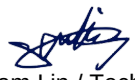


Prüfbericht-Nr.: <i>Test report No.:</i>	60376402 001	Auftrags-Nr.: <i>Order No.:</i>	168261665	Seite 1 von 22 <i>Page 1 of 22</i>	
Kunden-Referenz-Nr.: <i>Client reference No.:</i>	N/A	Auftragsdatum: <i>Order date.:</i>	20.04.2020		
Auftraggeber: <i>Client:</i>	BERINGIA LLC 500 Marquette Avenue NW, Suite 1200, Albuquerque NM, 87102				
Prüfgegenstand: <i>Test item:</i>	Self-Replenishing Smart Scale				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	H36GSA, H36GSB, H36GSC				
Auftrags-Inhalt: <i>Order content:</i>	Test Report				
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 15C §15.203 CFR47 FCC Part 15C §15.207 CFR47 FCC Part 15C §15.209 CFR47 FCC Part 15C §15.247		CFR47 FCC Part 2.1091		
Wareneingangsdatum: <i>Date of receipt:</i>	17.04.2020	Please refer to photo documents			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A002810433-001~003				
Prüfzeitraum: <i>Testing period:</i>	22.04.2020 - 21.05.2020				
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.				
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.				
Prüfergebnis*: <i>Test result*:</i>	Pass				
geprüft von / tested by:		kontrolliert von / reviewed by:			
17.06.2020 Hardy Suo / Assistant Project Manager 		17.06.2020 Sam Lin / Technical Certifier 			
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: FCC ID: 2AU96-6689					
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 P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n)			4 = ausreichend 5 = mangelhaft N/A = nicht anwendbar N/T = nicht getestet		
Legend: 1 = very good 2 = good 3 = satisfactory P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s)			4 = sufficient 5 = poor 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>					

CONTENTS

1	GENERAL REMARKS	3
1.1	Complementary Materials	3
2	TEST SITES	4
2.1	Test Facilities	4
2.2	List of Test and Measurement Instruments.....	4
2.3	Traceability	5
2.4	Calibration	5
2.5	Measurement Uncertainty	5
2.6	Location of Original Data.....	5
2.7	Status of Facility Used for Testing	6
3	GENERAL PRODUCT INFORMATION.....	7
3.1	Product Function and Intended Use.....	7
3.2	Ratings and System Details	7
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.....	10
4.5	Test Setup Diagram	11
5	TEST RESULTS.....	13
5.1	Transmitter Requirement & Test Suites	13
5.1.1	Antenna Requirement.....	13
5.1.2	Maximum Peak Conducted Output Power	14
5.1.3	Conducted Power Spectral Density.....	15
5.1.4	6dB Bandwidth	16
5.1.5	99% Bandwidth.....	17
5.1.6	Conducted Spurious Emissions Measured in 100 kHz Bandwidth	18
5.1.7	Radiated Spurious Emission	19
5.1.8	Conducted Emission.....	20
6	RADIO FREQUENCY EXPOSURE COMPLIANCE	21
7	PHOTOGRAPHS OF THE TEST SET-UP.....	22
8	LIST OF TABLES	22

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Test Results of BLE

Appendix C: Test Results of Wi-Fi 802.11 b/g/n

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China

FCC Registration No.: 694916

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing (TS8997)				
Equipment	Manufacturer	Model	Serial No.	Cal. until
Signal Analyzer	R&S	FSV 40	101441	20.08.2020
OSP	R&S	OSP 150	101017	17.12.2020
Control PC	DELL	OptiPlex 7050	FTJZ9P2	N/A
Test Software	R&S	WMS32 (V10.50.10)	N/A	N/A
Power Meter	R&S	NRP2	107105	17.12.2020
Wideband Power Sensor	R&S	NRP-Z81	105350	17.12.2020
Shielding Room 8#	Albatross	SR8	APC17151-SR8	23.07.2020
Unwanted Emission Testing (TS9975)				
Equipment	Manufacturer	Model	Serial No.	Cal. until
EMI Test Receiver	R&S	ESR 7	102021	19.08.2020
Signal Analyzer	R&S	FSV 40	101439	21.08.2020
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	21.08.2020
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	20.08.2020
Amplifier	R&S	SCU-18F	180070	20.08.2020
Amplifier	R&S	SCU40A	100475	20.09.2020
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	02.09.2020
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	02.09.2020
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	02.09.2020
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	01.09.2020
Wideband Ridged Horn Antenna (12-18 GHz)	Steatite	QMS-00208	18313	02.09.2020
Test software	R&S	EMC32 (V10.50.40)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	06.07.2020
Conducted Emission on AC Mains				

