

FCC REPORT

(ZIGBEE)

Applicant: AZTECH TECHNOLOGIES PTE LTD

Address of Applicant: 31 Ubi Road 1, #01-05, Singapore 408694

Equipment Under Test (EUT)

Product Name: Smart Motion Sensor

Model No.: KSEN-210-ZB

Trade mark: Kyla

FCC ID: I38KSEN210ZB

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

Date of sample receipt: 01 Jul., 2020

Date of Test: 02 Jul., to 21 Jul., 2020

Date of report issued: 15 Sep., 2020

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.

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2 Version

Version No.	Date	Description
00	22 Jul., 2020	Original
01	15 Sep., 2020	Update Page 4, 7, 8

Tested by:

Yao Wu

Test Engineer

Date:

15 Sep., 2020

Reviewed by:

Winner Zhang

Project Engineer

Date:

15 Sep., 2020

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4 Test Summary

Test Items	Section in CFR 47	Result
Antenna requirement	15.203 & 15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	N/A
Conducted Peak Output Power	15.247 (b)(3)	Pass
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247 (d)	Pass
Spurious Emission	15.205 & 15.209	Pass
Remark: <ol style="list-style-type: none">1. Pass: The EUT complies with the essential requirements in the standard.2. N/A: The EUT not applicable of the test item.3. 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:	AZTECH TECHNOLOGIES PTE LTD
Address:	31 Ubi Road 1, #01-05, Singapore 408694
Manufacturer:	AZTECH TECHNOLOGIES PTE LTD
Address:	31 Ubi Road 1, #01-05, Singapore 408694
Factory:	Aztech Communication Device (DG) LTD
Address:	Jiu Jiang Shui Village, Chang Ping Town, Dong Guan City, Guang Dong Province, China.

5.2 General Description of E.U.T.

Product Name:	Smart Motion Sensor
Model No.:	KSEN-210-ZB
Operation Frequency:	2405MHz~2480MHz (IEEE 802.15.4)
Channel numbers:	16 for (IEEE 802.15.4)
Channel separation:	5 MHz
Modulation technology: (IEEE 802.15.4)	OQPSK
Data speed(IEEE 802.15.4):	250kbps
Antenna Type:	PCB antenna
Antenna gain:	1.5 dBi
Power supply:	DC 3.0V ("AAA" battery X 2)
Test Sample Condition:	The applicant provided engineering samples for staying in continuously transmitting for testing.

Operation Frequency each of channel for IEEE 802.15.4							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2405MHz	5	2425MHz	9	2445MHz	13	2465MHz
2	2410MHz	6	2430MHz	10	2450MHz	14	2470MHz
3	2415MHz	7	2435MHz	11	2455MHz	15	2475MHz
4	2420MHz	8	2440MHz	12	2460MHz	16	2480MHz
Note: 1. Channel 1, 8 & 16 selected for IEEE 802.15.4 as Lowest, Middle and Highest channel.							

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode	Keep the EUT in continuous transmitting with modulation
<p>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, 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. Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.</p>	

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)	±3.20dB (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 - Registration No.: CN1211**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

● **IC - Registration No.: CN0021**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 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

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
 Address: No.110~116, Building B, Jinyuan Business Building, Xixiang Road,
 Bao'an District, Shenzhen, Guangdong, China
 Tel: +86-755-23118282, Fax: +86-755-23116366
 Email: info@ccis-cb.com, Website: <http://www.ccis-cb.com>

5.9 Test Instruments list

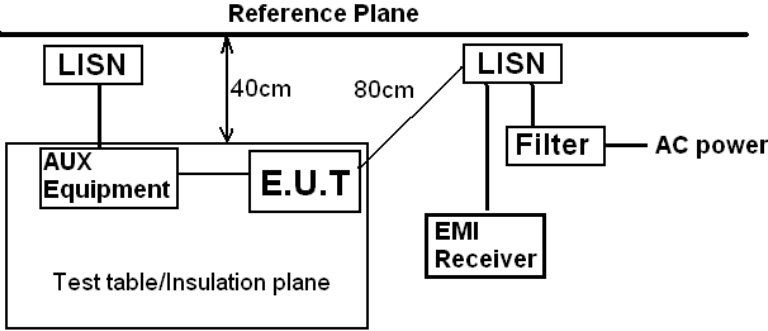
Radiated Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
				07-22-2020	07-21-2023
Loop Antenna	SCHWARZBECK	FMZB1519B	00044	03-18-2020	03-17-2021
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2020	03-17-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2020	03-17-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-21-2020	06-20-2023
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-18-2019	11-17-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-18-2020	03-17-2021
Pre-amplifier	CD	PAP-1G18	11804	03-18-2020	03-17-2021
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2020	03-17-2021
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-18-2019	11-17-2020
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2020	03-17-2021
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-18-2020	03-17-2021
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2020	03-17-2021
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2020	03-17-2021
RF Switch Unit	MWRFTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTEST	MTS8200	Version: 2.0.0.0		

6 Test results and Measurement Data

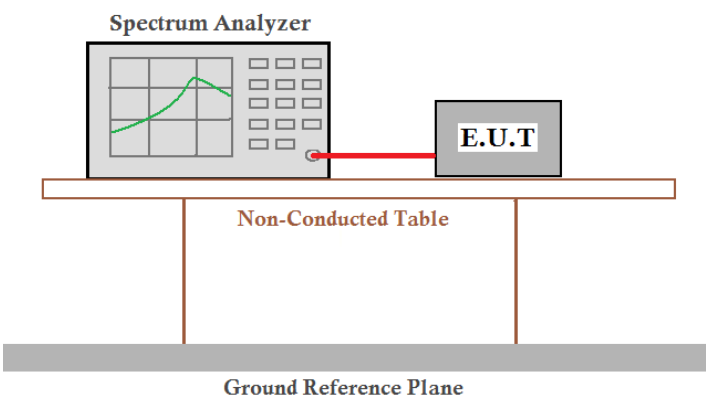
6.1 Antenna requirement:

Standard requirement:	FCC Part 15 C Section 15.203 /247(b)
<p>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.</p> <p>15.247(b) (4) requirement: (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p>	
E.U.T Antenna:	
The Zigbee antenna is an PCB antenna which cannot replace by end-user, the best-case gain of the antenna is 1.5 dBi.	

