)
Conducted spurious emission 9KHz-12.75 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-12.75 GHz	2.20 dB	(1)
Intermodulation attenuation	1.00 dB	(1)
Maximum useable receiver sensitivity	2.80 dB	(1)
Co-channel rejection	2.80 dB	(1)
Adjacent channel selectivity	2.80 dB	(1)
Spurious response rejection	2.80 dB	(1)
Intermodulation response rejection	2.80 dB	(1)
Blcking or desensitization	2.80 dB	(1)
Radio Frequency (RF)	0.3×10^{-7}	(1)
Deviation limitation	2%	(1)
Transmitter transient time	10%	(1)
Transmitter transient frequency	125Hz	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.4. Equipments Used during the Test

Frequency Deviation					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1

Unwanted emissions in the spurious domain					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2014/11/1
2	EMI TEST SOFTWARE	Audix	E3	N/A	N/A
3	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1
4	High-Pass Filter	Anritsu	MP526D	6220878392	2014/11/1
5	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2014/11/1
6	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	539	2014/11/1
7	HORN ANTENNA	ShwarzBeck	9120D	1011	2014/11/1
8	HORN ANTENNA	ShwarzBeck	9120D	1012	2014/11/1
9	TURNTABLE	MATURO	TT2.0	----	N/A
10	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
11	SPECTRUM ANALYZER	Agilent	E4407B	MY44210775	2014/11/1

Frequency Error & Carrier power (Conducted)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Receiver	Rohde&Schwarz	ESIB26	100009	2014/11/1
2	Climate Chamber	ESPEC	EL-10KA	05107008	2014/11/1
3	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1

Adjacent Channel Power					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Receiver	Rohde&Schwarz	ESI26	100009	2014/11/1
2	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1

Intermodulation Attenuation					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1
2	Receiver	Rohde&Schwarz	ESIB26	100009	2014/11/1
3	Signal Generator	Rohde&Schwarz	SMT03	100059	2014/11/1

Maximum Usable Sensitivity					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Climate Chamber	ESPEC	EL-10KA	05107008	2014/11/1
2	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1
3	Vertor Signal Genertor	Rohde&Schwarz	SMU200A	1141.2205.02	2014/11/1
4	Digital Radio Test Set	AEROFLEX	3920	299001967	2014/11/1

Adjacent Channel Selectivity					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	Rohde&Schwarz	SMT03	100059	2014/11/1
2	Climate Chamber	ESPEC	EL-10KA	05107008	2014/11/1
3	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1
3	Vertor Signal Genertor	Rohde&Schwarz	SMU200A	1141.2205.02	2014/11/1
4	Digital Radio Test Set	AEROFLEX	3920	299001967	2014/11/1

Co-channel rejection & Spurious Response Rejection & Inter Modulation Response Rejection & Blocking or Desensitization					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	Rohde&Schwarz	SMT03	100059	2014/11/1
2	Signal Generator	IFR	2032	203002/100	2014/11/1
3	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1
4	Vertor Signal Genertor	Rohde&Schwarz	SMU200A	1141.2205.02	2014/11/1
5	Digital Radio Test Set	AEROFLEX	3920	299001967	2014/11/1

Transient Frequency Behavior				
Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.
Signal Generator	Rohde&Schwarz	SMT03	100059	2014/11/1
Storage Oscilloscope	Tektronix	TDS3054B	B033027	2014/11/1
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1

The Cal. Interval was one year

4. TEST CONDITIONS AND RESULTS

4.1. ETSI EN 301 025-3 Essential Requirements

4.1.1. General and operational requirements

1) Composition
TEST RESULTS: Complies

2) Construction
TEST RESULTS: Complies

3) Controls and indicators
TEST RESULTS: Complies

4) DSC interface for non-integrated controllers
TEST RESULTS: Complies

5) Display
TEST RESULTS: Complies

6) Handset and loudspeaker
TEST RESULTS: Complies

7) Safety precautions
TEST RESULTS: Complies

8) Labelling
TEST RESULTS: Complies

9) Warm up
TEST RESULTS: Complies

4.1.2. Technical requirements

1) Switching time
TEST RESULTS: Complies

2) Class of emission and modulation characteristics
TEST RESULTS: Complies

3) DSC operation
TEST RESULTS: Complies

4) Multiple watch facilities
   a) General
   TEST RESULTS: Complies

   b) Scanning provisions
   TEST RESULTS: Complies

   c) Scanning characteristics
   TEST RESULTS: Complies

4.1.3. Vibration test

TEST RESULTS: Complies

4.1.4. Dry heat

TEST RESULTS: Complies

4.1.5. Damp heat

TEST RESULTS: Complies

4.1.6. Low temperature

TEST RESULTS: Complies

4.1.7. Display

TEST RESULTS: Complies

4.1.8. Watchkeeping receiver

TEST RESULTS: Complies

4.1.9. Individual DSC calls

TEST RESULTS: Complies

4.1.10. All ships calls

TEST RESULTS: Complies

4.1.11. DSC call functionality

TEST RESULTS: Complies

4.1.12. DSC message composition

TEST RESULTS: Complies

4.1.13. Prioritized wait

TEST RESULTS: Complies

4.1.14. Alarms

TEST RESULTS: Complies

4.1.15. Standby

TEST RESULTS: Complies

4.1.16. Tasks - sending distress

TEST RESULTS: Complies

4.1.17. Display - sending distress

TEST RESULTS: Complies

4.1.18. Distress button sub-procedure

TEST RESULTS: Complies

4.1.19. Transmission of alert attempt

TEST RESULTS: Complies

4.1.20. Updating position

TEST RESULTS: Complies

4.1.21. Handling received DSC messages – sending distress

TEST RESULTS: Complies

4.1.22. Alarms – sending distress

TEST RESULTS: Complies

4.1.23. Determining subsequent communication – sending distress

TEST RESULTS: Complies

4.1.24. Automated tuning – sending distress

TEST RESULTS: Complies

4.1.25. Cancelling the distress alert

TEST RESULTS: Complies

4.1.26. Acknowledgement – sending distress

TEST RESULTS: Complies

4.1.27. Terminating – sending distress

TEST RESULTS: Complies

4.1.28. Warnings – sending distress

TEST RESULTS: Complies

4.1.29. Tasks - receiving distress

TEST RESULTS: Complies

4.1.30. Display - receiving distress

TEST RESULTS: Complies

4.1.31. Handling received DSC messages – receiving distress

TEST RESULTS: Complies

4.1.32. Alarms – receiving distress

TEST RESULTS: Complies

4.1.33. Determining subsequent communication – receiving distress

TEST RESULTS: Complies

4.1.34. Automated tuning – receiving distress

TEST RESULTS: Complies

4.1.35. Acknowledgement – receiving distress

TEST RESULTS: Complies

4.1.36. Terminating – receiving distress

TEST RESULTS: Complies

4.1.37. Warnings – receiving distress

TEST RESULTS: Complies

4.1.38. Tasks – sending non distress

TEST RESULTS: Complies

4.1.39. Display - sending non distress

TEST RESULTS: Complies

4.1.40. Handling received DSC messages – sending non distress

TEST RESULTS: Complies

4.1.41. Alarms – sending non distress

TEST RESULTS: Complies

4.1.42. Automated tuning – sending non distress

TEST RESULTS: Complies

4.1.43. Delayed acknowledgement –sending non distress

TEST RESULTS: Complies

4.1.44. Terminating – sending non distress

TEST RESULTS: Complies

4.1.45. Warnings – sending non distress

TEST RESULTS: Complies

4.1.46. Tasks – receiving non distress

TEST RESULTS: Complies

4.1.47. Display - receiving non distress

TEST RESULTS: Complies

4.1.48. Handling received DSC messages – receiving non distress

TEST RESULTS: Complies

4.1.49. Alarms – receiving non distress

TEST RESULTS: Complies

4.1.50. Automated tuning – receiving non distress

TEST RESULTS: Complies

4.1.51. Acknowledgement – receiving non distress

TEST RESULTS: Complies

4.1.52. Terminating – receiving non distress

TEST RESULTS: Complies

4.1.53. Warnings – receiving non distress

TEST RESULTS: Complies

4.1.54. Communication automated procedure

TEST RESULTS: Complies

4.1.55. Tasks – communication

TEST RESULTS: Complies

4.1.56. Display – communication

TEST RESULTS: Complies

4.1.57. Handling received DSC messages – communication

TEST RESULTS: Complies

4.1.58. Tuning of the receiver and transmitter – communication

TEST RESULTS: Complies

4.1.59. Termination – communication

TEST RESULTS: Complies

4.1.60. Handling incoming calls while engaged

TEST RESULTS: Complies

4.1.61. Termination of automated procedures

TEST RESULTS: Complies

4.1.62. Actions after termination of an automated procedure

TEST RESULTS: Complies

4.1.63. Putting automated procedures on hold

TEST RESULTS: Complies

4.1.64. Controlling non-terminated automatic procedures

TEST RESULTS: Complies

4.2. ETSI EN 301 025-1 Transmitter Requirements

4.2.1. Frequency Error

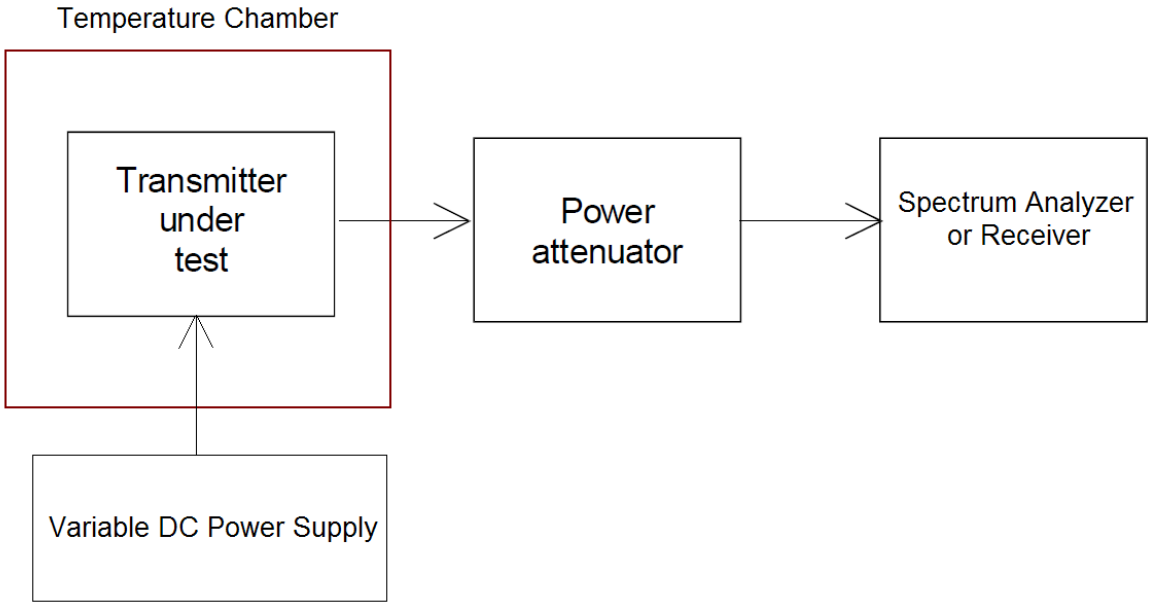
The frequency error is the difference between the measured carrier frequency and its nominal value.

LIMIT

ETSI EN 301 025-1 Sub-clause 8.1.3

The frequency error shall be within ±1,5 kHz.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 and 6.14 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.1.2 for the measurement method.

TEST RESULTS

Not application.

4.2.2. Carrier power

The carrier power is the mean power delivered to the artificial antenna during one radio frequency cycle in the absence of modulation.The rated output power is the carrier power declared by the manufacturer.

LIMIT

ETSI EN 301 025-1 Sub-clause 8.2.3

1)Normal test conditions:

With the output power switch set at maximum, the carrier power shall remain between 6 W and 25 W and be within ±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

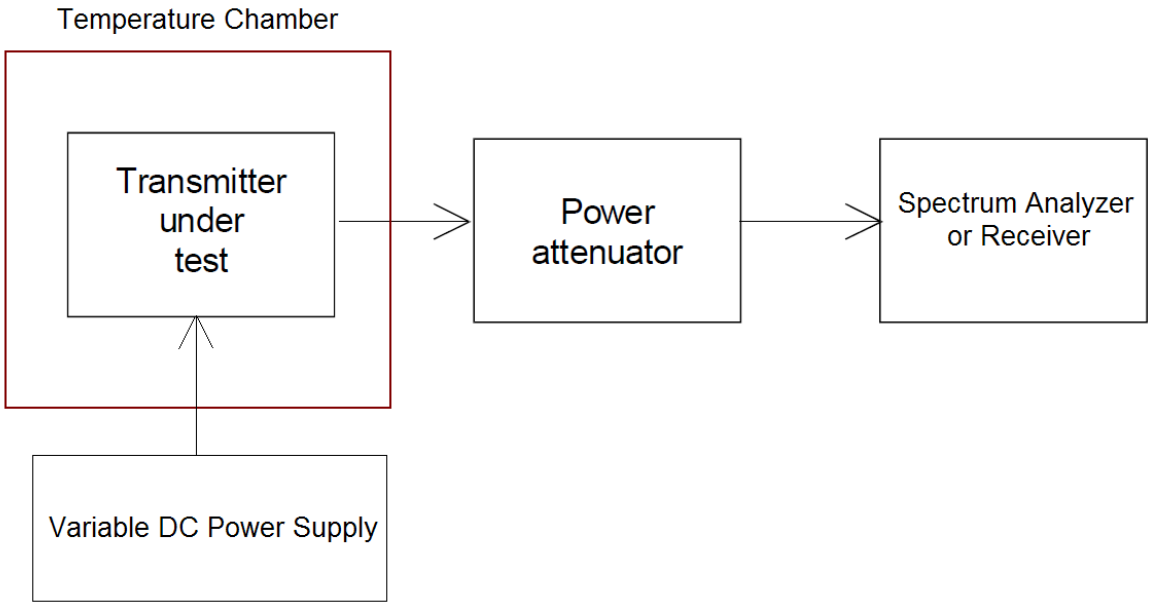
2)Extreme test conditions:

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.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 and 6.14 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.2.2 for the measurement method.

