FCC REPORT

Applicant:	Shanghai Wendtech Information Technology Co.,Ltd
Address of Applicant:	No.8 Xiushan Rd, Chongming District,Shanghai, China 200233

Equipment Under Test (EUT)

Product Name:	LoRa Module
Model No.:	WT5518
Trade mark:	Wendtech
FCC ID:	2AYSD-WT5518
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	21 Feb., 2021
Date of Test:	21 Feb., to 24 Mar., 2021
Date of report issued:	25 Mar., 2021
Test Result:	PASS *

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

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*11 Mar., 2021*	*Original*
01	*19 Mar., 2021*	*Update Page 9, 12, 13, 17 ,24*
02	*25 Mar., 2021*	*1. Added conducted emissions test data on page 10/11.* *2. Added conducted emissions test setup photo on page 33.*

Tested by: Yoyo Wu ***Date:*** *25 Mar., 2021*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *25 Mar., 2021*

Project Engineer

3 Contents

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Test Summary

Test Items	Section in CFR 47	Result
Antenna requirement	15.203 & 15.247 (b)	Pass
AC Power Line Conducted Emission	15.207	Pass
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:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: Not Applicable.*
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*

4 General Information

4.1 Client Information

Applicant:	Shanghai Wendtech Information Technology Co.,Ltd
Address:	No.8 Xiushan Rd, Chongming District, Shanghai, China 200233
Manufacturer:	Shanghai Wendtech Information Technology Co.,Ltd
Address:	No.8 Xiushan Rd, Chongming District, Shanghai, China 200233

4.2 General Description of E.U.T.

Product Name:	LoRa Module
Model No.:	WT5518
Operation Frequency:	902~928 MHz
Channel numbers:	1
Modulation technology:	LoRa
Antenna Type:	HELIX Antenna
Antenna gain:	0 dBi
Power supply:	CR 17345 3V *2
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation Frequency each of channel	
Channel	Frequency
1	915MHz

4.3 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
Radiated Emission: 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.	

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 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)

4.6 Additions to, deviations, or exclusions from the method

No

4.7 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 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.

- **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

4.8 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@ccis-cb.com, Website: http://www.ccis-cb.com

4.9 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
Loop Antenna	SCHWARZBECK	FMZB1519B	044	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-07-2020	03-06-2021
				03-03-2021	03-02-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-07-2020	03-06-2021
				03-03-2021	03-02-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-18-2020	06-17-2021
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
Pre-amplifier	CD	PAP-1G18	11804	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-05-2020	03-04-2021
				03-05-2021	03-04-2022
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-18-2019	11-17-2020
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-05-2020	03-04-2021
				03-05-2021	03-04-2022
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
Cable	MICRO-COAX	MFR64639	K10742-5	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-07-2020	03-06-2021
				03-07-2021	03-06-2022
RF Switch Unit	MWRFTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTEST	MTS8200	Version: 2.0.0.0		

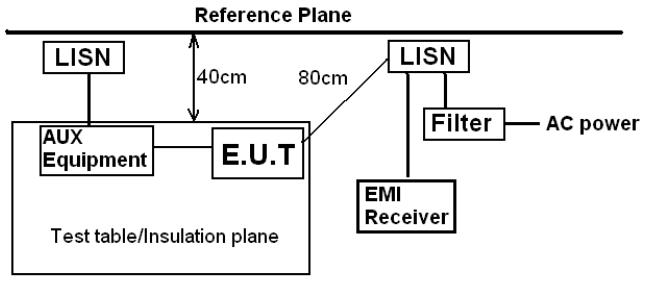
Conducted method:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
Spectrum Analyzer	Agilent	N9020A	MY50510123	11-16-2020	11-15-2021
Vector Signal Generator	Agilent	N5182A	MY49060014	11-16-2020	11-15-2021
Signal Generator	Rohde & Schwarz	SMR20	1008100050	03-03-2021	03-02-2022
Simulated Station	Rohde & Schwarz	CMW500	140493	06-18-2020	06-17-2021
RF Control Box	MWRF-test	MW200-RFCB	MW201013JYT	N/A	N/A
Automatic Filter Box	MWRF-test	MW200-SFCB	MW201019JYT	N/A	N/A
Test Software	MWRF-test	MTS8200	Version: 2.0.0.0		
DC Power Supply	XinNuoEr	WYK-10020K	1409050110020	09-23-2020	09-22-2021
Temperature Humidity Chamber	Zhongzhi	CZ－C－150D	ZH16491	09-23-2020	09-22-2021

5 Test results and Measurement Data

5.1 Antenna requirement:

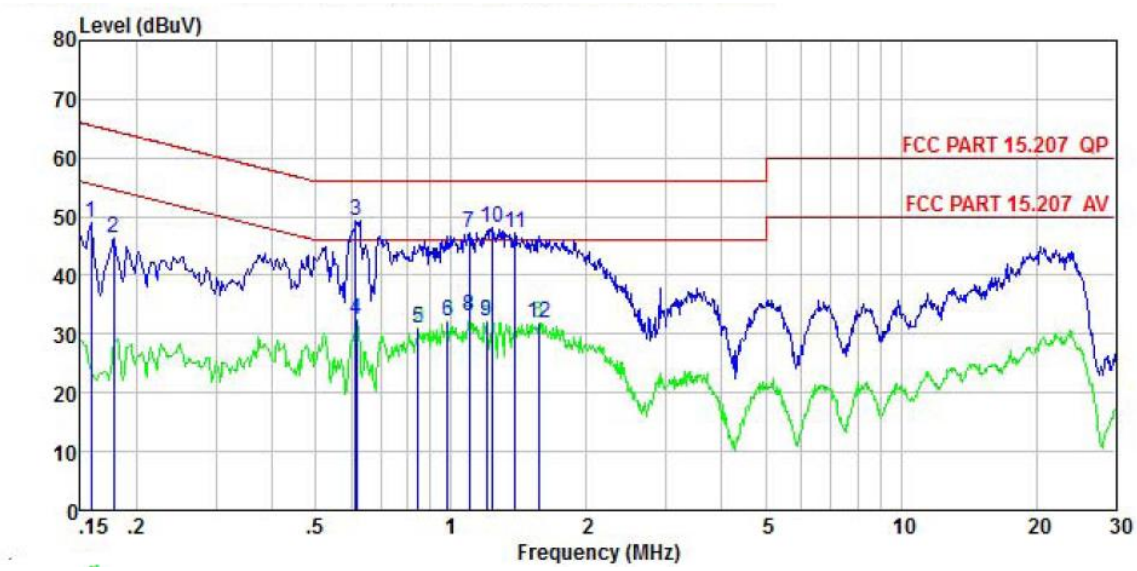
Standard requirement:	FCC Part 15 C Section 15.203 /247(b)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique 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(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.	
E.U.T Antenna:	
The RFID antenna is a HELIX antenna which cannot replace by end-user, the best-case gain of the antenna is 0 dBi.	