6.2 Conducted Emission

Test Requirement:	FCC Part 15 C Section 15.207		
Test Frequency Range:	150 kHz to 30 MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test procedure:	<ol style="list-style-type: none"> The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10(latest version) on conducted measurement. 		
Test setup:	 <p><i>Remark:</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>		
Test Instruments:	Refer to section 5.9 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	N/A: EUT is powered by DC3V ("AAA" battery X 2)		

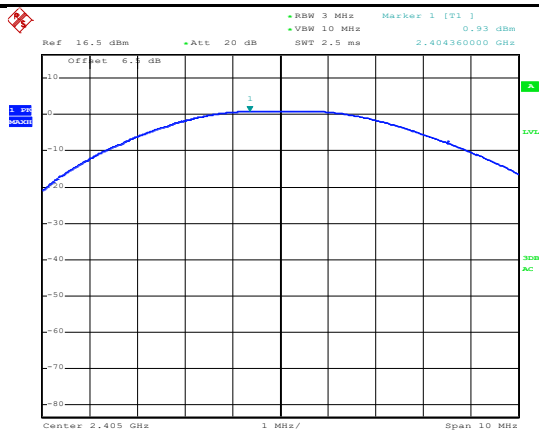
6.3 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(3)
Limit:	30dBm
Test setup:	 <p>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.</p>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

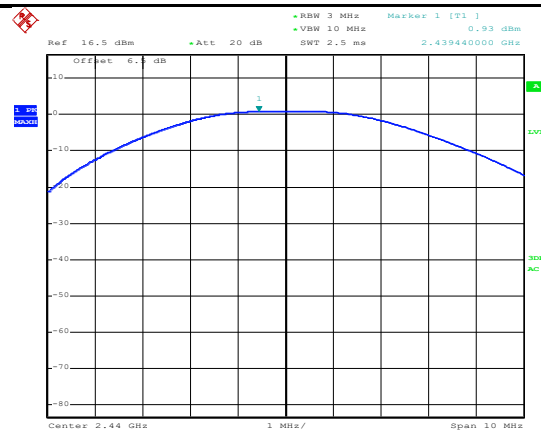
Test CH	Maximum Conducted Output Power (dBm)	Limit(dBm)	Result
Lowest	0.93	30.00	Pass
Middle	0.93		
Highest	0.93		

Test plot as follows:



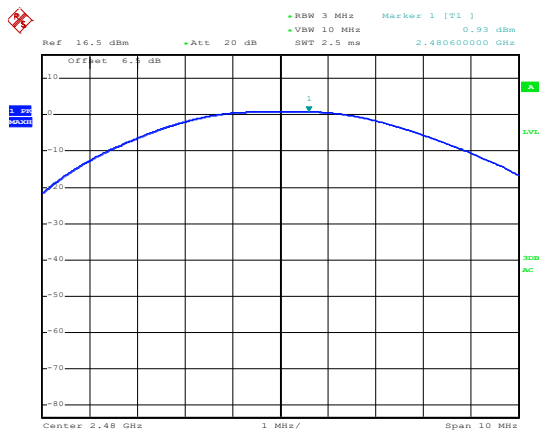
Date: 15.JUL.2020 19:51:38

Lowest channel



Date: 15.JUL.2020 19:52:45

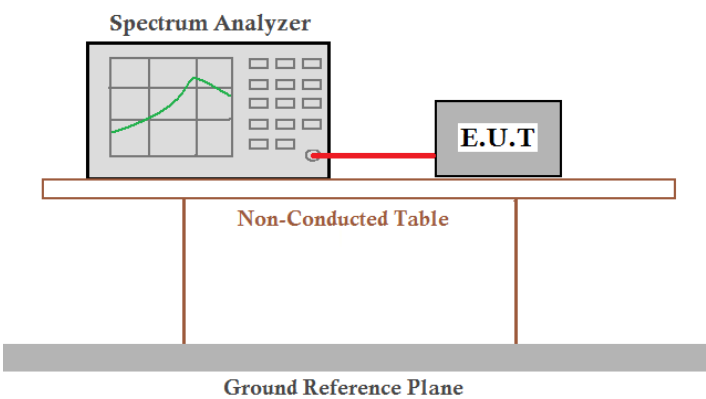
Middle channel



Date: 15.JUL.2020 19:53:13

Highest channel

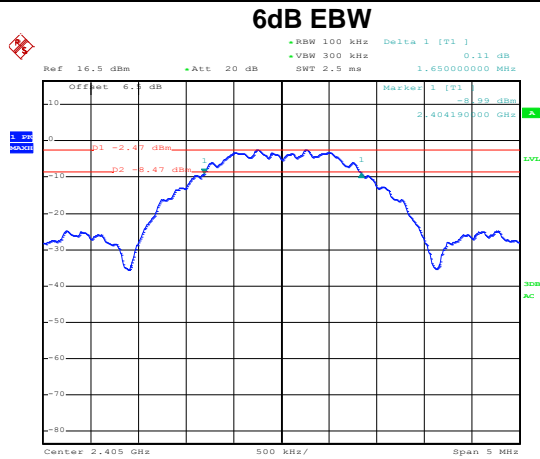
6.4 Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(2)
Limit:	>500kHz
Test setup:	 <p>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. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

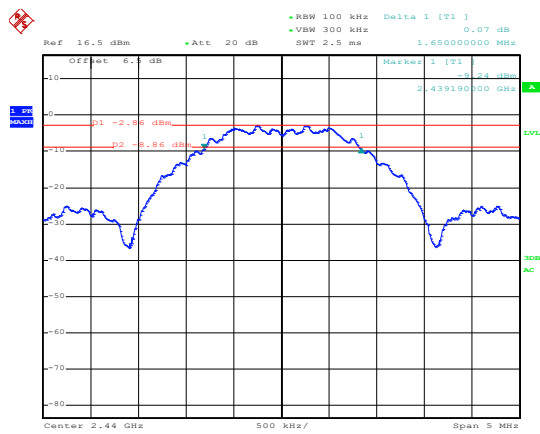
Test CH	6dB Emission Bandwidth (MHz)	Limit(kHz)	Result
Lowest	1.650	>500	Pass
Middle	1.650		
Highest	1.630		
Test CH	99% Occupy Bandwidth (MHz)	Limit(kHz)	Result
Lowest	2.570	N/A	N/A
Middle	2.570		
Highest	2.580		

Test plot as follows:



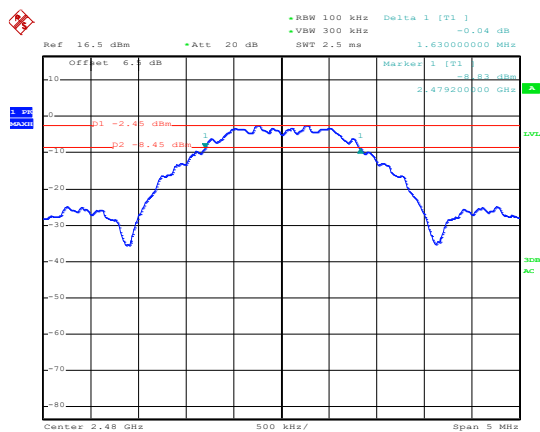
Date: 15.JUL.2020 20:14:14

Lowest channel



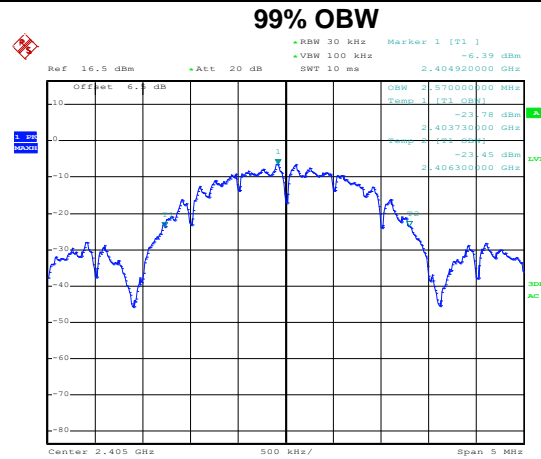
Date: 15.JUL.2020 20:09:42

Middle channel



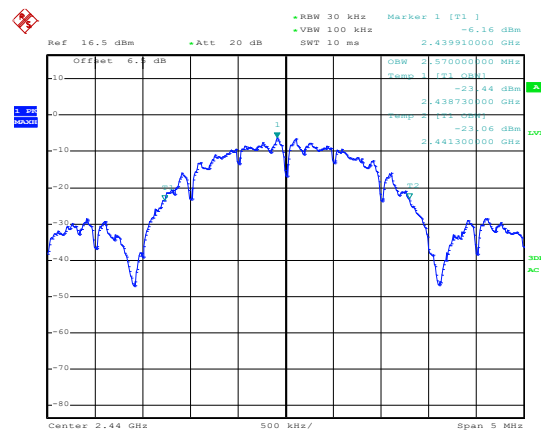
Date: 15.JUL.2020 20:08:06

Highest channel



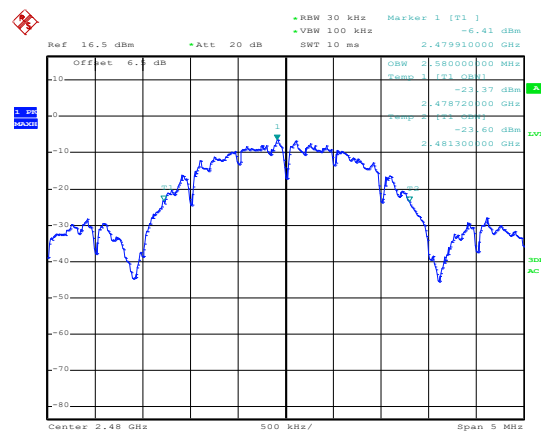
Date: 15.JUL.2020 20:16:24

Lowest channel



Date: 15.JUL.2020 20:15:52

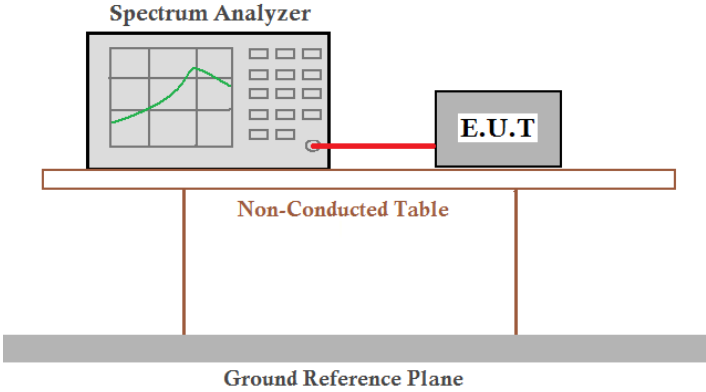
Middle channel



Date: 15.JUL.2020 20:16:52

Highest channel

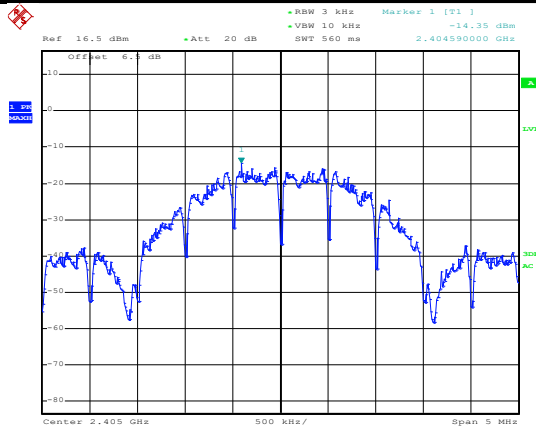
6.5 Power Spectral Density

Test Requirement:	FCC Part 15 C Section 15.247 (e)
Limit:	8 dBm/3kHz
Test setup:	 <p>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. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

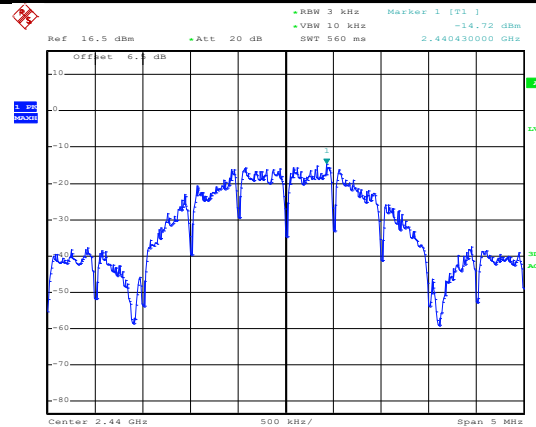
Test CH	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-14.35	8.00	Pass
Middle	-14.72		
Highest	-15.02		

Test plots as follow:



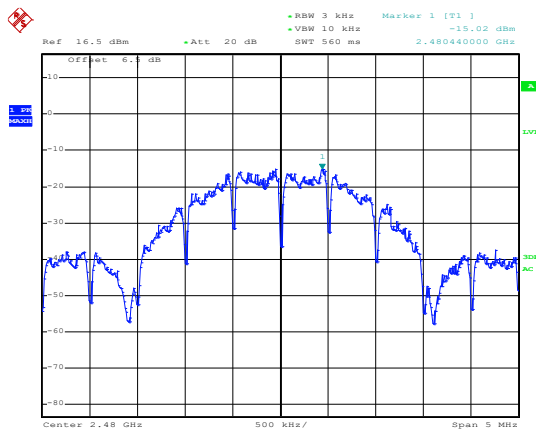
Date: 15.JUL.2020 20:18:18

Lowest channel



Date: 15.JUL.2020 20:17:55

Middle channel

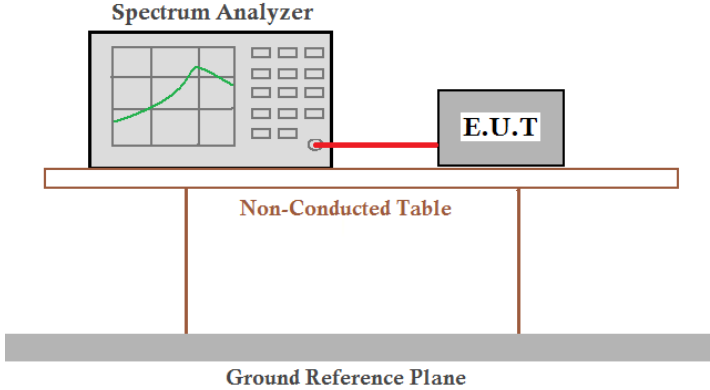


Date: 15.JUL.2020 20:17:24

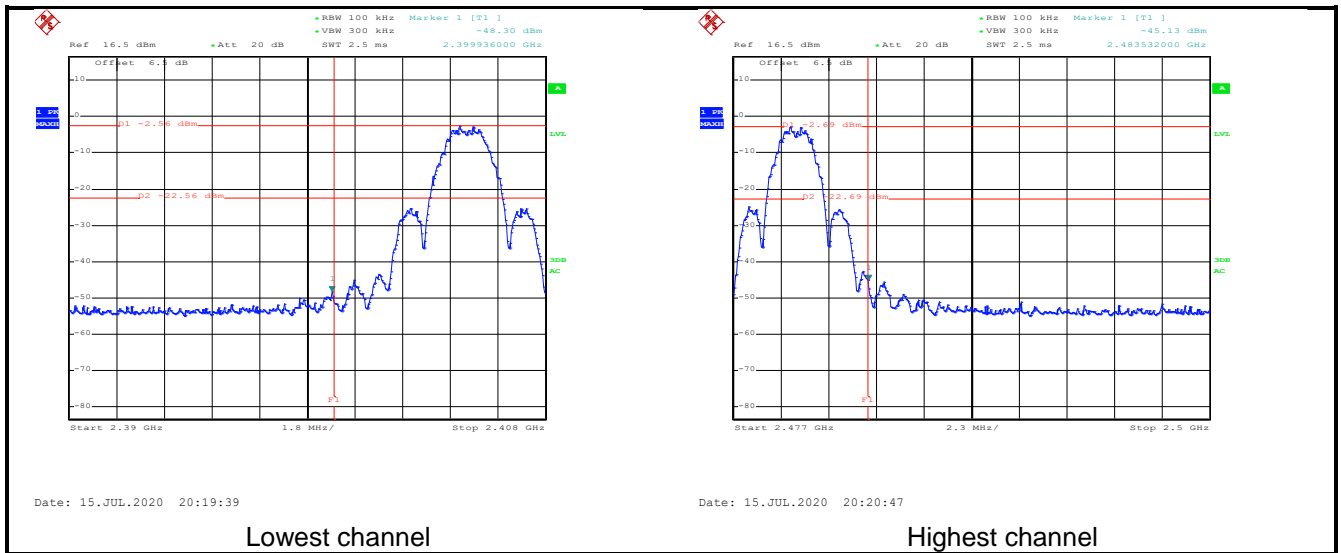
Highest channel

6.6 Band Edge

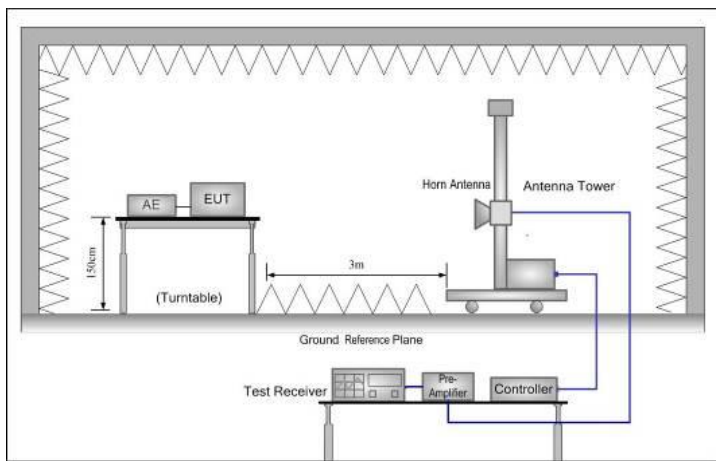
6.6.1 Conducted Emission Method

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:	 <p>The diagram illustrates the test setup for conducted emission measurement. It shows a Spectrum Analyzer 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, which is supported by two vertical legs. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

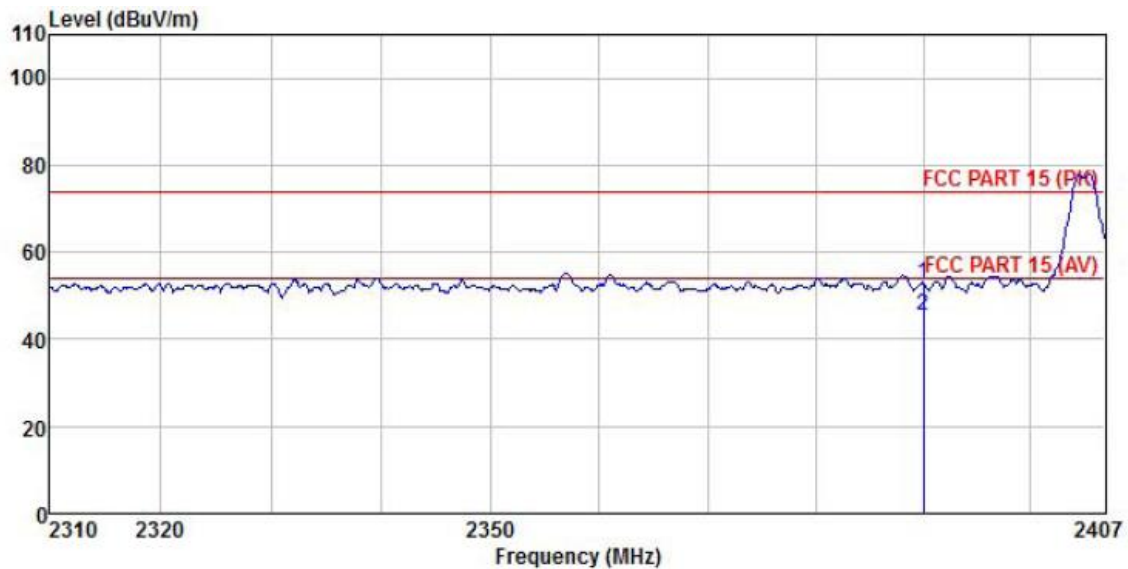
Test plots as follow:



6.6.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.205 and 15.209				
Test Frequency Range:	2310 MHz to 2390 MHz and 2483.5 MHz to 2500 MHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak RMS	1MHz 1MHz	3MHz 3MHz	Peak Value Average Value
Limit:	Frequency	Limit (dBuV/m @3m)		Remark	
	Above 1GHz	54.00 74.00		Average Value Peak Value	
Test Procedure:	<div>1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>6. If the emission level of the EUT in peak mode was 10 dB 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 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</div>				
Test setup:	<div></div>				
Test Instruments:	Refer to section 5.9 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Passed				

Product Name:	Smart Motion Sensor	Product model:	KSEN-210-ZB
Test By:	Yaro	Test mode:	Tx mode
Test Channel:	Lowest channel	Polarization:	Vertical
Test Voltage:	DC 3.0V	Environment:	Temp: 24°C Humi: 57%

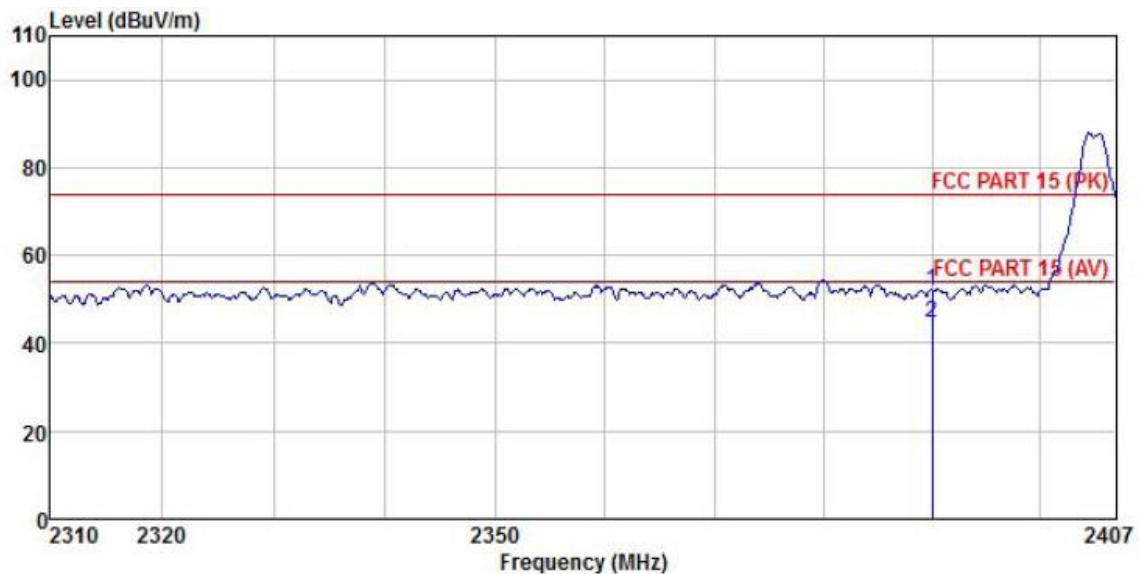


	Freq	ReadAntenna	Cable	Aux	Preamp	Level	Limit	Over	Remark
	MHz	Level	Factor	Loss	Factor	Factor	Line	Limit	
		dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB
1	2390.000	19.91	27.03	4.28	1.68	0.00	52.90	74.00	-21.10 Peak
2	2390.000	12.51	27.03	4.28	1.68	0.00	45.50	54.00	-8.50 Average

Remark:

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

Product Name:	Smart Motion Sensor	Product model:	KSEN-210-ZB
Test By:	Yaro	Test mode:	Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	DC 3.0V	Environment:	Temp: 24℃ Humi: 57%

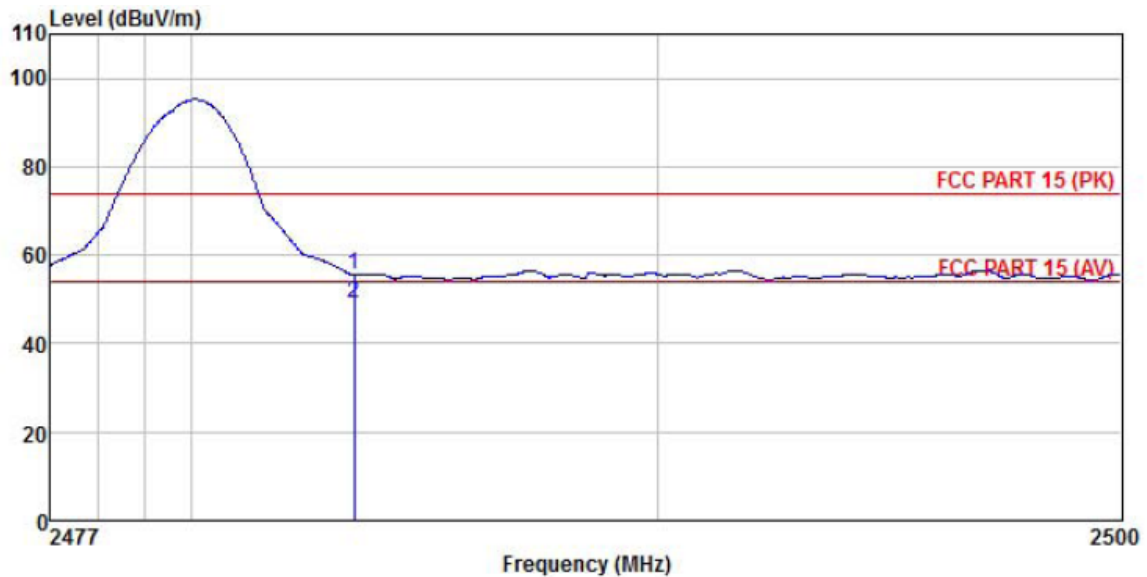


	Read	Antenna	Cable	Aux	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Factor	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB
1 2390.000	19.16	27.03	4.28	1.68	0.00	52.15	74.00	-21.85 Peak
2 2390.000	11.57	27.03	4.28	1.68	0.00	44.56	54.00	-9.44 Average