TEST RESULTS

Not application.

4.2.3. Frequency deviation

For the purposes of the present document, the frequency deviation is the difference between the instantaneous frequency of the modulated radio frequency signal and the carrier frequency.

LIMIT

ETSI EN 301 025-1 Sub-clause 8.3.2.2

The maximum permissible frequency deviation shall be:

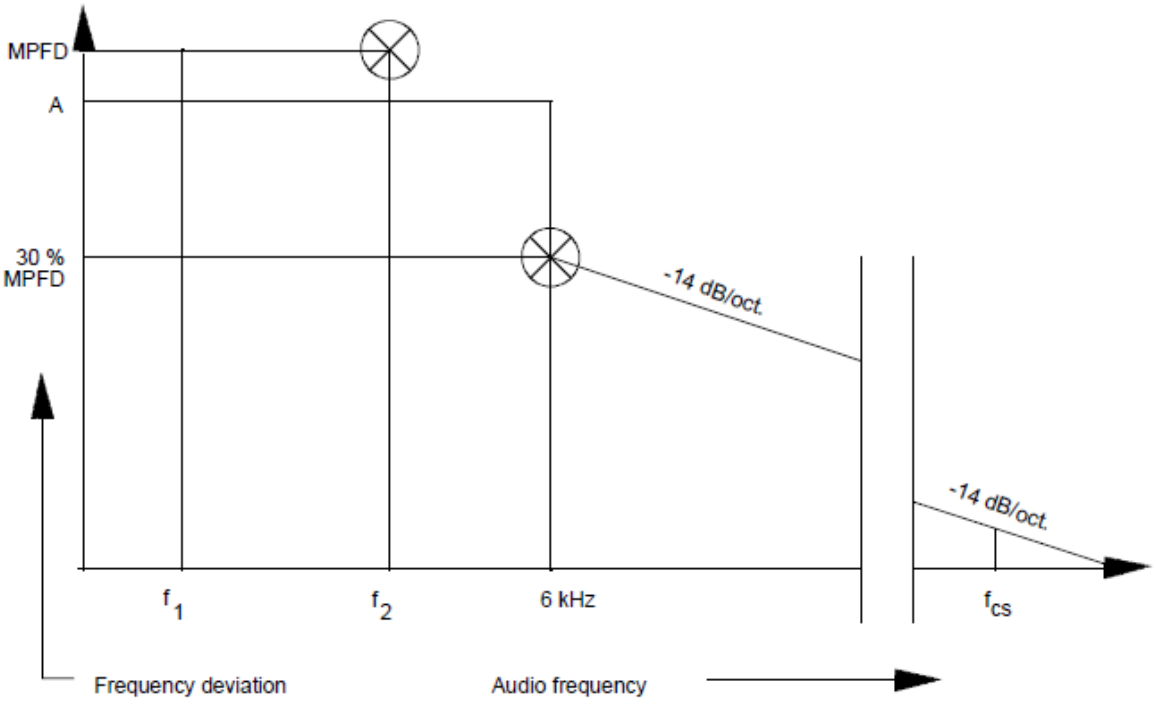
a) 25 kHz channels: ±5 kHz.

b) 12,5 kHz channels: ±2,5 kHz.

ETSI EN 301 025-1 Sub-clause 8.3.3.2

The frequency deviation at modulation frequencies between 3,0 kHz (for equipment operating with 25 kHz channel separations) or 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.

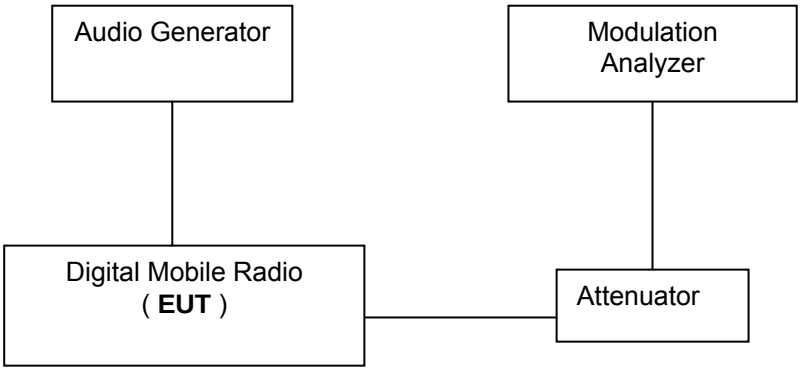


NOTE:
Abbreviations:

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

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.3.2.1 and 8.3.3.1 for the measurement method.

TEST RESULTS

Not application.

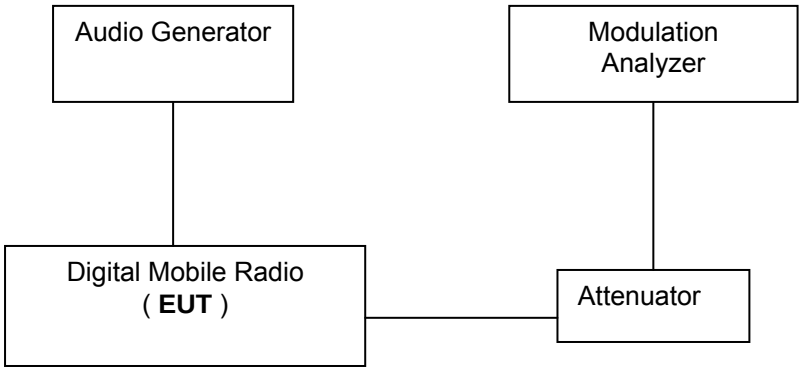
4.2.4. Sensitivity of the modulator, including microphone

This characteristic expresses the capability of the transmitter to produce sufficient modulation when an audio frequency signal corresponding to the normal mean speech level is applied to the microphone.

LIMIT

ETSI EN 301 025-1 Sub-clause 8.4.3
The resulting frequency deviation shall be between ±1,5 kHz and ±3 kHz.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.4.2 for the measurement method.

TEST RESULTS

Not application.

4.2.5. Audio frequency response

The audio frequency response is the frequency deviation of the transmitter as a function of the modulating frequency.

LIMIT

ETSI EN 301 025-1 Sub-clause 8.5.3

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

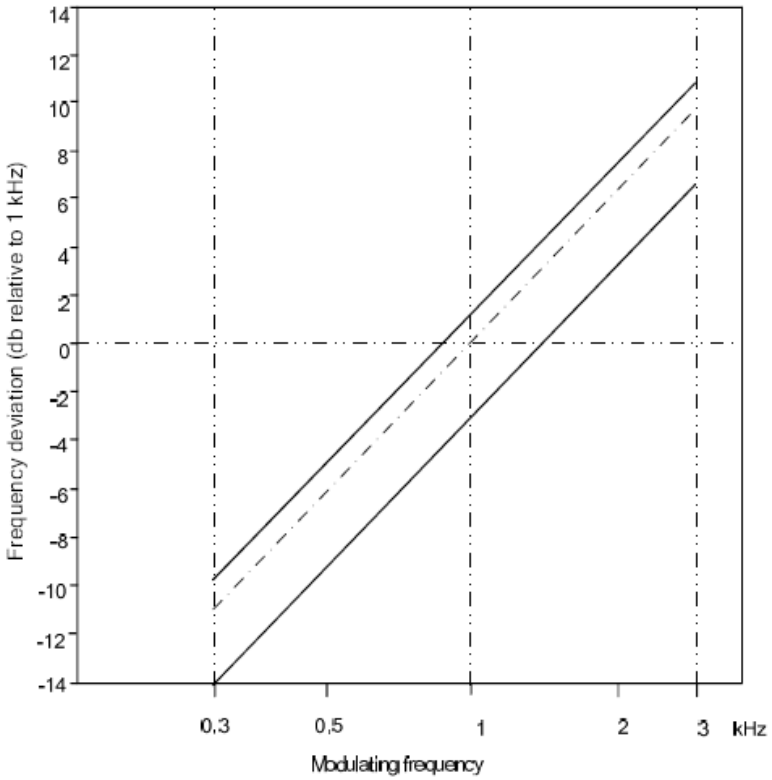
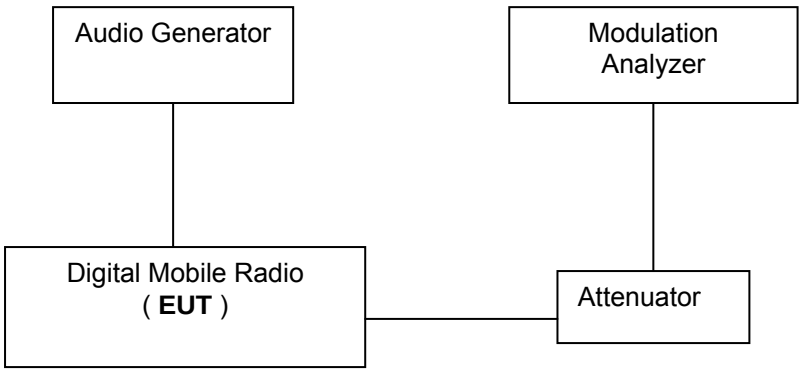


Figure 2: Audio frequency response

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.5.2 for the measurement method.

TEST RESULTS

Not application.

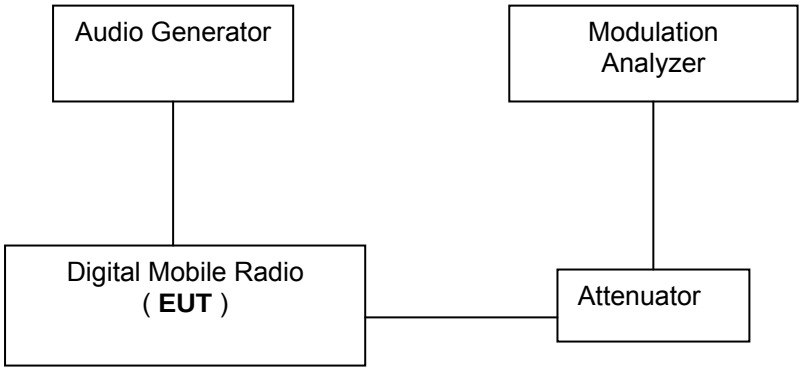
4.2.6. Audio frequency harmonic distortion of the emission

The harmonic distortion of the emission modulated by any audio frequency signal is defined as the ratio, expressed as a percentage, of the root mean square (r.m.s) voltage of all the harmonic components of the fundamental frequency to the total r.m.s. voltage of the signal after linear demodulation.

LIMIT

ETSI EN 301 025-1 Sub-clause 8.6.3
The harmonic distortion shall not exceed 10 %.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 and 6.14 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.6.2 for the measurement method.

TEST RESULTS

Not application.

4.2.7. Adjacent channel power

The adjacent channel power is that part of the total power output of a transmitter under defined conditions of modulation which falls within a specified passband centred on the nominal frequency of either of the adjacent channels.This power is the sum of the mean power produced by the modulation hum and noise of the transmitter.

LIMIT

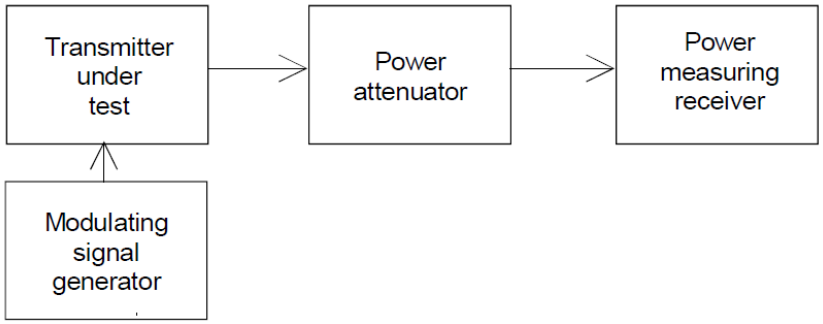
ETSI EN 301 025-1 Sub-clause 8.7.3

The adjacent channel power shall not exceed a value of:

a) 25 kHz channel: 70 dB below the carrier power of the transmitter without any need to be below 0,2 µW.

b) 12,5 kHz channel: 60 dB below the carrier power of the transmitter without any need to be below 0,2 µW.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.7.2 for the measurement method.

TEST RESULTS

Not application.

4.2.8. Conducted spurious emissions conveyed to the antenna

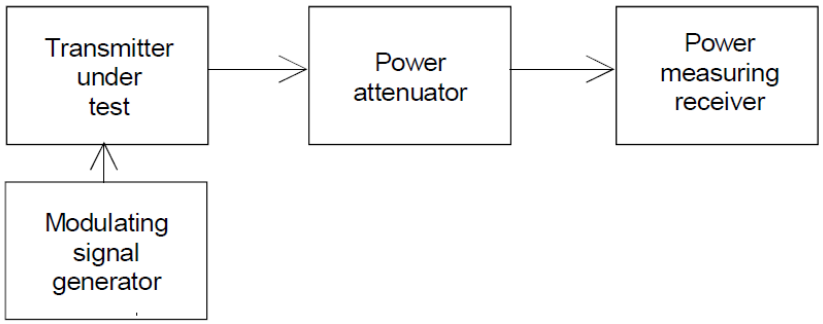
Conducted spurious emissions are emissions on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out of band emissions.

LIMIT

ETSI EN 301 025-1 Sub-clause 8.8.3

The power of any conducted spurious emission on any discrete frequency shall not exceed 0,25 μW(-36dBm).

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.8.2 for the measurement method.

TEST RESULTS

Not application.

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

Cabinet radiation consists of emissions at frequency, radiated by the equipment cabinet and structures.Conducted spurious emissions other than those conveyed to the antenna are emissions at frequencies, other than those of the carrier and the sideband components resulting from the wanted modulation process, which are produced by conduction in the wiring and accessories used with the equipment.

