



Prüfbericht-Nr.: <i>Test Report No.:</i>	50175099 003	Auftrags-Nr.: <i>Order No.:</i>	238112715	Seite 1 von 17 <i>Page 1 of 17</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	22-Nov-2019	
Auftraggeber: <i>Client:</i>	Microchip Technology Inc. 2355 West Chandler Blvd. Chandler, Arizona 85224-6199, United States.			
Prüfgegenstand: <i>Test item:</i>	SAM R34 Xplained Pro Evaluation Kit			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	A09-3167			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C / ISED RSS-247 Test report (LoRa)			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.247(DTS) ISED RSS-247 ISSUE 2 FEB 2017			
Wareneingangsdatum: <i>Date of receipt:</i>	05-Jul-2018			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000769530-001			
Prüfzeitraum: <i>Testing period:</i>	06-Dec-2019 – 31-Jan-2020			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Laboratory Taipei			
Prüflaboratorium: <i>Testing laboratory:</i>	TUV Rheinland Taiwan Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
Report date / tested by:		kontrolliert von / reviewed by:		
				
06-Feb-2020 Jack Chang / Project Manager		06-Feb-2020 Ryan W. T. Chen / Project Manager		
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>
				Unterschrift <i>Signature</i>
Sonstiges / Other: RSE test for additional antenna as RFA-ZW-C55-B70-D034, the antenna gain is 2dBi. 50175101 003 test report has added radiated spurious emission test data as below 1GHz.				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend
	5 = mangelhaft	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)
	N/A = nicht anwendbar	N/T = nicht getestet		
Legend:	1 = very good	2 = good	3 = satisfactory	4 = sufficient
	5 = poor	P(ass) = passed a.m. test specification(s)		F(ail) = failed a.m. test specification(s)
	N/A = not applicable	N/T = not tested		
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

TEST SUMMARY

4.5.1 SPURIOUS EMISSION

RESULT: Passed

Contents

1.	GENERAL REMARKS	4
1.1	COMPLEMENTARY MATERIALS.....	4
2.	TEST SITES	5
2.1	TEST LABORATORY	5
2.2	TEST FACILITY.....	5
2.3	LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	6
2.4	TRACEABILITY	7
2.5	CALIBRATION	7
2.6	MEASUREMENT UNCERTAINTY.....	7
3.	GENERAL PRODUCT INFORMATION.....	8
3.1	PRODUCT FUNCTION AND INTENDED USE	8
3.2	FOR DETAILS REFER TO THE USER GUIDE, DATA SHEET AND CIRCUIT DIAGRAMSYSTEM DETAILS AND RATINGS.....	8
3.3	INDEPENDENT OPERATION MODES.....	9
3.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS	9
3.5	SUBMITTED DOCUMENTS.....	9
4.	TEST SET-UP AND OPERATION MODES.....	10
4.1	PRINCIPLE OF CONFIGURATION SELECTION	10
4.2	TEST OPERATION AND TEST SOFTWARE.....	10
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	10
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....	11
4.5	TEST SETUP DIAGRAM	11
4.5.1	<i>Spurious Emission</i>	13
5.	PHOTOGRAPHS OF THE TEST SETUP	14
6.	LIST OF TABLES	17
7.	LIST OF PHOTOGRAPHS.....	17

1. General Remarks

1.1 Complementary Materials

The following attachments are integral parts of this test report:

Appendix P: Photo Documentation internal view
(File Name: 50175099 003 APPENDIX P)

Appendix D: Test Result of Radiated Emissions
(File Name: 50175099 003 APPENDIX D)

Test Specifications

The following standards were applied.

Table 1: Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.247 FCC 47CFR Part 2: Subpart J Section 2.1091 ISED RSS-247 Issue 2 (Feb 2017) ISED RSS-102 Issue 5 ISED RSS-Gen, Issue 5, April 2018 ANSI C63.10:2013 KDB558074 D01 DTS Meas Guidance v05 KDB447498 D01 General RF Exposure Guidance v06

2. Test Sites

2.1 Test Laboratory

TUV Rheinland Taiwan Ltd.

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

TUV Rheinland Taiwan Ltd.

No. 458-18, Sec 2, Fenliao., Linkou Dist.
New Taipei City 244
Taiwan (R.O.C.)

