

FCC REPORT

Applicant: Shenzhen Friendcom Technology Co., Ltd.

Address of Applicant: 3/F, 6 Building, Guangqian Industrial Park, Longzhu Road, Xili Town, Nanshan, Shenzhen, China

Equipment Under Test (EUT)

Product Name: IDUV915-LRW Inductive Sensor Endpoint

Model No.: FC-725

Trade Mark: Friendcom

FCC ID: UU3FC-725

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: 27 Dec., 2021

Date of Test: 28 Dec., 2021 to 08 Mar., 2022

Date of report issued: 06 May, 2023

Test Result: PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

2 Version

Version No.	Date	Description
00	05 May, 2023	Original
01	06 May, 2023	1. Update page 4/9 2. Update section 6.8.2

Tested by:

Tanet Wei

Test Engineer

Date:

06 May, 2023

Reviewed by:

Winner Zhang

Project Engineer

Date:

06 May, 2023

3 Contents

Page

1	COVER PAGE.....	1
2	VERSION	2
3	CONTENTS	3
4	TEST SUMMARY.....	4
5	GENERAL INFORMATION.....	5
5.1	CLIENT INFORMATION	5
5.2	GENERAL DESCRIPTION OF E.U.T.	5
5.3	TEST ENVIRONMENT AND MODE	6
5.4	DESCRIPTION OF SUPPORT UNITS	6
5.5	MEASUREMENT UNCERTAINTY.....	6
5.6	ADDITIONS TO, DEVIATIONS, OR EXCLUSIONS FROM THE METHOD	6
5.7	LABORATORY FACILITY	6
5.8	LABORATORY LOCATION	6
5.9	TEST INSTRUMENTS LIST.....	7
6	TEST RESULTS AND MEASUREMENT DATA.....	8
6.1	ANTENNA REQUIREMENT.....	8
6.2	CONDUCTED OUTPUT POWER	9
6.3	20dB OCCUPY BANDWIDTH	10
6.4	CARRIER FREQUENCIES SEPARATION.....	11
6.5	HOPPING CHANNEL NUMBER.....	12
6.6	DWELL TIME.....	13
6.7	PSEUDORANDOM FREQUENCY HOPPING SEQUENCE	14
6.8	BAND EDGE.....	15
6.8.1	Conducted Emission Method	15
6.8.2	Radiated Emission Method	16
6.9	SPURIOUS EMISSION.....	21
6.9.1	Conducted Emission Method	21
6.9.2	Radiated Emission Method	22
7	TEST SETUP PHOTO	26
8	EUT CONSTRUCTIONAL DETAILS.....	27

4 Test Summary

Test Items	Section in CFR 47	Result
Antenna Requirement	15.203 & 15.247 (c)	Please refer to report JYTSZB-R12-2100301, FCC ID: UU3FCWSL05-A0.
AC Power Line Conducted Emission	15.207	N/A
Conducted Peak Output Power	15.247 (b)(2)	Please refer to report JYTSZB-R12-2100301, FCC ID: UU3FCWSL05-A0.
20dB Occupied Bandwidth	15.247 (a)(1) (i)	Please refer to report JYTSZB-R12-2100301, FCC ID: UU3FCWSL05-A0.
Carrier Frequencies Separation	15.247 (a)(1)	Please refer to report JYTSZB-R12-2100301, FCC ID: UU3FCWSL05-A0.
Hopping Channel Number	15.247 (a)(1) (i)	Please refer to report JYTSZB-R12-2100301, FCC ID: UU3FCWSL05-A0.
Dwell Time	15.247 (a)(1) (i)	Please refer to report JYTSZB-R12-2100301, FCC ID: UU3FCWSL05-A0.
Spurious Emission	15.205 & 15.209	PASS
Remark: 1. Please refer to report JYTSZB-R12-2100301 issue by JianYan Testing Group Shenzhen Co., Ltd. 2. Please refer to FCC ID: UU3FCWSL05-A0, report No.: JYTSZB-R12-2100301 issue by JianYan Testing Group Shenzhen Co., Ltd. The differences between them as below: Applicant and applicant's address, Product name, model and antenna. So the radiation part needs to retest. 3. Pass: The EUT complies with the essential requirements in the standard. 4. The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).		
Test Method:	ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02	

5 General Information

5.1 Client Information

Applicant:	Shenzhen Friendcom Technology Co., Ltd.
Address:	3/F, 6 Building, Guangqian Industrial Park, Longzhu Road, Xili Town, Nanshan, Shenzhen, China
Manufacturer:	Shenzhen Friendcom Technology Co., Ltd.
Address:	3/F, 6 Building, Guangqian Industrial Park, Longzhu Road, Xili Town, Nanshan, Shenzhen, China
Factory:	Shenzhen Friendcom Technology Co.,Ltd.
Address:	Building 20, Zhubaocheng industry park, 568 Huanchang North Road, Changping Town, Dongguan, Guangdong Province, China

5.2 General Description of E.U.T.

Product Name:	IDUV915-LRW Inductive Sensor Endpoint
Model No.:	FC-725
Operation Frequency:	902 MHz~928MHz
Number of channel:	Upward : 902MHz~915MHz for 64 Down : 923MHz~928MHz for 8
Modulation type:	LoRaWAN
Modulation technology:	FHSS
Antenna Type:	Spring Antenna
Antenna gain:	0 dBi
Power supply:	DC 3.6V
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation Frequency							
Upward:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	902.3MHz	7	903.7MHz	14	905.1MHz	57	913.7MHz
1	902.5MHz	8	903.9MHz	15	905.3MHz	58	913.9MHz
2	902.7MHz	9	904.1MHz	...	...	59	914.1MHz
3	902.9MHz	10	904.3MHz	...	...	60	914.3MHz
4	903.1MHz	11	904.5MHz	...	...	61	914.5MHz
5	903.3MHz	12	904.7MHz	...	...	62	914.7MHz
6	903.5MHz	13	904.9MHz	...	...	63	914.9MHz
Down:							
0	923.3MHz	2	924.5MHz	4	925.7MHz	6	926.9MHz
1	923.9MHz	3	925.1MHz	5	926.3MHz	7	927.5MHz
Remark:							
1. Channel 0, 32 & 63 selected for test.							
2. Down channel only receives data.							

