MEASUREMENT REPORT

FCC ID:	2BAHBINTSHMDV20EC25
Applicant:	Intangles Lab Private Limited
Product:	System Health Monitoring Device
Model No.:	INT-SHMD-V2.0I-EC25AU; INT-SHMD-V2.0E-EC25AU
Brand Name:	INTANGLES
FCC Rule Part(s):	Part 2, 22 (H)
Result:	Complies
Received Date:	2023-04-18
Test Date:	2023-04-21 ~ 2023-05-06

Reviewed By: Sunny Sun

Approved By: Robin Wu

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.26-2015. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
2304RSU037-U2	Rev. 01	Initial Report	2023-05-22	Valid

CONTENTS

1. General Information

1.1. Applicant

Intangles Lab Private Limited

Orville Business Port,9th Floor, Terminal 2 Airport Road, Viman Nagar, Pune, Maharashtra – 411014

1.2. Manufacturer

Intangles Lab Private Limited

Orville Business Port,9th Floor, Terminal 2 Airport Road, Viman Nagar, Pune, Maharashtra – 411014

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**				
	Laboratory Location (Suzhou - Wuzhong)				
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China				
	Laboratory Location (Suzhou - SIP)				
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
	Laboratory Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☐	**Test Site – MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen)				
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**Test Site – MRT Taiwan Laboratory**				
	Laboratory Location (Taiwan)				
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name:	System Health Monitoring Device
Model No.:	INT-SHMD-V2.0I-EC25AU; INT-SHMD-V2.0E-EC25AU
Brand Name:	INTANGLES
IMEI:	866989056995662, 866989056996850;
WLAN Specification	802.11 b/g/n
Bluetooth Specification	V5.2
GNSS Specification	GPS/GLONASS/BDS/Galileo/SBAS
3GPP Specification	WCDMA Band I/V/VIII LTE Band 1/3/5/7/8/28/40
Operating Temperature:	-40 ~ 85°C
Supply Voltage:	8 ~ 32Vdc
Integrated Modular Information	
Cellular Modular Information	Model Number: EC25-AU FCC ID: XMR201805EC25AU
Wi-Fi & BT Modular Information	Model Number: FC41D FCC ID: XMR20211108FC41D
GNSS Modular Information	Model Number: LC86G Brand Name: QUECTEL

Remark:

1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.
2. This device is based on the certification modular to assess the radiated spurious emission.
3. The model “INT-SHMD-V2.0I-EC25AU” is the internal cellular antenna unit, the model “INT-SHMD-V2.0E-EC25AU” is the external cellular antenna unit, all the other circuits are the same.

1.5. Radio Specification Under Testing

WCDMA Specification	
TX Frequency Range:	Band V: 824 ~ 849 MHz
RX Frequency Range:	Band V: 869 ~ 894 MHz
Modulation	QPSK
Category	HSDPA: 24; HSUPA: 6
E-UTRA Specification	
TX Frequency Range:	Band 5: 824 ~ 849 MHz
RX Frequency Range:	Band 5: 869 ~ 894 MHz
Modulation	QPSK, 16QAM
Category	4

1.6. Description of Available Antennas

Technology	Frequency Range (MHz)	INT-SHMD-V2.0I-EC25AU		INT-SHMD-V2.0E-EC25AU	
		Antenna Type	Max Peak Gain (dBi)	Antenna Type	Max Peak Gain (dBi)
WCDMA Band V LTE Band 5	824 ~ 849	FPC	-4.12	Glue Stick	2.78

Note 1: All antenna information (Antenna type and Peak Gain) is provided by the manufacturer.