5.2 Conducted Emissions

Test Requirement:	FCC Part 15 C Section 15.207		
Test Frequency Range:	150 kHz to 30 MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto		
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 setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*		
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. 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). 3. 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 Instruments:	Refer to section 5.9 for details		
Test mode:	Hopping mode		
Test results:	Passed		

Measurement Data:

Product name:	LoRa Module	Product model:	WT5518
Test by:	Yayo	Test mode:	Lora mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Line
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 22.5℃ Huni: 55%

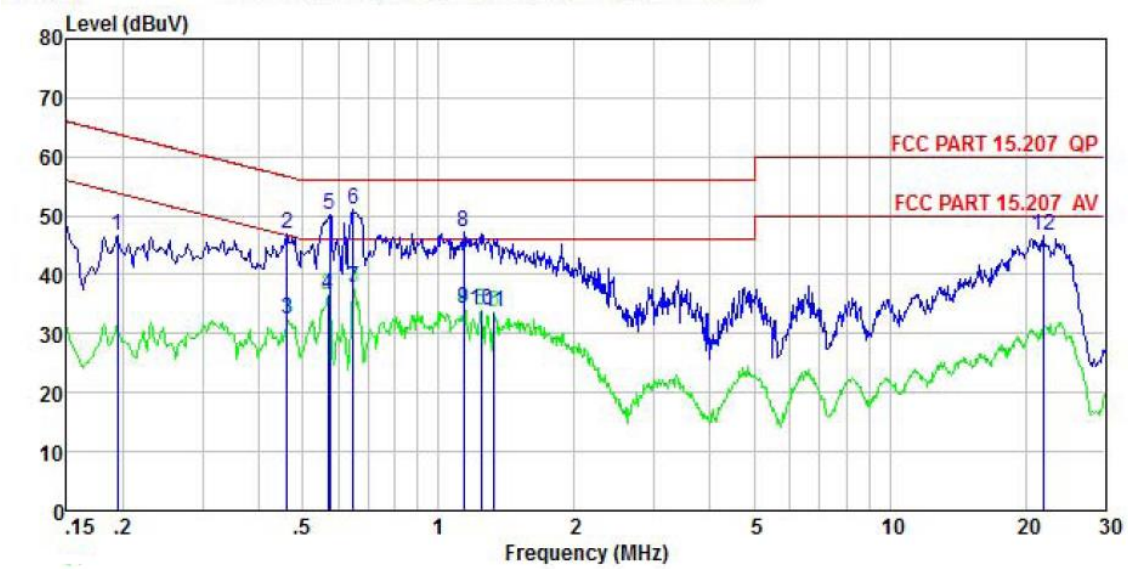


	Freq	Read Level	LISN Factor	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.158	49.74	-0.57	-0.07	0.01	49.11	65.56	-16.45	QP
2	0.178	47.10	-0.58	-0.12	0.01	46.41	64.59	-18.18	QP
3	0.614	50.07	-0.49	-0.38	0.02	49.22	56.00	-6.78	QP
4	0.617	33.32	-0.49	-0.38	0.02	32.47	46.00	-13.53	Average
5	0.844	31.47	-0.58	0.05	0.04	30.98	46.00	-15.02	Average
6	0.984	32.36	-0.62	0.42	0.05	32.21	46.00	-13.79	Average
7	1.100	47.48	-0.61	0.36	0.07	47.30	56.00	-8.70	QP
8	1.100	33.15	-0.61	0.36	0.07	32.97	46.00	-13.03	Average
9	1.197	32.39	-0.59	0.26	0.09	32.15	46.00	-13.85	Average
10	1.229	48.32	-0.59	0.23	0.10	48.06	56.00	-7.94	QP
11	1.388	47.50	-0.57	0.09	0.13	47.15	56.00	-8.85	QP
12	1.568	32.41	-0.55	-0.04	0.15	31.97	46.00	-14.03	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 + Aux Factor + Cable Loss.*

Product name:	LoRa Module	Product model:	WT5518
Test by:	Yayo	Test mode:	Lora mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 22.5℃ Huni: 55%