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Modes:	
Non-hopping mode:	Keep the EUT in continuous transmitting mode with worst case data rate.
Hopping mode:	Keep the EUT in hopping mode.
The sample was placed 0.8m (below 1GHz)/1.5m (above 1GHz) above the ground plane of 3m chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working with a fresh battery, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±1.60 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.16 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.20 dB (k=2)

5.6 Additions to, deviations, or exclusions from the method

No

5.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations: ● FCC - Designation No.: CN1211 JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551. ● ISED – CAB identifier.: CN0021 The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1. ● CNAS - Registration No.: CNAS L15527 JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527. ● A2LA - Registration No.: 4346.01 This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf
--

5.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd. Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China. Tel: +86-755-23118282, Fax: +86-755-23116366 Email: info-JYTee@lets.com, Website: http://jyt.lets.com

5.9 Test Instruments list

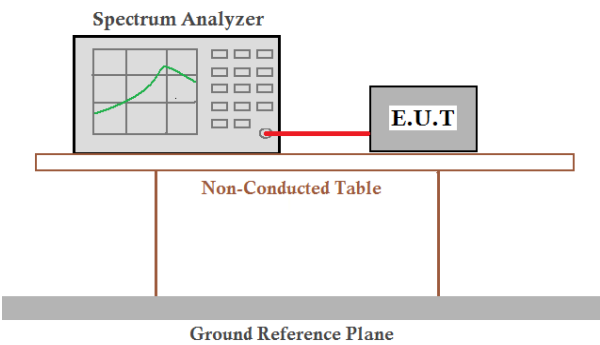
Radiated Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	ETS	9m*6m*6m	966	01-19-2021	01-18-2024
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-03-2021	03-02-2022
				02-17-2022	02-16-2023
Biconical Antenna	SCHWARZBECK	VUBA9117	359	06-20-2021	06-19-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-03-2021	03-02-2022
				02-17-2022	02-16-2023
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-18-2020	06-17-2021
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-18-2020	11-17-2021
				10-17-2021	11-16-2022
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-03-2021	03-02-2022
				02-17-2022	02-16-2023
Pre-amplifier	CD	PAP-1G18	11804	03-03-2021	03-02-2022
				02-17-2022	02-16-2023
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-03-2021	03-02-2022
				02-17-2022	02-16-2023
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-27-2021	11-26-2022
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-03-2021	03-02-2022
				02-17-2022	02-16-2023
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-03-2021	03-02-2022
				02-17-2022	02-16-2023
Cable	MICRO-COAX	MFR64639	K10742-5	03-03-2021	03-02-2022
				02-17-2022	02-16-2023
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-03-2021	03-02-2022
				02-17-2022	02-16-2023
RF Switch Unit	MWRFTTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTTEST	MTS8200	Version: 2.0.0.0		
10m SAC	ETS	RFSD-100-F/A	Q2005	04-28-2021	04-27-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	1249	04-02-2021	04-01-2022
BiConiLog Antenna	SCHWARZBECK	VULB 9168	1250	04-02-2021	04-01-2022
EMI Test Receiver	R&S	ESR 3	102800	04-08-2021	04-07-2022
EMI Test Receiver	R&S	ESR 3	102802	04-08-2021	04-07-2022
Low Pre-amplifier	Bost	LNA 0920N	2016	04-06-2021	04-05-2022
Low Pre-amplifier	Bost	LNA 0920N	2019	04-06-2021	04-05-2022
Cable	Bost	JYT10M-1G-NN-10M	JYT10M-1	04-02-2021	04-01-2022
Cable	Bost	JYT10M-1G-NN-10M	JYT10M-2	04-02-2021	04-01-2022
Test Software	R&S	EMC32	Version: 10.50.40		

6 Test results and measurement data

6.1 Antenna Requirement

Standard requirement:	FCC Part 15 C Section 15.203 & 247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
E.U.T Antenna:	
The LoRa antenna is a Spring antenna which permanently attached, and the best case gain of the antenna is 0 dBi.	

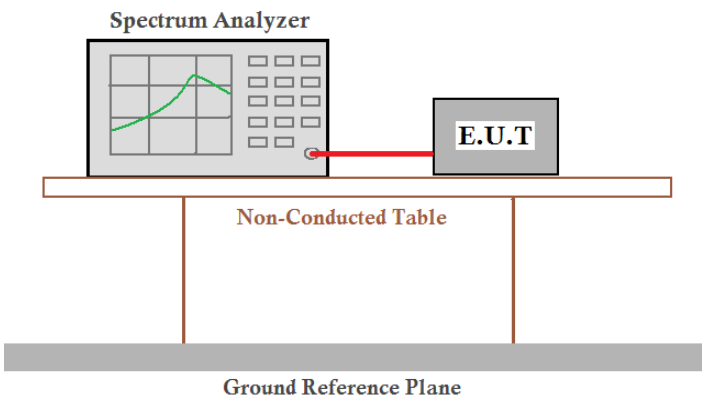
6.2 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(2)
Receiver setup:	RBW=1MHz, VBW=3MHz, Detector=Peak
Limit:	For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Non-hopping mode
Test results:	Pass

Measurement Data:

Refer to FCC ID: UU3FCWSL05-A0, report No. JYTSZB-R12-2100301.