FCC Registration No.: 226631
IC Canada Registration No.: 25563
TAF Accredited NCC Test Lab. No.:3567
TAF ISO17025 Certification effective period: 6th-May-2019 to 05th-May-2022



Testing Laboratory
3567

2.3 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESR7	102109	2019/4/17	2020/4/16
Spectrum Analyzer	R&S	FSV40	101509	2019/2/4	2020/2/4
Pre-Amplifier	Agilent	8447D	2727A05146	2019/2/22	2020/2/22
Pre-Amplifier	EMCI	EMC051845SE	980635	2019/2/25	2020/2/25
Pre-Amplifier	EMCI	EMC184045SE	980656	2019/2/23	2020/2/23
*Bilog Antenna	SCHWARZBECK	VULB-9168	00950	2020/1/20	2021/1/19
Horn Antenna	ETS-Lindgren	3117	00218929	2019/11/27	2020/11/26
Horn Antenna	SCHWARZBECK	BBHA 9170	00890	2019/4/12	2020/4/11
*Loop Antenna	EMCI	LPA600	287	2019/12/20	2020/12/19
Test Software	Audix	e3	Ver. 9	N/A	N/A
Test Cable	HUBER+SUHNER	SUCOFLEX 104EA	800057/4EA	2019/4/11	2020/4/10
Test Cable	HUBER+SUHNER	SUCOFLEX 104	802244/4	2019/4/11	2020/4/10
Test Cable	HUBER+SUHNER	SUCOFLEX 104	MY37203/4	2019/4/11	2020/4/10
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA	800897/2EA	2019/4/11	2020/4/10
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA	800902/2EA	2019/4/11	2020/4/10
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA	801026/2EA	2019/4/11	2020/4/10

Note: VULB-9168 of Bilog antenna and LPA600 of Loop antenna are use for radiate spurious emission test and the test date is 30-Jan-2020 to 31-Jan-2020.

2.4 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.5 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular schedule using in house standards or comparisons.

2.6 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements .

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 0.1 ppm
RF power, conducted	± 1.5 dB
RF power density, conducted	± 3 dB
spurious emissions, conducted	± 3 dB
all emissions, radiated	± 6 dB
Temperature	± 1 °C
Humidity	± 5 %
DC and low frequency voltages	±3 %

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Low power transceiver LoRa Technology Evaluation Kit. The Evaluation Kit has RF Shield and SMA connector for External Antenna.

3.2 For details refer to the User Guide, Data Sheet and Circuit Diagram System Details and Ratings

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	SAM R34 Xplained Pro Evaluation Kit
Type Identification	A09-3167
FCC ID	2ADHKA093167
Canada ID	20266-093167
Canada HVIN	A09-3167

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	903 MHz to 927.5MHz
Channel number	8+8
Operation Voltage	5Vdc through USB port
Modulation	LoRa
Antenna gain	2 dBi

3.3 Independent Operation Modes

Basic operation modes are:

- A. Transmitting
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- B. Receiving
- C. Standby
- D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Technical Description
- Rating Label

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: Test samples are provided with a USB interface which makes it possible to control them through a test software installed on a notebook computer.

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed in section 3.3 as appropriate.

The samples were used as follows:

Radiation: A000769530-001

Full test was applied on all test modes, but only worst case was shown

Test Software	fcc_red.py
Power setting	20
Spreading Factor	12

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

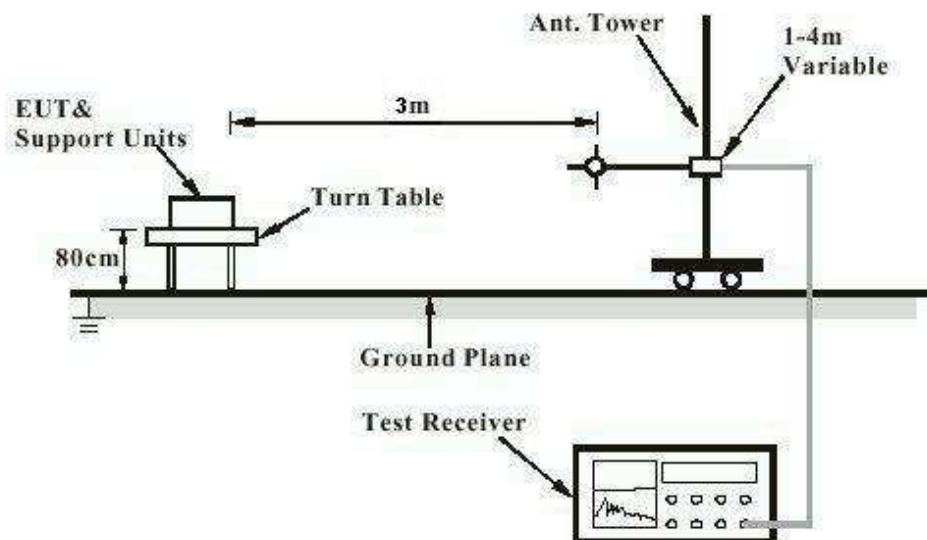
Description	Manufacturer	Model No.	Serial No.
Notebook(EMC-06)	Lenovo	TP00048A	PB-0F8B2

