Prüfbericht-Nr.: *Test report no.:*	**60425023 001**	**Auftrags-Nr.** *Order no.*: 168286551	Seite 1 von 24 *Page 1 of 24*
Kunden-Referenz-Nr.: *Client reference no.:*	**N/A**	**Auftragsdat :***Order date:* 2020-10-17	
Auftraggeber: *Client:*	**ARKON ELECTRONICS (HUIZHOU) CO., LIMITED** NO.4 Taihao Road, High-tech Industrial Park,Sandong Town, Huicheng District, Huizhou, Guangdong, China		
Prüfgegenstand: *Test item:*	2.4G Digital Wireless Headphone		
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	DHP380J/ADH300J (Trademark: ARKON/ ARTLSTE)		
Auftrags-Inhalt: *Order content*:	FCC ID		
Prüfgrundlage: *Test specification:*	CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209 CFR47 FCC Part 15: Subpart C Section 15.247 ANSI C63.10:2013	FCC Part 2 (Section 2.1093) KDB 447498 D01	
Wareneingangsdatum: *Date of sample receipt:*	2020-10-20		
Prüfmuster-Nr.: *Test sample no:*	HS2009023N001-001-011 HS2009023N001-001-012		
Prüfzeitraum: *Testing period:*	2020-09-22 – 2020-10-17		
Ort der Prüfung: *Place of testing:*	Hwa-Hsing (Dongguan) Testing Co., Ltd.		
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.		
Prüfergebnis*: *Test result*:*	Pass		

geprüft von: *tested by: Bell Hu*	**genehmigt von:** *authorized by: Winnie Hou*
Datum: *Date:* 2020-11-02 Bell Hu	**Ausstellungsdatum:** *Issue date:* 2020-11-02 Winnie Hou
Stellung */ Position:* Project Manager	**Stellung** */ Position:* Technical Certifier

Sonstiges */ Other:*

FCC ID: 2APBSDHP381J-01TX

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* 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*

Test Summary

5.1.1 Antenna Requirement

RESULT: *Pass*

5.1.2 Maximum Peak Conducted Output Power

RESULT: *Pass*

5.1.3 RF Exposure (Calculation)

RESULT: *Pass*

5.1.4 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: *Pass*

5.1.5 Radiated Spurious Emission

RESULT: *Pass*

5.1.6 20dB Bandwidth

RESULT: *Pass*

5.1.7 Carrier Frequency Separation

RESULT: *Pass*

5.1.8 Number of Hopping Frequency

RESULT: *Pass*

5.1.9 Time of Occupancy

RESULT: *Pass*

5.1.10 Conducted Emission on AC Mains

RESULT: *Pass*

Contents

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: Test Results of FHSS Wireless mode

Appendix B: Photographs of the Test Set-up

2 Test Sites

2.1 Test Facilities

Hwa-Hsing (Dongguan) Testing Co., Ltd.
No.101, Bld N1, Yuyuan 2Rd, Yuyuan Industrial Park, HuangJiang Town, Dongguan, China

FCC Registration No.: 0028199784
ISED wireless device testing laboratory: 25433

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Hwa-Hsing (Dongguan) Testing Co., Ltd.

Conducted Emission on AC Mains				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cali. until**
EMI Test Receiver (9kHz~3GHz)	Rohde&Schwarz	ESCI	101418	2021/09/16
Artificial Mains Network	Rohde&Schwarz	ENV216	3560.6550.15	2021/09/16
Test software	FARAD	EZ_EMC V1.1.4.2	N/A	N/A
Hygrothermograph	Yuhuaze	HTC-1	NA	2021/09/16
Digital Multimeter	FLUKE	15B+	43512617WS	2021/09/16
Radiated Emission (3m chamber,30MHz~1GHz)				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cali. until**
EMI Test Receiver (10kHz~7GHz)	Rohde&Schwarz	ESCI 7	100962	2021/05/14
Broadband antenna (25MHz~2500MHz)	Schwarzbeck	VULB 9168	00937	2021/04/15
3m Semi-anechoic Chamber	MAORUI	9m*6m*6m	NSEMC003	2021/04/14
Signal Amplifier (30MHz~1000MHz)	Com-power	PAM-103	18020051	2021/04/15
Attenuator	R&S	TS2GA-6dB	18101101	N/A
Test software	EZ	EZ_EMC V1.1.4.2	N/A	N/A
Radiated Emission (3m chamber,30MHz~1GHz)				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cali. until**
Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA 9170	01959	2021/04/15
Broadband Coaxial Preamplifier (1GHz-18GHz)	Schwarzbeck	BBV 9718	00025	2021/04/15
Spectrum Analyzer	Rohde&Schwarz	FSV-40N	101783	2021/04/15
Horn Antenna (18GHz-40GHz)	Schwarzbeck	BBHA 9170	BBHA9170242	2021/04/15
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	2021/04/15
High pass filter	Micro-Tronics	HPM50107	G050	2021/09/16