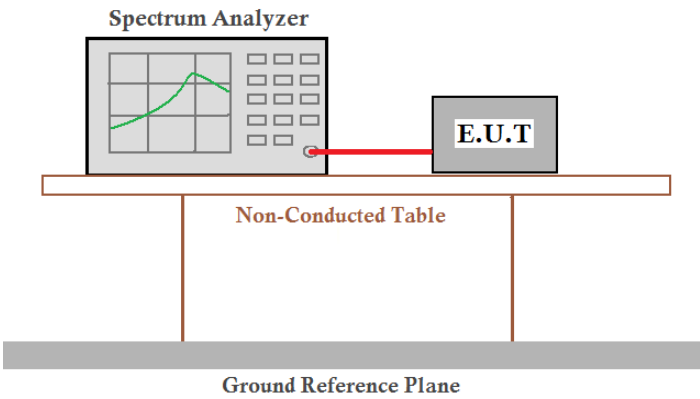
6.3 20dB Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)(i)
Receiver setup:	RBW=30 kHz, VBW=100 kHz, detector=Peak
Limit:	< 250KHz
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green trace, is connected to an E.U.T (Equipment Under Test) box by a red cable. Both the Spectrum Analyzer and the E.U.T are positioned on a 'Non-Conducted Table', which is a rectangular platform supported by two vertical legs. Below this table is a 'Ground Reference Plane', represented by a thick grey horizontal bar.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Non-hopping mode
Test results:	Pass

Measurement Data:

Refer to FCC ID: UU3FCWSL05-A0, report No. JYTSZB-R12-2100301.

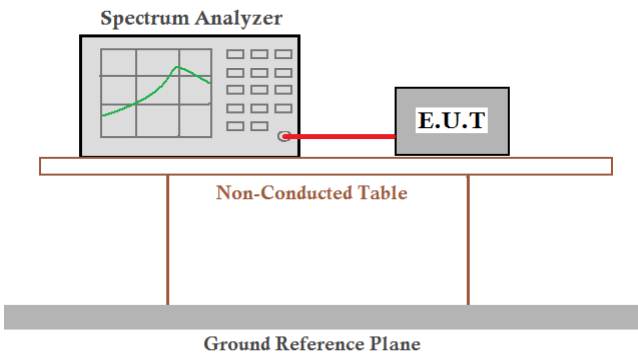
6.4 Carrier Frequencies Separation

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)
Receiver setup:	RBW=100 kHz, VBW=300 kHz, detector=Peak
Limit:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Hopping mode
Test results:	Pass

Measurement Data

Refer to FCC ID: UU3FCWSL05-A0, report No. JYTSZB-R12-2100301.

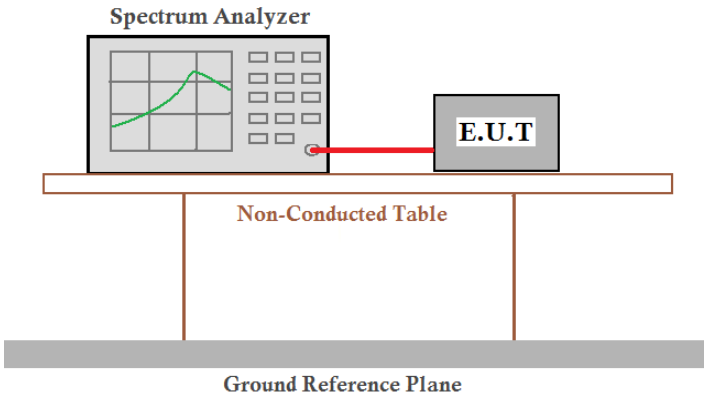
6.5 Hopping Channel Number

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)(i)
Receiver setup:	RBW=100 kHz, VBW=300 kHz, Detector=Peak
Limit:	50 channels
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Hopping mode
Test results:	Pass

Measurement Data:

Refer to FCC ID: UU3FCWSL05-A0, report No. JYTSZB-R12-2100301.

6.6 Dwell Time

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1)(i)
Receiver setup:	RBW=1 MHz, VBW=1 MHz, Span=0 Hz, Detector=Peak
Limit:	Occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green trace, is connected to an E.U.T (Equipment Under Test) box by a red cable. Both the Spectrum Analyzer and the E.U.T are positioned on a 'Non-Conducted Table'. This table is supported by two vertical legs that rest on a 'Ground Reference Plane', which is represented by a thick grey horizontal bar at the bottom of the setup.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Hopping mode
Test results:	Pass

Measurement Data:

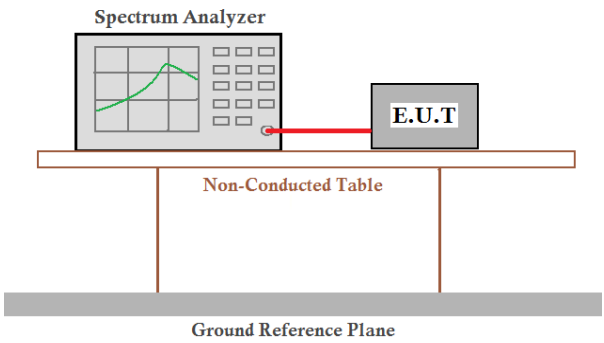
Refer to FCC ID: UU3FCWSL05-A0, report No. JYTSZB-R12-2100301.