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

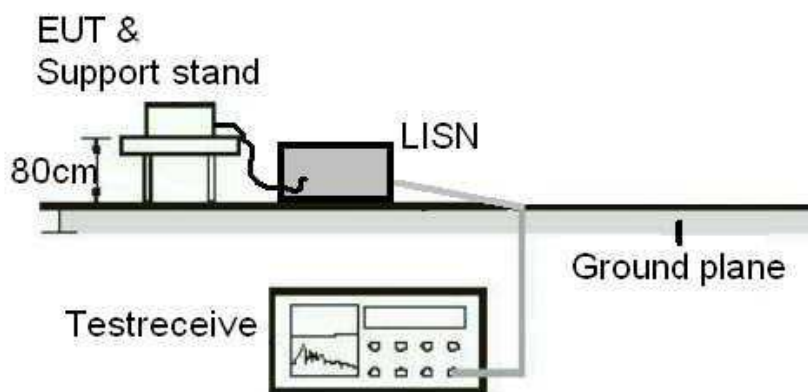
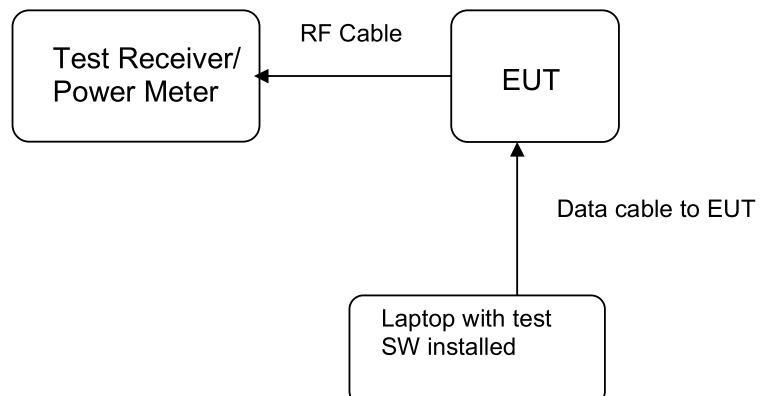


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



4.5.1 Spurious Emission

RESULT:**Passed**

Test standard	:	FCC part 15.247(d), FCC 15.205, FCC 15.209 and ISED RSS-Gen 8.9
Basic standard	:	ANSI C63.10: 2013
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and ISED RSS-Gen i5, 8.10 (Table 7), must comply with the radiated emission limits specified in FCC 15.209(a) and ISED RSS-Gen 5, 8.9 (Table 5 and 6). Emission radiated outside the restricted and authorized frequency bands must either comply with the radiated emission limits specified for the restricted bands or in FCC15.247(d) and ISED RSS-247 i2, 5.5
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A, B
Ambient temperature	:	20-24 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

For details refer to Appendix D.

The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Axis orientation is recorded in this test report.

5. Photographs of the Test Setup

Photograph 1: Set-up for Spurious Emission (Front View 1)



Photograph 2: Set-up for Spurious Emissions (Front View 2)



Photograph 3: Set-up for Spurious Emissions (Back View 1)



Photograph 4: Set-up for Spurious Emissions (Back View 2)



Photograph 5: Set-up for Spurious Emissions (Back View 3)



6. List of Tables

Table 1: Applied Standard and Test Levels	4
Table 2: List of Test and Measurement Equipment	6
Table 3: Emission Measurement Uncertainty.....	7
Table 4: Basic Information of EUT	8
Table 5: Technical Specification of EUT	8

7. List of Photographs

Photograph 1: Set-up for Spurious Emission (Front View 1)	14
Photograph 2: Set-up for Spurious Emissions (Front View 2).....	14
Photograph 3: Set-up for Spurious Emissions (Back View 1).....	15
Photograph 4: Set-up for Spurious Emissions (Back View 2).....	15
Photograph 5: Set-up for Spurious Emissions (Back View 3).....	16