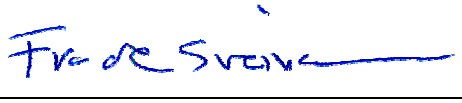
Report No. 305070-16

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 distributor	TT Micro AS www.ttmicro.no
Model	Tiny Audio C10
Rating	12 V DC
Trademark	Tiny Audio
Serial number	TA4300607
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	2016.03.10
Issue date	2016.03.11
Name and address of the testing laboratory	Nemko 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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CONTENTS

1 INFORMATION

1.1 Tested Items

EUT Information	
Brand	Tiny Audio
Model number	Tiny Audio C10
Serial number	TA4300607
Antenna Connector	SMB
Bluetooth	Yes

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

The EUT supports DAB+ at VHF Band III.

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

The EUT is designed to connect to a RDS car radio for display and audio output. A Pioneer DEH-X6800DAB car radio has been used during testing for display via the RDS function and to verify audio quality. Transmission between the DAB receiver and the car radio is via radiated FM at 88.1 MHz.

1.2 Test Environment

1.2.1 Normal test condition

Temperature:	20.8 – 22.3 °C
Relative humidity:	21.2 – 36.1 %
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 has a 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

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	-98.9	-98.4	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	+12.0	Complies
Limit	≥ -10 dBm	

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

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

	Adjacent channel selectivity (dB)						Verdict
Freq. Offset (MHz)	**-5.136**	**-3.428**	**-1.712**	**+1.712**	**+3.428**	**+5.136**	
Measured value	**53**	**51**	**44**	**45**	**52**	**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

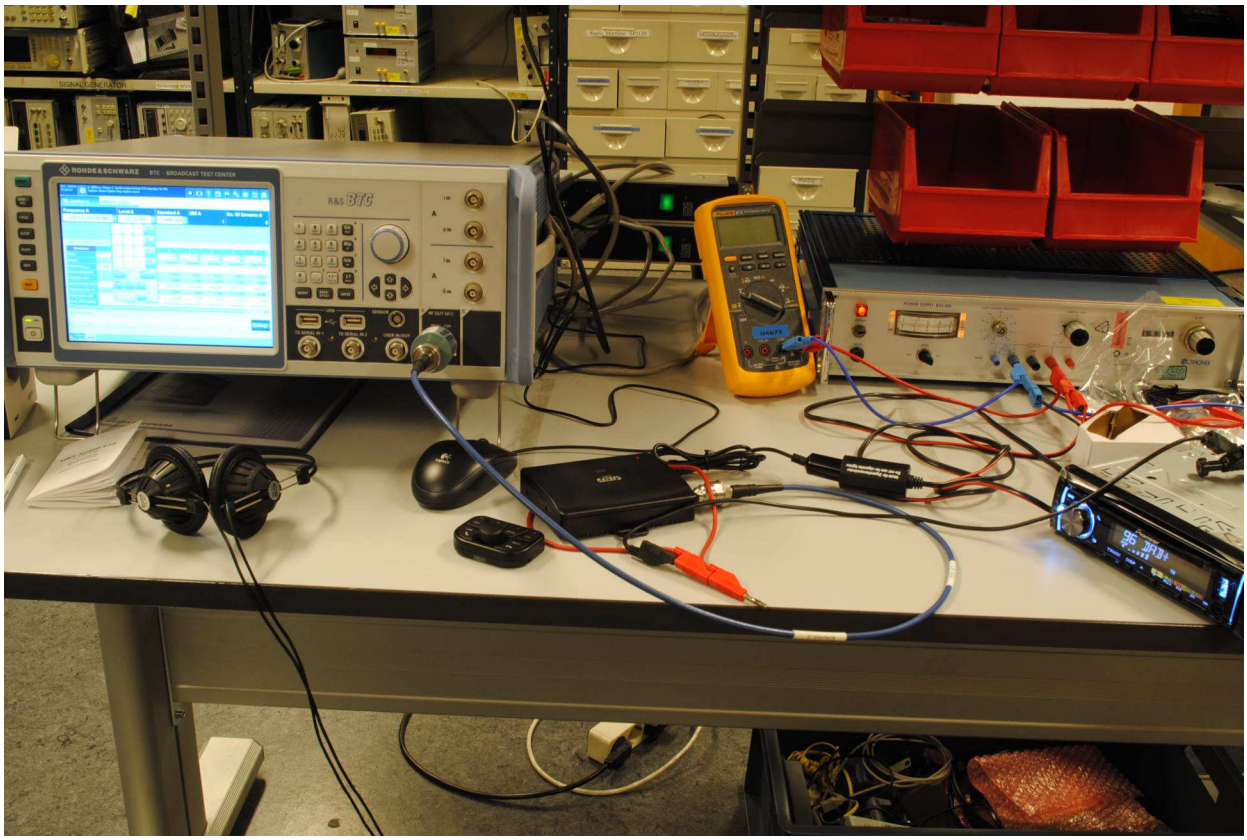
Measurement Uncertainty Values	
Test Item	**Uncertainty**
Maximum sensitivity	±1.0 dB
Maximum power level	±0.5 dB
Adjacent channel selectivity	±2.0 dB
Temperature Uncertainty	±1 °C

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

Tiny Audio C10

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	2016.03.11	First edition	BN