




FCC REPORT

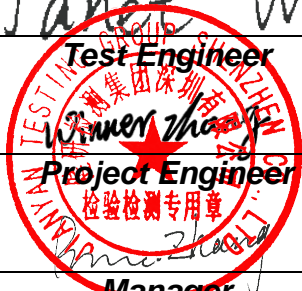
(LoRa)

Applicant: Hangzhou Roombanker Technology Co., Ltd.
Address of Applicant: A#801 Wantong center, Hangzhou, China
Equipment Under Test (EUT)
Product Name: Indoor LoRaWAN Light Hotspot
Model No.: DSGW-090B
FCC ID: 2AUXBDSGW-090B
Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt: 25 Apr., 2022
Date of Test: 26 Apr., to 11 May., 2022
Date of report issued: 12 May., 2022
Test Result: PASS *

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

Tested by:		Date:	12 May., 2022
Reviewed by:		Date:	12 May., 2022
Approved by:		Date:	12 May., 2022

Test Engineer
Project Engineer
Manager



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

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2 Version

Version No.	Date	Description
00	12 May., 2022	Original

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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	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
6dB Emission Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Conducted and radiated Spurious Emission	15.205/15.209	Pass
<p>Remark:</p> <ol style="list-style-type: none"> 1. Pass: Meet the requirement. 2. N/A: Not Applicable for Non-adaptive equipment. 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 C63.4-2014 ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02	

5 General Information

5.1 Client Information

Applicant:	Hangzhou Roombanker Technology Co., Ltd.
Address:	A#801 Wantong center, Hangzhou, China
Manufacturer:	Hangzhou Roombanker Technology Co., Ltd.
Address:	A#801 Wantong center, Hangzhou, China

5.2 General Description of E.U.T.

Product Name:	Indoor LoRaWAN Light Hotspot
Model No.:	DSGW-090B
Operation Frequency:	923.3MHz~927.5MHz
Channel numbers:	500KHz Channel: 8 channels
Channel separation:	500 KHz
Modulation technology:	Lora
Antenna Type:	External Antenna
Antenna gain:	2.44 dBi
Power supply:	DC 5V
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation Frequency each of channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1	923.3MHz	4	925.1MHz	7	926.9MHz
2	923.9MHz	5	925.7MHz	8	927.5MHz
3	924.5MHz	6	926.3MHz		

Note:
 In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test. Channel No. 1, 5 & 8 were selected 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>	
<p>Remark: JianYan Testing Group Shenzhen Co., Ltd. is only responsible for the test project data of the above samples, and will keep the above samples for a month.</p>	

5.4 Description of Support Units

Manufacturer	Description	Model	S/N	FCC ID/DoC
LENOVO	Laptop	SL510	2847A65	DoC

5.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%)
Conducted Emission (9kHz ~ 150KHz) for V-AMN	3.11 dB
Conducted Emission (150kHz ~ 30MHz) for V-AMN	2.62 dB
Conducted Emission (150kHz ~ 30MHz) for AAN	3.54 dB
Radiated Emission (30MHz ~ 1GHz) for 3m SAC	4.45 dB
Radiated Emission (1GHz ~ 18GHz) for 3m SAC	5.34 dB
Radiated Emission (18GHz ~ 40GHz) for 3m SAC	5.34 dB

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	RFD-100	Q1984	04-14-2021	04-13-2024
BiConiLog Antenna	SCHWARZBECK	VULB9163	9163-1246	02-17-2022	02-16-2023
Biconical Antenna	SCHWARZBECK	VUBA 9117	9117#359	06-17-2021	06-17-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	912D-916	02-17-2022	02-16-2023
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9170	1067	02-17-2022	02-16-2023
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9170	1068	02-17-2022	02-16-2023
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	02-17-2022	02-16-2023
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	02-17-2022	02-16-2023
Spectrum analyzer	Keysight	N9010B	MY60240202	10-27-2021	10-26-2022
Low Pre-amplifier	SCHWARZBECK	BBV9743B	00305	02-17-2022	02-16-2023
High Pre-amplifier	SKET	LNPA_0118G-50	MF280208233	02-17-2022	02-16-2023
Cable	Qualwave	JYT3M-1G-NN-8M	JYT3M-1	02-17-2022	02-16-2023
Cable	Qualwave	JYT3M-18G-NN-8M	JYT3M-2	02-17-2022	02-16-2023
Cable	Qualwave	JYT3M-1G-BB-5M	JYT3M-3	02-17-2022	02-16-2023
Cable	Bost	JYT3M-40G-SS-8M	JYT3M-4	02-17-2022	02-16-2023
EMI Test Software	Tonscend	TS+		Version:3.0.0.1	

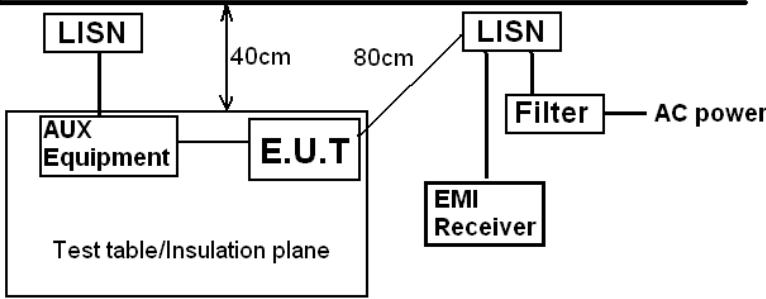
Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESCI 3	101189	02-17-2022	02-16-2023
LISN	Schwarzbeck	NSLK 8127	QCJ001-13	02-17-2022	02-16-2023
LISN	Rohde & Schwarz	ESH3-Z5	843862/010	06-18-2020	06-17-2022
ISN	Schwarzbeck	CAT3 8158	#96	02-17-2022	02-16-2023
ISN	Schwarzbeck	CAT5 8158	#166	02-17-2022	02-16-2023
ISN	Schwarzbeck	NTFM 8158	#126	02-17-2022	02-16-2023
RF Switch	TOP PRECISION	RSU0301	N/A	02-17-2022	02-16-2023
Cable	Bost	JYTCE-1G-NN-2M	JYTCE-1	02-17-2022	02-16-2023
Cable	Bost	JYTCE-1G-BN-3M	JYTCE-2	02-17-2022	02-16-2023
EMI Test Software	AUDIX	E3		Version: 6.110919b	