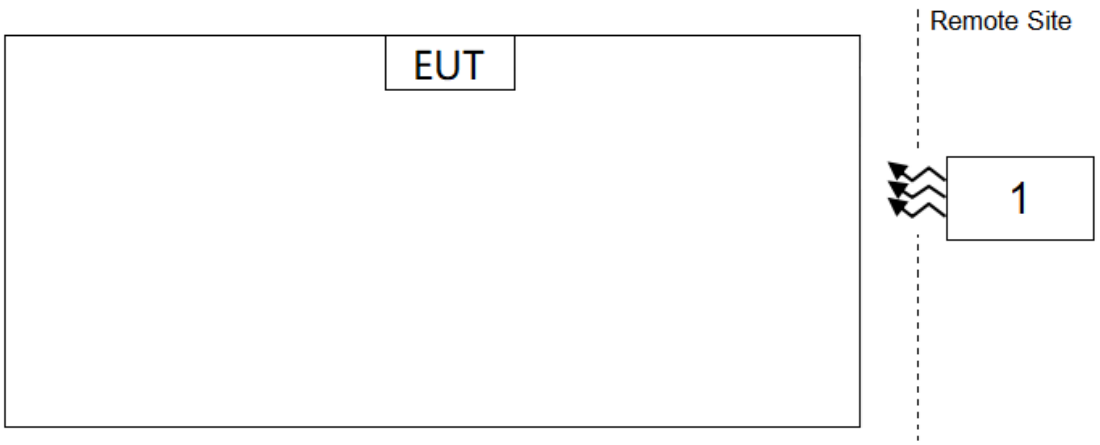
1.7. Test Methodology

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26: 2015
- FCC CFR 47 Part 2, Part 22,
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems

2. Test Configuration

2.1. Test System Connection Diagram



Product		Manufacturer	Model No.
1	Wideband Radio Communication Tester	R&S	CMW 500

2.2. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20% ~ 75%RH

3. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2023-05-20	WZ-AC2
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2023-06-04	WZ-AC2
Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2023-11-27	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2023-10-13	WZ-AC2
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2024-05-06	WZ-AC2
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2024-04-20	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11038	1 year	2023-11-01	WZ-AC2

Software	Version	Function
EMI V3	V 3.0.0	EMI Test Software
Controller_MF 7802	1.02	RE Antenna & Turntable

4. Decision Rules and Measurement Uncertainty

4.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Radiated Spurious Emissions
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Horizontal: 9kHz ~ 300MHz: 5.04dB 300MHz ~ 1GHz: 4.95dB 1GHz ~ 40GHz: 6.40dB Vertical: 9kHz ~ 300MHz: 5.24dB 300MHz ~ 1GHz: 6.03dB 1GHz ~ 40GHz: 6.40dB

5. Test Result

5.1. Summary

FCC Part Section(s)	Test Description	Test Condition	Test Result
2.1053, 22.917(a)	Spurious Emissions	Radiated	Pass

Notes:

1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
2) Radiated Spurious Emission were presented the worst-case in the test report.
3) For radiated emission tests, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.

5.2. Radiated Spurious Emissions Measurement

5.2.1. Test Limit

The power of any emission outside of theauthorized operating frequency ranges must be attenuated below the transmitting power (P) by a factorof at least 43 + 10 log(P) dB. The emission limit equal to -13dBm.

E (dBμV/m) = EIRP (dBm) - 20 log D + 104.8; where D is the measurement distance in meters. The emission limit equal to 82.3dBμV/m.