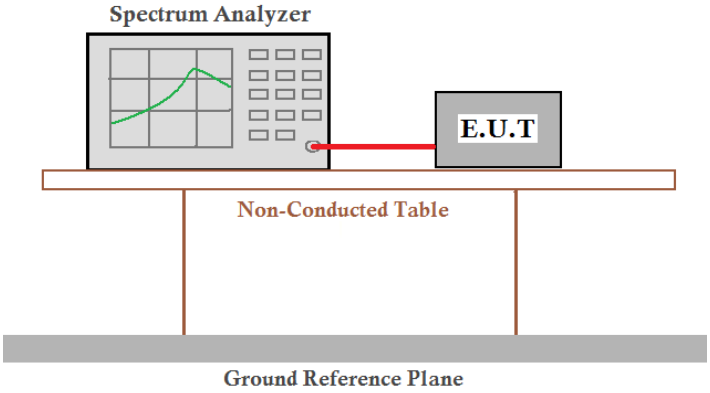


	Freq	Read Level	LISN Factor	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.194	47.32	-0.67	0.00	0.03	46.68	63.84	-17.16	QP
2	0.461	47.51	-0.64	0.00	0.03	46.90	56.67	-9.77	QP
3	0.461	33.02	-0.64	0.00	0.03	32.41	46.67	-14.26	Average
4	0.570	37.24	-0.65	0.03	0.02	36.64	46.00	-9.36	Average
5	0.573	50.80	-0.65	0.03	0.02	50.20	56.00	-5.80	QP
6	0.647	51.66	-0.64	0.04	0.02	51.08	56.00	-4.92	QP
7	0.647	38.24	-0.64	0.04	0.02	37.66	46.00	-8.34	Average
8	1.135	47.71	-0.69	0.10	0.08	47.20	56.00	-8.80	QP
9	1.135	34.73	-0.69	0.10	0.08	34.22	46.00	-11.78	Average
10	1.242	34.36	-0.69	0.11	0.10	33.88	46.00	-12.12	Average
11	1.331	34.00	-0.69	0.12	0.12	33.55	46.00	-12.45	Average
12	21.830	47.24	-1.30	0.43	0.16	46.53	60.00	-13.47	QP

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 + Aux Factor + Cable Loss.*

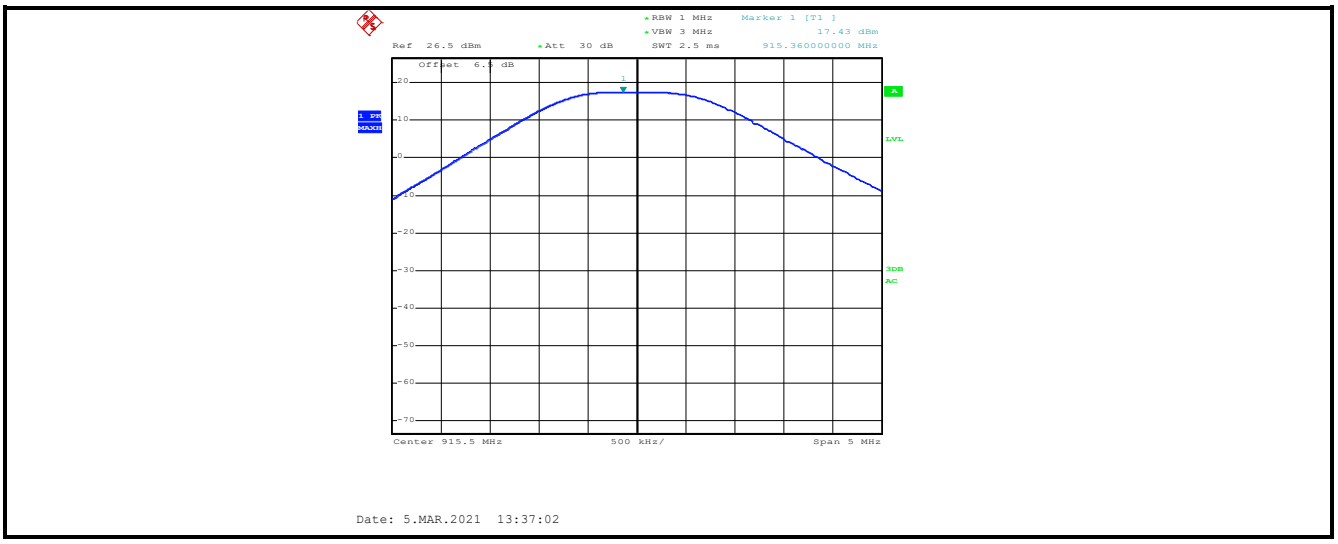
5.3 Conducted Output Power

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

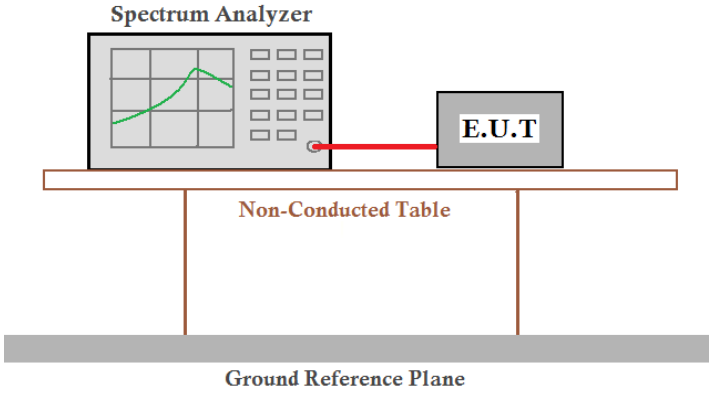
Measurement Data:

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)	Limit(dBm)	Result
915	17.43	30.00	Pass

Test plot as follows:



5.4 Occupy Bandwidth

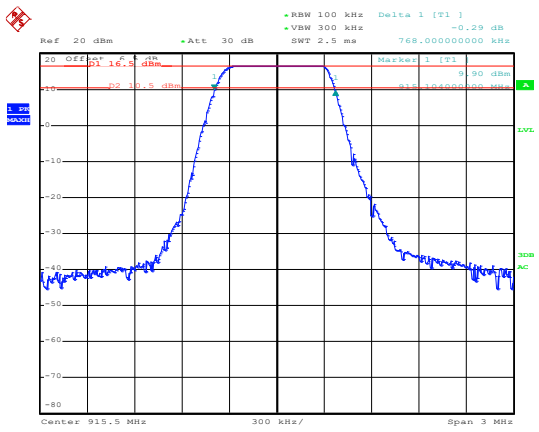
Test Requirement:	FCC Part 15 C Section 15.247 (a)(2)
Limit:	>500kHz
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Test Frequency (MHz)	6dB Emission Bandwidth (MHz)	Limit(kHz)	Result
915	0.768	>500	Pass
Test Frequency (MHz)	99% Occupy Bandwidth (MHz)	Limit(kHz)	Result
915	0.792	N/A	N/A

