



Module Integration Report on  
Brand: Particle  
Model: E402D  
HW: V1.00  
SW: V0.8.0  
Module Brand: u-blox  
Module Model: SARA-R410M-02B  
Module HW: 306A05  
Module SW: L0.0.00.00.05.06  
SVN: 02

**Report Reference:** Project NO: 181128C03  
Report NO: GC181128C03

**Date:** January 08, 2019

### Test Laboratory:

#### Bureau Veritas ADT

Hwa Ya Lab & Head Office

No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil, Kwei Shan Dist, Taoyuan, 33383, Taiwan (R.O.C)



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**1 Administrative Data**

**1.1 Project Data**

*Project Responsible:* Han Shih  
*Date Of Test Report:* 2019/01/08  
*Date of first test:* 2018/11/29  
*Date of last test:* 2018/12/14

**1.2 Applicant Data**

*Company Name:* Particle Industries, Inc  
*Street:* 126 Post St, 4th floor, San Francisco, CA 94108 USA  
*Contact Person:* Zach Supalla  
*Phone:* 415-660-6095  
*E-Mail:* zach@particle.io

**1.3 Test Laboratory Data**

The following list shows all places and laboratories involved for test result generation:

**Bureau Veritas ADT**

*Company Name :* Bureau Veritas Consumer Products Services (H.K.) Ltd.,  
Taoyuan Branch  
*Street :* Mobile Communications Laboratory  
No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil,  
Kwei Shan Dist.,  
*City :* 33383 Taoyuan  
*Country :* Taiwan (R.O.C)  
*Contact Person :* Mr. Elvis Chen  
*Phone :* 886-3-318-3232 ext. 1918  
*Fax :* 886-3-211-5834  
*E Mail :* elvis.chen@tw.bureauveritas.com

**Laboratory Details**

Lab ID	Identification	Responsible	Accreditation Info
Lab 1	TP001 - IOP Environment	Eric SW Chiu	TAF Accreditation No.: 2770
Lab 2	TP092 - Protocol - R&S CMW500	Peace Lin	TAF Accreditation No.: 2770
Lab 3	TP118 - COMPRION UT3 Platform	Cara Huang	TAF Accreditation No.: 2770

**1.4 Signature of the Testing Responsible**

Nilson She  
responsible for tests performed in: Lab 1, Lab 2, Lab 3



## 2 Test Object Data

### 2.1 General OUT Description

The following section lists all OUTs (Object's Under Test) involved during testing.

#### OUT: E402D

<i>Type / Model / Family:</i>	Brand: Particle Model: E402D HW: V1.00 SW: V0.8.0 Module Brand: u-blox Module Model: SARA-R410M-02B Module HW: 306A05 Module SW: L0.0.00.00.05.06
<b>Manufacturer:</b>	
<i>Company Name:</i>	Particle Industries,Inc
<i>Street:</i>	126 Post St,4th floor, San Francisco,CA 94108 USA
<i>Contact Person:</i>	Frank Yang
<i>Phone:</i>	13590495425
<i>E-Mail:</i>	frank@particle.io

### 2.2 Detailed Description of OUT Samples

#### Sample : EUT 01

<i>OUT Identifier</i>	E402D		
<i>Sample Description</i>			
<i>HW Status</i>	306A05		
<i>SW Status</i>	L0.0.00.00.05.06		
<i>Low Voltage</i>	3.6 V	<i>Low Temp.</i>	-10 °C
<i>High Voltage</i>	4.4 V	<i>High Temp.</i>	55 °C
<i>Nominal Voltage</i>	4.1 V	<i>Normal Temp.</i>	25 °C

#### Parameter List:

<u>Parameter Description</u>	<u>Value</u>
<b>Parameter for Scope LTE_v1</b>	
IMEISV	3527530902046802
Official IMEI	352753090204684
<b>Parameter for Scope UTRA_v2</b>	
Official IMEI	352753090204684



### 2.3 OUT Features

**Features for OUT: E402D**

<i>Designation</i>	<i>Description</i>	<i>Allowed Values</i>	<i>Supported Value(s)</i>
<b>Features for scope: LTE_v1</b>			
36521_A.4.	E-UTRA FDD		
1-1/1			
36521_A.4.	Frequency band: 1850-1910, 1930-1990 MHz		
3-3/2			
36521_A.4.	Frequency band: 1710-1785, 1805-1880 MHz		
3-3/3			
36521_A.4.	Frequency band: 1710-1755, 2110-2155 MHz		
3-3/4			
36521_A.4.	Frequency band: 824-849, 869-894 MHz		
3-3/5			
36521_A.4.	Frequency band: 698-716, 729-746 MHz		
3-3/12			
36521_A.4.	Frequency band: 777-787, 746-756 MHz		
3-3/13			
36521_A.4.	Frequency band: 703-748, 758-803 MHz		
3-3/28			
36523_A.4.	E-UTRA FDD		
1-1/1			
36523_A.4.	Frequency band: 1710-1755, 2110-2155 MHz		
3.1-1/4			
R	recommended - the test case is recommended		
<b>Features for scope: UTRA_v2</b>			
102230_A.	Class B		
1/4			
102230_A.	Class C		
1/5			
R	recommended - the test case is recommended		