High pass filter	Micro-Tronics	HPM50117	G007	2021/09/16
Test software	EZ	EZ_EMC V1.1.4.2	N/A	N/A
Spectrum （10kHz~26.5GHz）	Keysight	N9020A	MY51240612	2021/09/16

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 basics 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	±1 x 10-7
RF Power (conducted)	±1.5 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, 150kHz to 30MHz	± 2.66 dB
Radiated Emission (3m SAC), 30MHz to 1000MHz	± 4.84 dB
Radiated Emission (3m SAC), above 1000MHz	± 3.47 dB
Temperature	±0.5 °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 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 Hwa-Hsing (Dongguan) Testing Co., Ltd. Test facility located at No.101, Bld N1, Yuyuan 2Rd, Yuyuan Industrial Park, HuangJiang Town, Dongguan, 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 wireless transmitter which supports 2.4G Wireless: FHSS wireless technology. This report is for 2.4G Wireless function. It contians a Wireless Headphone only for RX and a Charging Base.

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

The Wireless Headphone only supports RX mode and powered by batteries as below:

Battery Model	Manufacturer	Ratings
Ni-MHAAA700mAh	SHENZHEN FBTECH CO,. LTD	DC1.2V 700mAh

The Transmitter/Charging Base powered by adapter as below:

Adaptor Model		Manufacturer	Ratings
1	YLJXA-T050055	N/A	Input: AC100-240V~50/60Hz 0.5A Max. Output: DC5.0V0.55A 2.75W

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

3.2 Ratings and System Details

Table 2: Technical Specification of EUT (Transmitter/Charging Base)

General Information of EUT	**Value**
Kind of Equipment	2.4G Digital Wireless Headphone
Type Designation	DHP380J/ADH300J
Model Difference	Difference for model name and Trade mark
Trade Mark	The model DHP380J has the brand name “ARKON” The model ADH300J has the brand name “ARTLSTE”
FCC ID	2APBSDHP381J-01TX
Operating Voltage:	DC5V from adaptor or powered by The adaptor input: AC100-240V~50/60Hz 0.5A Max. The adaptor output: DC5.0V 0.55A 2.75W
Testing Voltage	DC5V from adaptor The adaptor input: AC120V~60Hz
Antenna Type	Internal (PIFA) Antenna
Antenna Gain	-2.2 dBi
Power Adapter	YLJXA-T050055
Other accessories	Aux in Line: unshielded, detachable 1.6m Optical Line: un-shielded, detachable 1.52m RCA Line: unshielded, detachable 0.2m
Technical Specification of wireless (GFSK)FHSS	
Operating Frequency	2406 – 2472 MHz
Type of Modulation	GFSK(FHSS)
Channel Number	31 channels total. The module RF normal operation mode supports 15 hopping channel/Per Sequence, as listed in table 3.
Channel Separation	2 MHz

Table 3: RF Channel and Frequency of FHSS

● The UUT support total 31 channels of FHSS mode							
RF Channel	**Frequency (MHz)**	**RF Channel**	**Frequency (MHz)**	**RF Channel**	**Frequency (MHz)**	**RF Channel**	**Frequency (MHz)**
0	2406	8	2422	16	2444	24	2460
1	2408	9	2424	17	2446	25	2462
2	2410	10	2426	18	2448	26	2464
3	2412	11	2428	19	2450	27	2466
4	2414	12	2430	20	2452	28	2468
5	2416	13	2432	21	2454	29	2470
6	2418	14	2438	22	2456	30	2472
7	2420	15	2440	23	2458		