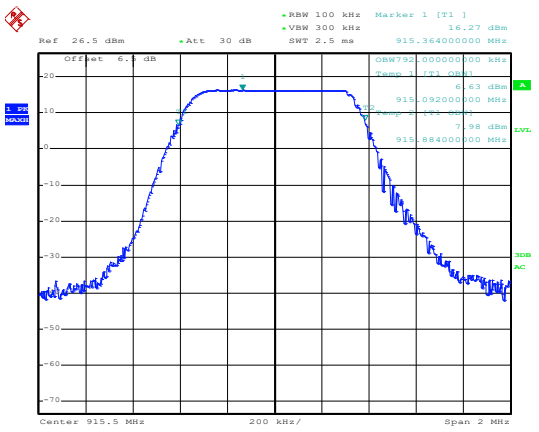
Test plot as follows:

6dB EBW



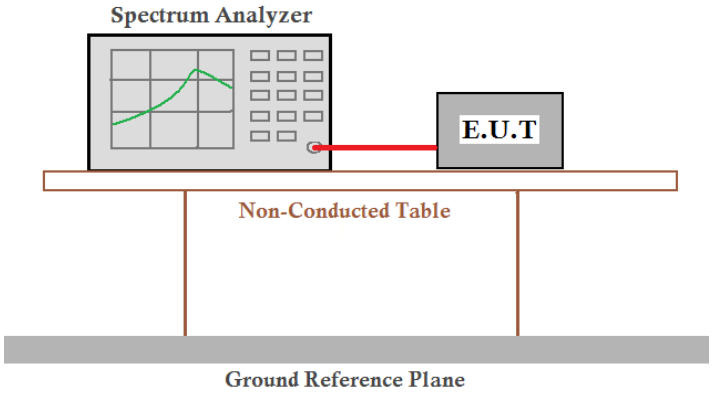
Date: 19.MAR.2021 16:36:01

99% OBW



Date: 10.MAR.2021 09:57:00

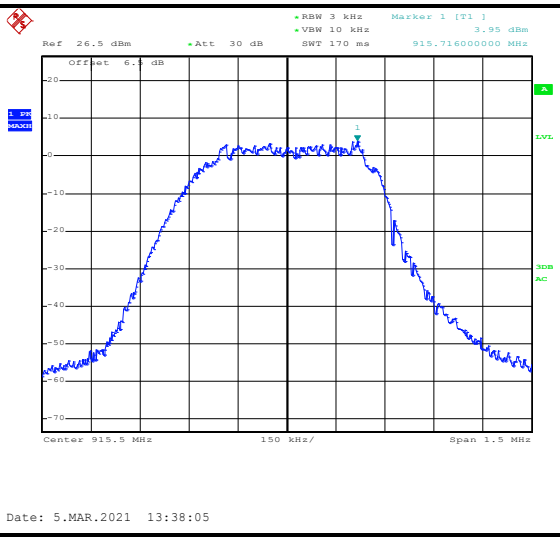
5.5 Power Spectral Density

Test Requirement:	FCC Part 15 C Section 15.247 (e)
Limit:	8 dBm/3kHz
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:

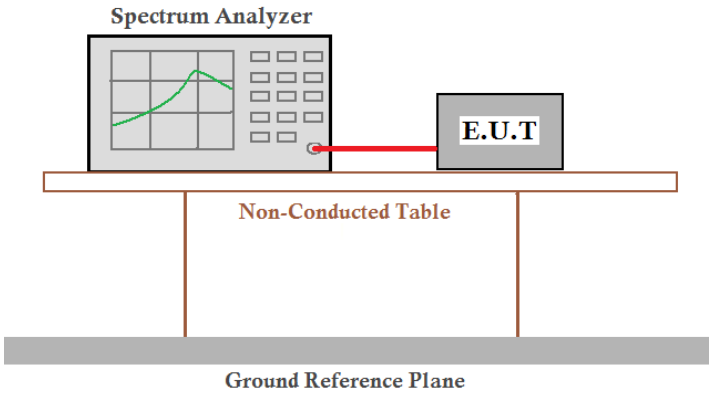
Test Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
915	3.95	8.00	Pass

Test plots as follow:

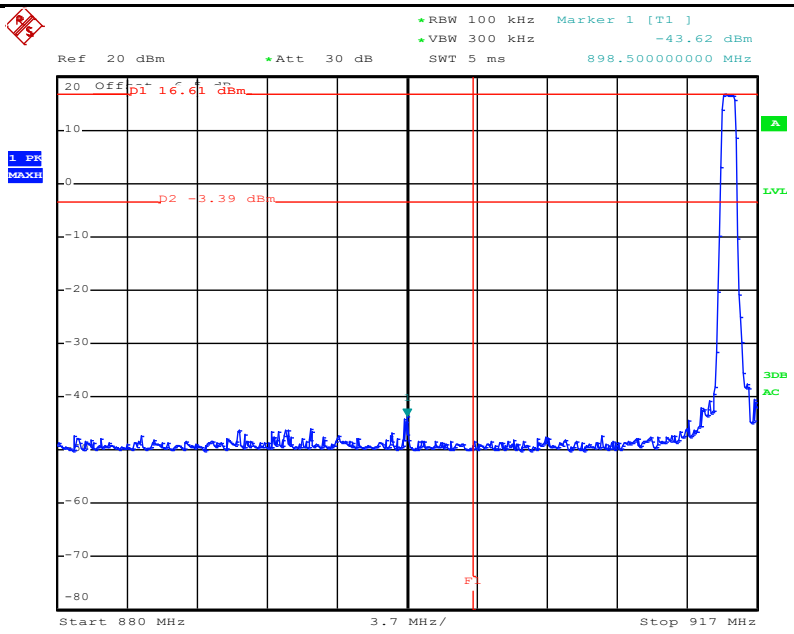


5.6 Band Edge

5.6.1 Conducted Emission Method

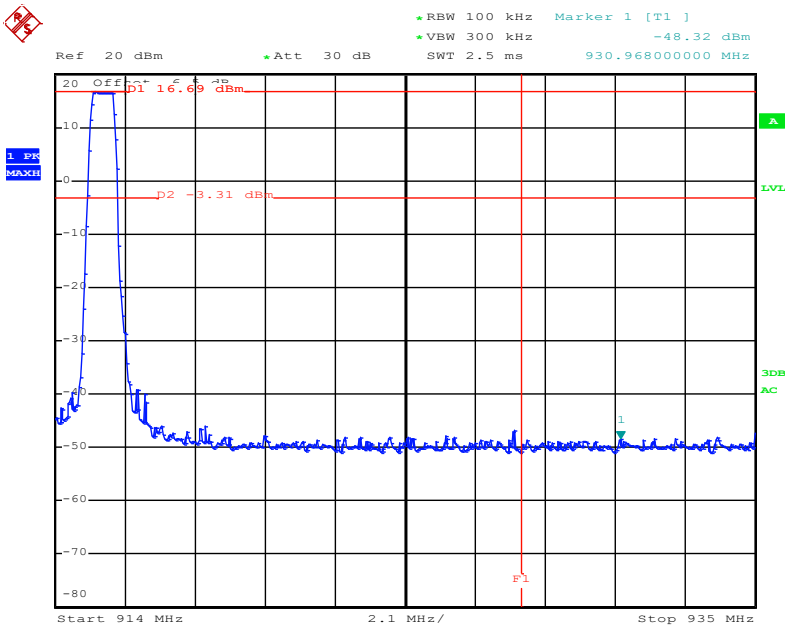
Test Requirement:	FCC Part 15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
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:



Date: 19.MAR.2021 16:37:26

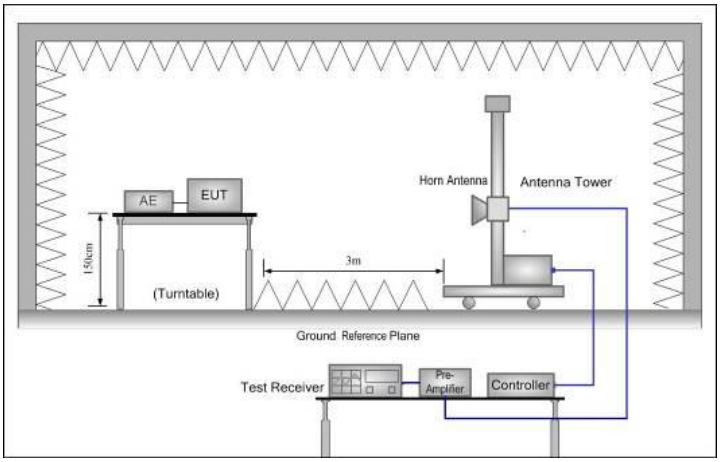
Lowest channel



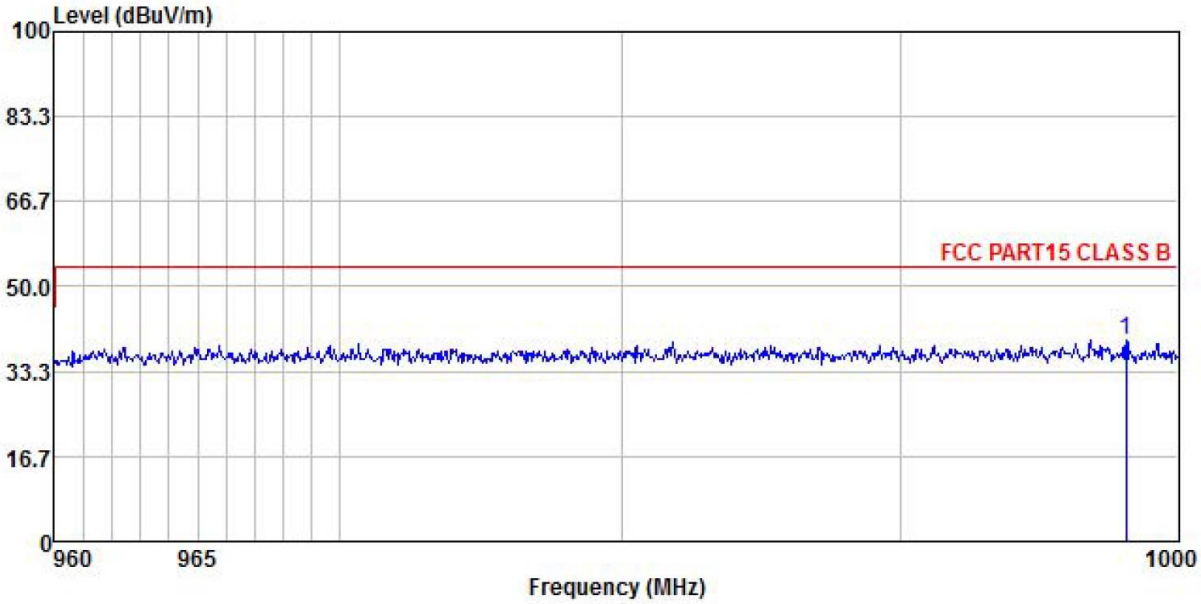
Date: 19.MAR.2021 16:38:25

Highest channel

5.6.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part 15 C Section 15.205 and 15.209</td></tr>
<tr><td>Test Frequency Range:</td><td>2310 MHz to 2390 MHz and 2483.5MHz to 2500 MHz</td></tr>
<tr><td>Test Distance:</td><td>3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.00</td><td>Average Value</td></tr>
<tr><td>74.00</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>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.
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 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.</td></tr>
<tr><td>Test setup:</td><td> 
</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 5.9 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td>Passed</td></tr>
</table>