6.7 Pseudorandom Frequency Hopping Sequence

Test Requirement:	FCC Part 15 C Section 15.247 (a)(1) requirement:
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively. Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.	
EUT Pseudorandom Frequency Hopping Sequence	
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONES; i.e. the shift register is initialized with nine ones. • Number of shift register stages: 9 • Length of pseudo-random sequence: $2^9 - 1 = 511$ bits • Longest sequence of zeros: 8 (non-inverted signal) <i>Linear Feedback Shift Register for Generation of the PRBS sequence</i> An example of Pseudorandom Frequency Hopping Sequence as follow: Each frequency used equally on the average by each transmitter. The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.	

6.8 Band Edge

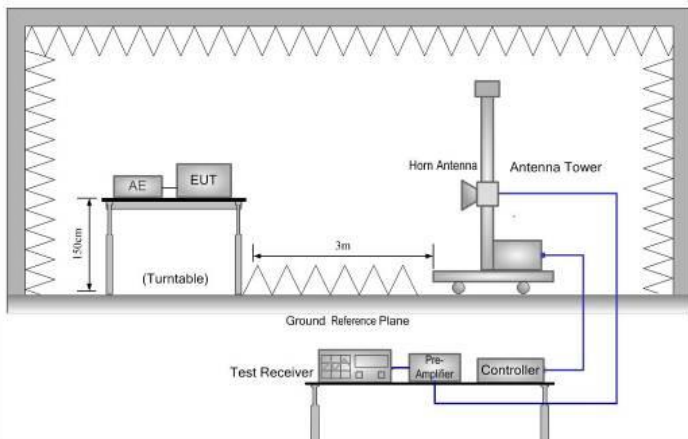
6.8.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Receiver setup:	RBW=100 kHz, VBW=300 kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Non-hopping mode and hopping mode
Test results:	Pass

Test plot as follows:

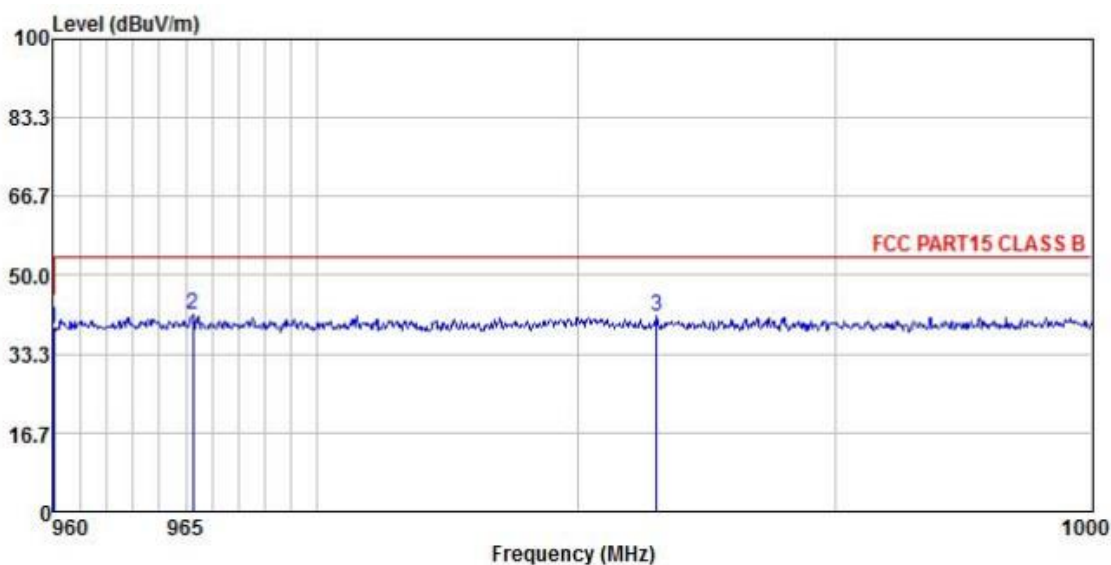
Refer to FCC ID: UU3FCWSL05-A0, report No. JYTSZB-R12-2100301.

6.8.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Frequency Range:	960MHz to1240MHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	Above 1GHz		54.00		Average Value
			74.00		Peak Value
Test setup:					
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.				
Test Instruments:	Refer to section 5.9 for details				
Test mode:	Non-hopping mode				
Test results:	Passed				

Below 1GHz:

Product Name:	IDUV915-LRW Inductive Sensor Endpoint	Product Model:	FC-725
Test By:	Janet	Test mode:	Tx mode
Test Channel:	960 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	DC 3.6V	Environment:	Temp: 22.1℃ Humi:59%