### 2.4 Setups used for Testing

For each setup a relation is given to determine if and which samples and auxiliary equipment is used. The left side list all OUT samples and the right side lists all auxiliary equipment for the given setup.

<i>Setup No.</i>	<i>List of OUT samples</i>	<i>List of auxiliary equipment</i>
<i>Sample No.</i>	<i>Sample Description</i>	<i>AE No. AE Description</i>

**01.01.01 (HW: 306A05  
SW: LO.0.00.00.05.06)**

*Sample:* EUT 01



### 3 Results

#### 3.1 General

**Documentation of tested devices:**

Available at the test laboratory.

**Interpretation of the test results:**

The results of the inspection are described on the following pages, where 'Conformity' or 'Passed' means that the certification criteria were verified and that the tested device is conform to the applied standard.

In cases where 'Declaration' is printed, the required documents are available in the manufacturers product documentation.

In cases where 'not applicable' is printed, the test case requirements are not relevant to the specific equipment implementation.

**Note:**

1.Uncertainty for each test case and measurement were calculated implemented according to test equipment uncertainty document.

2.Test condition not required due to no practical connection made to the power supply, and then normal condition performed with standard battery. The standard battery would be measured prior to testing, and make sure the battery voltage was at full charge condition.

#### 3.2 List of the Applicable Body

(Body for Scope: LTE\_v1)

<i>Designation</i>	<i>Description</i>
NAPRD.03 v5.34 bis	Official PTCRB NAPRD.03 v5.34

(Body for Scope: UTRA\_v2)

<i>Designation</i>	<i>Description</i>
NAPRD.03 v5.34 bis	Official PTCRB NAPRD.03 v5.34



### 3.3 List of Test Specification

*Test Specification:* **3GPP TS 36.124**  
*Date / Version* 2018/04/05 Version: V15.2.0  
*Title:* Technical Specification  
3rd Generation Partnership Project;  
Technical Specification Group Radio Access Network;  
Evolved Universal Terrestrial Radio Access (E-UTRA);  
ElectroMagnetic Compatibility (EMC) requirements  
for mobile terminals and ancillary equipment  
(Release 15)

*Test Specification:* **3GPP TS 36.523-1**  
*Date / Version* 2018/06/26 Version: V15.2.0  
*Title:* 3rd Generation Partnership Project;  
Technical Specification Group Radio Access Network;  
Evolved Universal Terrestrial Radio Access (E-UTRA)  
and Evolved Packet Core (EPC);  
User Equipment (UE) conformance specification;  
Part 1: Protocol conformance specification  
(Release 15)

*Test Specification:* **ETSI TS 102 230-1**  
*Date / Version* 2016/06/01 Version: V11.0.0  
*Title:* Smart Cards;  
UICC-Terminal interface;  
Physical, electrical and logical test specification;  
Part 1: Terminal features (Release 11)



#### 4 Test Equipment Details

##### 4.1 List of Used Test Equipment

The calibration, hardware and software states are shown for the testing period.

###### Test Equipment CMW500

**Lab ID:** Lab 2  
**Manufacturer:** ROHDE & SCHWARZ GmbH & Co.KG  
**Description:** CMW500  
**Type:** CMW500

###### Single Devices for CMW500

Single Device Name	Type	Serial Number	Manufacturer	
CMW CONTROLLER	CMWC	101407	R&S	
RF COMBINER	CMW-Z24	101815	R&S	
Wideband Radio communication tester	CMW500	159168	R&S	
			<i>Calibration Details</i>	<i>Last Execution</i> <i>Next Exec.</i>
			Calibration	2018/10/25    2019/10/25
Wideband Radio communication tester	CMW500	159169	R&S	
			<i>Calibration Details</i>	<i>Last Execution</i> <i>Next Exec.</i>
			Calibration	2018/10/24    2019/10/24

###### Test Equipment RSE Test System 1

**Lab ID:** Lab 1  
**Manufacturer:** Bureau Veritas ADT  
**Description:** RSE Test System 1  
**Type:** RSE Test System  
**Serial Number:** n/a

