



TEST REPORT

Test Report No. : UL-RPT-RP10809253JD16F V2.0

Manufacturer : Aava Mobile Oy
Model No. : INARI10-LTDN-2
FCC ID : 2ABVH-INARI102
IC Certification No. : 11875A-INARI102
Test Standard(s) : FCC Parts 15.209(a) & 15.225(d)
Industry Canada RSS-Gen 6.13 & RSS-210 A2.6

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 Supersedes all previous versions

Date of Issue: 07 September 2015

Checked by:

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This laboratory is accredited by UKAS.
The tests reported herein have been
performed in accordance with its terms
of accreditation.

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1. Customer Information

Company Name:	Aava Mobile Oy
Address:	Nahkatehtaankatu 2 90130 Oulu Finland

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.225
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Radio Frequency Devices) - Section 15.225
Specification Reference:	47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) – Section 15.209
Specification Reference:	RSS Gen Issue 4, November 13, 2014
Specification Title:	General Requirements for Compliance of Radio Apparatus
Specification Reference:	RSS 210 Issue 8 December 2010
Specification Title:	Licence-exempt Radio Apparatus (All frequency Bands): Category I Equipment
Site Registration:	FCC: 209735, Industry Canada: 3245B-2
Location of Testing:	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Date:	22 August 2015

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.209(a) / 15.225(d)	RSS-Gen 6.13 / RSS-210 A2.6	Transmitter Radiated Emissions	
Key to Results  = Complied  = Did not comply			

2.3. Methods and Procedures

Reference:	ANSI C63.4-2014
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	FCC KDB Publication Number 937606 Date: 10/10/2014
Title:	Test Site Requirements for Part 15 and 18 Devices Operating Below 30 MHz

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Aava Mobile Oy
Model Name or Number:	INARI10-LTDN-2
Test Sample Serial Number:	BB44102198
Hardware Version Number:	Tablet PC: RU Wireless Module: 1.0, 1.1
Software Version Number:	Tablet PC :Windows Embedded 8.1 Industry Pro Build 9600 Wireless Module: SW19X15C_05.05.58.00
FCC ID:	2ABVH-INARI102
Industry Canada Certification Number:	11875A-INARI102

3.2. Description of EUT

The Equipment Under Test was a 10.1 inch tablet PC with cellular, WiFi, *Bluetooth*, NFC and GPS connectivity.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Tested Technology:	RFID	
Category of Equipment:	Transceiver	
Channel Spacing:	Single channel device	
Transmit Frequency Range:	13.56 MHz	
Power Supply Requirement:	Nominal	3.8 VDC Via 120 VAC 60 Hz

3.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	2 GB Micro SD Card
Brand Name:	Generic
Model Name or Number:	Not marked

Brand Name:	Delta Electronics Inc
Description:	AC/DC Adapter
Model Name or Number:	ADP-10BW B
Serial Number:	05GW441000K

Description:	USB Cable
Brand Name:	None stated
Model Name or Number:	None stated
Serial Number:	None stated

Description:	PHF
Brand Name:	None stated
Model Name or Number:	None stated
Serial Number:	None stated

Description:	Battery
Brand Name:	AAVAmobile
Model Name or Number:	AMME2415
Serial Number:	AMME2415EA16000692

Description:	Male to Male USB Cable
Brand Name:	None stated
Model Name or Number:	None stated
Serial Number:	None stated

Description:	USB Hub
Brand Name:	Belkin
Model Name or Number:	F5U404-BLK
Serial Number:	D12-0047312

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Constantly transmitting at full power with a modulated carrier in RFID test mode.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- Controlled using a bespoke application on the laptop PC supplied by the customer. The application was used to enable a continuous transmission mode and to select the test channels, data rates and modulation schemes as required.
- The application supported eight different modes. The fundamental field strength was initially checked for all modes and the combination that produced the highest levels was used for transmitter spurious emission measurements. This mode was Type B with a baud rate of 212.
- The EUT was powered by its own 3.8 VDC internal battery. The battery was connected to its own AC/DC power supply via a USB cable, the power supply was connected to 120 VAC 60 Hz supply.
- All ports were terminated during radiated emissions testing.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6: Measurement Uncertainties* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

5.2. Test Results

5.2.1. Transmitter Radiated Spurious Emissions

Test Summary:

Test Engineer:	Andrew Edwards	Test Date:	22 August 2015
Test Sample Serial Number:	BB44102198		