6 Test results and Measurement Data

6.1 Antenna requirement:

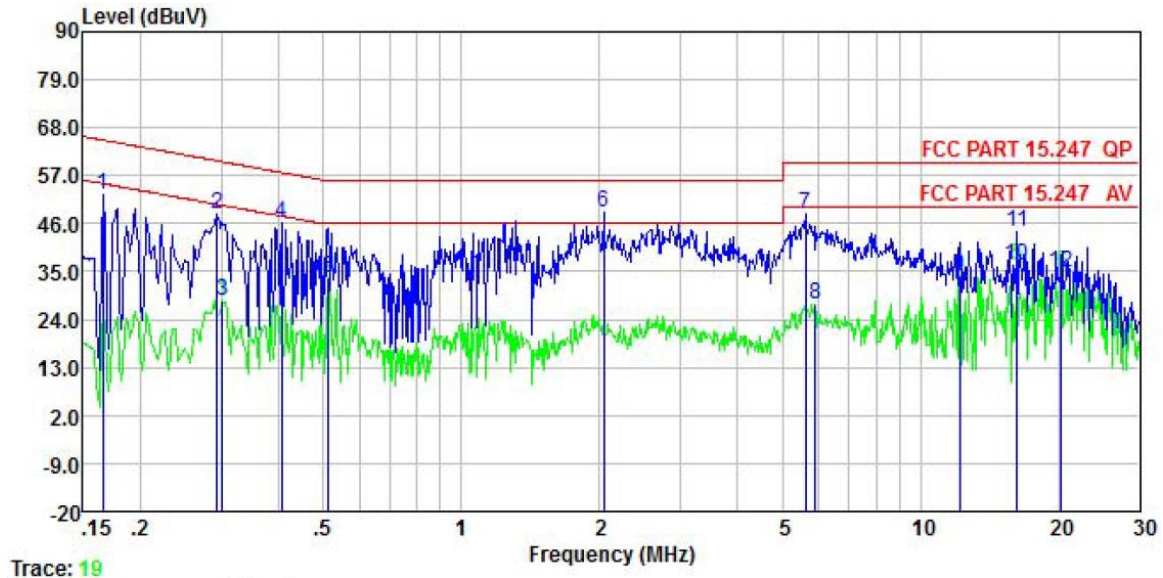
Standard requirement:	FCC Part 15 C Section 15.203 /247(c)
<p>15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses 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(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.</p>	
E.U.T Antenna:	
<p>The LoRa antenna is an External antenna which cannot replace by end-user, the best-case gain of the antenna is 2.44 dBi.</p>	

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 C63.4(latest version) on conducted measurement. 		
Test setup:	<div style="text-align: center;"> <p>Reference Plane</p>  </div> <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:	Passed		

Measurement Data:

Product name:	Indoor LoRaWAN Light Hotspot	Product model:	DSGW-090B
Test by:	Janet	Test mode:	Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Line
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 22.5°C Humi: 55%



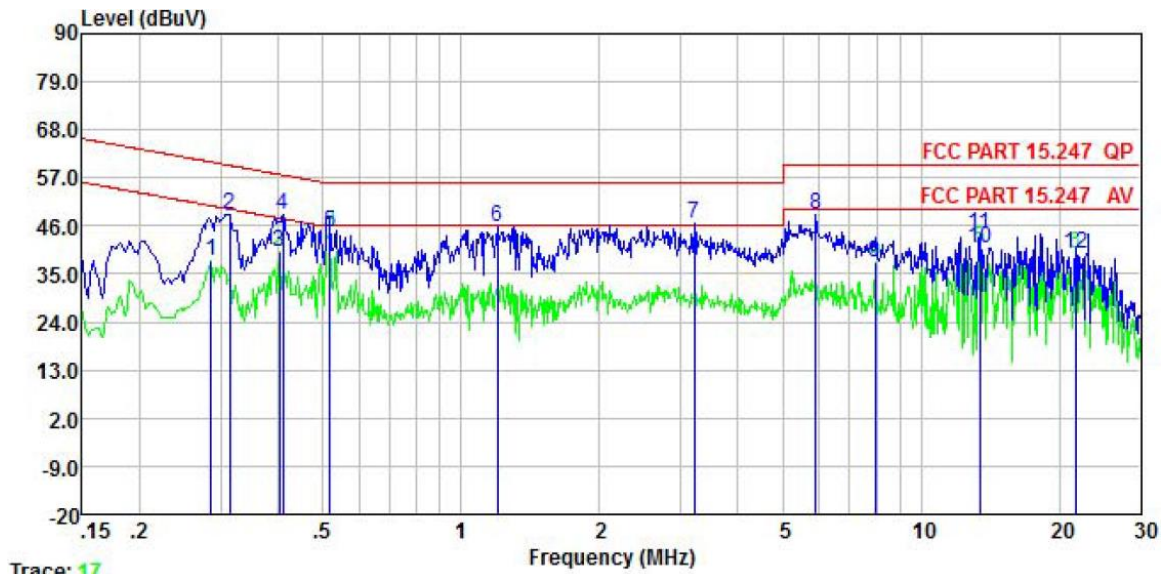
Trace: 19

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.166	52.53	0.04	0.01	52.58	65.16	-12.58	QP
2	0.294	48.32	0.04	0.03	48.39	60.41	-12.02	QP
3	0.302	28.18	0.04	0.03	28.25	50.19	-21.94	Average
4	0.406	46.14	0.04	0.04	46.22	57.73	-11.51	QP
5	0.513	33.70	0.04	0.03	33.77	46.00	-12.23	Average
6	2.044	48.35	0.07	0.20	48.62	56.00	-7.38	QP
7	5.623	48.03	0.13	0.09	48.25	60.00	-11.75	QP
8	5.898	27.30	0.13	0.09	27.52	50.00	-22.48	Average
9	12.188	33.50	0.24	0.10	33.84	50.00	-16.16	Average
10	16.226	36.17	0.28	0.16	36.61	50.00	-13.39	Average
11	16.226	43.84	0.28	0.16	44.28	60.00	-15.72	QP
12	20.270	34.21	0.32	0.19	34.72	50.00	-15.28	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

Product name:	Indoor LoRaWAN Light Hotspot	Product model:	DSGW-090B
Test by:	Janet	Test mode:	Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 22.5°C Huni: 55%



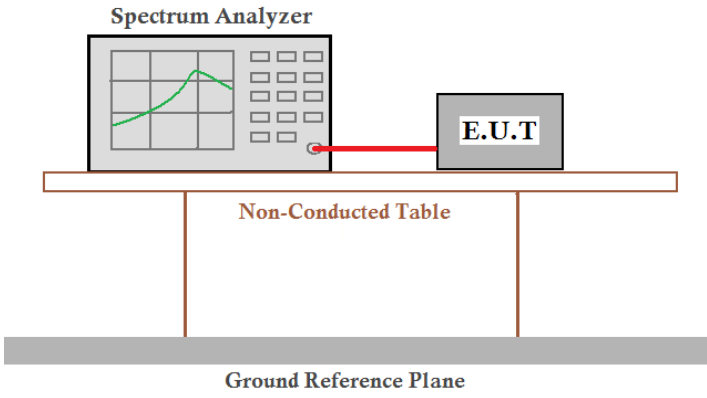
Trace: 17

	Read Freq	Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.286	37.78	0.04	0.03	37.85	50.63	-12.78	Average
2	0.313	48.65	0.04	0.03	48.72	59.88	-11.16	QP
3	0.402	39.81	0.04	0.04	39.89	47.81	-7.92	Average
4	0.410	48.56	0.04	0.04	48.64	57.64	-9.00	QP
5	0.518	44.62	0.04	0.03	44.69	46.00	-1.31	Average
6	1.197	45.77	0.05	0.09	45.91	56.00	-10.09	QP
7	3.207	46.61	0.08	0.07	46.76	56.00	-9.24	QP
8	5.898	48.19	0.12	0.09	48.40	60.00	-11.60	QP
9	7.935	37.44	0.16	0.10	37.70	50.00	-12.30	Average
10	13.408	40.72	0.23	0.11	41.06	50.00	-8.94	Average
11	13.408	43.78	0.23	0.11	44.12	60.00	-15.88	QP
12	21.715	39.26	0.32	0.16	39.74	50.00	-10.26	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