###### Single Devices for RSE Test System 1

Single Device Name	Type	Serial Number	Manufacturer	
18GHz ~ 40GHz Amplifier	EMC 184045	980116		
ADT_Radiated_V7.6.1 5.9.3	ADT_Radiated	n/a	Bureau Veritas ADT	
			<i>HW/SW Status</i>	<i>Date of Start</i> <i>Date of End</i>
			SW: V7.6.15.9.3	2010/02/01
Antenna Tower	MA 4000	MA 4000/012/615030 3/L	Inn-co GmbH	
BILOG Antenna	VULB 9168	9168-158	SCHWARZBECK	
			<i>Calibration Details</i>	<i>Last Execution</i> <i>Next Exec.</i>
			Calibration	2017/12/11    2018/12/11
Controller	SI-300	130009	TDK RF.	
HORN Antenna	3117	00034126	ETS	
			<i>Calibration Details</i>	<i>Last Execution</i> <i>Next Exec.</i>
			Calibration	2017/11/30    2018/11/30
HORN Antenna	BBHA 9170	BBHA9170243	SCHWARZBECK	
			<i>Calibration Details</i>	<i>Last Execution</i> <i>Next Exec.</i>
			Calibration	2017/12/14    2018/12/14



**Single Devices for RSE Test System 1 (continued)**

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>	
Preamplifier	8447D	2944A10738	Agilent Technologies	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Calibration		2018/08/21	2019/08/21
Preamplifier	8449B	3008A01963	Agilent Technologies	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Calibration		2018/08/21	2019/08/21
Spectrum Analyzer	E4446A	MY51100039	Agilent Technologies	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Calibration		2018/09/10	2019/09/10
Splitters/Combiners	ZN2PD-9G		Mini-Circuits	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Calibration		2018/06/21	2020/06/21
Turn Table		SN40303		

**Test Equipment UT3**

**Lab ID:** Lab 3  
**Manufacturer:** COMPRION  
**Description:** COMPRION UT3 Platform  
**Type:** UT3  
**Serial Number:** 40070-45013

**Single Devices for UT3**

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>	
UT3 Analog Probe	APR-TT	45013	COMPRION	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Calibration		2018/06/13	2019/06/13
	<i>HW/SW Status</i>		<i>Date of Start</i>	<i>Date of End</i>
	HW: 3.0		2016/11/16	
UT3 APR	UT3 APR	40070	COMPRION	
	<i>HW/SW Status</i>		<i>Date of Start</i>	<i>Date of End</i>
	HW: 3.0		2017/10/20	
	HCI Monitoring: 1.6 SWP Monitoring: 1.8 Device Test Center: R 7.4.6473.20589			