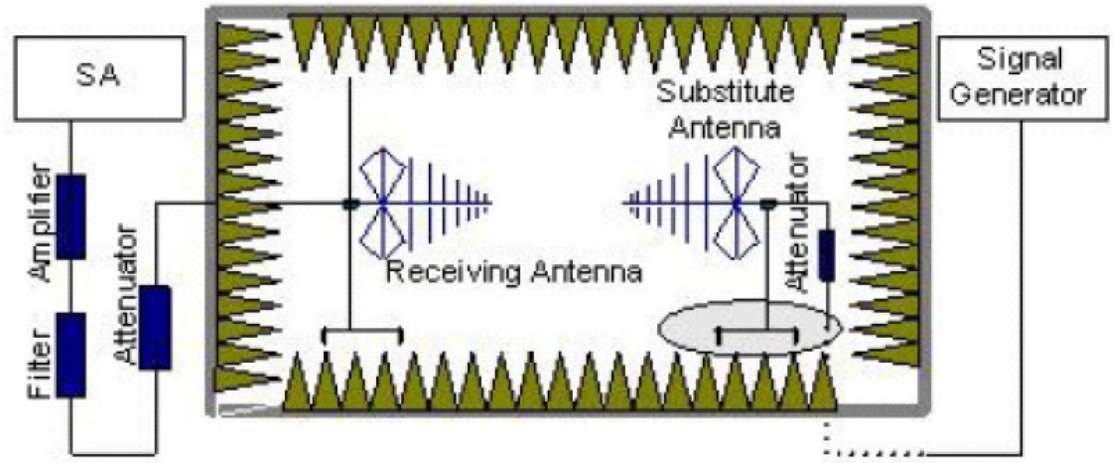
LIMIT

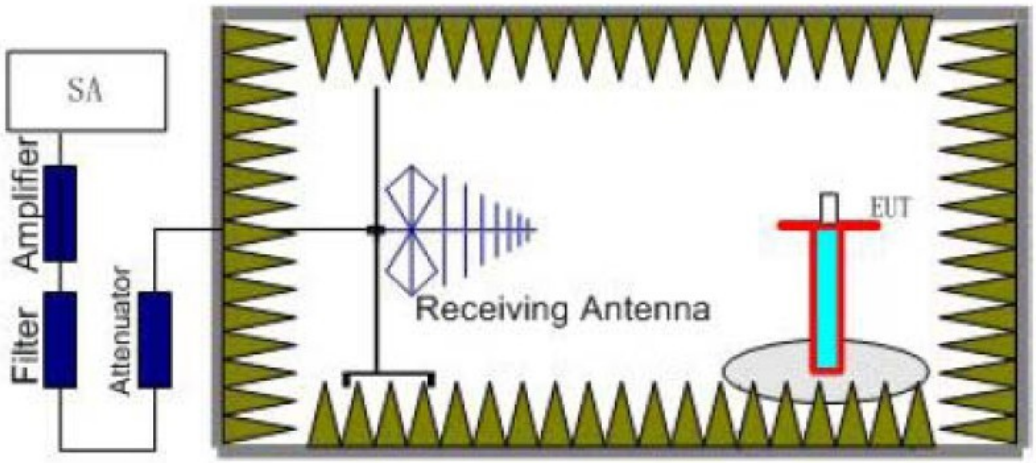
ETSI EN 301 025-1 Sub-clause 8.9.3

When the transmitter is in stand-by the cabinet radiation and spurious emissions shall not exceed 2 nW (-57dBm).

When the transmitter is in operation the cabinet radiation and spurious emissions shall not exceed 0,25 µW (-36dBm).

TEST CONFIGURATION





TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.9.2 for the measurement method.

TEST RESULTS

Not application.

4.2.10. Transient frequency behaviour of the transmitter

The transient frequency behaviour of the transmitter is the variation in time of the transmitter frequency difference from the nominal frequency of the transmitter when the RF output power is switched on and off.

t_{on}: according to the method of measurement described in clause 8.9.2 the switch-on instant ton of a transmitter is defined by the condition when the output power, measured at the antenna terminal, exceeds 0,1 % of the nominal power;

t_1: period of time starting at ton and finishing according to table 2;

t_2: period of time starting at the end of t1 and finishing according to table 2;

t_{off}: switch-off instant defined by the condition when the nominal power falls below 0,1 % of the nominal power;

t_3: period of time that finishing at toff and starting according to table 2.

Table 2: Time periods

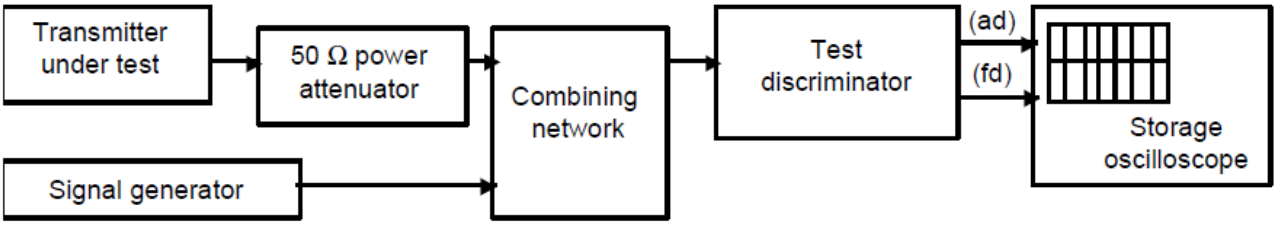
t_1 (ms)	5,0
t_2 (ms)	20,0
t_3 (ms)	5,0

LIMIT

ETSI EN 301 025-1 Sub-clause 8.10.3

During the periods of time t1 and t3 the frequency difference shall not exceed ±25 kHz.
The frequency difference after the end of t2 shall be within the limit of the frequency error given in clause 8.1.
During the period of time t2 the frequency difference shall not exceed ±12,5 kHz.
Before the start of t3 the frequency difference shall be within the limit of the frequency error given in clause 8.1.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.10.2 for the measurement method.

TEST RESULTS

Not application.

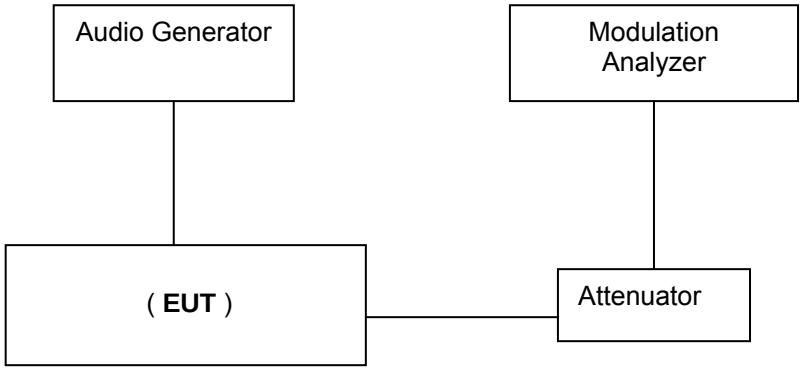
4.2.11. Residual modulation of the transmitter

The residual modulation of the transmitter is the ratio, in dB, of the demodulated RF signal in the absence of wanted modulation, to the demodulated RF signal produced when the normal test modulation is applied.

LIMIT

ETSI EN 301 025-1 Sub-clause 8.11.3
The residual modulation shall not exceed -40 dB on either 12,5 kHz or 25 kHz channels.

TEST CONFIGURATION



TEST PROCEDURE
1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.11.2 for the measurement method.

TEST RESULTS

Not application.

4.2.12. Frequency error (demodulated DSC signal)

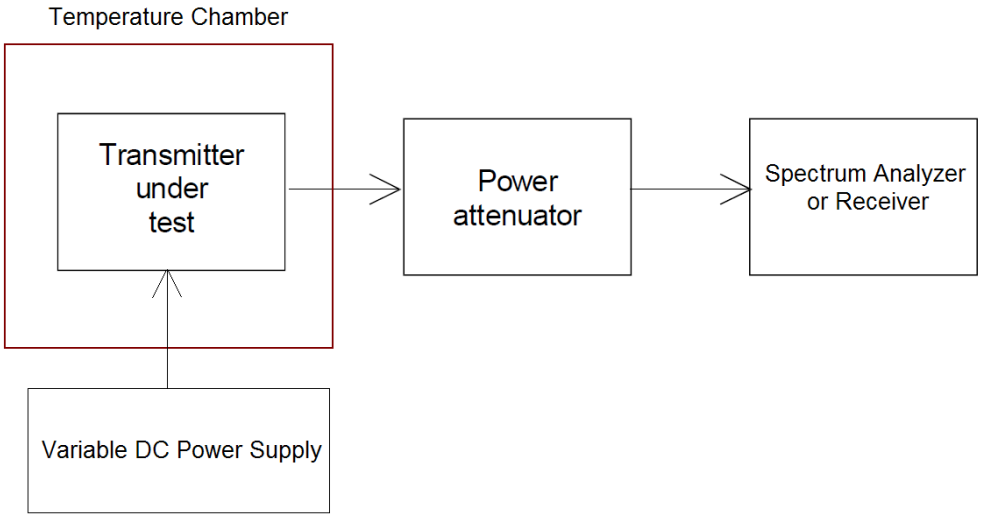
The frequency error for the B- and the Y-state is the difference between the measured frequency from the demodulator and the nominal values.

LIMIT

ETSI EN 301 025-1 Sub-clause 8.12.3

The measured frequency from the demodulator at any time for the B-state shall be within 2 100 Hz ± 10 Hz and for the Y-state within 1300Hz ± 10Hz.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 and 6.14 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.12.2 for the measurement method.

TEST RESULTS

Operation Mode	Test conditions		Frequency Error(Hz)	Limit (Hz)	Result
	Temperature(℃)	Voltage (V)	156.525(MHz)		
B- state	25	13.8	2105	2100 ± 10	Pass
	-15	17.94	2107		
		12.42	2108		
	55	17.94	2106		
		12.42	2107		

Operation Mode	Test conditions		Frequency Error(Hz)	Limit (Hz)	Result
	Temperature(℃)	Voltage (V)	156.525(MHz)		
Y- state	25	13.8	1306	1300 ± 10	Pass
	-10	17.94	1304		
		12.42	1305		
	55	17.94	1307		
		12.42	1304		

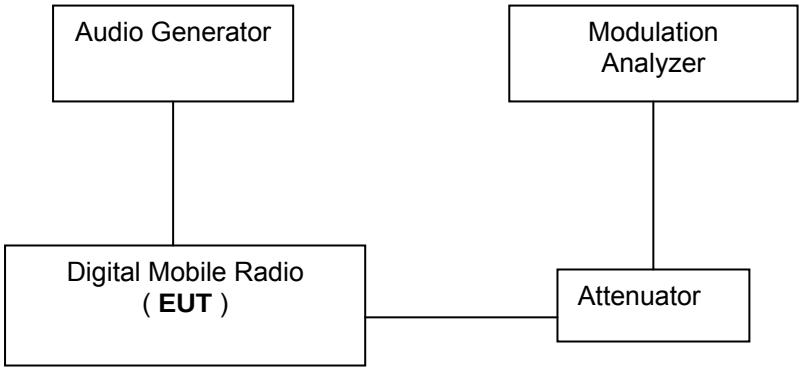
4.2.13. Modulation index for DSC

This test measures the modulation index in the B and Y states.

LIMIT

ETSI EN 301 025-1 Sub-clause 8.13.3
The modulation index shall be 2,0 ± 10 %.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.13.2 for the measurement method.

TEST RESULTS

Operation Mode	Test Frequency(MHz)	Modulation index	Limit	Result
B- state	156.525	2.01	2.0 ± 10 %	Pass
Y- state	156.525	2.05	2.0 ± 10 %	Pass

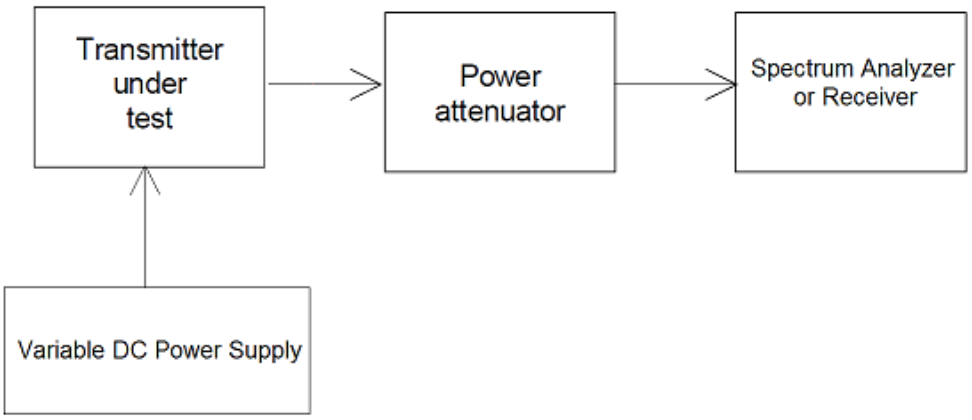
4.2.14. Modulation rate for DSC

The modulation rate is the bit stream speed measured in bit/s.

LIMIT

ETSI EN 301 025-1 Sub-clause 8.14.3
The frequency shall be 600 Hz ± 30 ppm corresponding to a modulation rate of 1 200 baud.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 8.14.2 for the measurement method.

TEST RESULTS

Operation Mode	Test Frequency(MHz)	Modulation rate(Hz)	Limit	Result
B+Y- state	156.525	599.999	600Hz ± 30 ppm	Pass

4.2.15. Testing of free channel transmission on DSC channel 70

This test verifies that the transmitter has a facility to prevent transmission of DSC calls if channel 70 is busy, except in case of distress and safety calls.