Equipment	Manufacturer	Model No.	Serial No.	Cali. until
EMI Test Receiver	R&S	ESR3	102428	03.09.2020
Artificial Mains Network	R&S	ENV216	102333	19.08.2020
Artificial Mains Network	R&S	ENV432	101411	19.08.2020
Attenuator	R&S	ESH2Z31	100300	19.08.2020
EMC32 test software	R&S	EMC32(Ver.10.50.01)	N/A	N/A

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

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

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-7}$
RF Power (conducted)	± 2.5 dB
Radiated Emission of Transmitter, valid up to 26.5 GHz	± 6 dB
Radiated Emission of Receiver, valid up to 26.5 GHz	± 6 dB
Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz)	± 3.70 dB / ± 3.30 dB
Radiated Emission (3m SAC), 30MHz to 1000MHz	± 4.52 dB
Radiated Emission (3m SAC), above 1000MHz	± 4.37 dB
Temperature	± 1 °C
Humidity	± 5 %
Voltage (DC)	± 1 %
Voltage (AC, <10kHz)	± 2 %

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B & C of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at 362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a Self-Replenishing Smart Scale, which support Bluetooth 5.0 and Wi-Fi 802.11 b/g/n wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	Self-Replenishing Smart Scale
Type Designation	H36GSA, H36GSB, H36GSC
Device Serial Number (DSN)	G6A17R020125003K for H36GSA G6A17V0201170028 for H36GSB G6A17W0201170002 for H36GSC
FCC ID	2AU96-6689
Operating Voltage	Re-chargeable battery or USB Port (DC 5.0V)
Technical Specification of BLE	
Frequency Range	2402 MHz to 2480 MHz
Type of Modulation	GFSK(Bluetooth BLE)
Channel Number	40 channels
Channel Separation	2MHz
Antenna Type	Integral Antenna
Antenna Gain	3.5 dBi
Technical Specification of Wi-Fi 802.11 b/g/n	
Operating Frequency	2412 - 2462 MHz for 802.11b/g/n(HT20)
Type of Modulation	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM)
Data Rate	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 for 802.11n
Channel Number	11 channels for 802.11b/g/n(HT20)
Channel Separation	5 MHz
Antenna Type	Integral antenna
Antenna Gain	3.5 dBi
Remark: According to the declaration of the applicant, the electrical circuit design, PCB layout and construction Design are identical for all models, only the model No. and size are different.	

Table 3: RF Channel and Frequency of BLE

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

Table 4: RF Channel and Frequency of Wi-Fi 802.11 b/g/n

RF Channel	802.11 b/g/n(HT20)
	Frequency (MHz)
01	2412
02	2417
03	2422
04	2427
05	2432
06	2437
07	2442
08	2447
09	2452
10	2457
11	2462

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Bluetooth Low Energy transmitting mode
 - 1) Low Channel
 - 2) Middle Channel
 - 3) High Channel
- B. On, Wi-Fi 802.11 b/g/n wireless transmitting mode
 - 4) Low Channel
 - 5) Middle Channel
 - 6) High Channel
- C. On, Normal operation with Bluetooth Low Energy mode
- D. On, Normal operation with Wi-Fi mode
- E. On, Standby mode
- F. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- | | |
|----------------------------------|---------------|
| - Block Diagram | - Schematics |
| - FCC/IC Label and Location Info | - User Manual |

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.2, all tests were performed on model H36GSA and radiated spurious emissions and band-edge testing on models H36GSB, H36GSC in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 5: Auxiliary Equipment Used during Test

Description	Manufacturer	Model	S/N	Rating
Laptop	Lenovo	T480	PF-16A6N8	N/A
AC/DC Adapter	Amazon	PS39WR	-	Input: 100-240Vac, 0.2A Output: 5.25Vdc, 1.0A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

