




Test Report

Product	DAB+ receiver		
Name and address of the applicant	Nasjonal kommunikasjonsmyndighet Nygård 1, Postboks 93 4791 Lillesand, Norway		
Name and address of the manufacturer	Connects2 Ltd, High Street, Princes End, Tipton, DY4 9HG. ENGLAND		
Model	SmartDAB		
Rating	12 V DC		
Trademark	SmartDAB		
Serial number	048050501021115		
Additional information	DAB+, Class E2, Automotive accessory Receiver Nkom ref. 1505303-32-649		
Tested according to	IEC 62104 Characteristics of DAB receivers		
Order number	305070		
Tested in period	2016.03.01 to 2016.03.07		
Issue date	2016.03.10		
Name and address of the testing laboratory	 Instituttveien 6 Kjeller, Norway	TEL: +47 22 96 03 30 FAX: +47 22 96 05 50	
	 Prepared by [Bjørn Nordset]	 Approved by [Frode Sveinsen]	
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1 INFORMATION

1.1 Tested Items

EUT Information	
Brand	SmartDAB
Model number	SmartDAB
Serial number	048050501021115
Antenna Connector	SMB
Bluetooth	Yes

The EUT is a Class E2 Automotive accessory Receiver and have a 50 Ω antenna connector.

The EUT supports DAB+ at VHF Band III.

The EUT has USB and other functions which have not been tested here.

A free APP (SmartDAB) was downloaded to a mobile phone which configured the EUT during the test.

1.2 Test Environment

1.2.1 Normal test condition

Temperature: 21.9 – 23.7 °C

Relative humidity: 17.5 – 41.5 %

Normal test voltage: 12 V DC

All testing has been carried out with a regulated external power supply.

The values are the limits registered during the test period.

1.3 Standards and Regulations

IEC 62104-2015: Characteristics of DAB receivers; Edition 3.0; 2015-07

1.4 Test Engineer(s)

Bjørn Nordset

1.5 Additional Information

1.5.1 Test methods

The test methods have been according to IEC 62104-2015 Edition 3.0 (2015-07).

The tested equipment have SMB 50 Ω antenna connector. All tests were tested performed at the antenna connector. All tests were performed on VHF Band III.

The tests were performed with a 96kbps DAB+ stream (gross data rate: 2.048 Mbps). Since we had no access to the bit-stream, the tests were performed by listening to the audio signal. For all tests the acoustic signal was defined as impairment free as long as the number of dropouts were less than three per ten seconds.

The Adjacent channel interferer was generated with the arbitrary generator of the BTC tester. The interferer waveform selected was "T-DMB_DAB_M1_V1_251".

1.5.2 Selection Criteria

Test performed in this report were selected by Nasjonal kommunikasjonsmyndighet.

1.5.3 Test Equipment

See list of test equipment in clause 5.

1.6 Other Comments



THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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2 TEST REPORT SUMMARY

2.1 Abbreviations

The following abbreviations are used in the test summary:

Complies The test results are inside the limits in IEC 62104
Not Compliant The test results are outside the limits in IEC 62104

2.2 Test Summary

	RF sensitivity	Maximum input level	Adjacent channel selectivity
Test result	Complies	Complies	Complies

3 TEST RESULTS

3.1 RF sensitivity

IEC 62104 clause 7.4

Measured values

Receiver	Measured minimum sensitivity (dBm)		Verdict
	Channel 11A	Channel 13F	
Measured value	-99.9	-99.8	Complies
Limit	≤ -97.7 dBm		

Comment: This test was performed on VHF Band III channels 11A and 13F.

Limit

Minimum requirement		
Type E2 receiver	-97.7 dBm or less	VHF Band III

Test equipment used:1, 2, 3, 4, 5, 6....

3.2 Maximum input power

IEC 62104 clause 7.6

Measured values

Receiver	Maximum input power (dBm)	Verdict
	Channel 11A	
Measured value	≥+15.0	Complies
Limit	≥ -10 dBm	

Comment: This test was performed on VHF Band III channel 11A only. The maximum power from the test instrument is +15 dBm.

Limit

Minimum requirement		
Type E2 receiver	≥ -10 dBm	VHF Band III

Test equipment used:1, 2, 3, 4, 5, 6....

3.3 Adjacent channel selectivity

IEC 62104 clause 7.7

Measured values

Freq. Offset (MHz)	Adjacent channel selectivity (dB)						Verdict
	-5.136	-3.428	-1.712	+1.712	+3.428	+5.136	
Measured value	53	51	46	45	50	53	Complies
Limit (dB)	≥ 45	≥ 40	≥ 35		≥ 40	≥ 45	

Comment: This test was performed on VHF Band III channel 11A only.