Method of measurement

ETSI EN 301 025-1 Sub-clause 8.15.2

The output of the transmitter shall be suitably connected to a calibrated apparatus for decoding and printing out the information content of the call sequences generated by the equipment.
The receiver input is connected to a signal generator. The signal generator is set to the frequency of channel 70(156,525 MHz) and the RF signal shall be modulated by a standard DSC signal, see clause 6.9. The test is performed at an RF level; of +6 dBµV (e.m.f).If the receiver input and transmitter output are combined in the same port it is necessary to combine the calibrated apparatus for decoding and printing out the information content of the call sequences and the signal generator through a suitable combining network, see clause 6.1. It may be necessary to protect the signal generator against the power output from the equipment through an attenuator. The signal generator output shall be turned on. The transmitter shall be set to transmit DSC calls as specified in annex A.Then the signal generator output shall be turned off.

Requirement

ETSI EN 301 025-1 Sub-clause 8.15.3

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.

TEST RESULTS

Complies

4.3. ETSI EN 301 025-1 Receiver Requirements (Radiotelephone receiver)

4.3.1. Harmonic distortion and rated audio-frequency output power

The harmonic distortion at the receiver output is defined as the ratio, expressed as a percentage, of the total r.m.s.voltage of all the harmonic components of the modulation audio frequency to the total r.m.s. voltage of the signal delivered by the receiver.The rated audio frequency output power is the value stated by the manufacturer to be the maximum power available at the output, for which all the requirements of the present document are met.

LIMIT

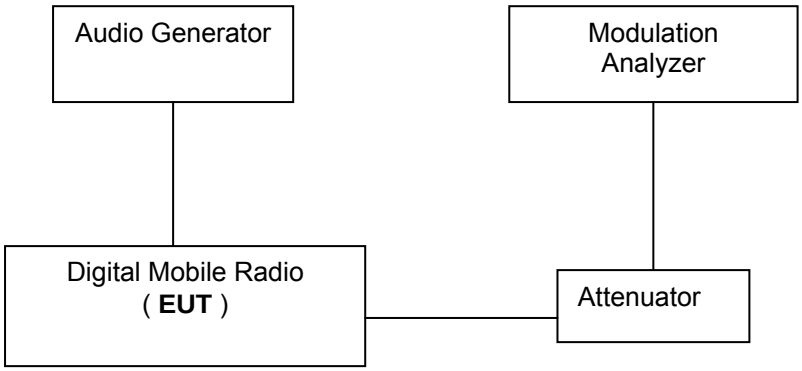
ETSI EN 301 025-1 Sub-clause 9.1.3

The rated audio-frequency output power shall be at least:

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

The harmonic distortion shall not exceed 10 %.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.1.2 for the measurement method.

TEST RESULTS

Not application.

4.3.2. Audio frequency response

The audio frequency response is defined as the variation in the receiver's audio frequency output level as a function of the modulation frequency of the radio frequency signal with constant deviation applied to its input.

LIMIT

ETSI EN 301 025-1 Sub-clause 9.2.3

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).

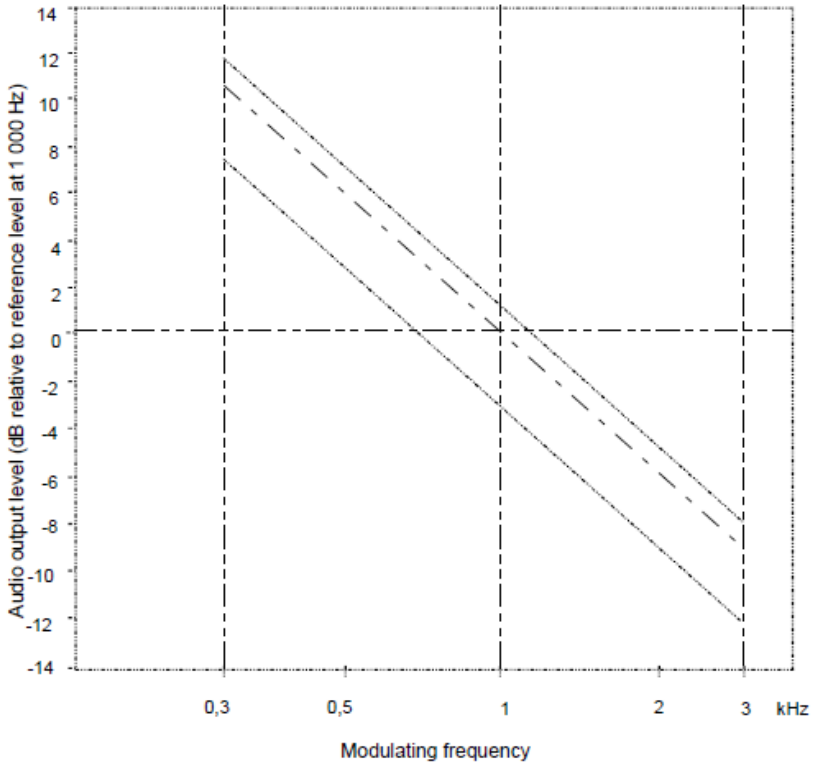
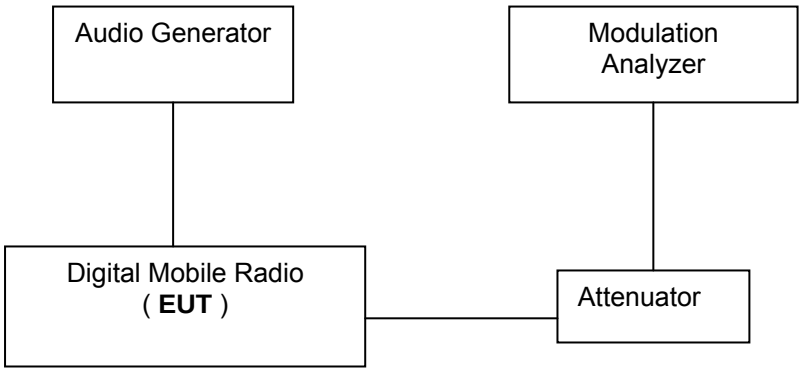


Figure 5: Audio frequency response

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.2.2 for the measurement method.

TEST RESULTS

Not application.

4.3.3. Maximum usable sensitivity

The maximum usable sensitivity of the receiver is the minimum level of the signal (e.m.f.) at the nominal frequency of the receiver which, when applied to the receiver input with normal test modulation (see clause 6.4), will produce:

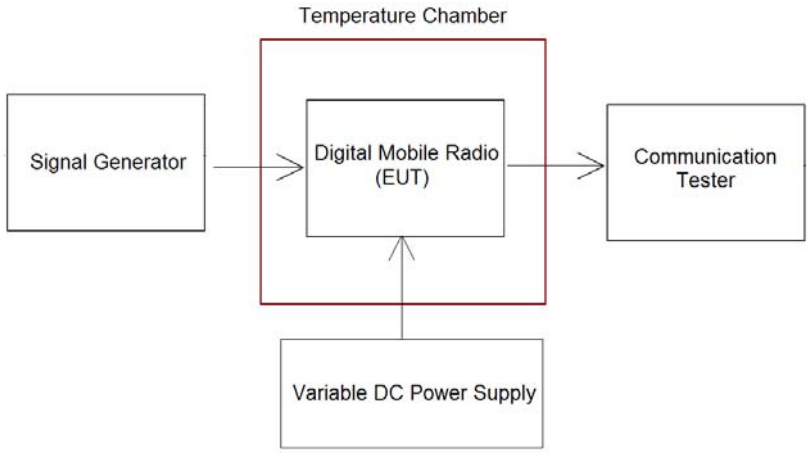
- in all cases, an audio frequency output power equal to 50 % of the rated output power (see clause 9.1); and
- a Signal + Noise + Distortion to Noise + Distortion (SINAD) ratio of 20 dB, measured at the receiver output through a psophometric telephone filtering network such as described in Recommendation ITU-T O.41 [i.6].

LIMIT

ETSI EN 301 025-1 Sub-clause 9.3.3

The maximum usable sensitivity for either 25 kHz or 12,5 kHz channels shall not exceed +6 dBµV (e.m.f.) under normal test conditions and +12 dBµV (e.m.f.) under extreme test conditions.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 and 6.14 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.3.2 for the measurement method.

TEST RESULTS

Not application.

4.3.4. Co-channel Rejection

The co-channel rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal, both signals being at the nominal frequency of the receiver.

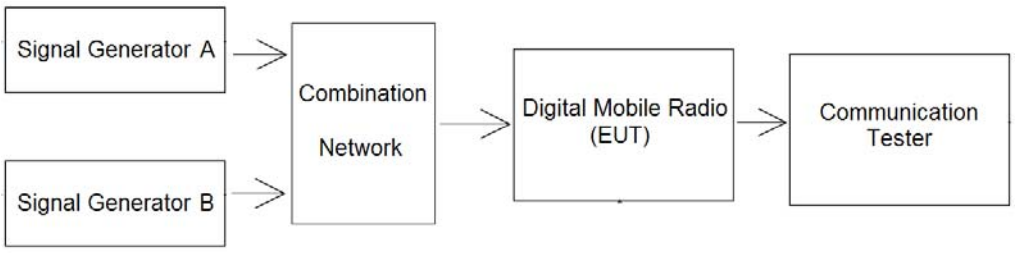
LIMIT

ETSI EN 301 025-1Sub-clause 9.4.3

The co-channel rejection ratio, at any frequency of the unwanted signal within the specified range, shall be between:

a) -10 dB and 0 dB for 25 kHz channels;
b) -12 dB and 0 dB for 12,5 kHz channels.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.4.2 for the measurement method.

TEST RESULTS

Not application.

4.3.5. Adjacent Channel Selectivity

The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal which differs in frequency from the nominal channel spacing.

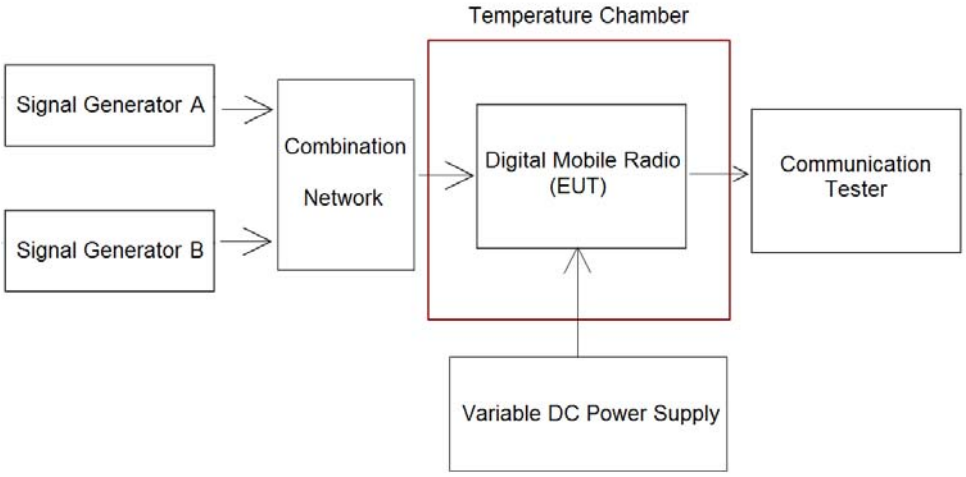
LIMIT

ETSI EN 301 025-1 Sub-clause 9.5.3

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.

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.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 and 6.14 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.5.2 for the measurement method.

TEST RESULTS

Not application.

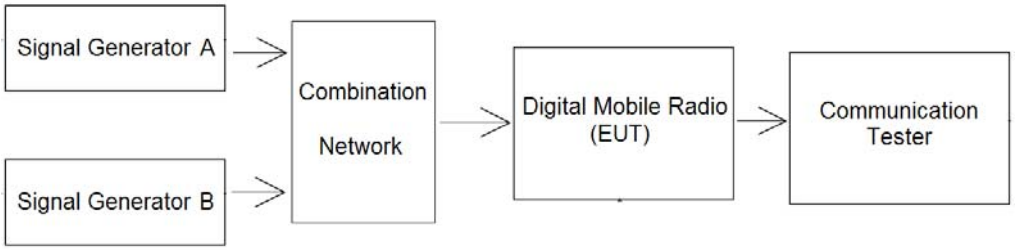
4.3.6. Spurious Response Rejection

The spurious response rejection is a measure of the capability of the receiver to discriminate between the wanted modulated signal at the nominal frequency and an unwanted signal at any other frequency at which a response is obtained.

LIMIT

ETSI EN 301 025-1Sub-clause 9.6.3
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.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.6.2 for the measurement method.

TEST RESULTS

Not application.

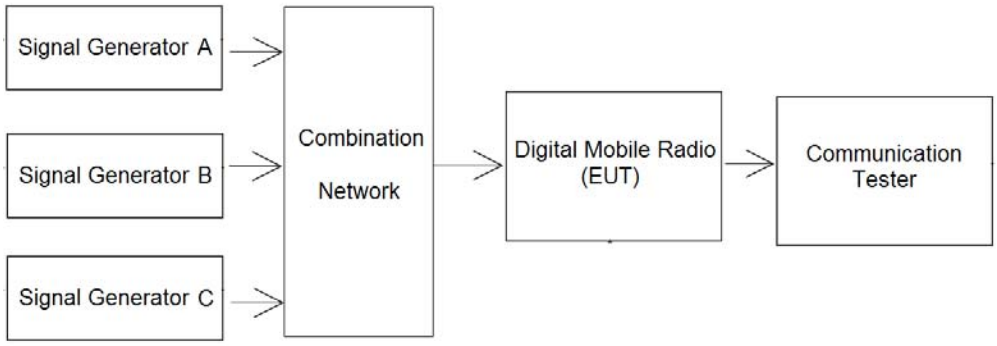
4.3.7. Intermodulation response

The intermodulation response is a measure of the capability of a receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency.

LIMIT

ETSI EN 301 025-1 Sub-clause 9.7.3
The intermodulation response ratio shall be greater than 68 dB.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.7.2 for the measurement method.

TEST RESULTS

Not application.