● This module is controlled by microchip to generate Pseudorandom Frequency Hopping Sequence. The module RF normal operation mode support 15 hopping channel/Per Sequence.
● There are four hopping sequences list as below:

Hopping Sequence 1 Channel list		**Hopping Sequence 2 Channel list**		**Hopping Sequence 3 Channel list**		**Hopping Sequence 4 Channel list**	
RF Channel	**Frequency (MHz)**	**RF Channel**	**Frequency (MHz)**	**RF Channel**	**Frequency (MHz)**	**RF Channel**	**Frequency (MHz)**
0	2406	0	2406	13	2432	0	2406
7	2420	1	2408	15	2440	1	2408
8	2422	2	2410	18	2448	2	2410
9	2424	3	2412	19	2450	3	2412
10	2426	4	2414	20	2452	4	2414
11	2428	5	2416	21	2454	5	2416
16	2444	6	2418	22	2456	6	2418
17	2446	7	2420	23	2458	10	2426
18	2448	8	2422	24	2460	21	2454
19	2450	9	2424	25	2462	25	2462
20	2452	10	2426	26	2464	26	2464
22	2456	11	2428	27	2466	27	2466
28	2468	12	2430	28	2468	28	2468
29	2470	14	2438	29	2470	29	2470
30	2472	17	2446	30	2472	30	2472

Test frequencies are lowest channel: 2406 MHz, middle channel: 2440 MHz and highest channel: 2472 MHz for General 2.4GHz

3.3 Independent Operation Modes

The basic operation modes are:

A. On, Wireless transmitting mode (GFSK mode)
    1) Low Channel
    2) Middle Channel
    3) High Channel
B. On, Transmitting on Hopping channel
C. On, Standby mode(Charging)
D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- Block Diagram
- Operation Description
- ID Label and Location Info
- Photo Document
- Schematics
- User Manual
- Operation Description

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 and ANSI C63.4: 2014.

4.3 Special Accessories and Auxiliary Equipment

Table 4: Auxiliary Equipment Used during Test

Equip. No.	Description	Manufacturer	Model	S/N
01	DVD Player	Sony	DVDP4K	N/A

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 30MHz)