Limit

Minimum requirement			
Frequency offset (MHz)	± 1.712	± 3.428	± 5.136
Requirement (dB)	≥ 35	≥ 40	≥ 45

Test equipment used:1, 2, 3, 4, 5, 6....

4 Measurement Uncertainty

Measurement Uncertainty Values	
Test Item	Uncertainty
Maximum sensitivity	±1.0 dB
Maximum power level	±0.5 dB
Adjacent channel selectivity	±2.0 dB
Temperature Uncertainty	±1 °C

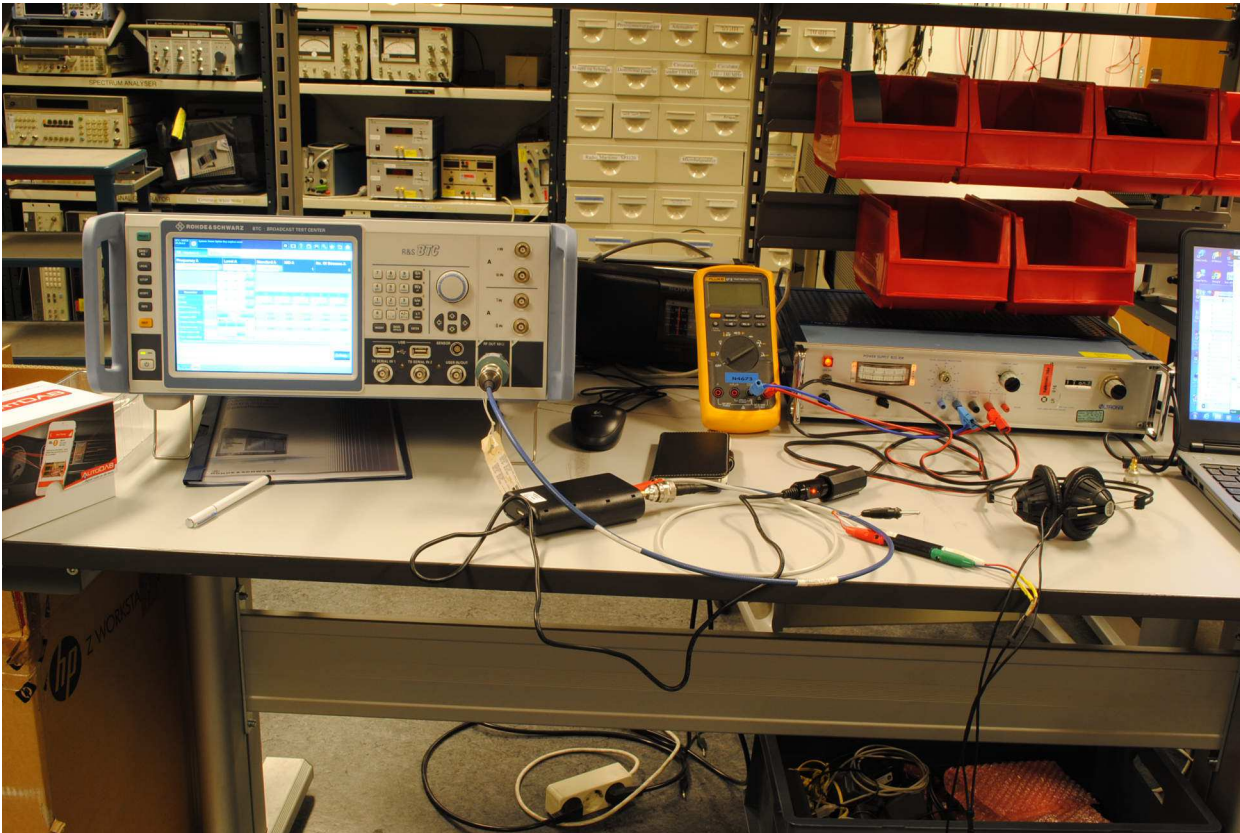
All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor $k=2$

5 Photos of the EUT



SmartDAB

6 Test Setup Photos



7 Test Equipment Used

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the testhouse.

No.	Instrument/ancillary	Type of instrument/ancillary	Manufacturer	Ref. no.	Cal Date	Cal Due
1	BTC	Broadcast Test Center	R&S	S.no.: 100138	Cal b4 use	
2	NRP-Z81	Wideband Power Sensor	R&S	LR 1644	2015-10	2016-10
3	Model 87 V	Multimeter	Fluke	LR 1597	2015-10	2016-10
4	B32-10R	Power Supply	Oltronics	LR 015	Cal b4 use	
5	Model 562	Noise Suppressor	Narda	LR 1527	Cal b4 use	
6	FSW26	Spectrum Analyzer	R&S	LR 1640	2015-11	2016-11

Revision history

Version	Date	Comment	Sign
1.0	2016.03.03	First edition	BN