5.2.2. Test Procedure

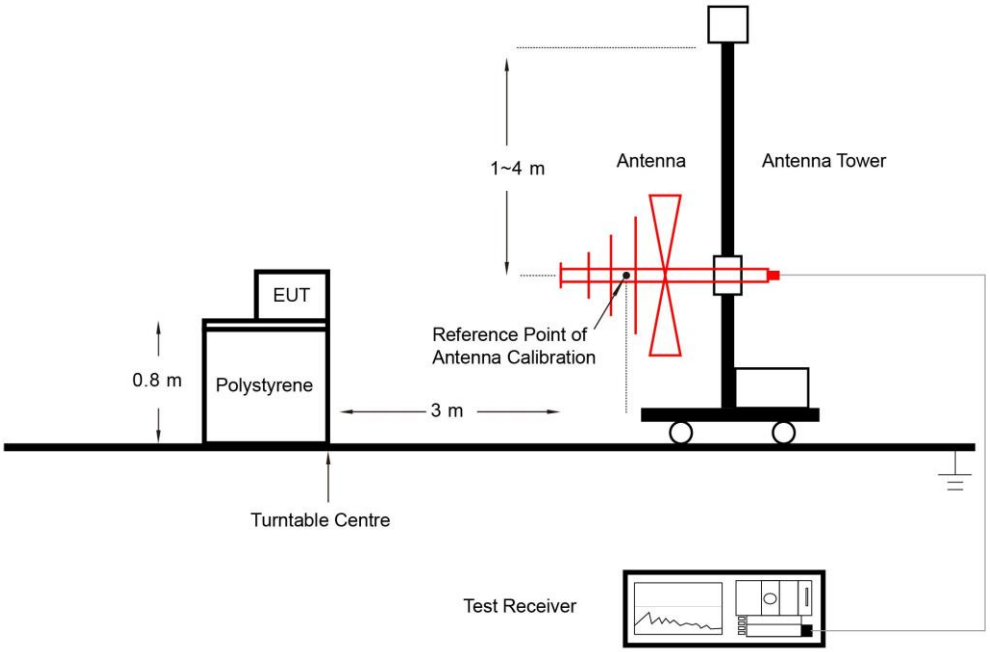
ANSI C63.26-2015 - Section 5.2.7 & 5.5

5.2.3. Test Setting

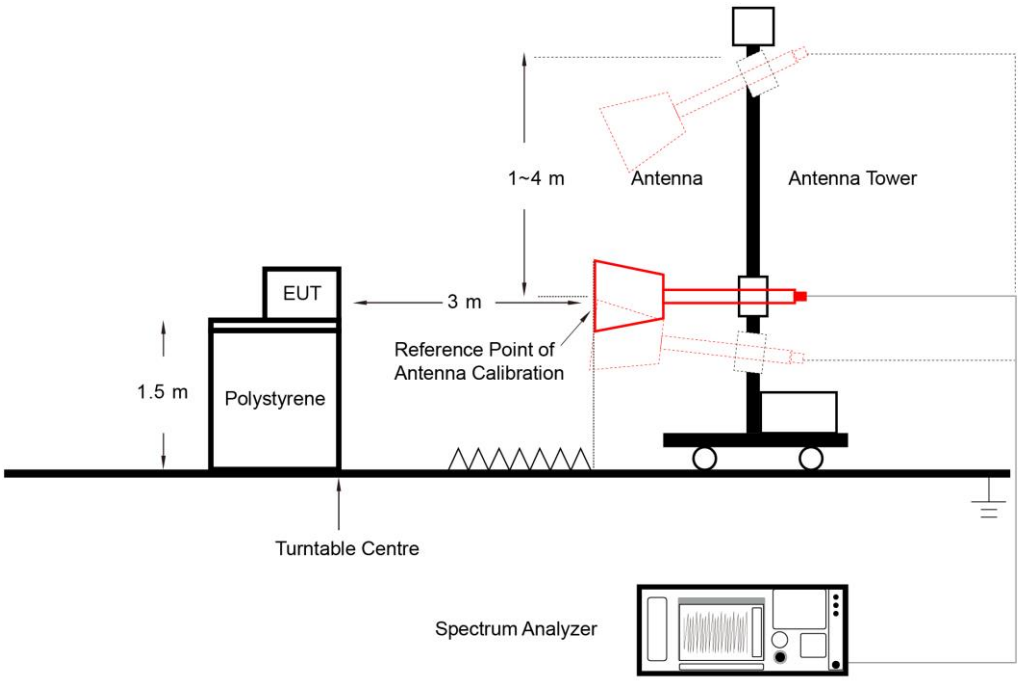
1. RBW = 1MHz
2. VBW ≥ 3*RBW
3. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period)
4. Detector = Peak
5. Trace mode = max hold
6. The trace was allowed to stabilize

5.2.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.2.5. Test Result

Refer to Appendix A.7.