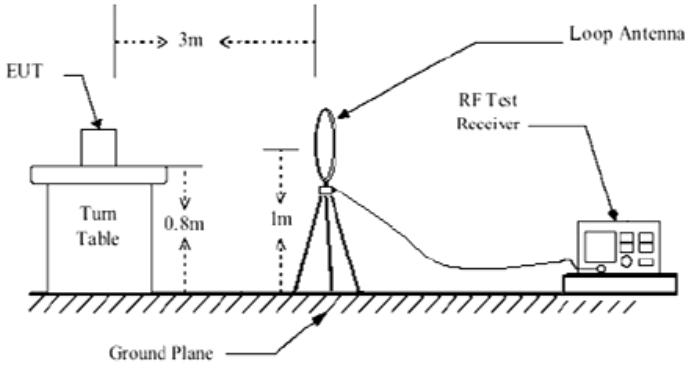


Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

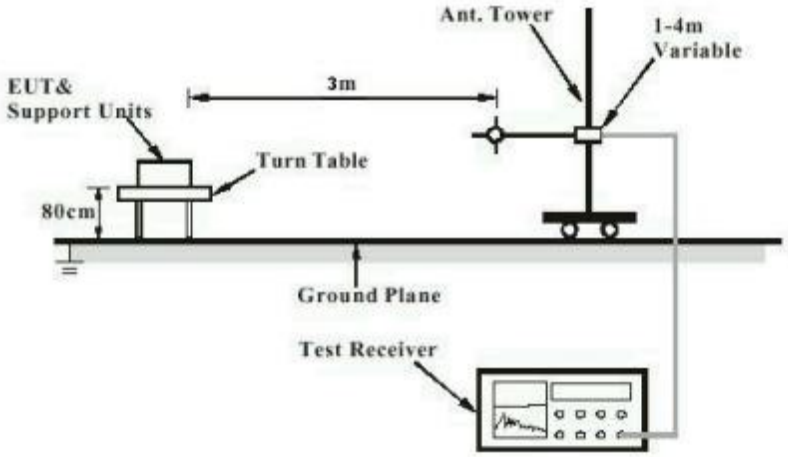


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

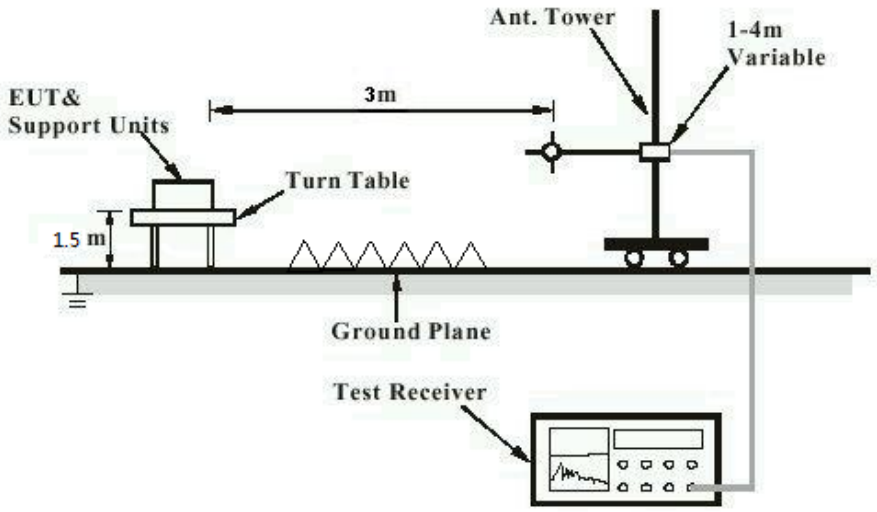


Diagram of Measurement Configuration for Mains Conduction Measurement

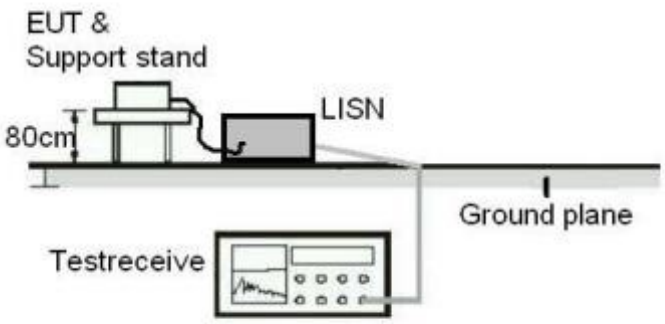
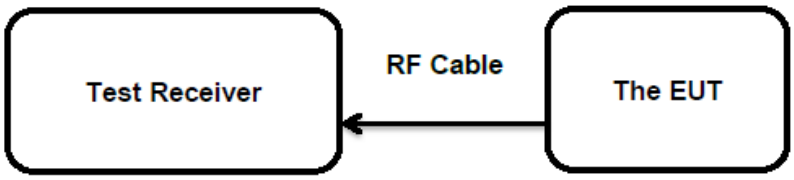


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification		CFR47 FCC Part 15: Subpart C
Test standard	:	FCC Part 15.247(b)(4) and Part 15.203

According to the manufacturer declared, the EUT has an internal antenna, the max. directional gain of antenna is -2.2dBi, 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		CFR47 FCC Part 15: Subpart C
Test standard	:	FCC Part 15.247(b)(1)&(3)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 0.125 Watts
Kind of test site	:	Shielded Room

Test Setup		
Date of testing	:	2020-09-24 – 2020-10-15
Input voltage	:	DC5V from adaptor
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.3 ℃
Relative humidity	:	58.3 %
Atmospheric pressure	:	101 kPa

Table 5: Test Result of Maximum Average Conducted Output Power

Test Mode	Test Channel (MHz)	Measured average Power		Limit (W)
		(dBm)	(mW)	
GFSK	2406	6.45	4.416	< 0.125
	2440	6.21	4.178	
	2472	6.43	4.395	
Maximum Measured Value		**6.45**	**4.416**	

Table 6: Test Result of Maximum Peak Conducted Output Power

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(mW)	
GFSK	2406	7.18	5.224	< 0.125
	2440	6.92	4.920	
	2472	7.01	5.023	
Maximum Measured Value		**7.18**	**5.224**	

Note:
1) The cable loss is taken into account in results.
2) Antenna gain(G) of Bluetooth: -2.2dBi

5.1.3 RF Exposure (Calculation)

RESULT: **Pass**

Test Specification		
Test standard	:	CFR47 FCC Part 15: Subpart C Part 2.1093 FCC KDB Publication 447498 v06
Maximum Peak conducted power		7.18 dBm

The highest maximum power is 7.18dBm (5.22mW), lower than the threshold power 9.67mW@2406, SAR is exempted.