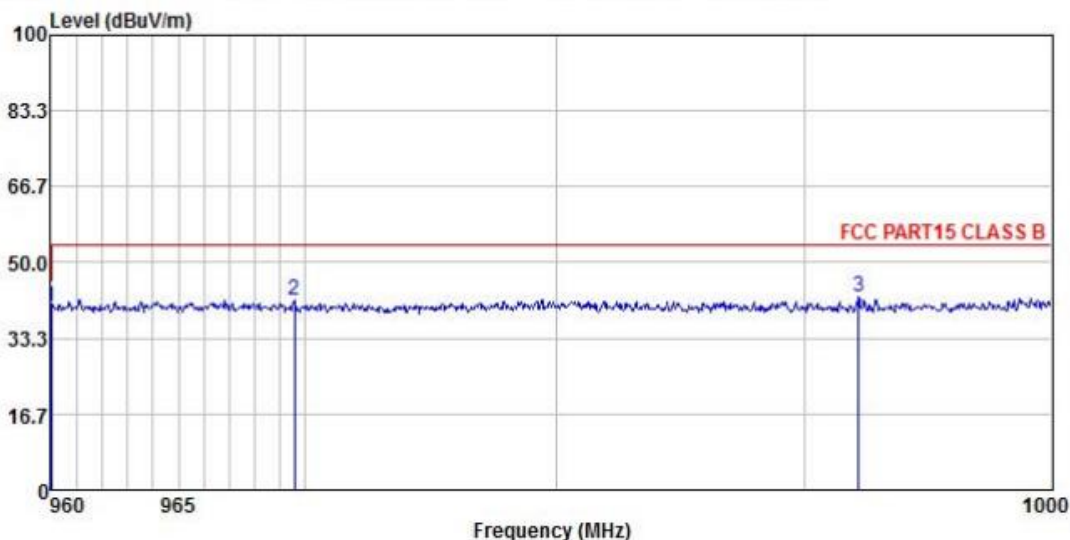


	Freq	ReadAntenna	Cable Preamp	Level	Limit	Over	Remark
	MHz	Level	Factor	Loss Factor	dB	Line	Limit
		dBuV	dB/m	dB	dB	dBuV/m	dB
1	960.000	12.44	22.86	3.51	0.00	38.81	46.00 -7.19
2	965.266	15.37	22.90	3.54	0.00	41.81	54.00 -12.19
3	983.041	14.72	23.00	3.61	0.00	41.33	54.00 -12.67

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Low mid high channels all have been tested, high channel is worse case and only reported; below 1GHz, level reported is QP.

Product Name:	IDUV915-LRW Inductive Sensor Endpoint	Product Model:	FC-725
Test By:	Janet	Test mode:	Tx mode
Test Channel:	960 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	DC 3.6V	Environment:	Temp:22.1℃ Humi:59%



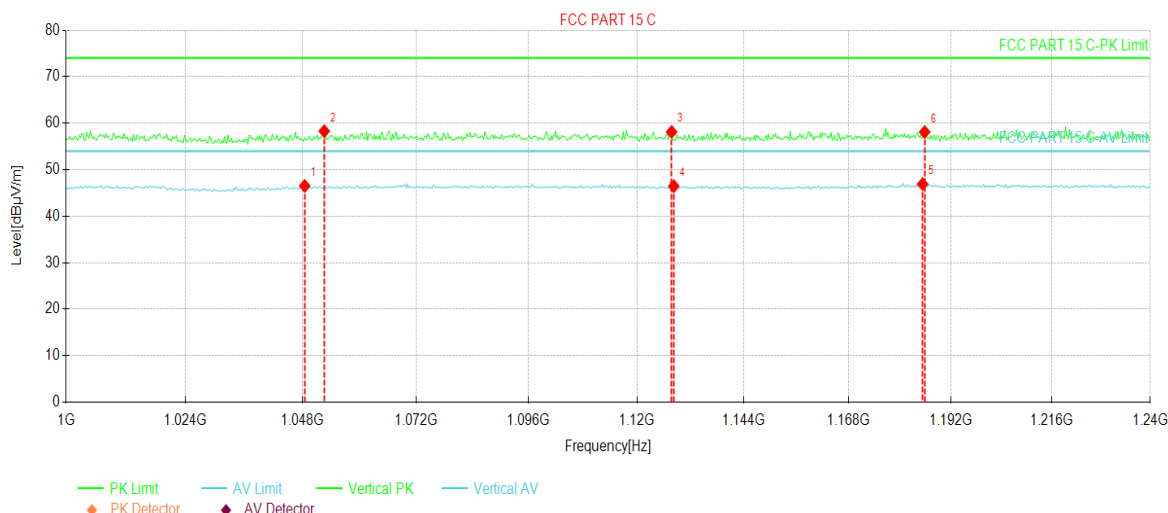
	Read	Antenna	Cable	Preamp	Level	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	960.000	14.00	22.86	3.51	0.00	40.37	46.00	-5.63
2	969.570	15.27	22.92	3.55	0.00	41.74	54.00	-12.26
3	992.152	15.70	23.06	3.65	0.00	42.41	54.00	-11.59

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Low mid high channels all have been tested, high channel is worse case and only reported; below 1GHz, level reported is QP.

Above 1GHz:

Product Name:	IDUV915-LRW Inductive Sensor Endpoint	Product Model:	FC-725
Test By:	Janet	Test mode:	Tx mode
Test Channel:	1GHz ~ 1.24 GHz	Polarization:	Vertical
Test Voltage:	DC 3.6V	Environment:	Temp: 22.1℃ Humi:59%