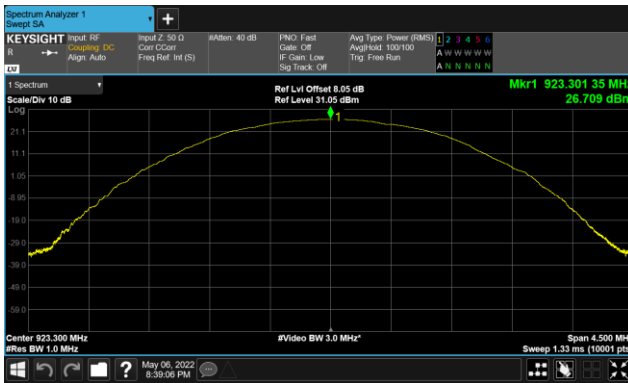
6.3 Conducted Output Power

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

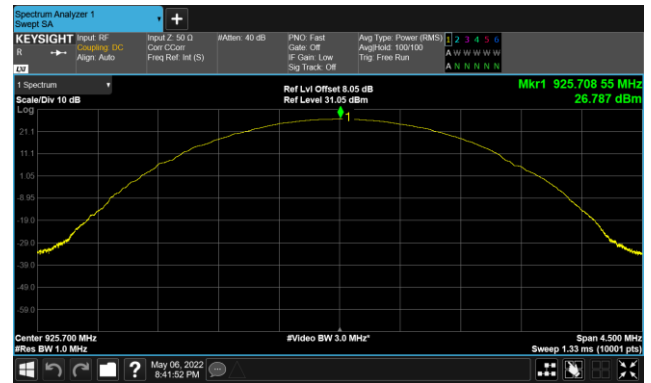
Measurement Data:

Test CH	Maximum Conducted Output Power (dBm)	Limit(dBm)	Result
Lowest	26.71	30.00	Pass
Middle	26.79		
Highest	26.31		

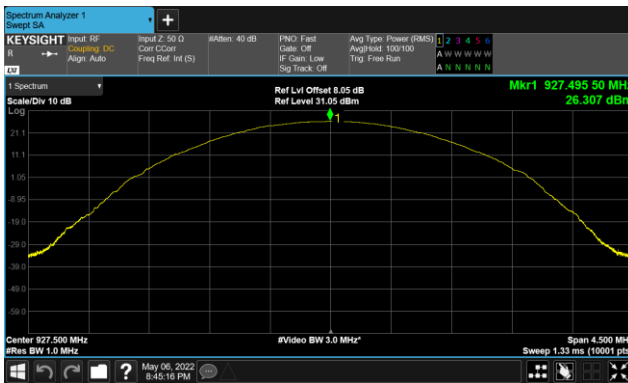
Test plot as follows:



Lowest channel

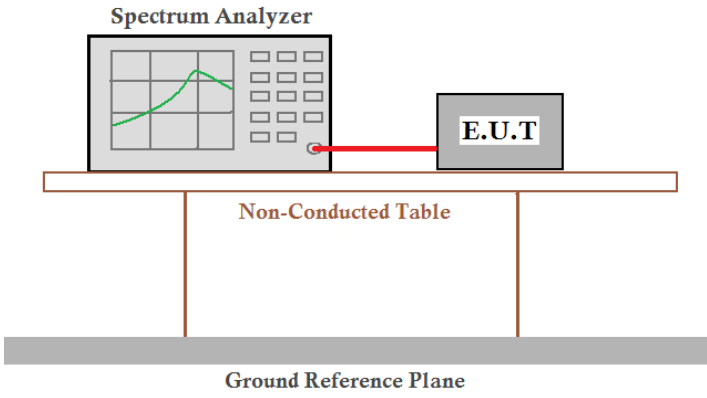


Middle channel



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 via a red cable to an E.U.T. (Equipment Under Test). Both 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

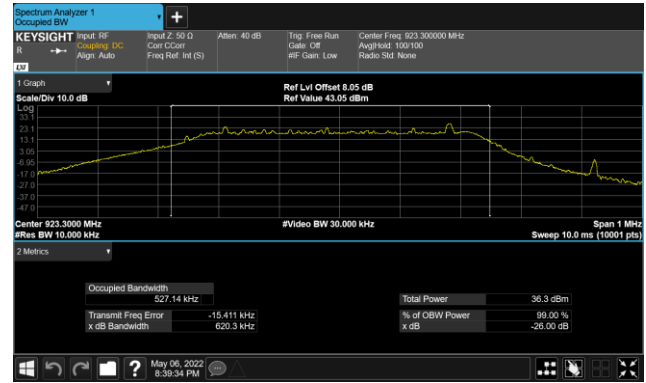
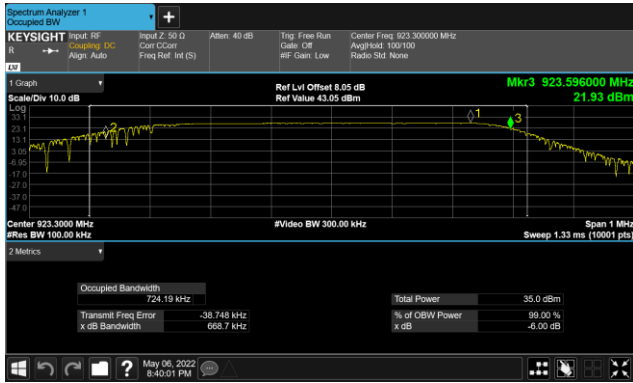
Measurement Data:

Test CH	-6dB Emission Bandwidth (KHz)	Limit(kHz)	Result
Lowest	669	>500	Pass
Middle	622		
Highest	625		
Test CH	99% Occupy Bandwidth (KHz)	Limit(kHz)	Result
Lowest	527	N/A	N/A
Middle	507		
Highest	509		

Test plot as follows:

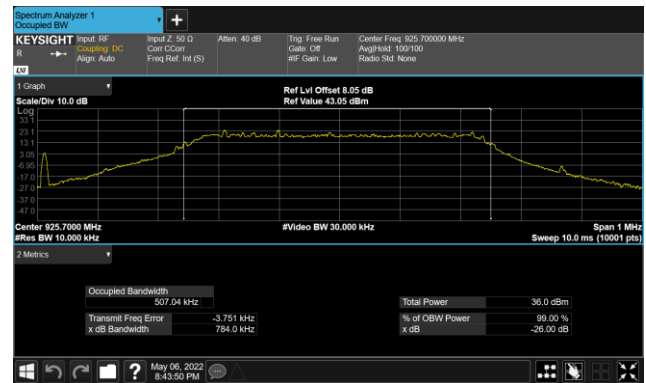
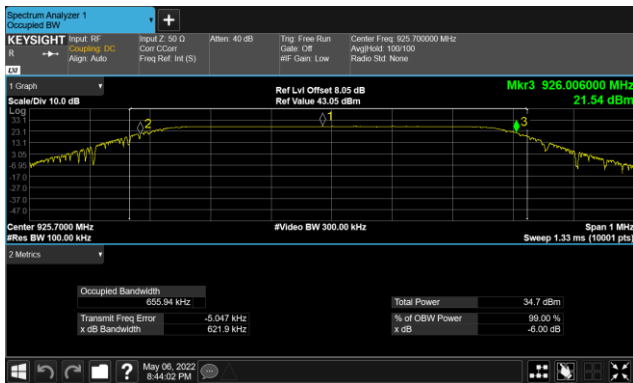
6dB EBW

99% OBW



Lowest channel

Lowest channel



Middle channel

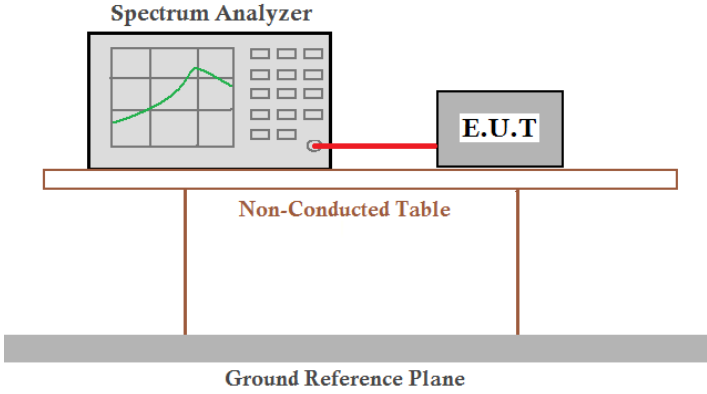
Middle channel



Highest channel

Highest channel

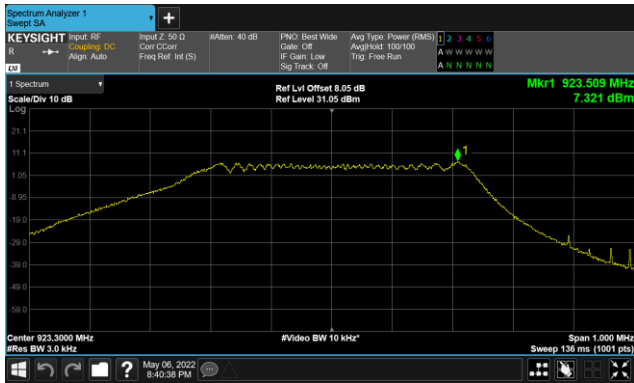
6.5 Power Spectral Density

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 via a red cable to an E.U.T. (Equipment Under Test). Both 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

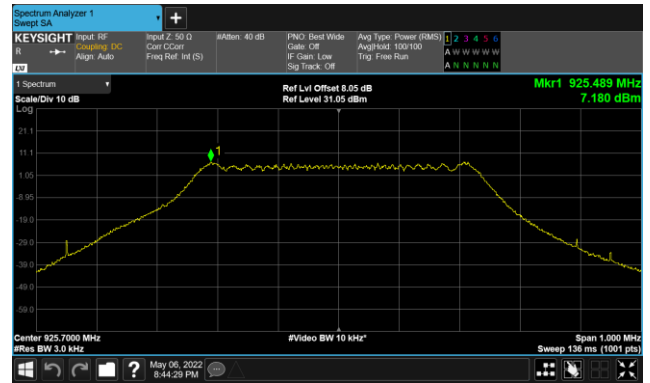
Measurement Data:

Test CH	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	7.32	8.00	Pass
Middle	7.18		
Highest	6.15		

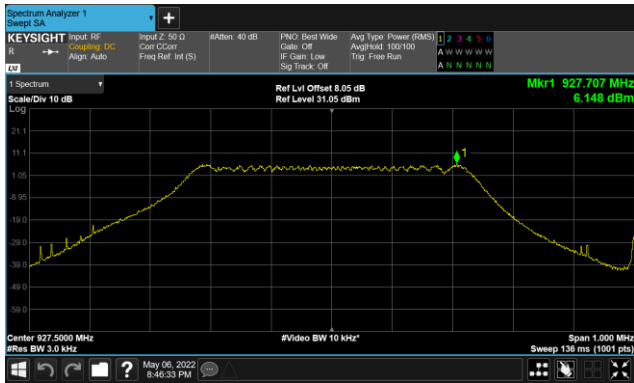
Test plots as follow:



Lowest channel



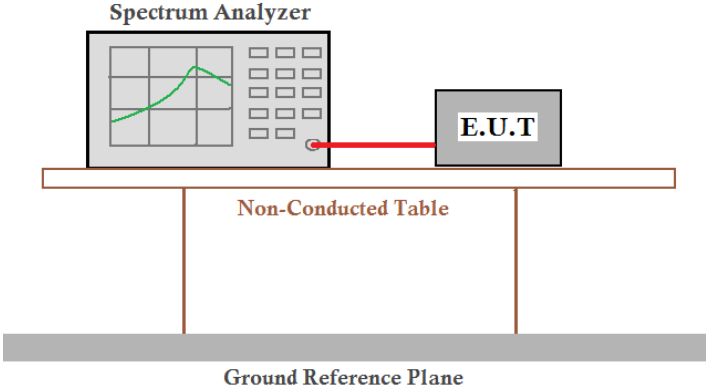
Middle channel



Highest channel

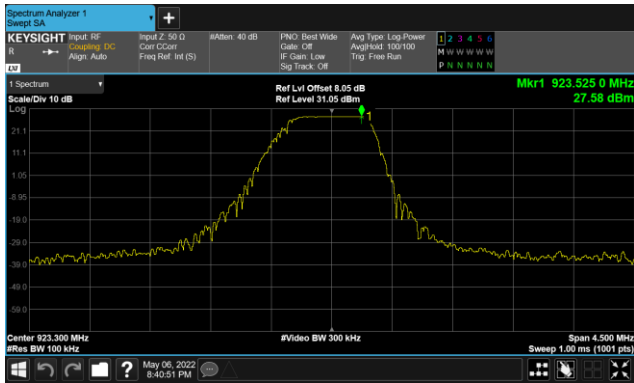
6.6 Band Edge

6.6.1 Conducted Emission Method

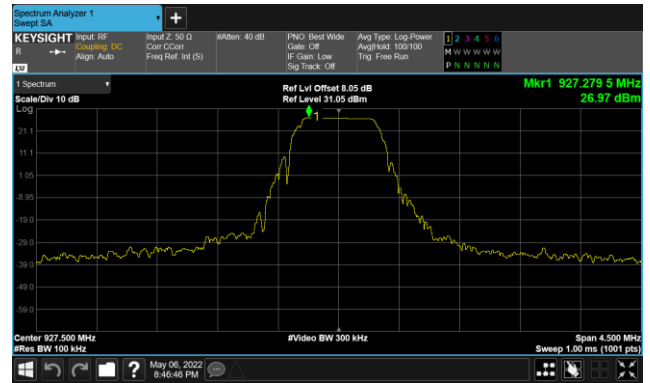
Test Requirement:	FCC Part 15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth 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. 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 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:

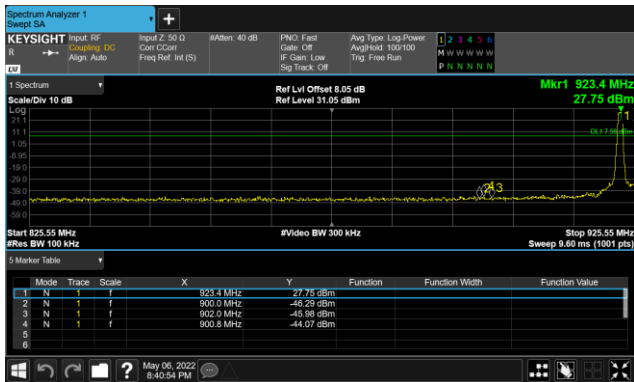
HOPP:



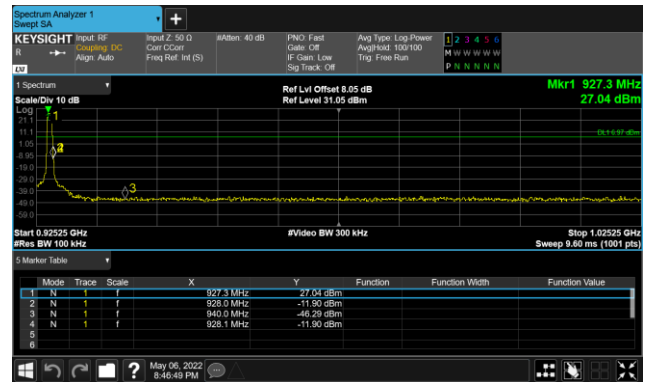
Lowest channel



Highest channel



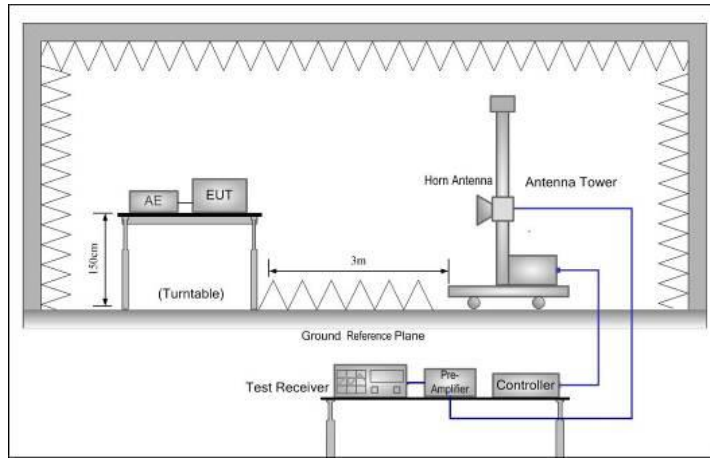
Lowest channel



Highest channel

6.6.2 Radiated Emission Method

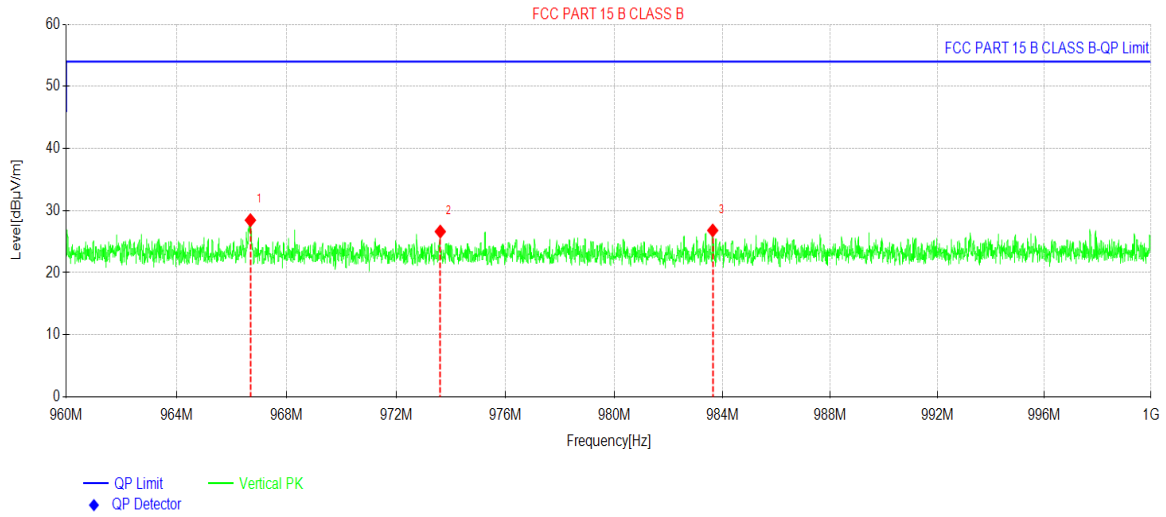
Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Frequency Range:	960MHz to 1.240GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	960MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
RMS		1MHz	3MHz	Average Value	
Limit:	Frequency	Limit (dBuV/m @3m)			Remark
	960MHz-1GHz	54.00			Quasi-peak Value
	Above 1GHz	54.00			Average Value
74.00			Peak Value		
Test Procedure:	<ol style="list-style-type: none"> The EUT was placed on the top of a rotating table 0.8m(below 1GHz) /1.5m(above 1GHz) above the groundat a 3 meter chamber.The table was rotated 360 degrees todetermine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, whichwas 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 rotatablewas turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limitspecified, then testing could be stopped and the peak values of the EUT wouldbe reported. Otherwise the emissions that did not have 10dB margin would bere-tested one by one using peak, quasi-peak or average method as specified andthen reported in a data sheet. 				
Test setup:	<p>Below 1GHz</p> <p>Above 1GHz</p>				



Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Below 1GHz:

Product Name:	Indoor LoRaWAN Light Hotspot	Product Model:	DSGW-090B
Test By:	Janet	Test mode:	Tx mode
Test Channel:	960~1000MHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24°C Humi: 57%



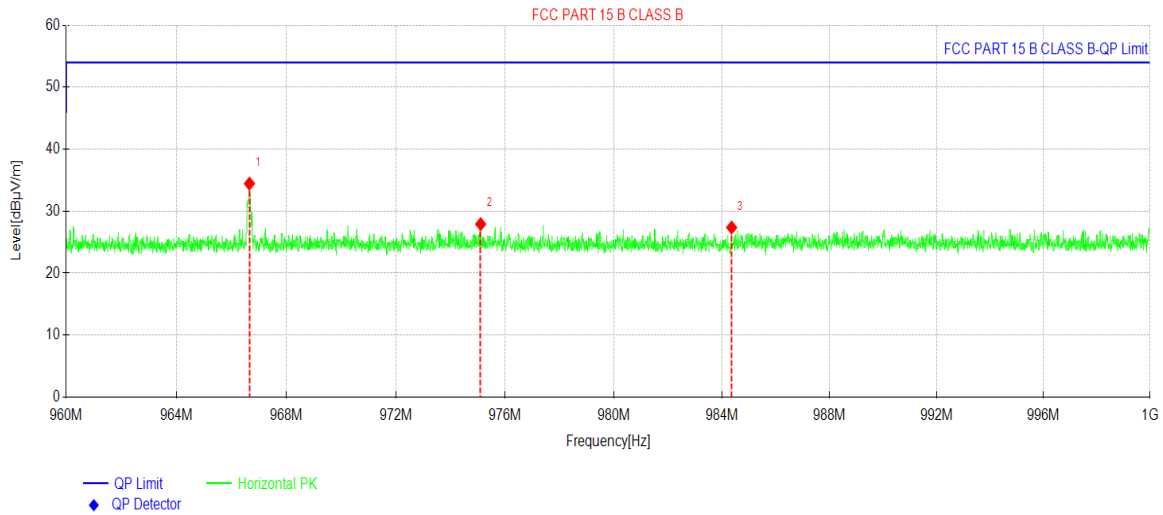
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	966.6767	29.32	28.45	-0.87	54.00	25.55	PK	Vertical
2	973.6094	27.51	26.62	-0.89	54.00	27.38	PK	Vertical
3	983.6424	27.63	26.80	-0.83	54.00	27.20	PK	Vertical

Remark:

- Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).
- The emission levels of other frequencies are lower than the limit 20dB and not show in test report.

Product Name:	Indoor LoRaWAN Light Hotspot	Product Model:	DSGW-090B
Test By:	Janet	Test mode:	Tx mode
Test Channel:	960~1000MHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24℃ Humi: 57%



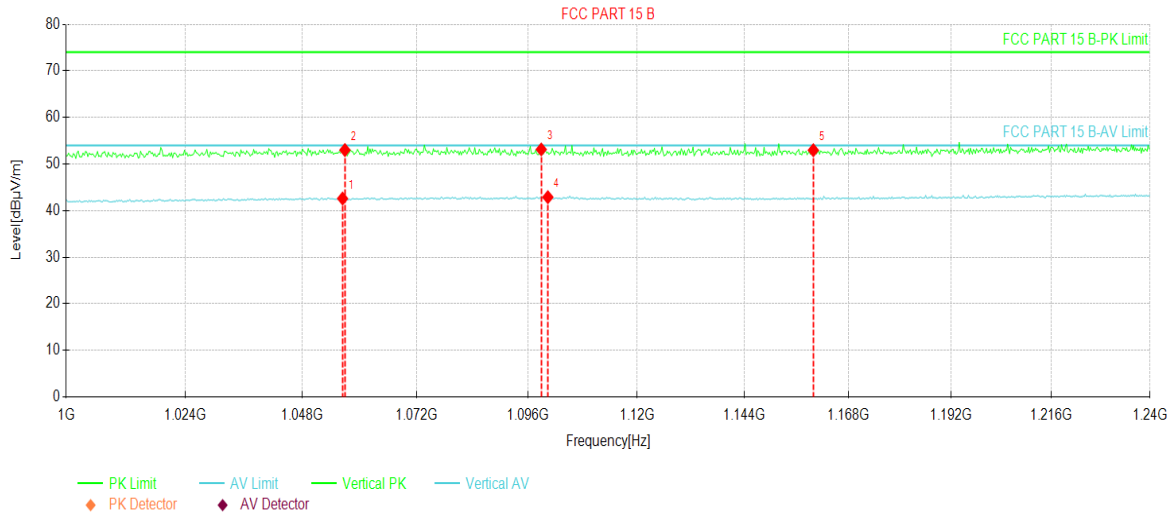
Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	966.6487	35.32	34.45	-0.87	54.00	19.55	PK	Horizontal
2	975.1055	28.81	27.91	-0.90	54.00	26.09	PK	Horizontal
3	984.3664	28.18	27.36	-0.82	54.00	26.64	PK	Horizontal

Remark:

- Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).
- The emission levels of other frequencies are lower than the limit 20dB and not show in test report.

Above 1GHz:

Product Name:	Indoor LoRaWAN Light Hotspot	Product Model:	DSGW-090B
Test By:	Janet	Test mode:	Tx mode
Test Channel:	1000~1240MHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24°C Huni: 57%

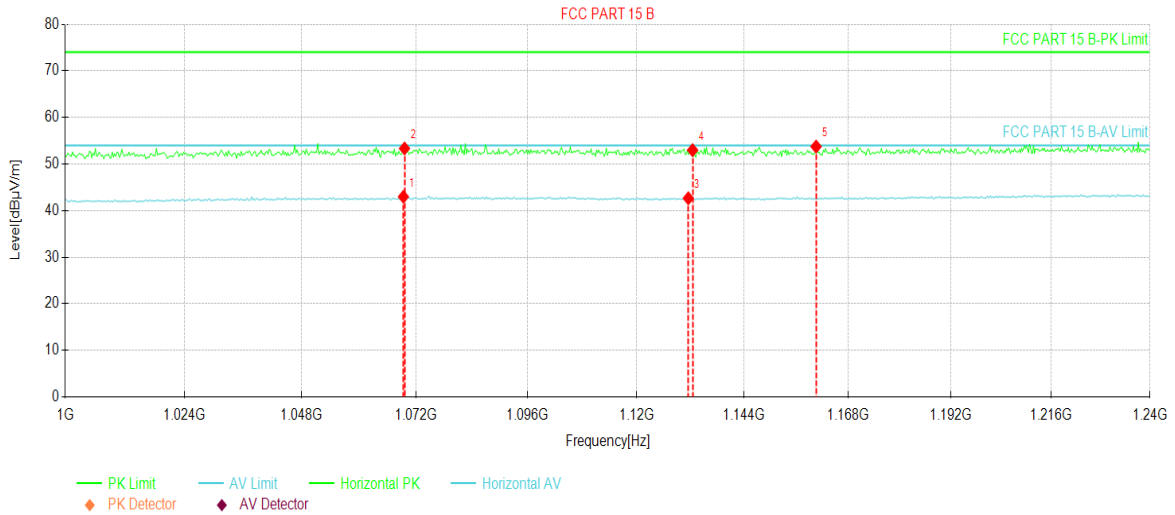


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1056.4000	12.64	42.58	29.94	54.00	11.42	AV	Vertical
2	1056.8800	23.06	53.00	29.94	74.00	21.00	PK	Vertical
3	1098.8800	22.97	53.13	30.16	74.00	20.87	PK	Vertical
4	1100.3200	12.70	42.87	30.17	54.00	11.13	AV	Vertical
5	1159.8400	22.72	52.96	30.24	74.00	21.04	PK	Vertical