5.1.4 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: **Pass**

Test Specification		CFR47 FCC Part 15: Subpart C
Test standard	:	FCC Part 15.247(d)
Basic standard	:	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	:	2020-09-24 – 2020-10-16
Input voltage	:	DC5V from adaptor
Operation mode	:	A, B
Test channel	:	Low / Middle / High
Ambient temperature	:	25.3 ℃
Relative humidity	:	58.5 %
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 A

5.1.5 Radiated Spurious Emission

RESULT: **Pass**

Test Specification		CFR47 FCC Part 15: Subpart C
Test standard	:	FCC Part 15.247(d) & FCC Part 15.205
Basic standard	:	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	:	2020-09-24 – 2020-10-16
Input voltage	:	DC5V from adaptor
Operation mode	:	A, B
Test channel	:	Low / Middle / High
Ambient temperature	:	24.4 ℃
Relative humidity	:	57.2 %
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 A

5.1.6 20dB Bandwidth

RESULT: **Pass**

Test Specification		CFR47 FCC Part 15: Subpart C
Test standard	:	FCC Part 15.247(a)(1)
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup		
Date of testing	:	2020-05-24 – 2020-06-10
Input voltage	:	DC5V from adaptor
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.3 ℃
Relative humidity	:	58.5 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

5.1.7 Carrier Frequency Separation

RESULT: **Pass**

Test Specification		CFR47 FCC Part 15: Subpart C
Test standard	:	FCC Part 15.247(a)(1)
Basic standard	:	ANSI C63.10: 2013
Limits	:	≥ 25kHz or 2/3 of 20dB bandwidth, whichever is greater
Kind of test site	:	Shielded Room

Test Setup		
Date of testing	:	2020-09-24 – 2020-10-16
Input voltage	:	DC5V from adaptor
Operation mode	:	B
Test channel	:	Low / Middle / High
Ambient temperature	:	25.3 ℃
Relative humidity	:	58.5 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A

5.1.8 Number of Hopping Frequency

RESULT: **Pass**

Test Specification		CFR47 FCC Part 15: Subpart C
Test standard	:	FCC part 15.247(a)(1)(iii) RSS-247 Clause 5.1(d)
Basic standard	:	ANSI C63.10: 2013
Limits	:	≥ 15 non-overlapping channels
Kind of test site	:	Shielded Room

Test Setup		
Date of testing	:	2020-09-16 – 2020-10-16
Input voltage	:	DC5V from adaptor
Operation mode	:	B
Ambient temperature	:	25.3 ℃
Relative humidity	:	58.5 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A

5.1.9 Time of Occupancy

RESULT: **Pass**

Test Specification		CFR47 FCC Part 15: Subpart C
Test standard	:	FCC part 15.247(a)(1)(iii)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 0.4s
Kind of test site	:	Shielded Room

Test Setup		
Date of testing	:	2020-09-24 – 2020-10-16
Input voltage	:	DC5V from adaptor
Operation mode	:	B
Test channel	:	Low / Middle / High
Ambient temperature	:	25.3 ℃
Relative humidity	:	58.5 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A

5.1.10 Conducted Emission on AC Mains

RESULT: **Pass**

Test Specification		CFR47 FCC Part 15: Subpart C
Test standard	:	FCC Part 15.207(a)
Basic standard	:	ANSI C63.10: 2013
Frequency range	:	0.15 – 30MHz
Limits	:	FCC Part 15.207(a)
Kind of test site	:	Shielded Room

Test Setup		
Date of testing	:	2020-09-24 – 2020-10-16
Input voltage	:	DC5V from adaptor
Operation mode	:	B
Earthing	:	Not connected
Ambient temperature	:	25.3 ℃
Relative humidity	:	58.5 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A

6 Photographs of the Test Set-Up

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

7 List of Tables

--End--