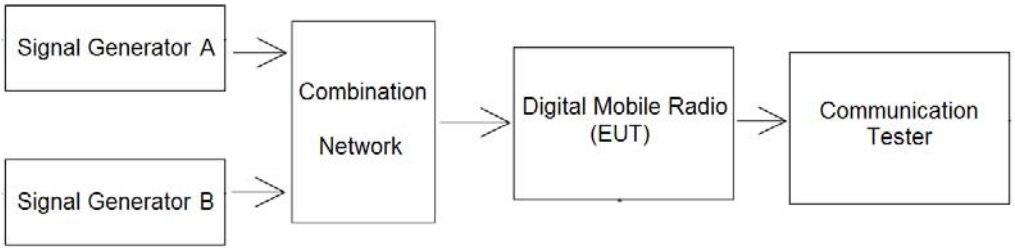
4.3.8. Blocking or Desensitization

Blocking is a change (generally a reduction) in the wanted output power of the receiver or a reduction of the SINAD ratio due to an unwanted signal on another frequency.

LIMIT

ETSI EN 301 025-1 Sub-clause 9.8.3
The blocking level for any frequency within the specified ranges, shall be not less than 90 dBμV (e.m.f.), except at frequencies on which spurious responses are found (see clause 9.6).

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.8.2 for the measurement method.

TEST RESULTS

Not application.

Spurious emissions

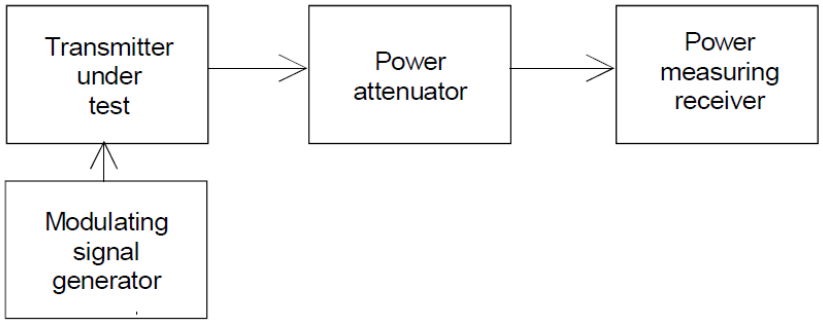
Spurious emissions from the receiver are components at any frequency, present at the receiver input port.The level of spurious emissions shall be measured as the power level at the antenna.

LIMIT

ETSI EN 301 025-1 Sub-clause 9.9.3

The power of any spurious emission shall not exceed 2 nW(-57dBm) at any frequency in the range between 9 kHz and 2 GHz.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.9.2 for the measurement method.

TEST RESULTS

Not application.

4.3.9. Receiver radiated spurious emissions

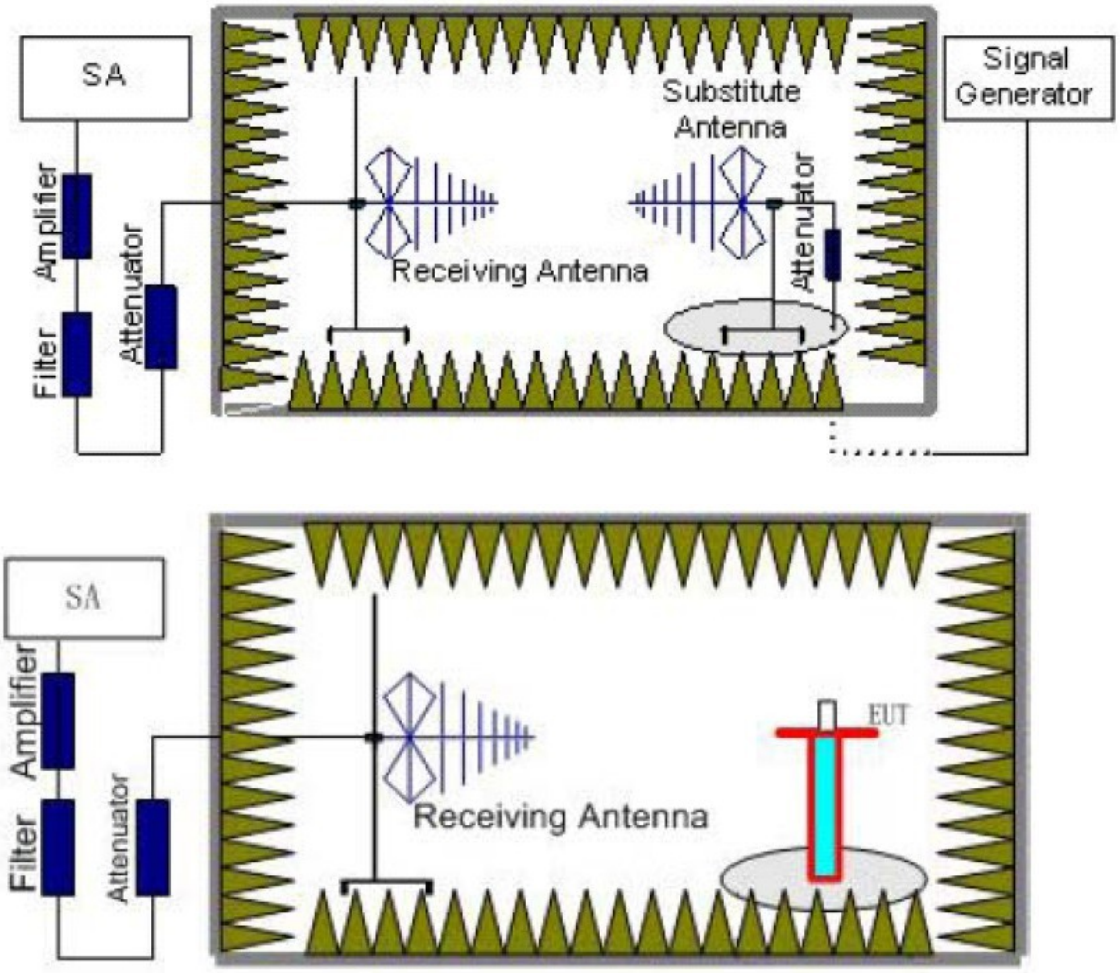
Radiated spurious emissions from the receiver are components at any frequency radiated by the equipment cabinet and the structure. This test is performed for both the telephony receiver and the DSC receiver.

LIMIT

ETSI EN 301 025-1 Sub-clause 9.10.3

The power of any spurious radiation shall not exceed 2 nW at any frequency in the range between 30 MHz and 2 GHz.

TEST CONFIGURATION

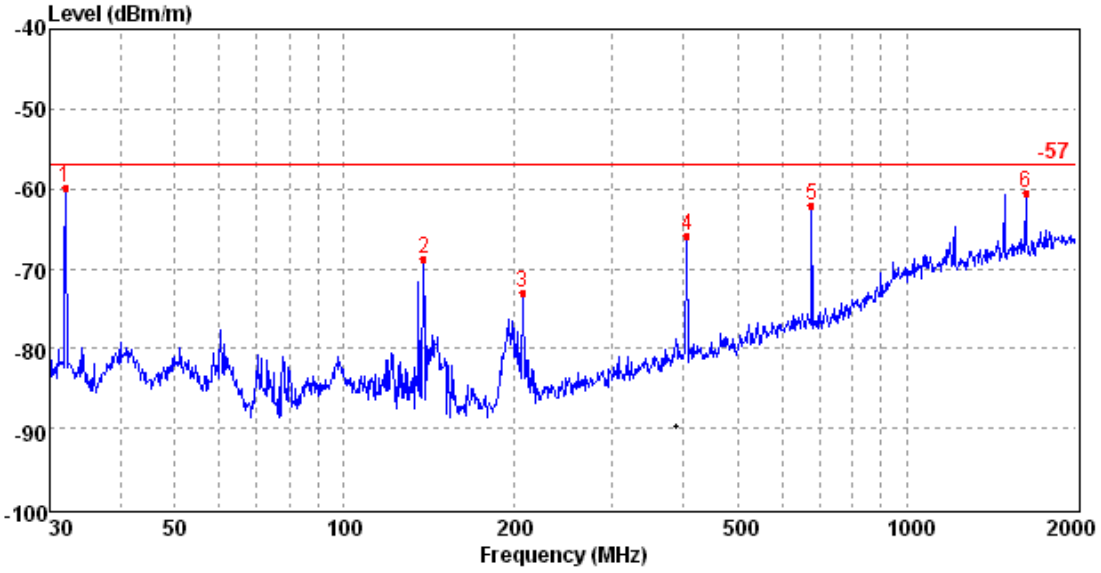


TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.10.2 for the measurement method.

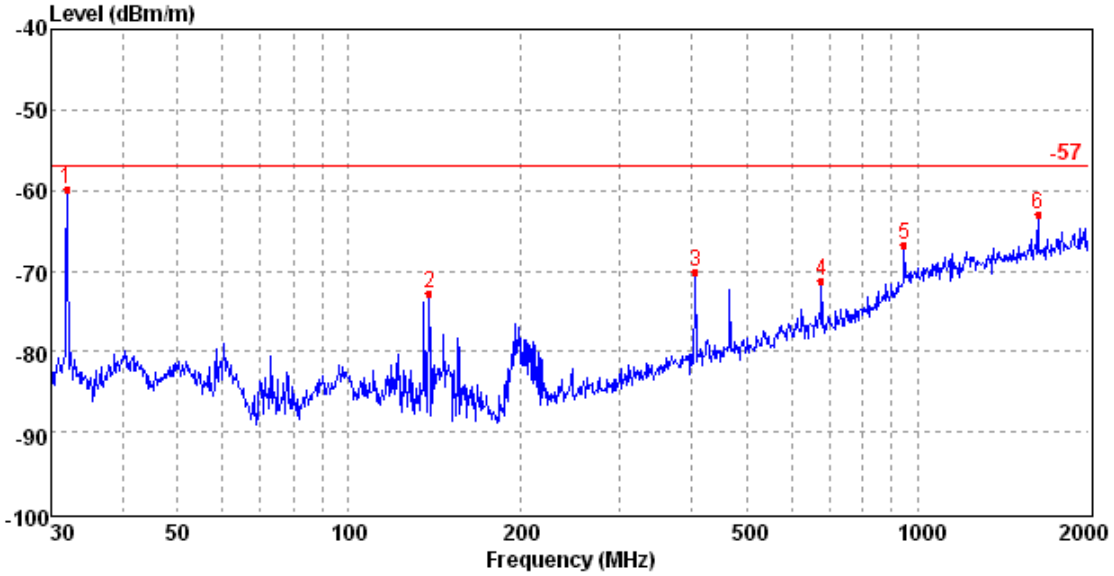
TEST RESULTS

RX:DSC			
Test Frequency:	156.525MHz	Polarity:	Horizontal



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	31.95	-58.03	25.51	0.52	27.76	-59.76	-57.00	-2.76	Peak
2	138.36	-63.46	22.18	1.24	28.62	-68.66	-57.00	-11.66	Peak
3	207.94	-69.55	23.85	1.56	28.80	-72.94	-57.00	-15.94	Peak
4	407.16	-67.65	28.35	2.28	28.89	-65.91	-57.00	-8.91	Peak
5	676.80	-68.38	31.94	3.08	28.66	-62.02	-57.00	-5.02	Peak
6	1628.02	-77.75	40.34	4.97	28.12	-60.56	-57.00	-3.56	Peak

Test Frequency:	156.525MHz	Polarity:	Vertical



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	31.95	-58.09	25.51	0.52	27.76	-59.82	-57.00	-2.82	Peak
2	138.36	-67.49	22.18	1.24	28.62	-72.69	-57.00	-15.69	Peak
3	407.16	-71.75	28.35	2.28	28.89	-70.01	-57.00	-13.01	Peak
4	676.80	-77.51	31.94	3.08	28.66	-71.15	-57.00	-14.15	Peak
5	947.05	-78.77	36.64	3.64	28.37	-66.86	-57.00	-9.86	Peak
6	1628.02	-80.16	40.34	4.97	28.12	-62.97	-57.00	-5.97	Peak

4.3.10. Receiver residual noise level

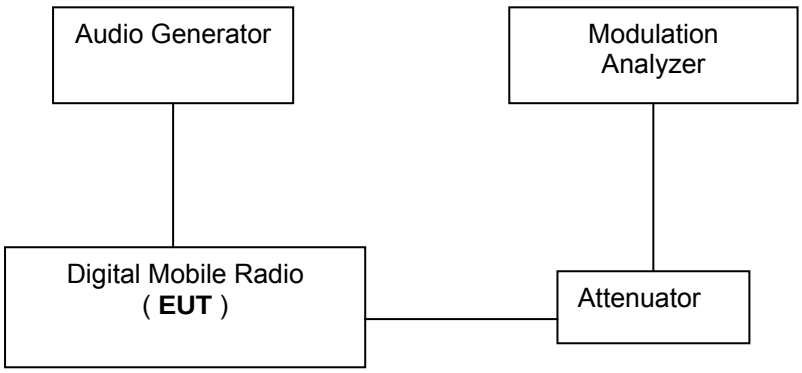
The receiver residual noise level is defined as the ratio, in dB, of the audio-frequency power of the noise and hum resulting from spurious effects of the power supply system or from other causes, to the audio-frequency power produced by a high-frequency signal of average level, modulated by the normal test modulation and applied to the receiver input.

LIMIT

ETSI EN 301 025-1 Sub-clause 9.11.3

The receiver residual noise level shall not exceed -40 dB.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.11.2 for the measurement method.

TEST RESULTS

Not application.

4.3.11. Squelch operation

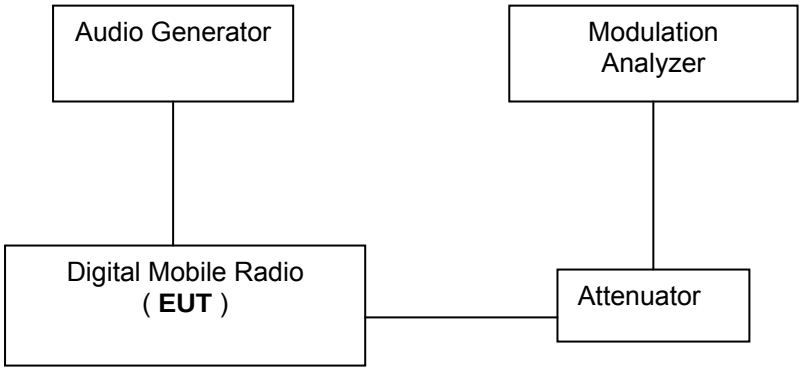
The purpose of the squelch facility is to mute the receiver audio output signal when the level of the signal at the receiver input is less than a given value.