Product Name:	LoRa Module	Product Model:	WT5518
Test By:	Yaro	Test mode:	Lora Tx mode
Test Channel:	Lowest channel	Polarization:	Vertical
Test Voltage:	CR 17345 3V	Environment:	Temp: 24℃ Huni: 57%

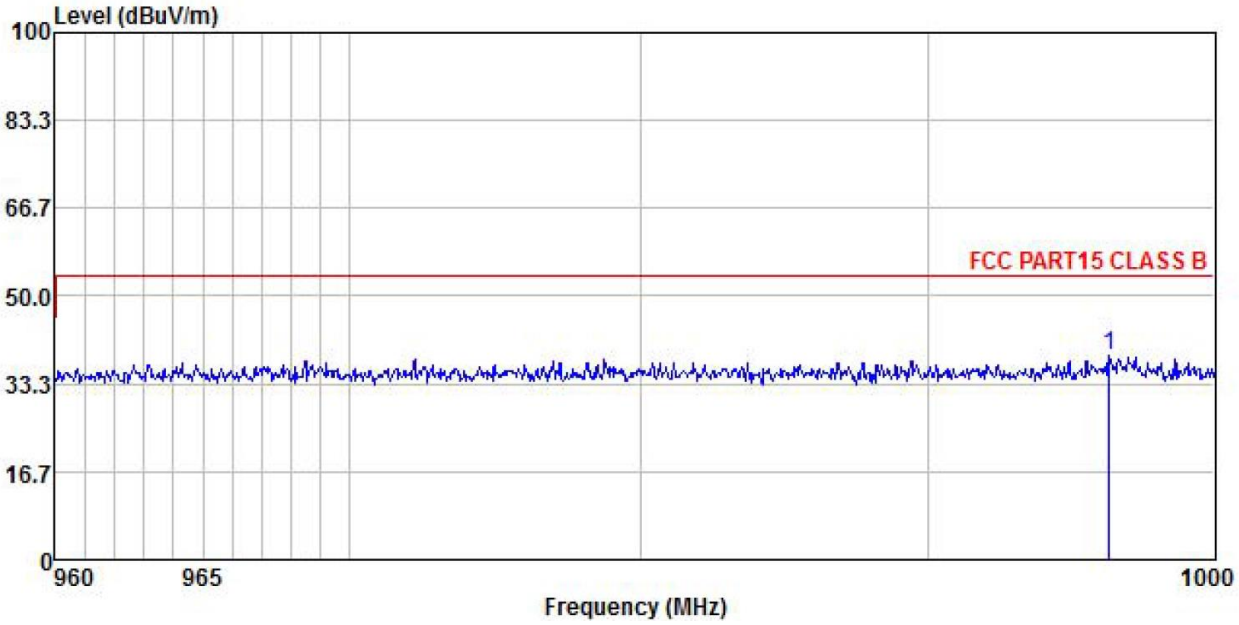


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	998.124	16.40	23.08	0.00	0.00	0.00	39.48	54.00	-14.52	

Remark:

1. *Final Level = Receiver Read level + 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.*

Product Name:	LoRa Module	Product Model:	WT5518
Test By:	Yaro	Test mode:	Lora Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	CR 17345 3V	Environment:	Temp: 24℃ Huni: 57%

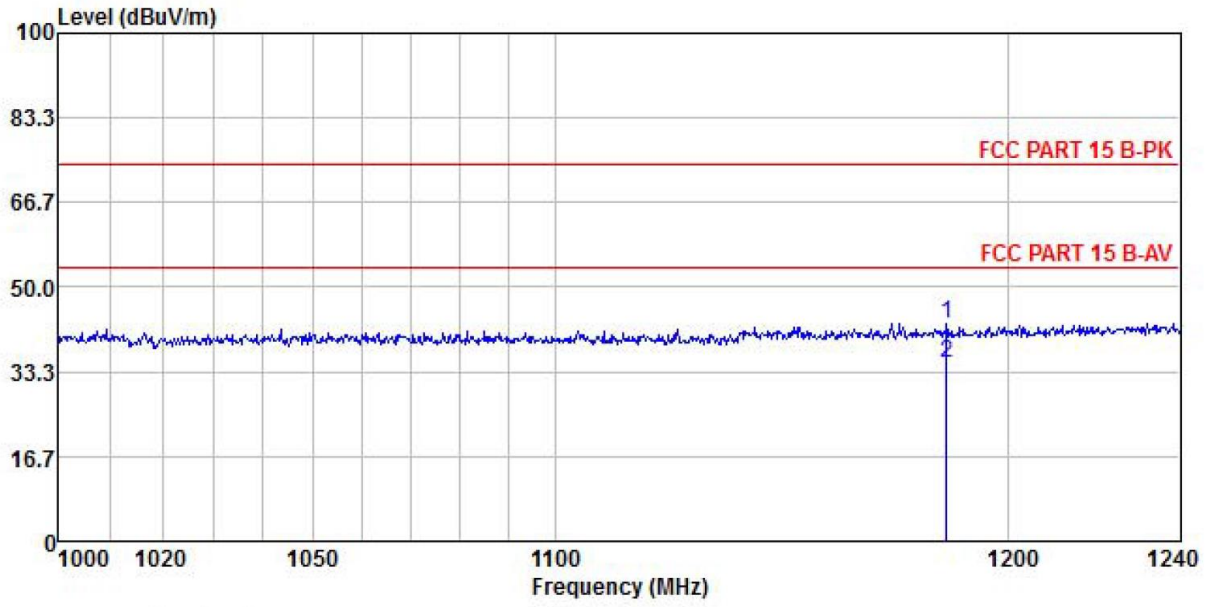


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	996.292	15.75	23.08	0.00	0.00	0.00	38.83	54.00	-15.17	

Remark:

1. *Final Level = Receiver Read level + 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.*

Product Name:	LoRa Module	Product Model:	WT5518
Test By:	Yaro	Test mode:	Lora Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	CR 17345 3V	Environment:	Temp: 24℃ Huni: 57%