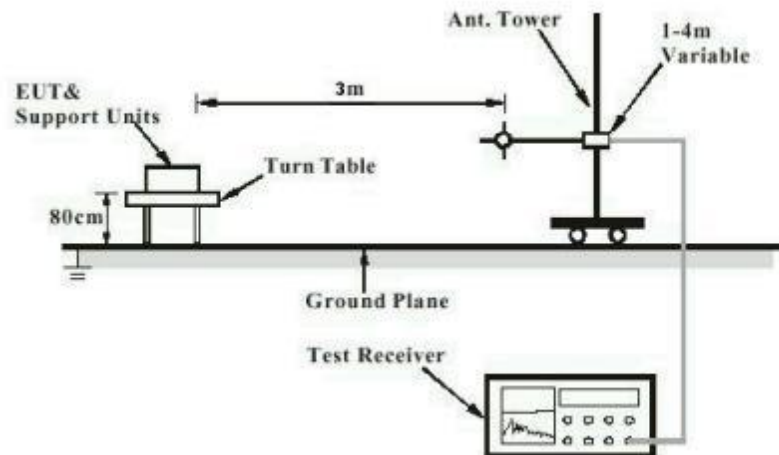


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

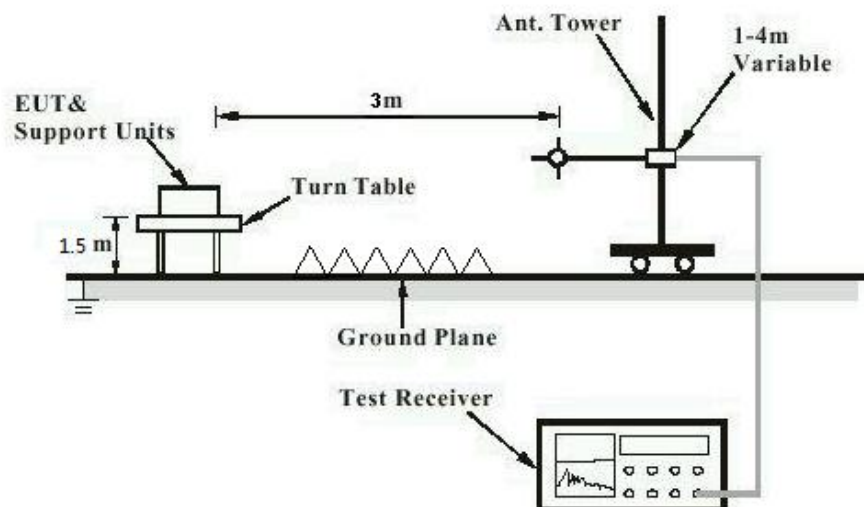


Diagram of Measurement Configuration for Mains Conduction Measurement

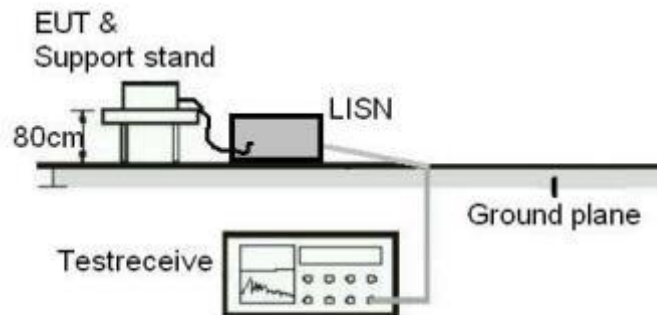
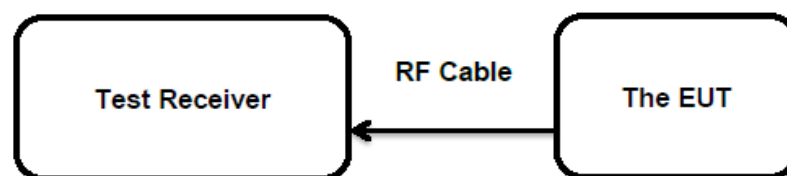


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.247(b)(4) and Part 15.203

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is 3.5 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Peak Conducted Output Power

RESULT:
Pass
Test Specification

Test standard	: FCC Part 15.247(b)(3)
Basic standard	: Section of 11.9.1 of ANSI C63.10: 2013
Limits	: 1.0 Watts
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 27.04.2020-15.05.2020
Input voltage	: DC 5V from adapter
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

Table 6: Test Result of Maximum Peak Conducted Output Power, BLE

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
GFSK (BLE)	2402.0	2.20	0.0017	< 1.0
	2440.0	2.00	0.0016	
	2480.0	1.90	0.0015	
Maximum Measured Value		2.20	0.0017	