LIMIT

ETSI EN 301 025-1 Sub-clause 9.12.3

a) 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.
b) Under the conditions specified in b) clause 9.12.2, the input level shall not exceed +6 dBµV (e.m.f.) and the SINAD ratio shall be at least 20 dB.
c) Under the conditions specified in c) clause 9.12.2, the input signal shall not exceed +6 dBµV (e.m.f.) when the control is set at maximum.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.12.2 for the measurement method.

TEST RESULTS

Not application.

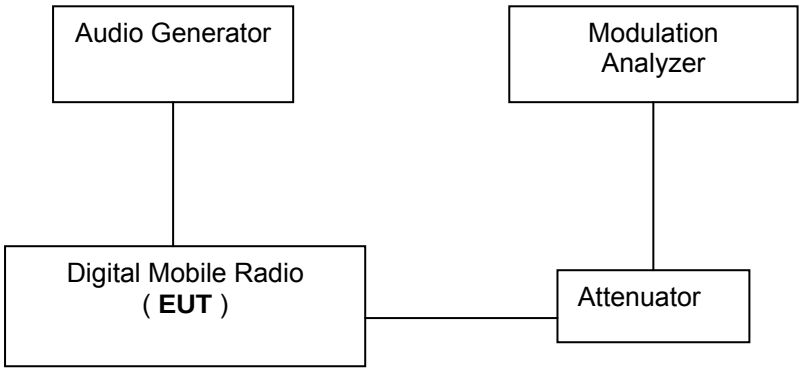
4.3.12. Squelch hysteresis

Squelch hysteresis is the difference in dB between the receiver input signal levels at which the squelch opens and closes.

LIMIT

ETSI EN 301 025-1 Sub-clause 9.13.3
The squelch hysteresis shall be between 3 dB and 6 dB.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.13.2 for the measurement method.

TEST RESULTS

Not application.

4.3.13. Multiple watch characteristic

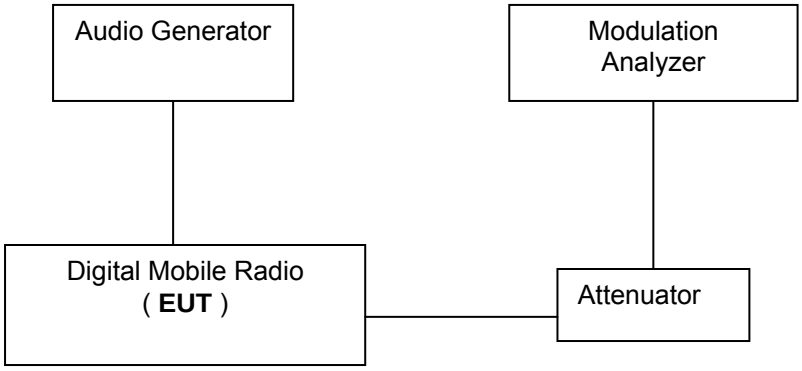
The scanning period is the time between the start of two successive samples of the priority channel in the absence of a signal on that channel.
The dwell time on the priority channel is the time between the start and finish of any sample of the priority channel in the absence of a signal on that channel.
The dwell time on the additional channel is the time between the start and finish of any sample of the additional channel.

LIMIT

ETSI EN 301 025-1 Sub-clause 9.14.3

a) The scanning period shall not exceed 2 s.
b) The dwell time on the priority channel shall not exceed 150 ms.
c) 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.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 and 6.14 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 9.14.2 for the measurement method.

TEST RESULTS

Not application.

4.4. ETSI EN 301 025-1 Receiver Requirements (Receiver for DSC decoder)

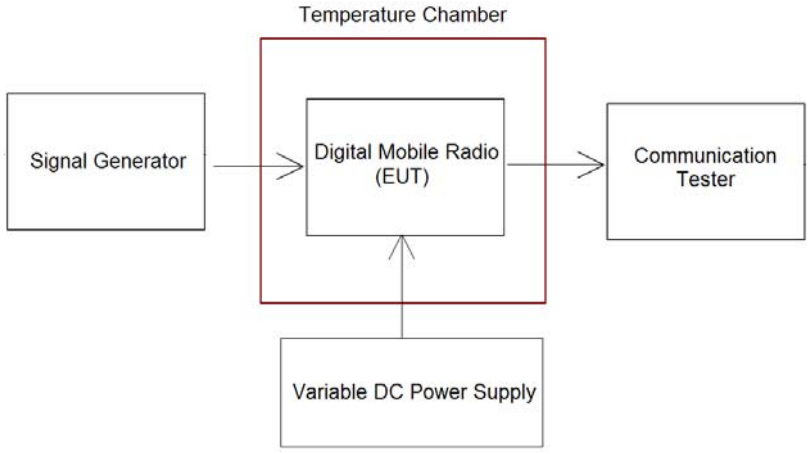
4.4.1. Maximum usable sensitivity

The maximum usable sensitivity of the receiver is the minimum level of the signal (e.m.f.) at the nominal frequency of the receiver which when applied to the receiver input with a test modulation will produce a bit error ratio of 10^{-2}.

LIMIT

ETSI EN 301 025-1 Sub-clause 10.1.3
The bit error ratio shall be equal to or less than 10^{-2}.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 and 6.14 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 10.1.2 for the measurement method.

TEST RESULTS

Operation Mode	Temperature (℃)	Voltage (V)	Test Frequency (MHz)	Measured (error ratio)	Limit (error ratio)	Result
B+Y- state	25	13.8	156.525	0.0084	$\leqslant 10^{-2}$	Pass
	-15	17.94	156.525	0.0047		
		12.42	156.525	0.0059		
	55	17.94	156.525	0.0037		
		12.42	156.525	0.0044		

4.4.2. Co-channel Rejection

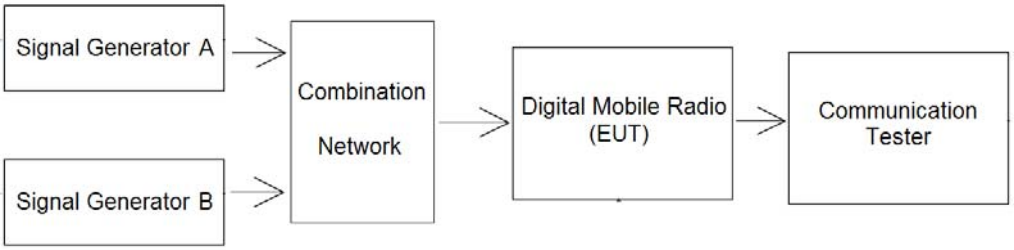
The co-channel rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal, both signals being at the nominal frequency of the receiver.

LIMIT

ETSI EN 301 025-1Sub-clause 10.2.3

The bit error ratio shall be equal to or less than 10^{-2}.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 10.2.2 for the measurement method.

TEST RESULTS

Operation Mode	Test Frequency (MHz)	Measurement Offset (kHz)	Measured (error ratio)	Limit (error ratio)	Result
B+Y- state	156.525	-3	0.0084	$\leqslant 10^{-2}$	Pass
		0	0.0081		
		3	0.0084		

4.4.3. Adjacent Channel Selectivity

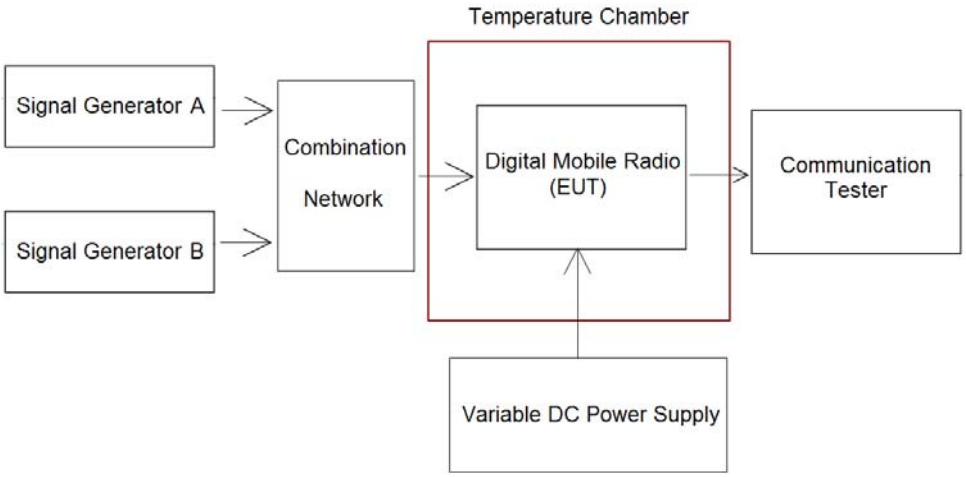
The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal which differs in frequency from the wanted signal by 25 kHz.

LIMIT

ETSI EN 301 025-1 Sub-clause 10.3.3

The bit error ratio shall be equal to or less than 10^{-2}.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 and 6.14 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 10.3.2 for the measurement method.

TEST RESULTS

Operation Mode	Test Condition		Test Frequency (MHz)	Measurement Position	Measured (error ratio)	Limit (error ratio)	Result
	Temperature (℃)	Voltage (V)					
B+Y-state	25	13.8	156.525	Lower adjacent	0.0086	$\leqslant 10^{-2}$	Pass
				Upper adjacent	0.0085		
	-15	17.94	156.525	Lower adjacent	0.0084	$\leqslant 10^{-2}$	Pass
				Upper adjacent	0.0087		
		12.42	156.525	Lower adjacent	0.0083	$\leqslant 10^{-2}$	Pass
				Upper adjacent	0.0088		
	55	17.94	156.525	Lower adjacent	0.0085	$\leqslant 10^{-2}$	Pass
				Upper adjacent	0.0086		
		12.42	156.525	Lower adjacent	0.0083	$\leqslant 10^{-2}$	Pass
				Upper adjacent	0.0084		

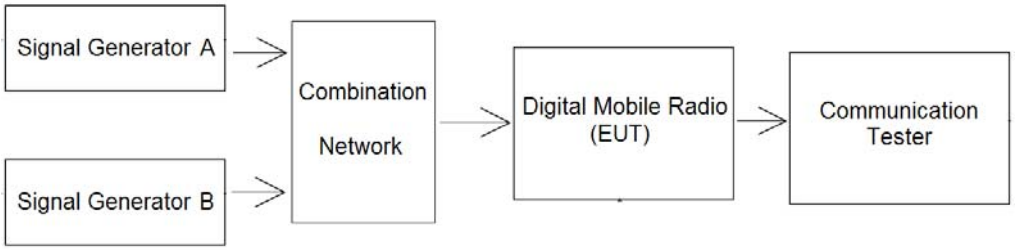
4.4.4. Spurious response

The spurious response is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal with frequencies outside the pass band of the receiver.

LIMIT

ETSI EN 301 025-1Sub-clause 10.4.3
The bit error ratio shall be equal to or less than 10^{-2}.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 10.4.2 for the measurement method.

TEST RESULTS

Operation Mode	Test Frequency (MHz)	Relationship	Spurious Frequency (MHz)	Measured (error ratio)	Limit (error ratio)	Result
B+Y- state	156.525	f_{RF1}-f_{LO}/2	145.675	0.0082	$\leqslant 10^{-2}$	Pass
		f_{RF1}-2*f_{LO}	113.125	0.0084		
		f_{LO}	21.7	0.0087		
		2*f_{I1}-f_{LO}	247.95	0.0081		

Remark:

1)f_{RF1}=156.525MHz, f_{LO}=41.7MHz, f_{I1}=156.525MHz-21.7MHz=134.825MHz

2)An increment sweep was made between 9 kHz - 2000 MHz with no other significant responses detected.

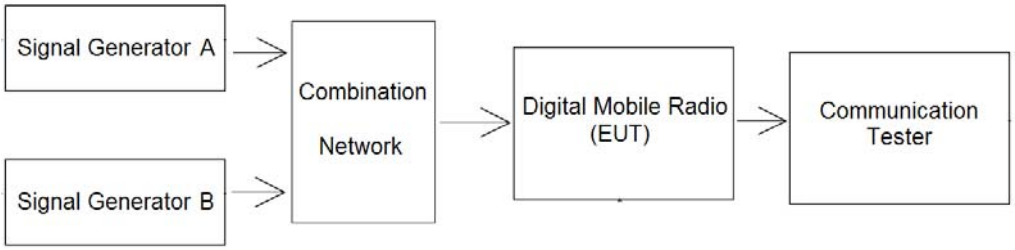
4.4.5. Blocking immunity

The blocking immunity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal with frequencies outside the pass band of the receiver.

LIMIT

ETSI EN 301 025-1Sub-clause 10.4.3
The bit error ratio shall be equal to or less than 10^{-2}.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 10.4.2 for the measurement method.