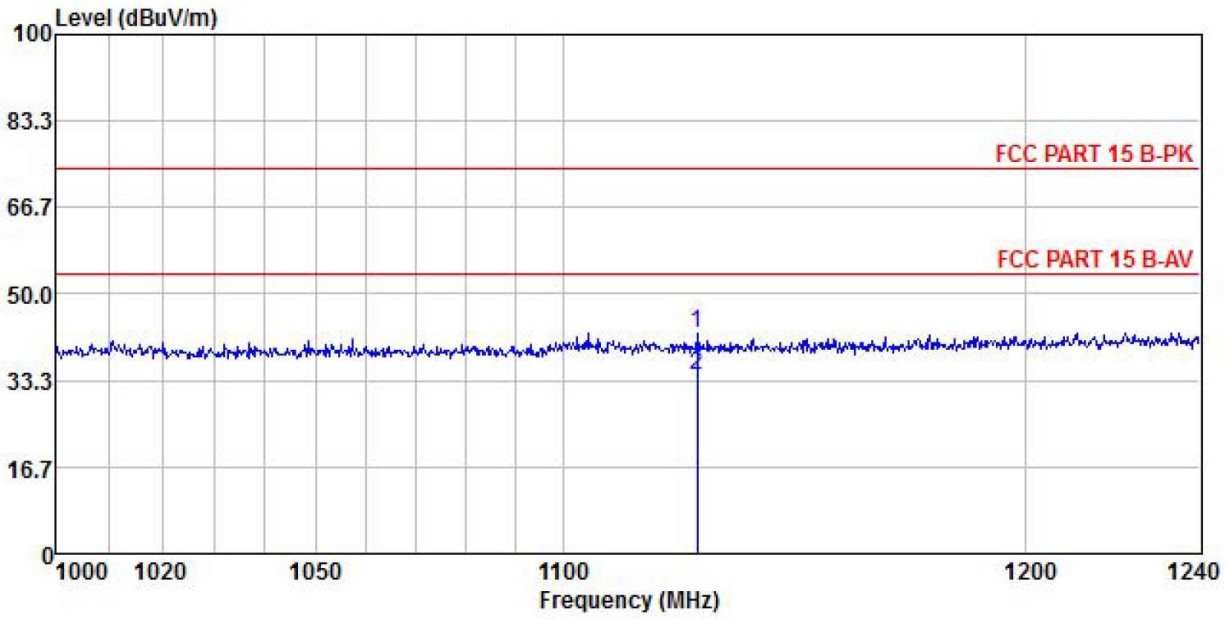


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	1185.741	18.65	24.29	0.00	0.00	0.00	42.94	74.00	-31.06	Peak
2	1185.741	10.83	24.29	0.00	0.00	0.00	35.12	54.00	-18.88	Average

Remark:

1. *Final Level = Receiver Read level + 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.*

Product Name:	LoRa Module	Product Model:	WT5518
Test By:	Yaro	Test mode:	Lora Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	CR 17345 3V	Environment:	Temp: 24℃ Huni: 57%



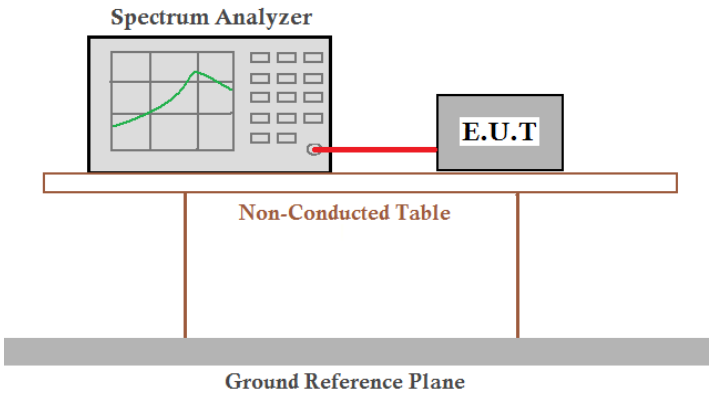
	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	1128.018	18.14	24.27	0.00	0.00	0.00	42.41	74.00	-31.59	Peak
2	1128.018	10.16	24.27	0.00	0.00	0.00	34.43	54.00	-19.57	Average

Remark:

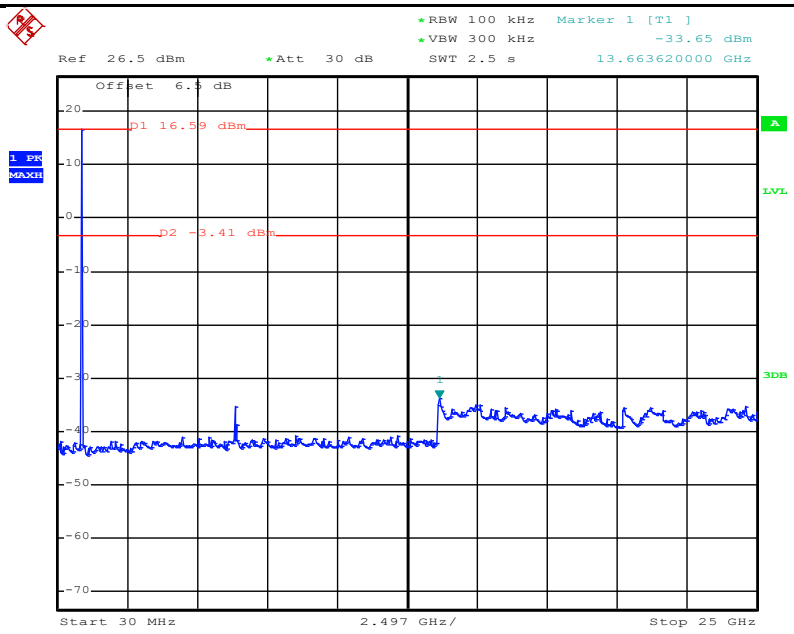
1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