Remark:

- Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).
- The emission levels of other frequencies are lower than the limit 20dB and not show in test report.

Product Name:	Indoor LoRaWAN Light Hotspot	Product Model:	DSGW-090B
Test By:	Janet	Test mode:	Tx mode
Test Channel:	1000~1240MHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24°C Humi: 57%



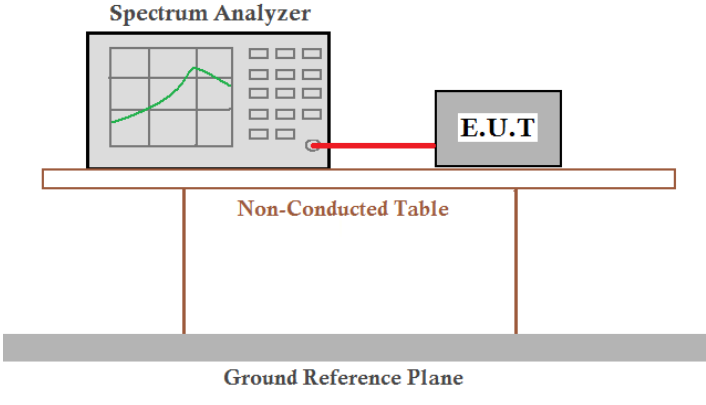
Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1069.3600	12.96	42.97	30.01	54.00	11.03	AV	Horizontal
2	1069.6000	23.32	53.33	30.01	74.00	20.67	PK	Horizontal
3	1131.5200	12.44	42.64	30.20	54.00	11.36	AV	Horizontal
4	1132.4800	22.76	52.97	30.21	74.00	21.03	PK	Horizontal
5	1160.5600	23.50	53.74	30.24	74.00	20.26	PK	Horizontal

Remark:

- Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).
- The emission levels of other frequencies are lower than the limit 20dB and not show in test report.

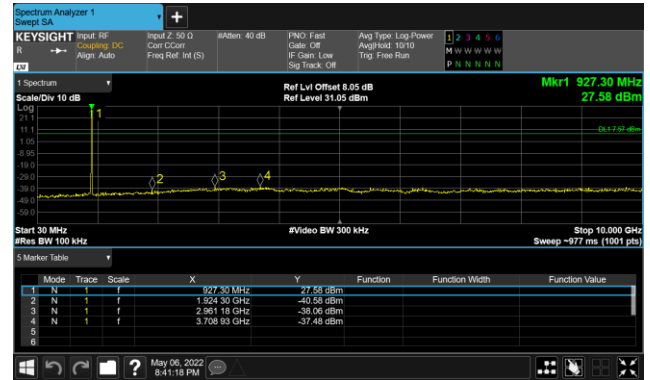
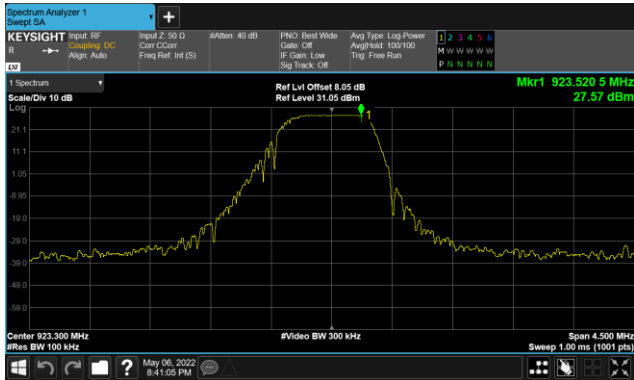
6.7 Spurious Emission

6.7.1 Conducted Emission Method

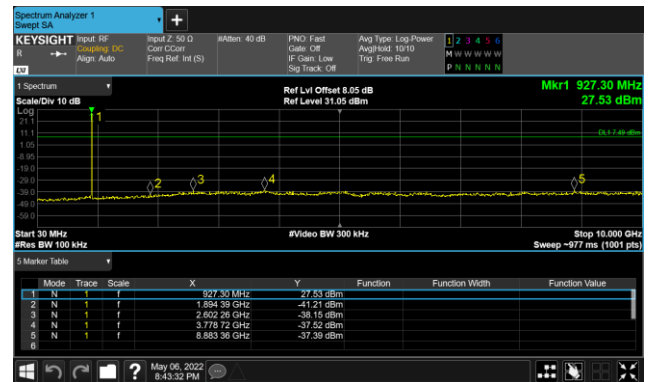
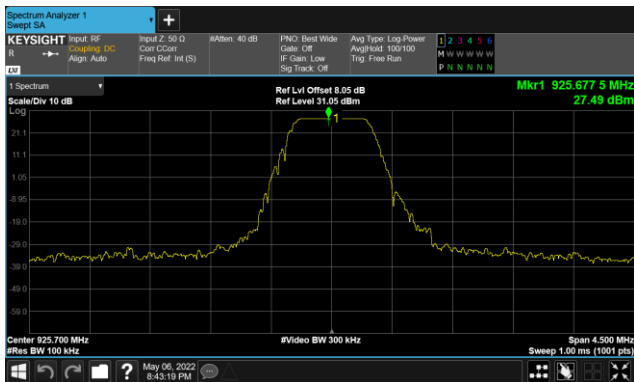
Test Requirement:	FCC Part 15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth 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. 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 legs and sits on 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 plot as follows:

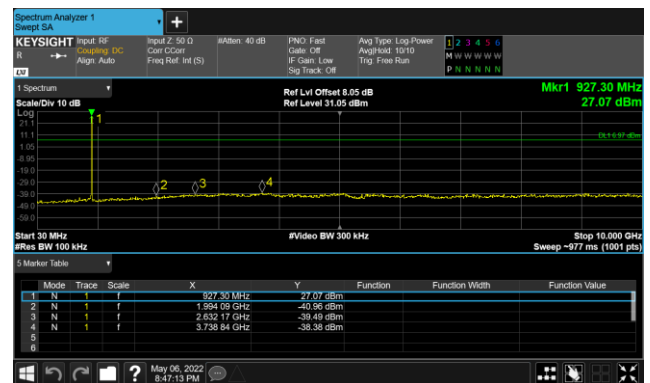
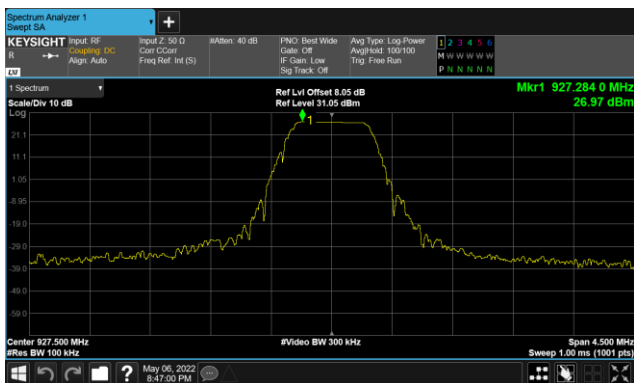
Lowest channel



Middle channel

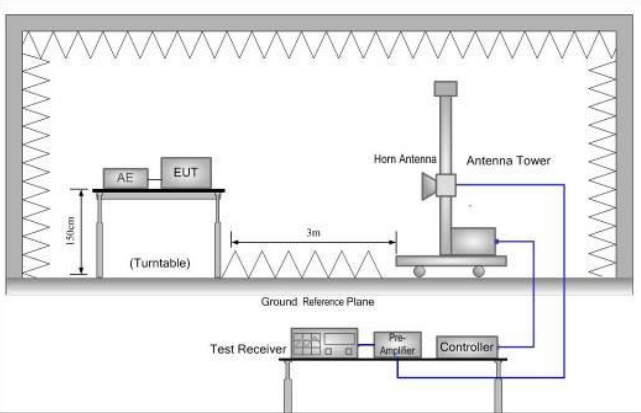


Highest channel



6.7.2 Radiated Emission Method

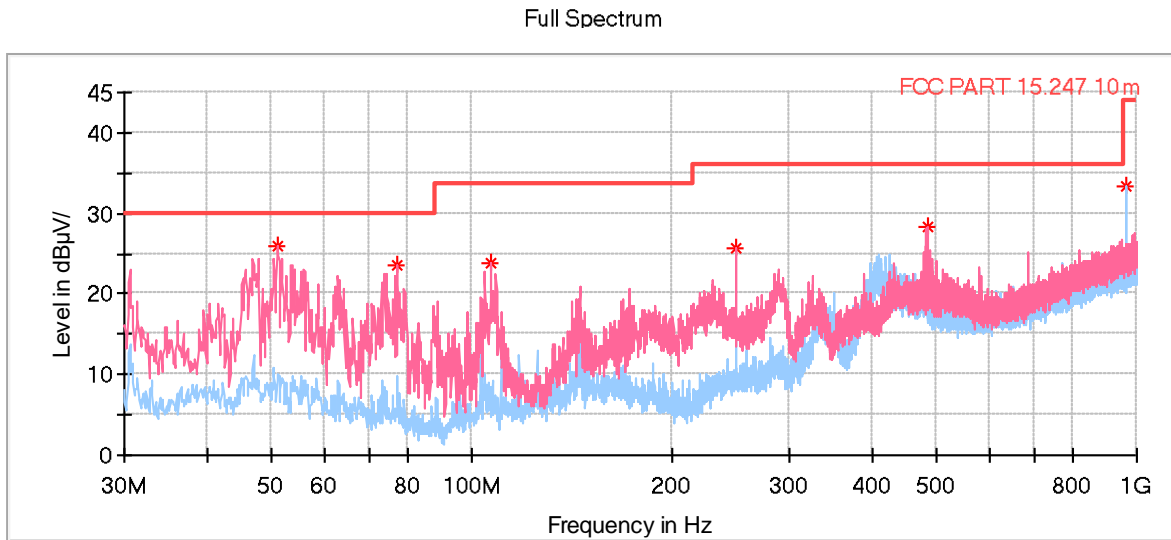
Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Frequency Range:	9kHz to 25GHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
RMS		1MHz	3MHz	Average Value	
Limit:	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	
	Above 1GHz	54.0		Average Value	
74.0		Peak Value			
Test Procedure:	<ol style="list-style-type: none"> 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. 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 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. 				
Test setup:	<p>Below 1GHz</p> <p>Above 1GHz</p>				

	
<p>Test Instruments:</p>	<p>Refer to section 5.9 for details</p>
<p>Test mode:</p>	<p>Refer to section 5.3 for details</p>
<p>Test results:</p>	<p>Passed</p>
<p>Remark:</p>	<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:	Indoor LoRaWAN Light Hotspot	Product Model:	DSGW-090B
Test By:	Janet	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical & Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24°C Humi: 57%



* Critical_Freqs PK+ — Preview Result 1H-PK+ ◆ Final_Result QPK
 — Preview Result 1V-PK+ — FCC PART 15.247 10m

Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB/m)
51.049000	26.07	30.00	3.93	100.0	V	245.0	-15.8
77.142000	23.56	30.00	6.44	100.0	V	54.0	-19.6
106.630000	23.76	33.50	9.74	100.0	V	70.0	-18.3
249.996000	25.73	36.00	10.27	100.0	V	184.0	-15.8
483.378000	28.25	36.00	7.75	100.0	V	184.0	-9.2
966.729000	33.35	44.00	10.65	100.0	H	318.0	-0.5

Remark:

- Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).
- The emission levels of other frequencies are lower than the limit 20dB and not show in test report.

Above 1GHz:

Test channel: Lowest channel						
Detector: Peak Value						
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1846.60	64.86	-20.77	44.09	74.00	29.91	Vertical
1846.60	63.15	-20.77	42.38	74.00	31.62	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1846.60	55.53	-20.77	34.76	54.00	19.24	Vertical
1846.60	55.14	-20.77	34.37	54.00	19.63	Horizontal
Test channel: Middle channel						
Detector: Peak Value						
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1851.40	64.28	-20.75	43.53	74.00	30.47	Vertical
1851.40	63.16	-20.75	42.41	74.00	31.59	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1851.40	55.17	-20.75	34.42	54.00	19.58	Vertical
1851.40	55.92	-20.75	35.17	54.00	18.83	Horizontal
Test channel: Highest channel						
Detector: Peak Value						
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1855.00	65.16	-20.73	44.43	74.00	29.57	Vertical
1855.00	64.92	-20.73	44.19	74.00	29.81	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1855.00	56.79	-20.73	36.06	54.00	17.94	Vertical
1855.00	55.28	-20.73	34.55	54.00	19.45	Horizontal
<i>Remark:</i>						
1. <i>Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).</i>						
2. <i>The emission levels of other frequencies are lower than the limit 20dB and not show in test report.</i>						

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