TEST RESULTS

Operation Mode	Test Frequency (MHz)	Measurement Offset (MHz)	Measured (error ratio)	Limit (error ratio)	Result
B+Y- state	156.525	-10	0.0083	$\leqslant 10^{-2}$	Pass
		-5	0.0086		
		-2	0.0081		
		-1	0.0085		
		1	0.0084		
		2	0.0082		
		5	0.0080		
		10	0.0087		

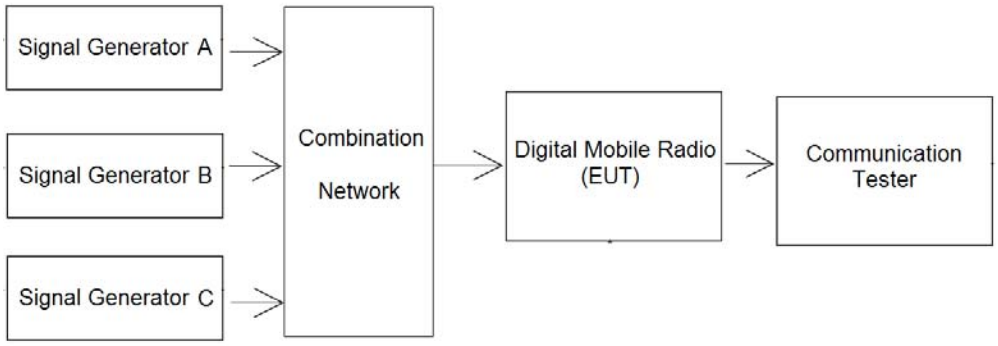
4.4.6. Intermodulation response

The intermodulation response is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency.

LIMIT

ETSI EN 301 025-1 Sub-clause 10.5.3
The bit error ratio shall be equal to or less than 10^{-2}.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 10.5.2 for the measurement method.

TEST RESULTS

Operation Mode	Test Frequency (MHz)	Measurement Offset (kHz)		Measured (error ratio)	Limit (error ratio)	Result
		SG B	SG C			
B+Y- state	156.525	-50	-100	0.0087	$\leqslant 10^{-2}$	Pass
		50	100	0.0084		

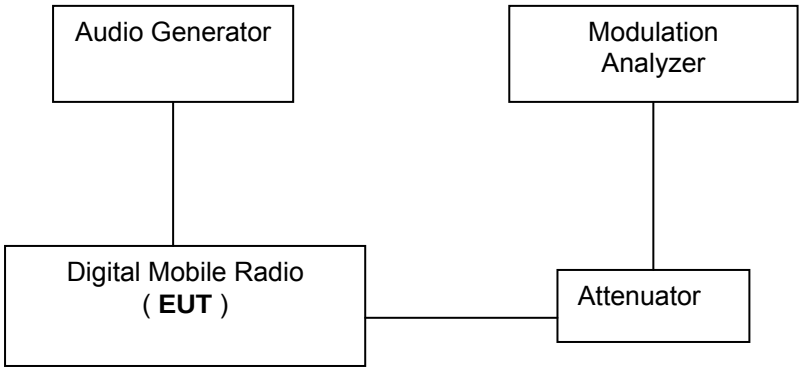
4.4.7. Dynamic range

The dynamic range of the equipment is the range from the minimum to the maximum level of a radio frequency input signal at which the bit error ratio in the output of the decoder does not exceed a specified value.

LIMIT

ETSI EN 301 025-1 Sub-clause 10.6.3
The bit error ratio shall be equal to or less than 10^{-2}.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 10.6.2 for the measurement method.

TEST RESULTS

Operation Mode	Test Frequency (MHz)	Measured (error ratio)	Limit (error ratio)	Result
B+Y- state	156.525	0.0086	$\leqslant 10^{-2}$	Pass

4.4.8. Spurious emissions

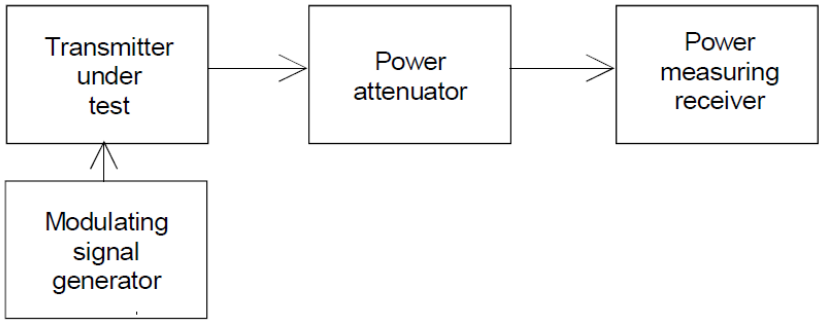
Spurious emissions from the receiver are components at any frequency, present at the receiver input port.The level of spurious emissions shall be measured as the power level at the antenna.

LIMIT

ETSI EN 301 025-1 Sub-clause 10.7.3

The power of any spurious emission shall not exceed 2 nW(-57dBm) at any frequency in the range between 9 kHz and 2 GHz.

TEST CONFIGURATION



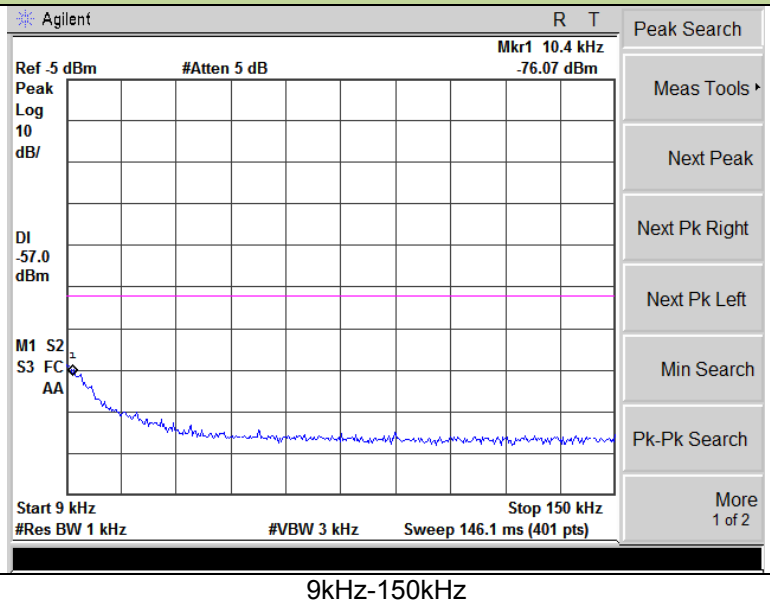
TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 10.7.2 for the measurement method.

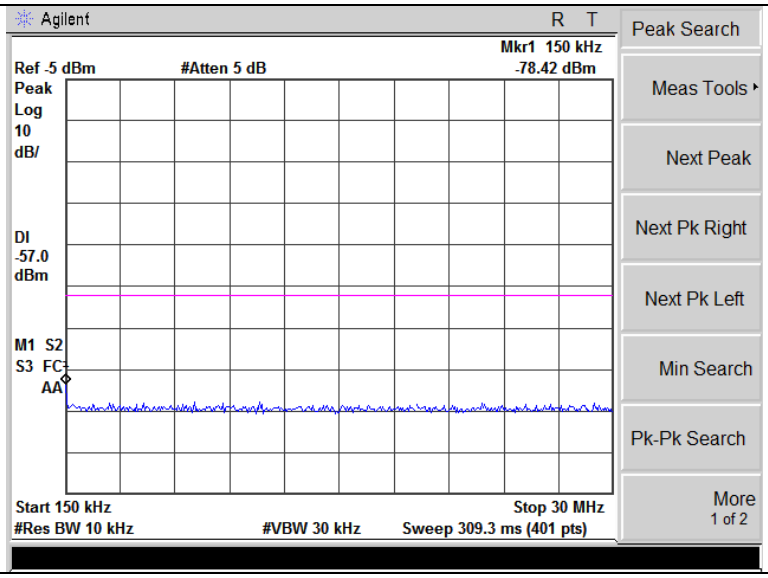
TEST RESULTS

Test plot as follows:

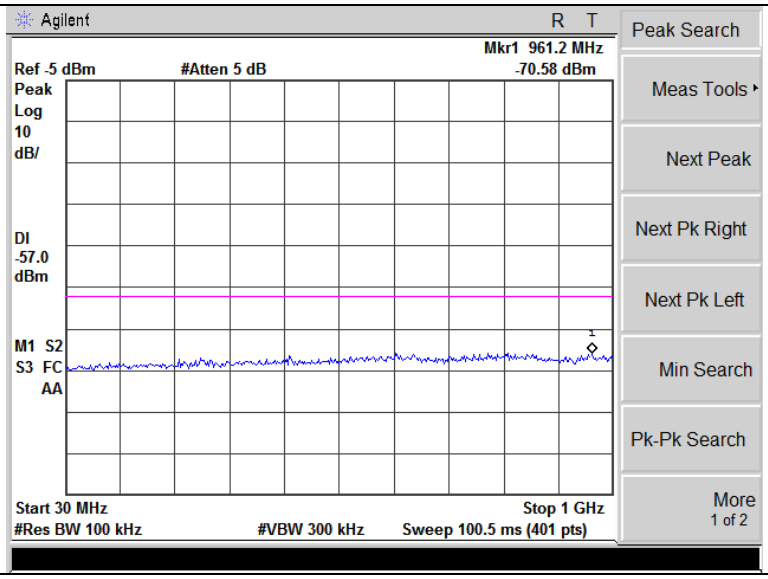
RX:DSC(156.525MHz)



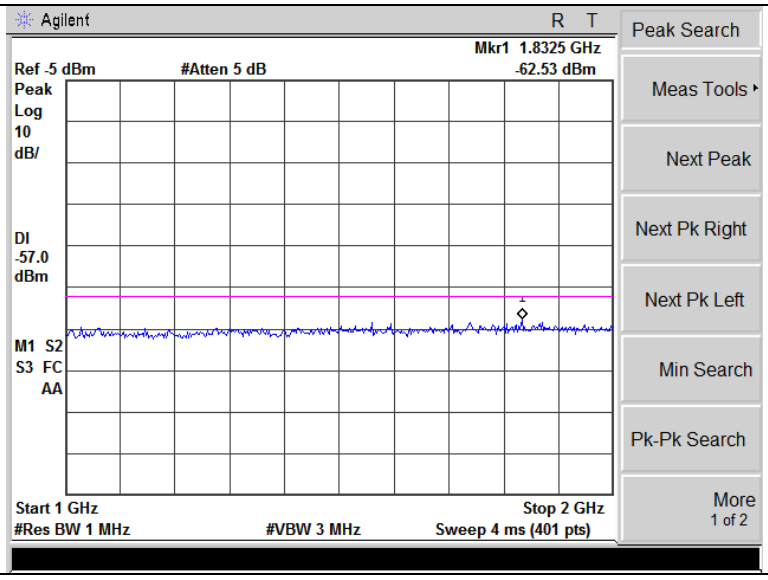
9kHz-150kHz



150kHz-30MHz



30MHz-1000MHz



1GHz-2GHz

4.4.9. Simultaneous reception

Simultaneous reception is the ability of the unit to correctly receive DSC traffic and radiotelephony traffic at the same time.

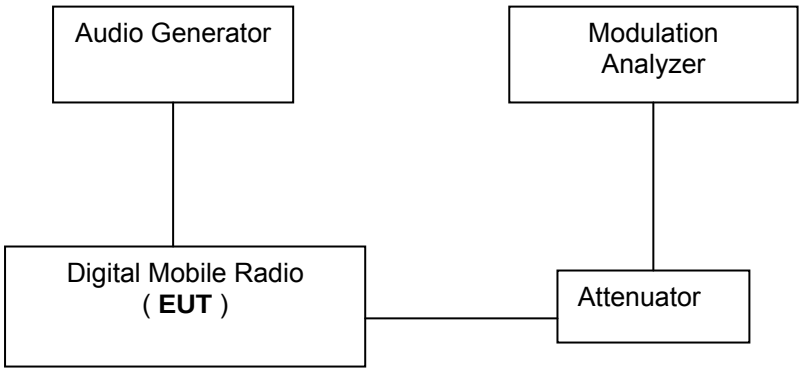
LIMIT

ETSI EN 301 025-1 Sub-clause 10.8.3

a) For radiotelephony operation the SINAD ratio shall be no less than 20 dB in the presence of the DSC test signal.

b) The DSC bit error ratio shall be equal to or less than 10^{-2}.

TEST CONFIGURATION



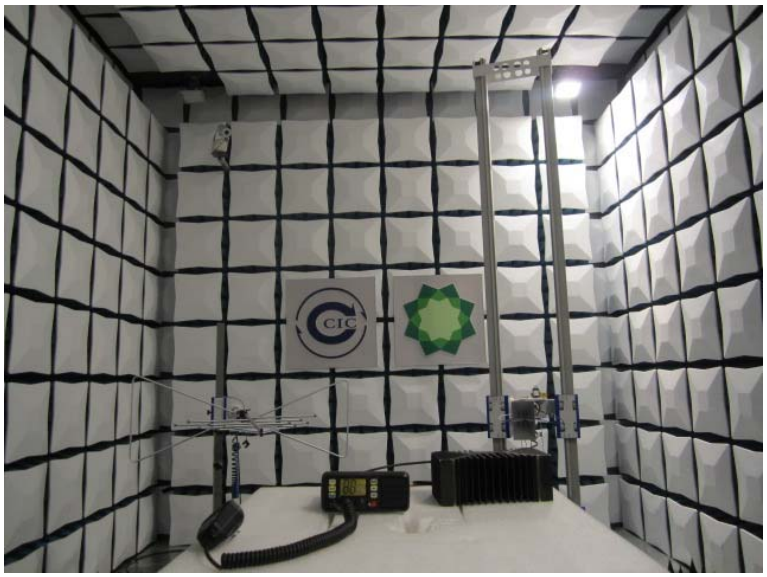
TEST PROCEDURE

1. Please refer to ETSI EN 301 025-1 Sub-clause 6.13 for the test conditions.
2. Please refer to ETSI EN 301 025-1 Sub-clause 10.8.2 for the measurement method.