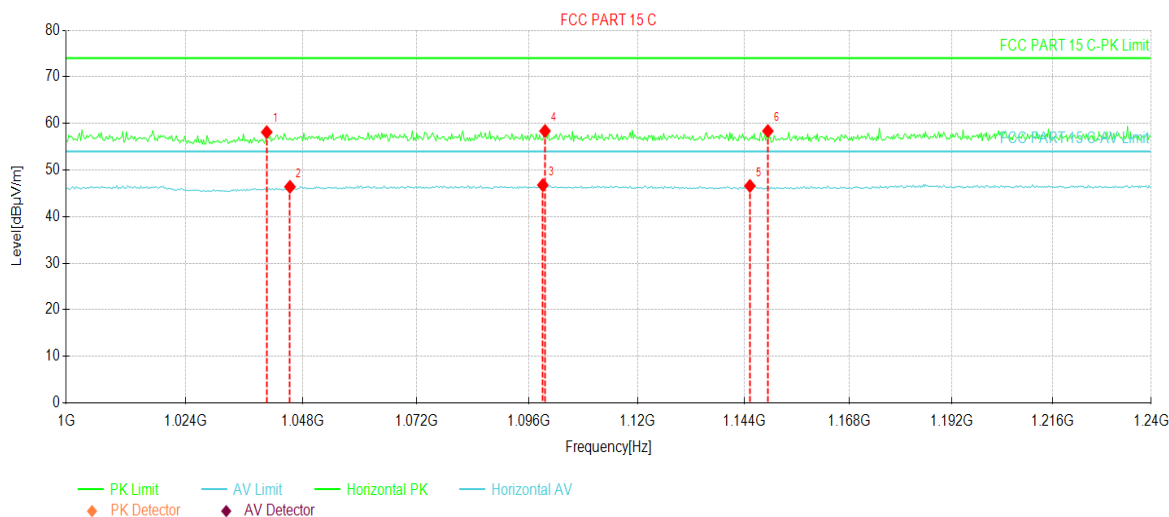


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1048.48	16.24	46.50	30.26	54.00	7.50	AV	Vertical
2	1052.56	27.98	58.28	30.30	74.00	15.72	PK	Vertical
3	1127.68	27.29	58.12	30.83	74.00	15.88	PK	Vertical
4	1128.16	15.61	46.45	30.84	54.00	7.55	AV	Vertical
5	1185.28	15.80	46.89	31.09	54.00	7.11	AV	Vertical
6	1185.76	26.99	58.09	31.10	74.00	15.91	PK	Vertical

Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- Low mid high channels all have been tested, high channel is worse case and only reported; below 1GHz, level reported is QP.

Product Name:	IDUV915-LRW Inductive Sensor Endpoint	Product Model:	FC-725
Test By:	Janet	Test mode:	Tx mode
Test Channel:	1GHz ~ 1.24 GHz	Polarization:	Horizontal
Test Voltage:	DC 3.6V	Environment:	Temp: 22.1℃ Humi: 59%



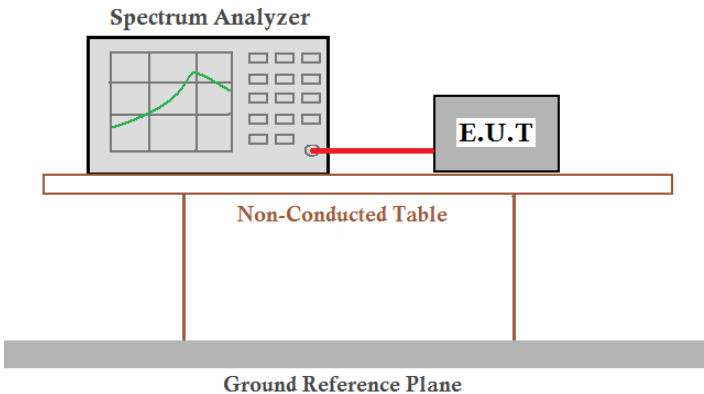
Suspected Data List								
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1040.56	27.93	58.12	30.19	74.00	15.88	PK	Horizontal
2	1045.36	16.16	46.39	30.23	54.00	7.61	AV	Horizontal
3	1099.12	16.06	46.76	30.70	54.00	7.24	AV	Horizontal
4	1099.60	27.65	58.36	30.71	74.00	15.64	PK	Horizontal
5	1145.20	15.66	46.57	30.91	54.00	7.43	AV	Horizontal
6	1149.28	27.43	58.36	30.93	74.00	15.64	PK	Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Low mid high channels all have been tested, high channel is worse case and only reported; below 1GHz, level reported is QP.

6.9 Spurious Emission

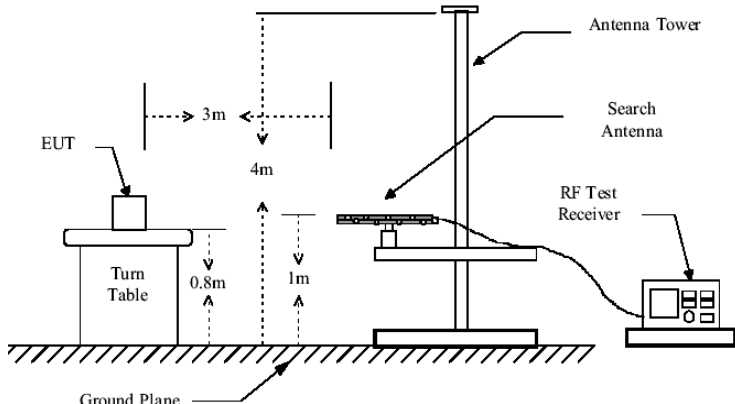
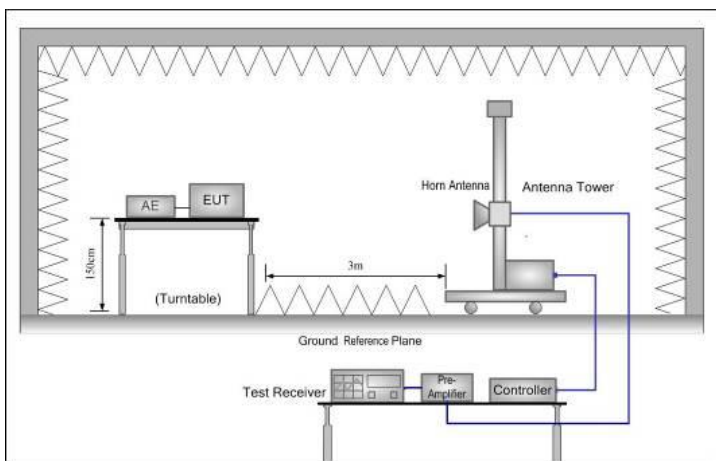
6.9.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs and sits on a Ground Reference Plane.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Non-hopping mode
Test results:	Pass

Test plot as follows:

Refer to FCC ID: UU3FCWSL05-A0, report No. JYTSZB-R12-2100301.