Table 7: Test Result of Maximum Peak Conducted Output Power, Wi-Fi 802.11 b/g/n

Test Mode	Data Rate	Test Channel (MHz)	Measured Peak Power		Limit (W)
			(dBm)	(W)	
802.11b	1 Mbps	2412	18.20	0.0661	< 1.0
		2437	18.10	0.0646	
		2462	18.60	0.0724	
802.11g	6 Mbps	2412	23.00	0.1995	
		2437	23.10	0.2042	
		2462	21.60	0.1445	
802.11n (HT20)	MCS0	2412	23.20	0.2089	
		2437	22.70	0.1862	
		2462	22.00	0.1585	
Maximum Measured Value			23.20	0.2089	

Note:

- 1) The cable loss is taken into account in results.
- 2) Antenna gain(G) of BLE: 3.5 dBi,
- 3) Antenna gain(G) of 802.11 b/g/n: 3.5 dBi,

5.1.3 Conducted Power Spectral Density

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(e)
Basic standard	: Section of 11.10.2 of ANSI C63.10: 2013
Limits	: < 8 dBm / 3kHz
Kind of test site	: Shielded Room

Test Setup

Date of testing	: Refer to test result
Input voltage	: DC 5V from adapter
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix B & C.

5.1.4 6dB Bandwidth

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(a)(2)
Basic standard	: Section of 11.8 of ANSI C63.10: 2013
Limits	: > 500 KHz
Kind of test site	: Shielded Room

Test Setup

Date of testing	: Refer to test result
Input voltage	: DC 5V from adapter
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix B & C.

5.1.5 99% Bandwidth

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(a)
Basic standard	: Section of 6.9.3 of ANSI C63.10: 2013
Kind of test site	: Shielded Room

Test Setup

Date of testing	: Refer to test result
Input voltage	: DC 5V from adapter
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix B & C.

5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(d) RSS-247 Clause 5.5
Basic standard	: Section of 11.11 of ANSI C63.10: 2013
Limits	: 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	: Shielded Room

Test Setup

Date of testing	: Refer to test result
Input voltage	: DC 5V from adapter
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix B & C.

5.1.7 Radiated Spurious Emission

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(d) & FCC Part 15.205
Basic standard	: Section of 11.12 of ANSI C63.10: 2013
Limits	: Refer to 15.209(a) of FCC part 15.247(d)
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: Refer to test result
Input voltage	: DC 5V from adapter
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: Refer to test result
Relative humidity	: Refer to test result
Atmospheric pressure	: 101 kPa

Remark:

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix B & C.

5.1.8 Conducted Emission

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.207
Basic standard	: Section of 6.2 of ANSI C63.10: 2013
Limits	: Refer to 15.207(a)
Kind of test site	: Shielded Room

Test Setup

Date of testing	: Refer to test result
Input voltage	: 120V, 60Hz
Operation mode	: C, D
Ambient temperature	: Refer to test result
Relative humidity	: Refer to test result
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix C that recorded the worst case.

6 Radio Frequency Exposure Compliance

RESULT:**Pass****Test Specification**

Test standard

: CFR47 FCC Part 2: Section 2.1091
CFR47 FCC Part 1: Section 1.1310
FCC KDB Publication 447498 v06

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

MPE Calculation Method according to KDB 447498 v06Power Density: $S_{(mW/cm^2)} = PG/4\pi R^2$ or $EIRP/4\pi R^2$

Where:

S = power density (mW/cm²)

P = power input to the antenna (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm)

The nominal maximum conducted output power specified:

BLE: 2.20 dBm

Wi-Fi 802.11 b/g/n: 23.20 dBm

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain (Max. 3.5 dBi for BLE, 3.5 dBi for Wi-Fi 802.11 b/g/n), the RF power density can be calculated as below:

For BLE: $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.001 \text{ mW/cm}^2$ For Wi-Fi 802.11 b/g/n: $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.093 \text{ mW/cm}^2$

Simultaneous Transmissions:

BLE and WLAN transmissions may not occur at the same time, because they share one antenna.

Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310:1.0 mW/cm²

7 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

8 List of Tables

Table 1: List of Test and Measurement Equipment.....	4
Table 2: Technical Specification of EUT	7
Table 3: RF Channel and Frequency of BLE	8
Table 4: RF Channel and Frequency of Wi-Fi 802.11 b/g/n	8
Table 5: Auxiliary Equipment Used during Test	10
Table 6: Test Result of Maximum Peak Conducted Output Power, BLE	14
Table 7: Test Result of Maximum Peak Conducted Output Power, Wi-Fi 802.11 b/g/n.....	14