TEST RESULTS

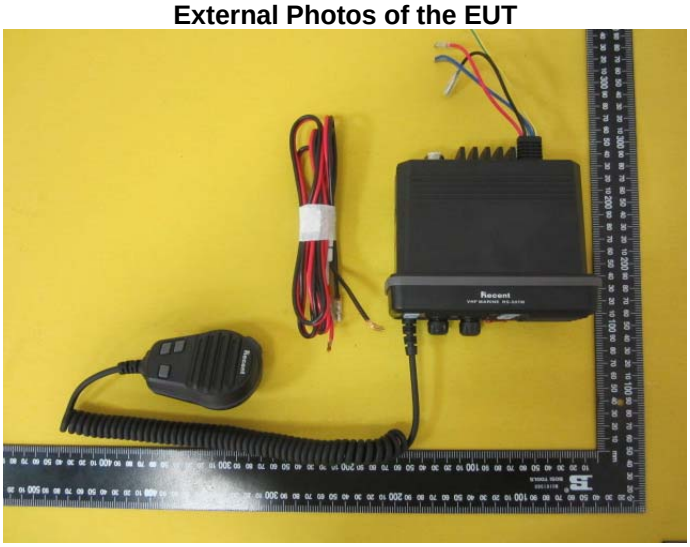
Operation Mode	Test Frequency (MHz)	Measured (error ratio)	Limit (error ratio)	Result
B+Y- state	156.525	0.0082	$\leqslant 10^{-2}$	Pass

5. Test Set up Photos of the EUT

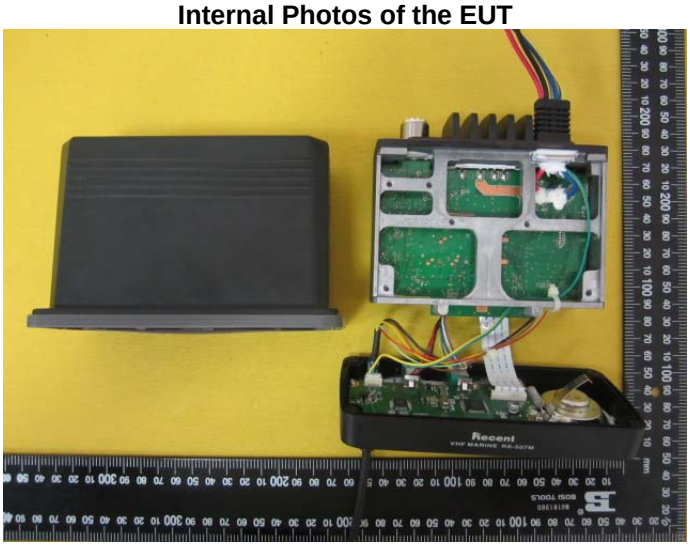


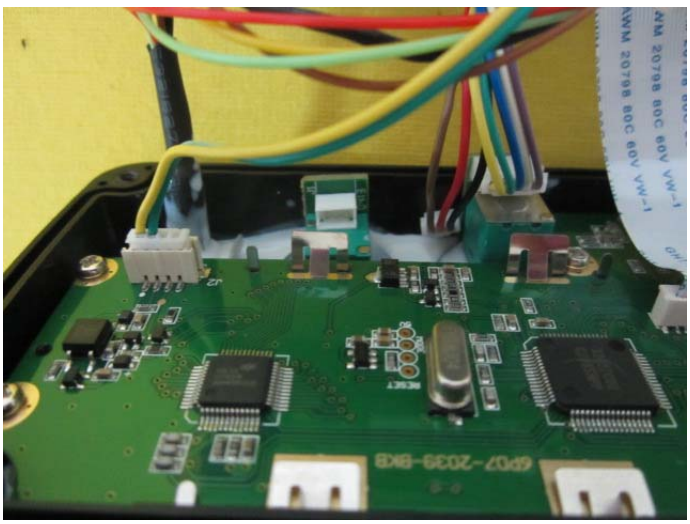
6. External and Internal Photos of the EUT

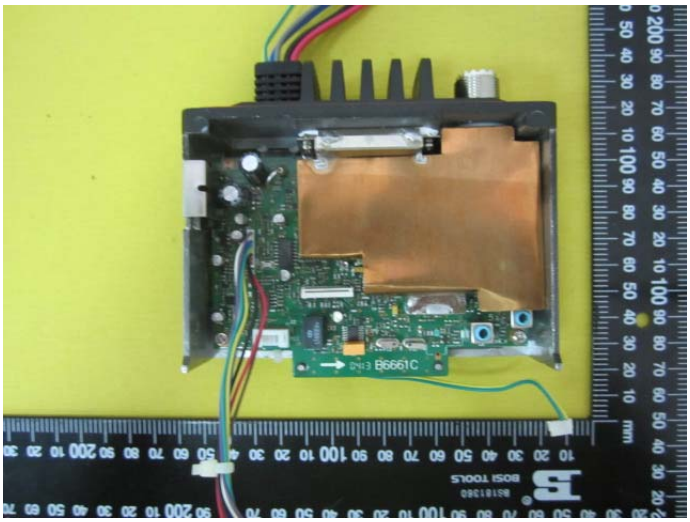
External Photos of the EUT



Internal Photos of the EUT



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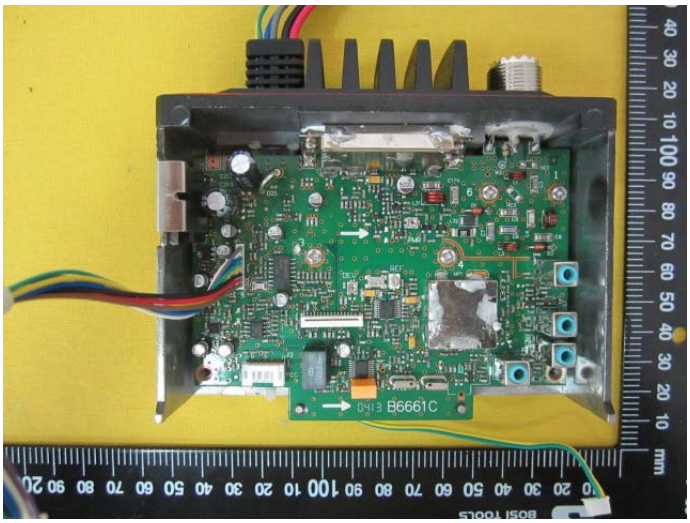
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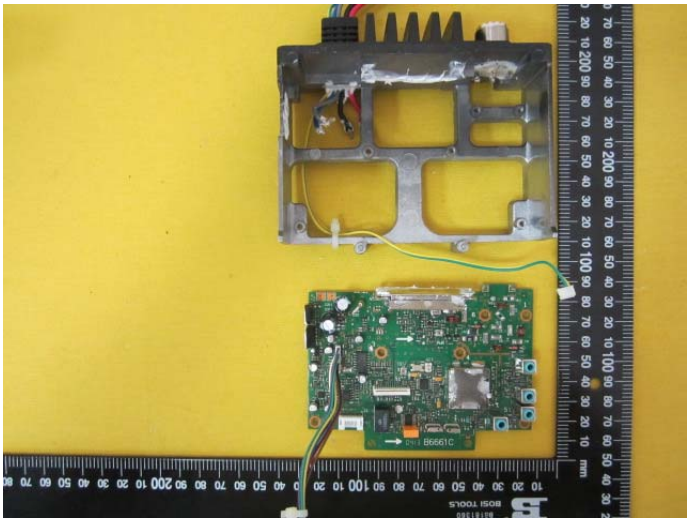
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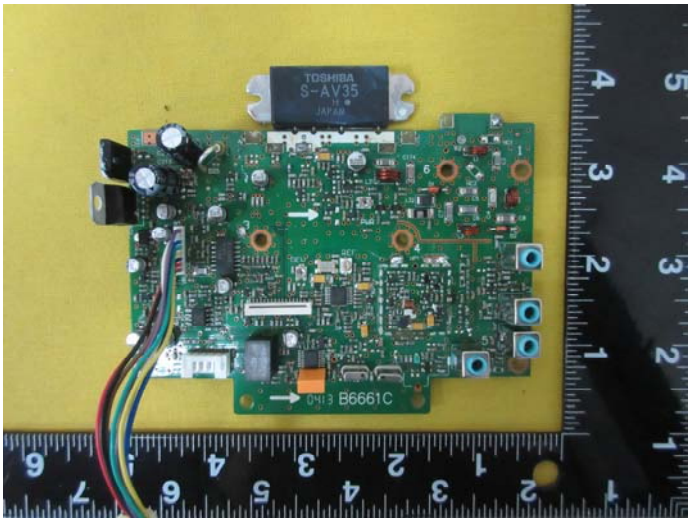
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S-AV35
JAPAN
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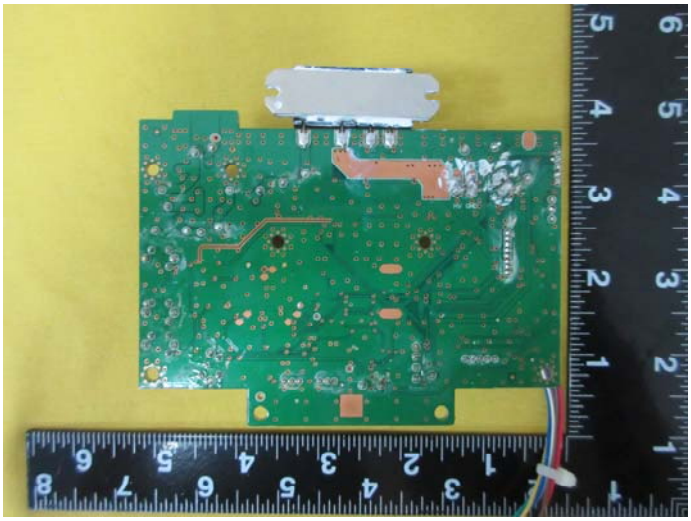
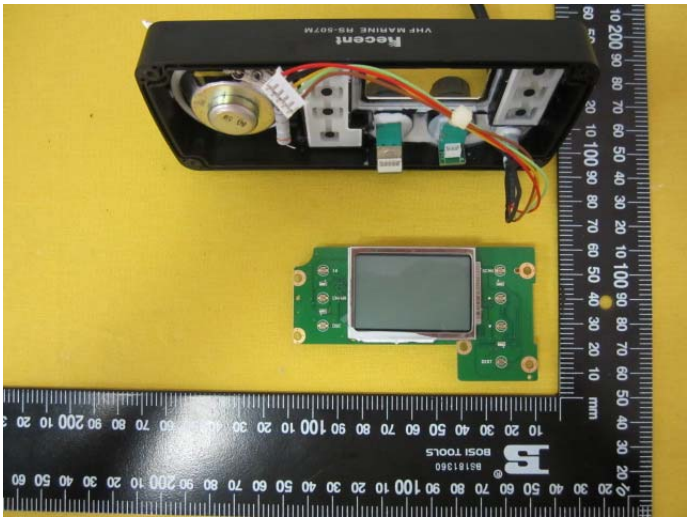
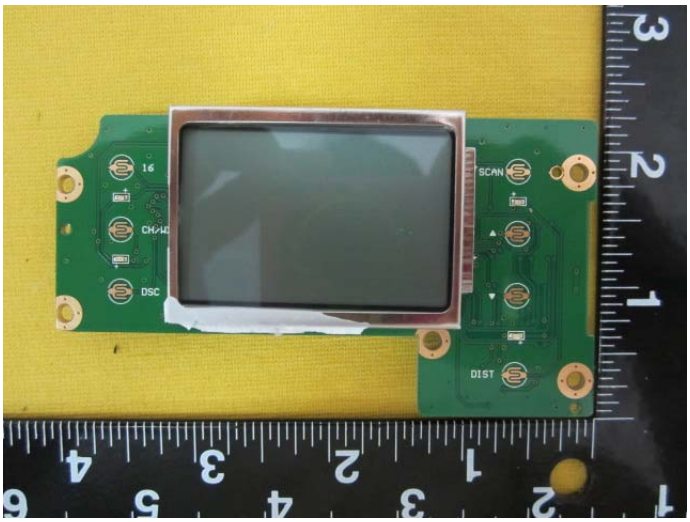
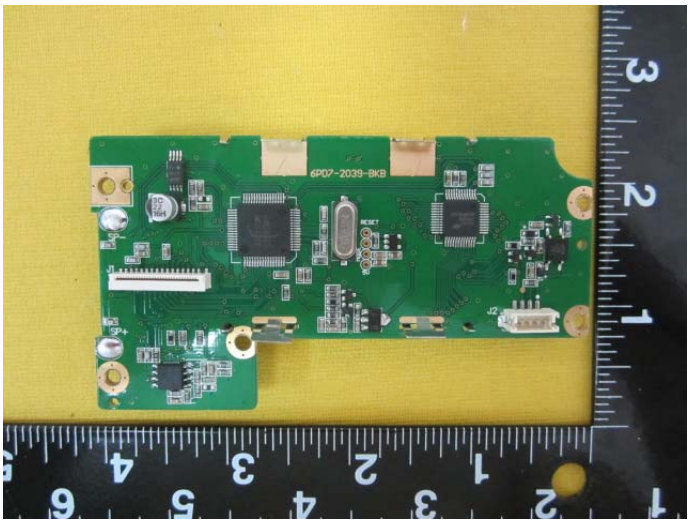
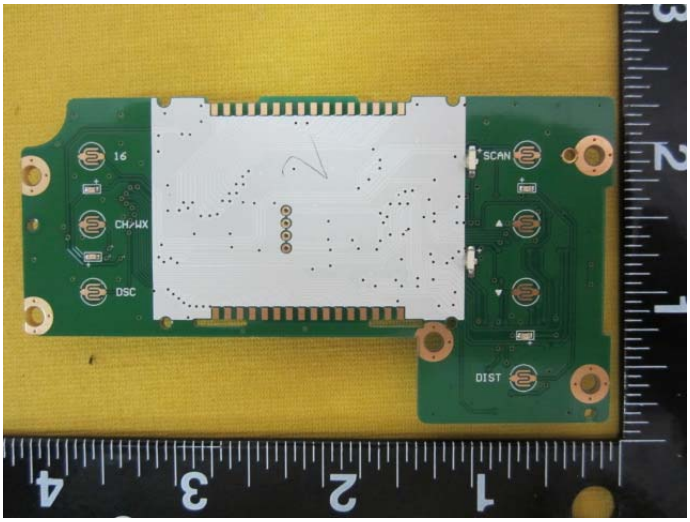



Recent
VHF MARINE RS-507M
BOSI TOOLS







--------End of Report--------