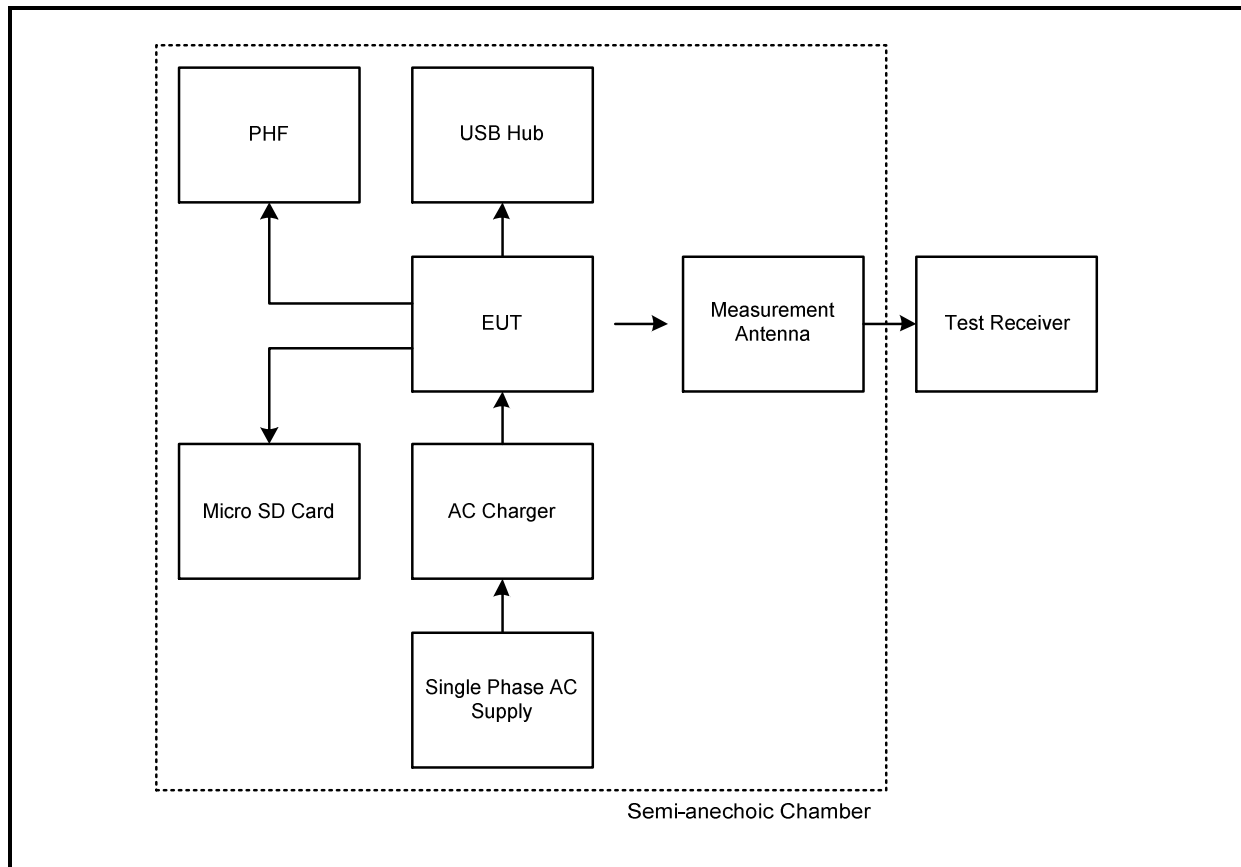
FCC Reference:	Parts 15.225(d) & 15.209(a)
Industry Canada Reference:	RSS-Gen 6.13 / RSS-210 A2.6
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5
Frequency Range:	9 kHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	41