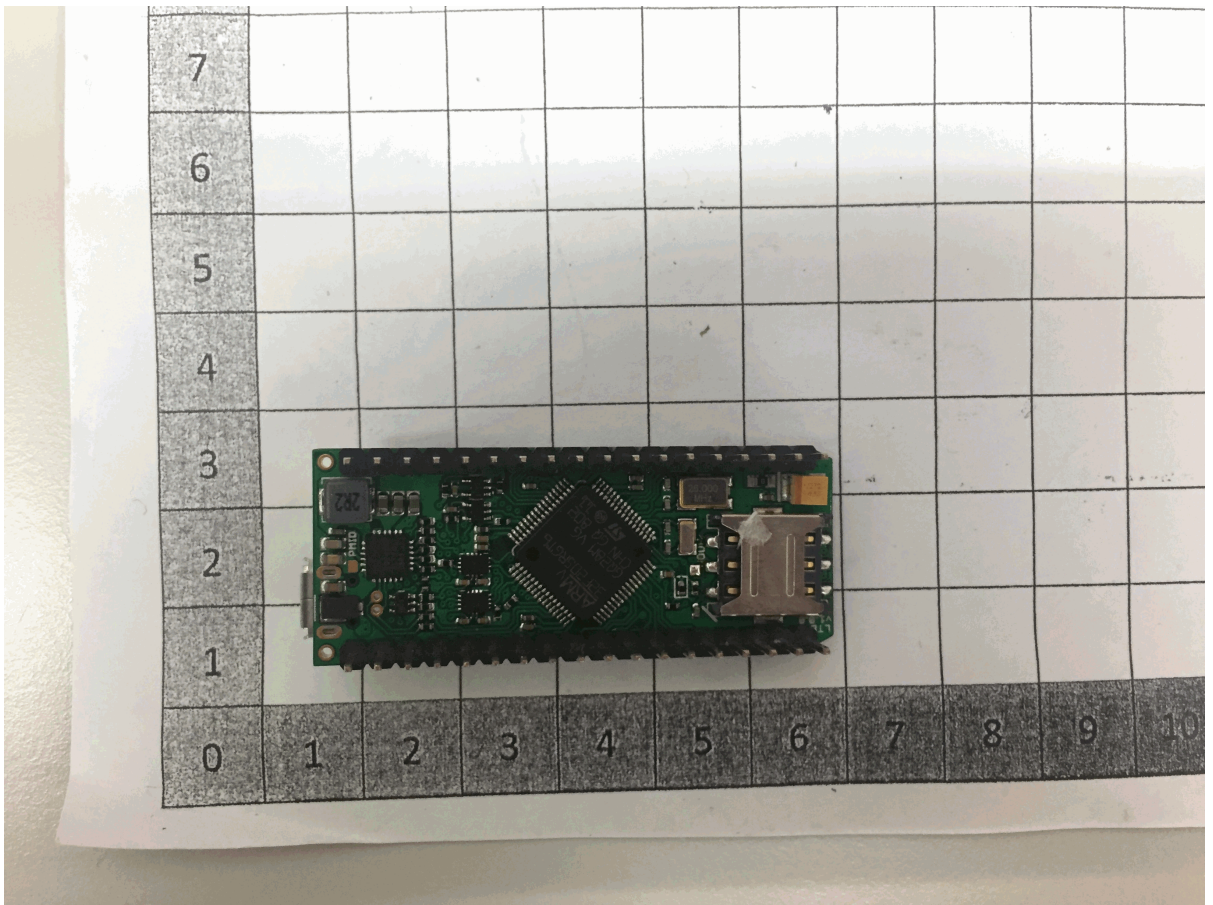


## 5 Annex

### 5.1 Additional Information for Sample Description



Photographs for the EUT  
1. Front View of the EUT



Photographs for the EUT  
2.Rear View of the EUT

## 5.2 Additional Information for TestResult

Test Case	Description	Test_Spec	Category	Band	Verdict	Sample	TP
5.1.1	Phase preceding Terminal power on	ETSI TS 102 230	A	Single	Passed	01.01.01	118
5.1.2.2	Phase during UICC power on: 1,8 V - 3 V	ETSI TS 102 230	A	Single	Passed	01.01.01	118
5.1.3.2	Phase during Terminal power off: 1,8 V - 3 V	ETSI TS 102 230	A	Single	Passed	01.01.01	118
5.1.5.3	Reaction of 1,8 V technology Terminals on type recognition of 1,8 V technology UICCs	ETSI TS 102 230	A	Single	Passed	01.01.01	118
5.1.5.4	Reaction of 1,8 V technology Terminals on type recognition of 3V technology UICCs	ETSI TS 102 230	A	Single	Passed	01.01.01	118
5.1.5.6	Reaction of a Terminals receiving no ATR	ETSI TS 102 230	A	Single	Passed	01.01.01	118
5.2.2.3	Electrical tests on contact C1, Test 1: 1,8 V - 3 V	ETSI TS 102 230	A	Single	Passed	01.01.01	118
5.2.2.4	Electrical tests on contact C1, Test 2: 1,8 V - 3 V	ETSI TS 102 230	A	Single	Passed	01.01.01	118
5.2.3.2	Electrical tests on contact C2: 1,8 V - 3 V	ETSI TS 102 230	A	Single	Passed	01.01.01	118
5.2.4.2	Electrical tests on contact C3: 1,8 V - 3 V	ETSI TS 102 230	A	Single	Passed	01.01.01	118
5.2.5.3	Electrical tests on contact C7, Test 1: 1,8 V - 3 V	ETSI TS 102 230	A	Single	Passed	01.01.01	118
8.2; Frequency Band = FDD2	Radiated spurious emissions, MS allocated a channel	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD2	Radiated spurious emissions, MS in idle mode	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD3	Radiated spurious emissions, MS allocated a channel	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD3	Radiated spurious emissions, MS in idle mode	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD4	Radiated spurious emissions, MS allocated a channel	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD4	Radiated spurious emissions, MS in idle mode	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD5	Radiated spurious emissions, MS allocated a channel	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD5	Radiated spurious emissions, MS in idle mode	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD12	Radiated spurious emissions, MS allocated a channel	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD12	Radiated spurious emissions, MS in idle mode	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD13	Radiated spurious emissions, MS allocated a channel	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD13	Radiated spurious emissions, MS in idle mode	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD28	Radiated spurious emissions, MS allocated a channel	36.124	A	Single	Passed	01.01.01	1
8.2; Frequency Band = FDD28	Radiated spurious emissions, MS in idle mode	36.124	A	Single	Passed	01.01.01	1
9.1.4.2; Frequency Band = FDD4	Identification procedure / IMEI / IMEISV requested	36.523-1	A	Single	Passed	01.01.01	92



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