Remark:

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

Product Name:	Smart Motion Sensor	Product model:	KSEN-210-ZB
Test By:	Yaro	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	DC 3.0V	Environment:	Temp: 24°C Humi: 57%

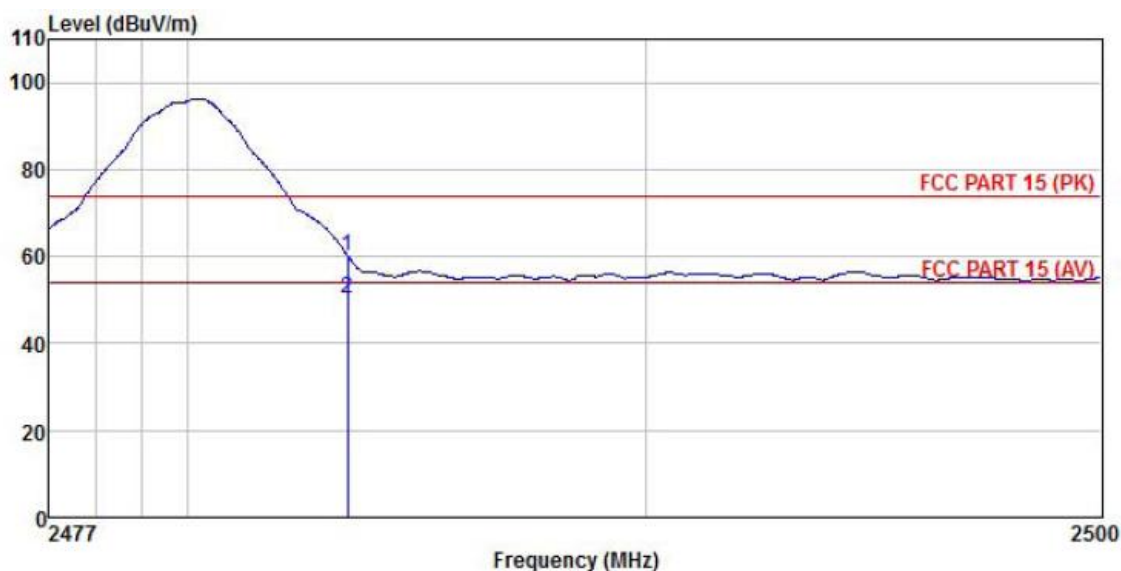


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	22.29	27.27	4.38	1.70	0.00	55.64	74.00	-18.36	Peak
2	2483.500	15.91	27.27	4.38	1.70	0.00	49.26	54.00	-4.74	Average

Remark:

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

Product Name:	Smart Motion Sensor	Product model:	KSEN-210-ZB
Test By:	Yaro	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	DC 3.0V	Environment:	Temp: 24℃ Humi: 57%



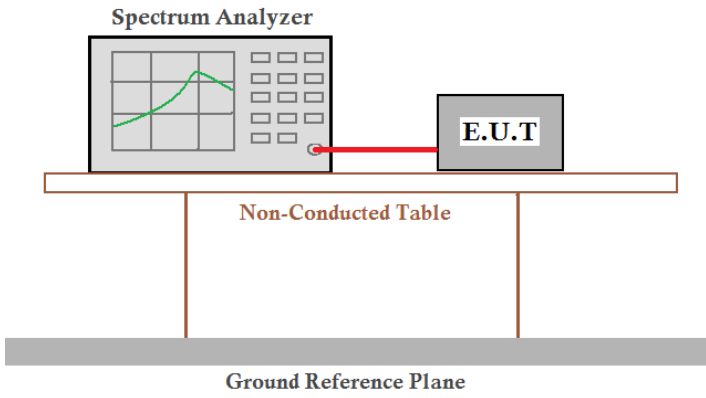
	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	26.70	27.27	4.38	1.70	0.00	60.05	74.00	-13.95	Peak
2	2483.500	17.06	27.27	4.38	1.70	0.00	50.41	54.00	-3.59	Average

Remark:

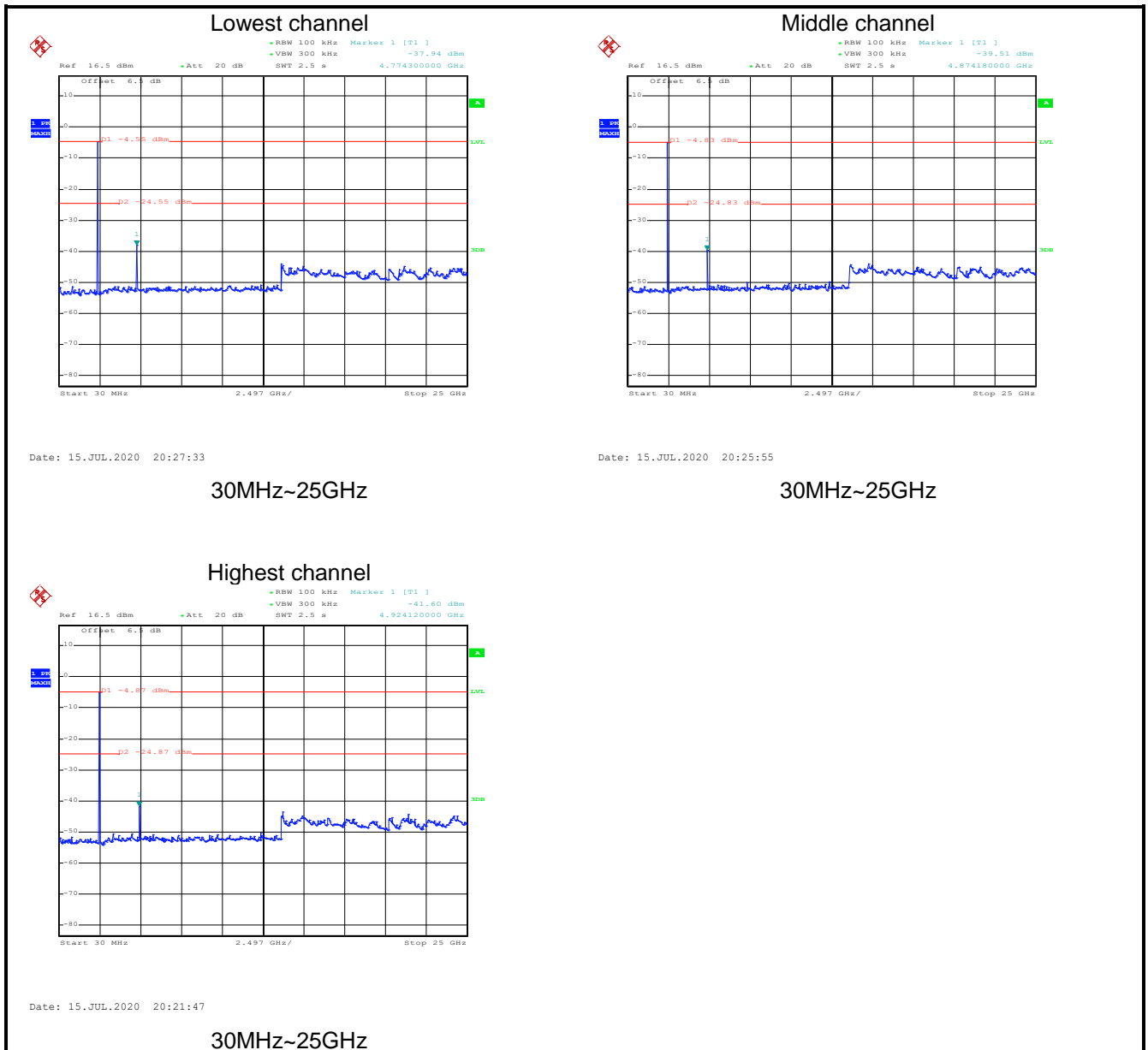
1. Final Level = Receiver Read level + Antenna Factor + Cable Loss + Aux Factor – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

6.7 Spurious Emission

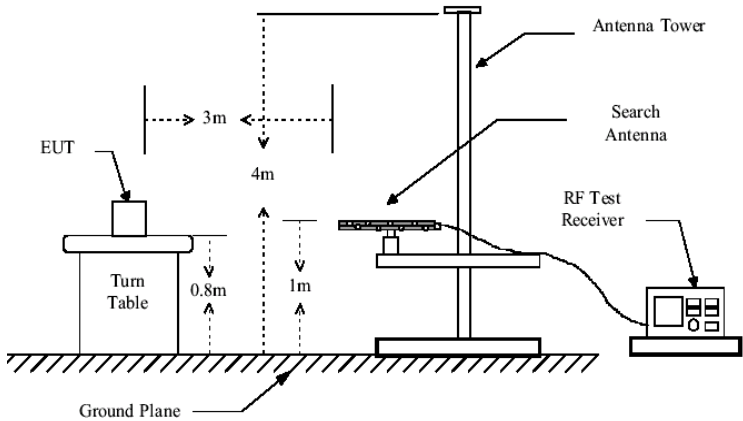
6.7.1 Conducted Emission Method

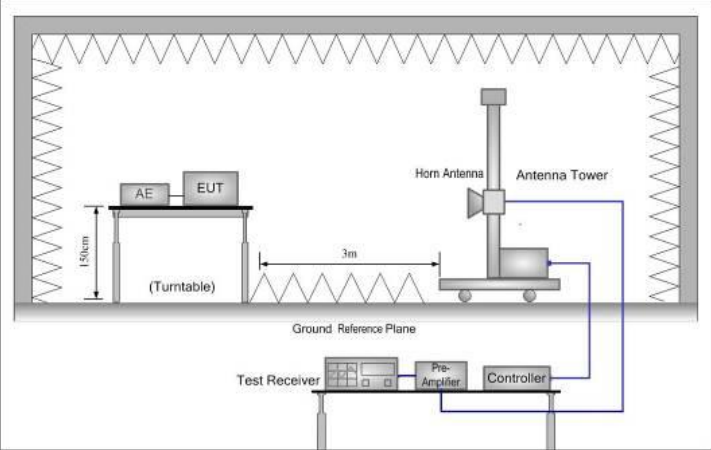
Test Requirement:	FCC Part 15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup for conducted emission measurements. A Spectrum Analyzer, shown with a grid and a green trace, is connected to an Equipment Under Test (E.U.T) box by a red cable. Both the Spectrum Analyzer and the E.U.T are positioned on a table labeled 'Non-Conducted Table'. This table is supported by two vertical legs and rests on a thick grey horizontal bar labeled 'Ground Reference Plane'.</p>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Test plot as follows:



6.7.2 Radiated Emission Method

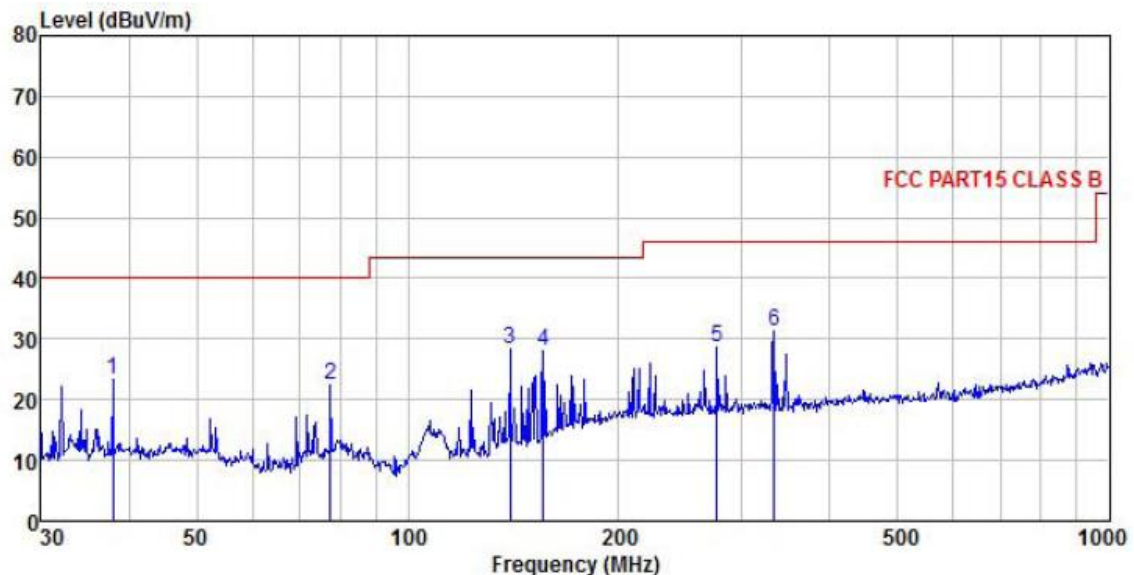
Test Requirement:	FCC Part 15 C Section 15.205 and 15.209				
Test Frequency Range:	9kHz to 25GHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	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 Procedure:	<div>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 camber. The table was rotated 360 degrees to determine the position of the highest radiation.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>6. If the emission level of the EUT in peak mode was 10 dB 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 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</div>				
Test setup:	<div>Below 1GHz</div> <div></div> <div>Above 1GHz</div>				