6.9.2 Radiated Emission Method

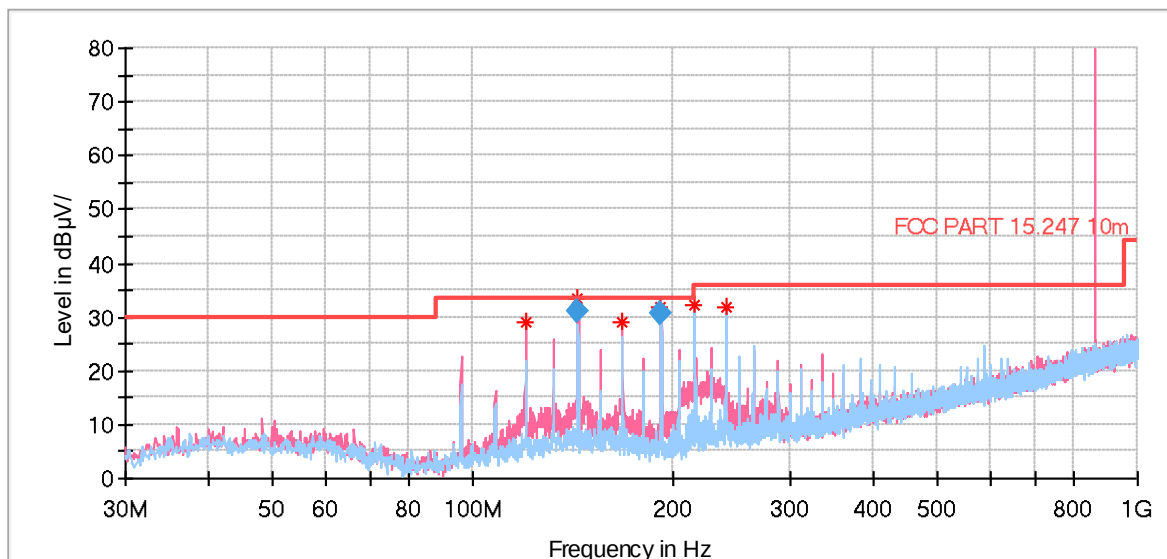
Test Requirement:	FCC Part 15 C Section 15.209				
Test Frequency Range:	9 kHz to 10 GHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Above 1GHz		54.0		Average Value
74.0			Peak Value		
Test setup:	Below 1GHz				
					
	Above 1GHz				
					
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz) /1.5m(above 1GHz) above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna				

	tower. - The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. - For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. - The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. - If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Non-hopping mode
Test results:	Pass
Remark:	- Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 9 kHz to 30 MHz is noise floor, so only shows the data of above 30MHz in this report.

Measurement Data (worst case):
Below 1GHz:

Product Name:	IDUV915-LRW Inductive Sensor Endpoint	Product Model:	FC-725
Test By:	Janet	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical &Horizontal
Test Voltage:	DC 3.6V	Environment:	Temp: 22.1℃ Humi: 59%

Full Spectrum



Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
120.016000	29.23	33.50	4.27	100.0	V	85.0	-17.1
143.975000	33.57	33.50	-0.07	100.0	V	90.0	-15.6
167.934000	28.92	33.50	4.58	100.0	V	73.0	-16.2
191.990000	31.67	33.50	1.83	100.0	V	96.0	-17.9
216.046000	32.35	36.00	3.65	100.0	V	124.0	-17.3
240.005000	32.03	36.00	3.97	100.0	V	90.0	-15.7

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
144.005000	31.02	33.50	2.48	100.0	V	73.0	-16.2
191.990000	30.54	33.50	2.96	100.0	V	96.0	-17.9

Remark:

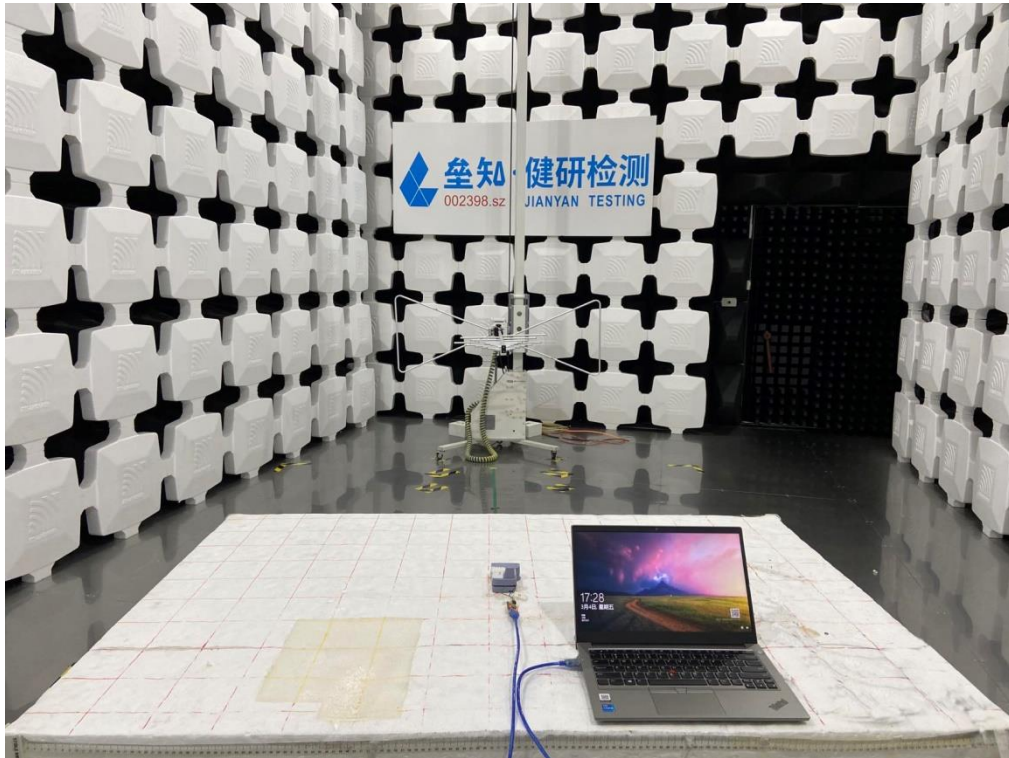
1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Above 1GHz:

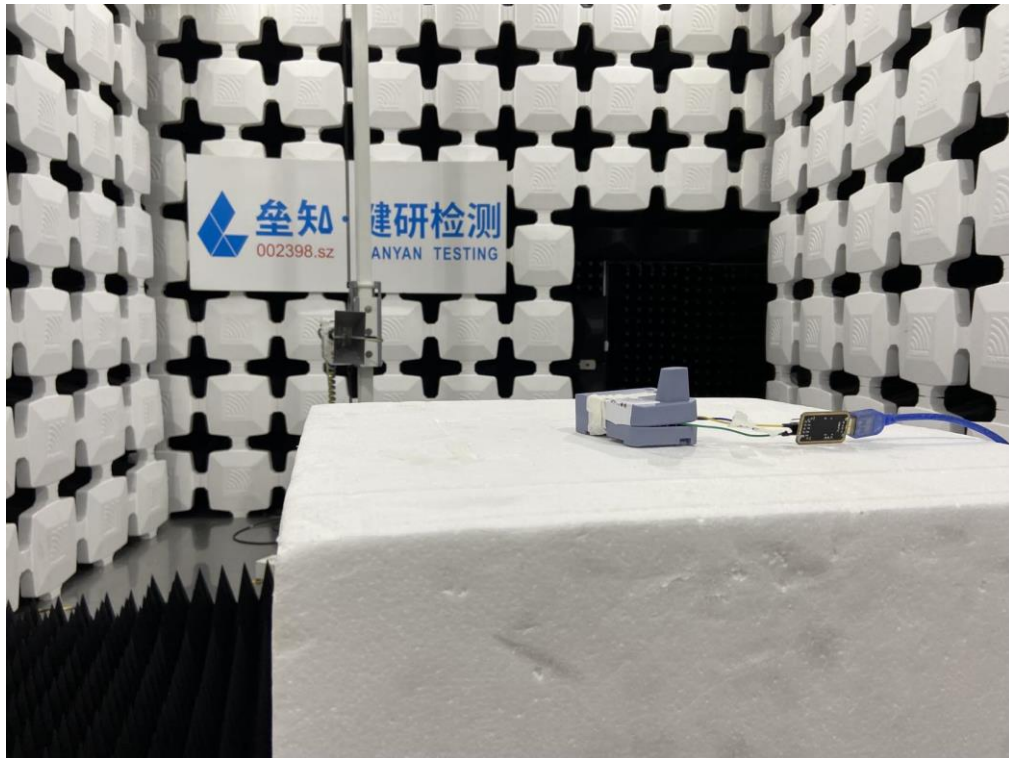
Test channel: Lowest channel									
Detector: Peak Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1804.60	72.33	25.22	7.92	0.00	54.72	50.75	74.00	-23.25	Vertical
1804.60	76.47	25.22	7.92	0.00	54.72	54.89	74.00	-19.11	Horizontal
Detector: Average Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1804.60	69.14	25.22	7.92	0.00	54.72	47.56	54.00	-6.44	Vertical
1804.60	68.80	25.22	7.92	0.00	54.72	47.22	54.00	-6.78	Horizontal
Test channel: Middle channel									
Detector: Peak Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1817.40	74.12	25.29	7.94	0.00	54.71	52.64	74.00	-21.36	Vertical
1817.40	76.47	25.29	7.94	0.00	54.71	54.99	74.00	-19.01	Horizontal
Detector: Average Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1817.40	56.12	25.33	7.82	0.00	54.71	34.56	54.00	-19.44	Vertical
1817.40	68.80	25.33	7.82	0.00	54.71	47.24	54.00	-6.76	Horizontal
Test channel: Highest channel									
Detector: Peak Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1829.80	73.60	25.33	7.96	0.00	54.71	52.18	74.00	-21.82	Vertical
1829.80	78.58	25.33	7.96	0.00	54.71	57.16	74.00	-16.84	Horizontal
Detector: Average Value									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor(dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1829.80	69.93	25.33	7.82	0.00	54.71	48.37	54.00	-5.63	Vertical
1829.80	74.48	25.33	7.82	0.00	54.71	52.92	54.00	-1.08	Horizontal
Remark:									
1. Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).									
2. The emission levels of other frequencies are lower than the limit 20dB and not show in test report.									

7 Test Setup Photo

Radiated Spurious Emission
Below 1GHz



Above 1GHz



8 EUT Constructional Details

Reference to the test report No.: JYTSZB-R01-2100914.

-----End of report-----