Appendix A - Test Result

A.1 Radiated Spurious Emissions Test Result

Test Site	WZ-AC1	Test Engineer	Bob Zhang
Test Date	2023-04-22 ~ 2023-04-28	Test Band	WCDMA Band V, QPSK
Model No.	INT-SHMD-V2.0I-EC25AU		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Low Channel							
55.7	24.2	20.2	44.4	82.3	-37.9	Peak	Horizontal
915.6	26.2	31.2	57.4	82.3	-24.9	Peak	Horizontal
53.3	23.8	20.4	44.2	82.3	-38.1	Peak	Vertical
931.6	26.4	31.1	57.5	82.3	-24.8	Peak	Vertical
1654.5	61.5	-5.8	55.7	82.3	-26.6	Peak	Horizontal
5301.0	47.8	3.2	51.0	82.3	-31.3	Peak	Horizontal
1654.5	63.1	-5.8	57.3	82.3	-25.0	Peak	Vertical
5309.5	47.4	3.1	50.5	82.3	-31.8	Peak	Vertical
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m) Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).							

Test Site	WZ-AC1	Test Engineer	Bob Zhang
Test Date	2023-04-22 ~ 2023-04-28	Test Band	LTE Band 5, 1RB_QPSK
Model No.	INT-SHMD-V2.0I-EC25AU		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Low Channel							
301.6	28.9	20.9	49.8	82.3	-32.5	Peak	Horizontal
869.5	28.6	30.8	59.4	82.3	-22.9	Peak	Horizontal
47.5	23.9	20.3	44.2	82.3	-38.1	Peak	Vertical
884.6	25.0	30.9	55.9	82.3	-26.4	Peak	Vertical
1646.0	67.0	-5.7	61.3	82.3	-21.0	Peak	Horizontal
2470.5	53.6	-2.8	50.8	82.3	-31.5	Peak	Horizontal
1646.0	68.6	-5.7	62.9	82.3	-19.4	Peak	Vertical
3295.0	51.2	-2.1	49.1	82.3	-33.2	Peak	Vertical
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m) Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).							

Test Site	WZ-AC1	Test Engineer	Bob Zhang
Test Date	2023-04-22 ~ 2023-04-28	Test Band	WCDMA Band V, QPSK
Model No.	INT-SHMD-V2.0E-EC25AU		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Low Channel							
301.6	30.1	20.9	51.0	82.3	-31.3	Peak	Horizontal
937.4	27.3	31.3	58.6	82.3	-23.7	Peak	Horizontal
149.8	43.3	15.3	58.6	82.3	-23.7	Peak	Vertical
888.9	27.2	31.0	58.2	82.3	-24.1	Peak	Vertical
1884.0	45.3	-5.0	40.3	82.3	-42.0	Peak	Horizontal
5250.0	48.0	3.2	51.2	82.3	-31.1	Peak	Horizontal
2028.5	49.4	-4.2	45.2	82.3	-37.1	Peak	Vertical
5318.0	49.0	3.0	52.0	82.3	-30.3	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)
Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Test Site	WZ-AC1	Test Engineer	Bob Zhang
Test Date	2023-04-22 ~ 2023-04-28	Test Band	LTE Band 5, 1RB_QPSK
Model No.	INT-SHMD-V2.0E-EC25AU		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level(dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Low Channel							
304.0	29.9	21.0	50.9	82.3	-31.4	Peak	Horizontal
898.2	26.8	31.2	58.0	82.3	-24.3	Peak	Horizontal
303.5	29.8	21.0	50.8	82.3	-31.5	Peak	Vertical
926.3	26.3	31.1	57.4	82.3	-24.9	Peak	Vertical
1646.0	48.1	-5.7	42.4	82.3	-39.9	Peak	Horizontal
5267.0	43.2	3.2	46.4	82.3	-35.9	Peak	Horizontal
1646.0	43.8	-5.7	38.1	82.3	-44.2	Peak	Vertical
5292.5	44.2	3.3	47.5	82.3	-34.8	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)
Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Appendix B - Test Setup Photograph

Refer to “2304RSU037-UT” file.

Appendix C - EUT Photograph

Refer to “2304RSU037-UE” file.

The End