	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	<ol style="list-style-type: none"> 1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 2. 9 kHz to 30MHz is too low, so only shows the data of above 30MHz in this report.

Measurement Data (worst case):

Below 1GHz:

Product Name:	Smart Motion Sensor	Product model:	KSEN-210-ZB
Test By:	Yaro	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	DC 3.0V	Environment:	Temp: 24℃ Humi: 57%

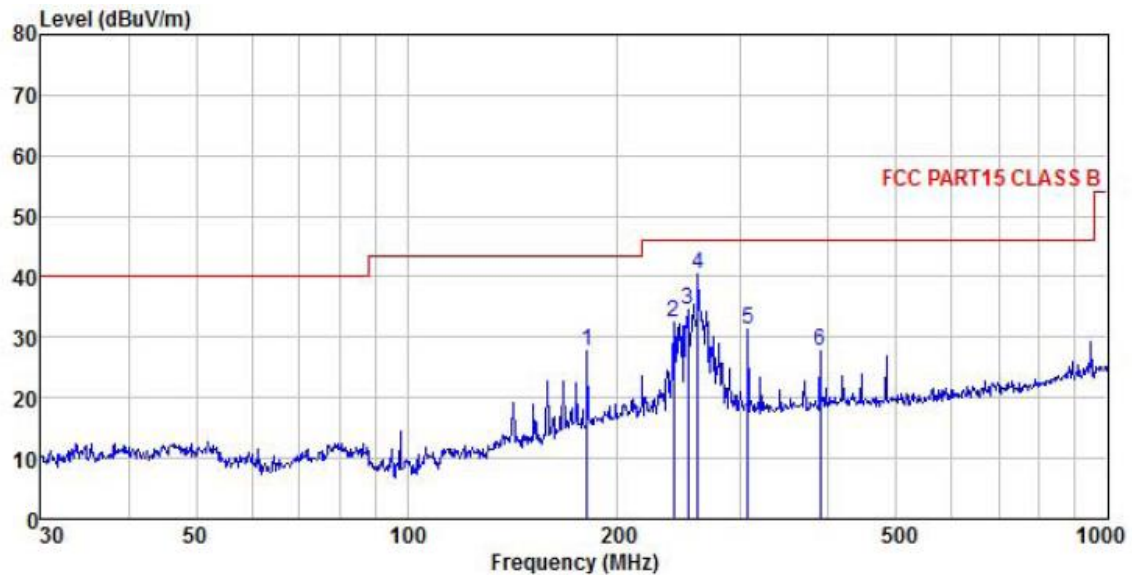


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	37.945	40.03	12.72	0.35	0.00	29.92	23.18	40.00	-16.82	QP
2	77.593	39.34	12.18	0.47	0.00	29.66	22.33	40.00	-17.67	QP
3	139.851	43.10	13.80	0.60	0.00	29.27	28.23	43.50	-15.27	QP
4	155.910	41.89	14.64	0.62	0.00	29.17	27.98	43.50	-15.52	QP
5	276.124	37.70	18.61	0.83	0.00	28.49	28.65	46.00	-17.35	QP
6	332.519	40.11	18.77	0.91	0.00	28.52	31.27	46.00	-14.73	QP

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss + Aux Factor – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. The Aux Factor is a notch filter switch box loss, this item is not used.

Product Name:	Smart Motion Sensor	Product model:	KSEN-210-ZB
Test By:	Yaro	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	DC 3.0V	Environment:	Temp: 24°C Humi: 57%



	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	180.649	39.01	16.94	0.68	0.00	28.97	27.66	43.50	-15.84	QP
2	239.987	41.94	18.46	0.76	0.00	28.59	32.57	46.00	-13.43	QP
3	252.063	43.86	18.51	0.78	0.00	28.54	34.61	46.00	-11.39	QP
4	260.144	49.50	18.54	0.80	0.00	28.52	40.32	46.00	-5.68	QP
5	306.754	40.28	18.71	0.87	0.00	28.47	31.39	46.00	-14.61	QP
6	389.355	36.55	19.04	0.98	0.00	28.73	27.84	46.00	-18.16	QP

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss + Aux Factor – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. The Aux Factor is a notch filter switch box loss, this item is not used.

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
4810.00	53.85	30.81	6.41	2.44	41.82	51.69	74.00	-22.31	Vertical
4810.00	55.57	30.81	6.41	2.44	41.82	53.41	74.00	-20.59	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
4810.00	50.17	30.81	6.41	2.44	41.82	48.01	54.00	-5.99	Vertical
4810.00	51.93	30.81	6.41	2.44	41.82	49.77	54.00	-4.23	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
4880.00	53.45	30.96	6.47	2.47	41.84	51.51	74.00	-22.49	Vertical
4880.00	53.79	30.96	6.47	2.47	41.84	51.85	74.00	-22.15	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
4880.00	49.19	30.96	6.47	2.47	41.84	47.25	54.00	-6.75	Vertical
4880.00	49.17	30.96	6.86	2.47	41.84	47.62	54.00	-6.38	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
4960.00	54.05	31.11	6.53	2.49	41.87	52.31	74.00	-21.69	Vertical
4960.00	52.89	31.11	6.53	2.49	41.87	51.15	74.00	-22.85	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
4960.00	51.20	31.11	6.53	2.49	41.87	49.46	54.00	-4.54	Vertical
4960.00	48.63	31.11	6.53	2.49	41.87	46.89	54.00	-7.11	Horizontal
Remark:									
1. Final Level = Receiver Read level + Antenna Factor + Cable Loss + Aux Factor – Preamplifier Factor.									
2. The emission levels of other frequencies are lower than the limit 20dB and not show in test report.									