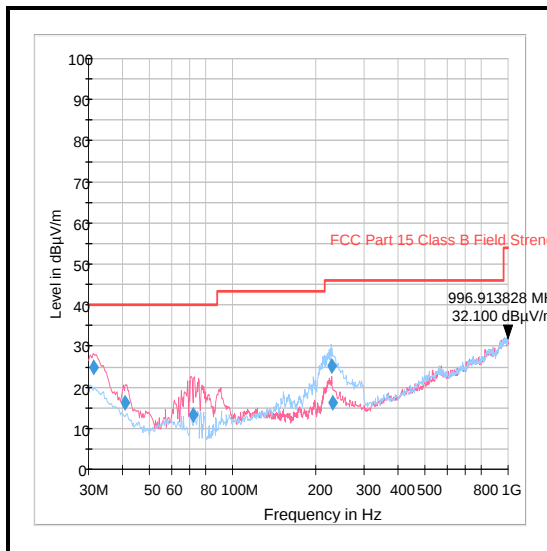
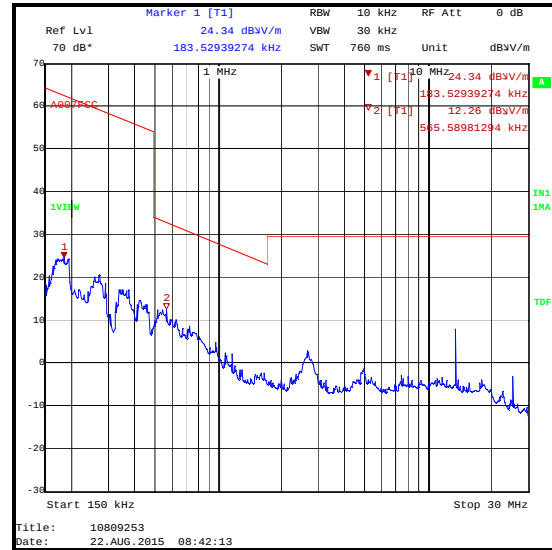
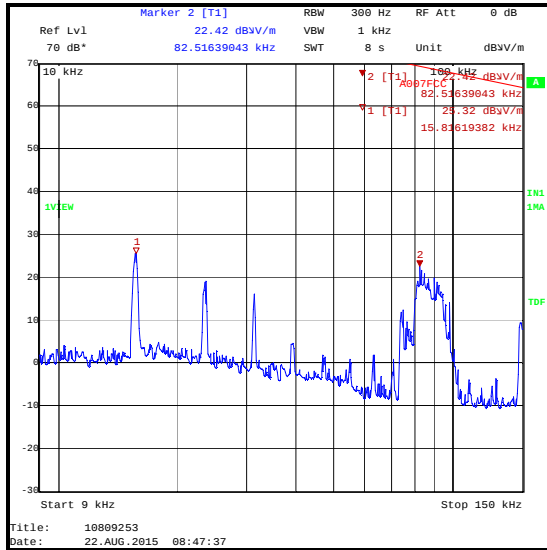
Note(s):

1. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40Db/decade).
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required. A distance extrapolation factor of 40 dB was used.
3. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss. Only spurious emissions in the range 30 MHz to 1 GHz were recorded. Markers were placed on the peaks of the pre-scan plot and final measurements were performed using a quasi-peak detector.
4. Final measurement values include corrections for antenna factor and cable losses.
5. The emission shown at approximately 13.56 MHz is the fundamental.
6. All emissions on the 9 kHz to 150 kHz plot were investigated and found to be radiating from the test site turntable.
7. All other emissions shown on the pre-scan plot were investigated and found to be >20 dB below the applicable limit or below the measurement system noise floor.
8. All measurements were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels above 30 MHz were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
9. All emissions detected below 30 MHz, were at least 20 dB below the limit or within the measurement system noise floor. Measurements at increased distances on an open field site, as per ANSI C63.10 section 6.4 or FCC KDB 937606 were therefore deemed to be unnecessary.

Transmitter Radiated Emissions (continued)**Test setup for radiated measurements: Semi-anechoic Chamber**

Transmitter Radiated Spurious Emissions (continued)**Results: Quasi Peak**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
31.468	Vertical	24.9	40.0	15.1	Complied

Transmitter Radiated Spurious Emissions (continued)

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Spurious Emissions (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1945	Thermo hygrometer	JM Handelspunkt	30.5015.01	Not stated	23 Apr 2016	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	19 Mar 2016	12
M1273	Test Receiver	Rohde & Schwarz	ESIB26	100275	19 Mar 2016	12
M1568	Magnetic Loop Antenna	Rohde & Schwarz	HFH2-Z2	879284/2	06 May 2016	12
A490	Bilog Antenna	Chase	CBL6111A	1590	30 Apr 2016	12
G0543	Amplifier	Sonoma	310N	230801	06 Nov 2015	3
A1834	Attenuator	Hewlett Packard	8491B	10444	05 Mar 2016	12

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	±3.73 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±5.65 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

7. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	-	-	Amended model number