5.7 Spurious Emission

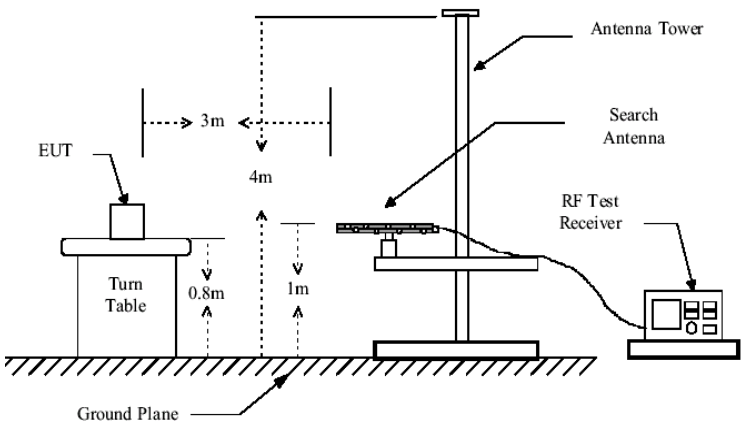
5.7.1 Conducted Emission Method

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

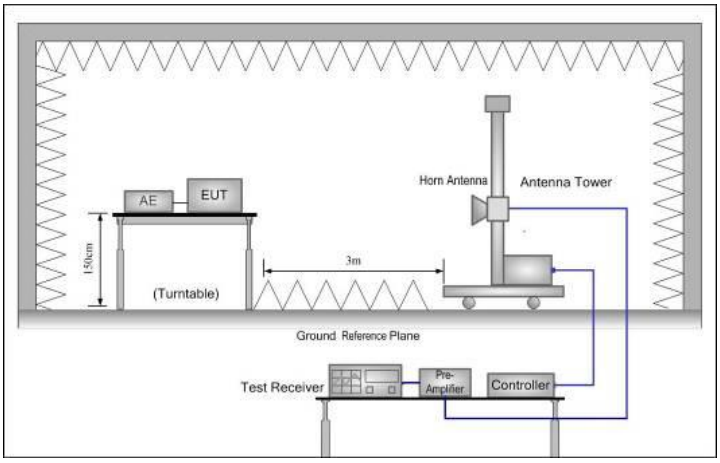
Test plot as follows:



5.7.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part 15 C Section 15.205 and 15.209</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">9kHz to 25GHz</td></tr>
<tr><td>Test Distance:</td><td colspan="5">3m</td></tr>
<tr><td>Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td></td><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td></td><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
<tr><td>Limit:</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td></td><td colspan="2">30MHz-88MHz</td><td colspan="2">40.0</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">88MHz-216MHz</td><td colspan="2">43.5</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">216MHz-960MHz</td><td colspan="2">46.0</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2">960MHz-1GHz</td><td colspan="2">54.0</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td colspan="2" rowspan="2">Above 1GHz</td><td colspan="2">54.0</td><td>Average Value</td></tr>
<tr><td></td><td colspan="2">74.0</td><td>Peak Value</td></tr>
<tr><td>Test Procedure:</td><td colspan="5">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.
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 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.</td></tr>
<tr><td>Test setup:</td><td colspan="5">Below 1GHz
 

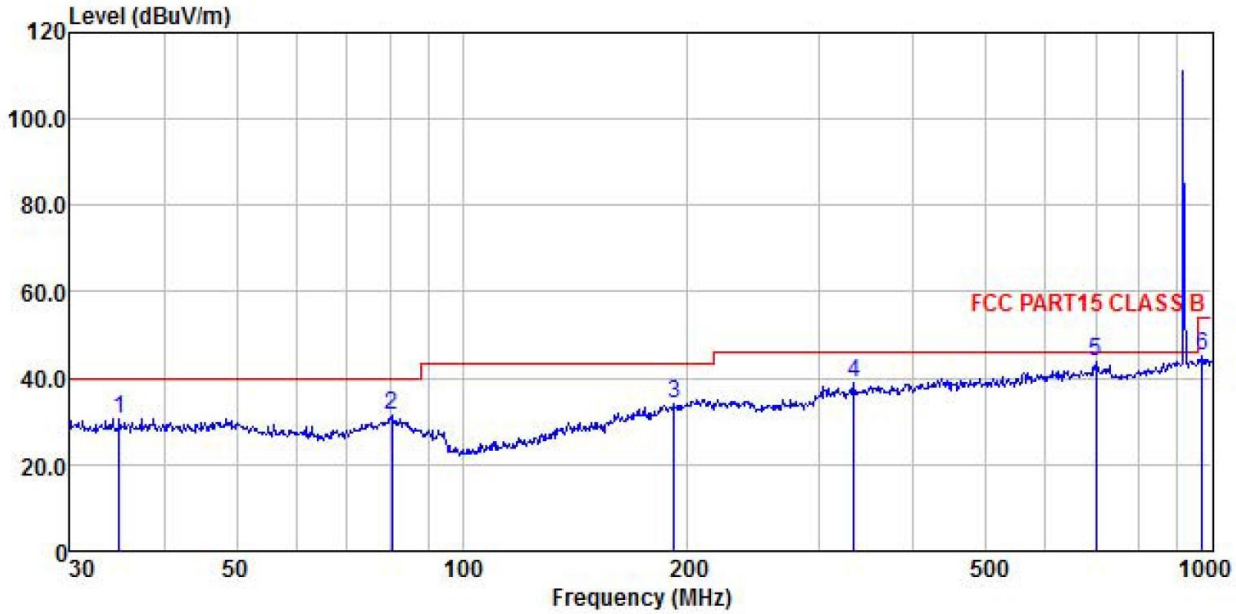
Above 1GHz</td></tr>
</table>

	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	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 lower than the limit 20dB, so only shows the data of above 30MHz in this report.

Measurement Data (worst case):

Below 1GHz:

Product Name:	LoRa Module	**Product Model:**	WT5518
Test By:	Yaro	**Test mode:**	Lora Tx mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical
Test Voltage:	CR 17345 3V	**Environment:**	Temp: 24℃ Huni: 57%

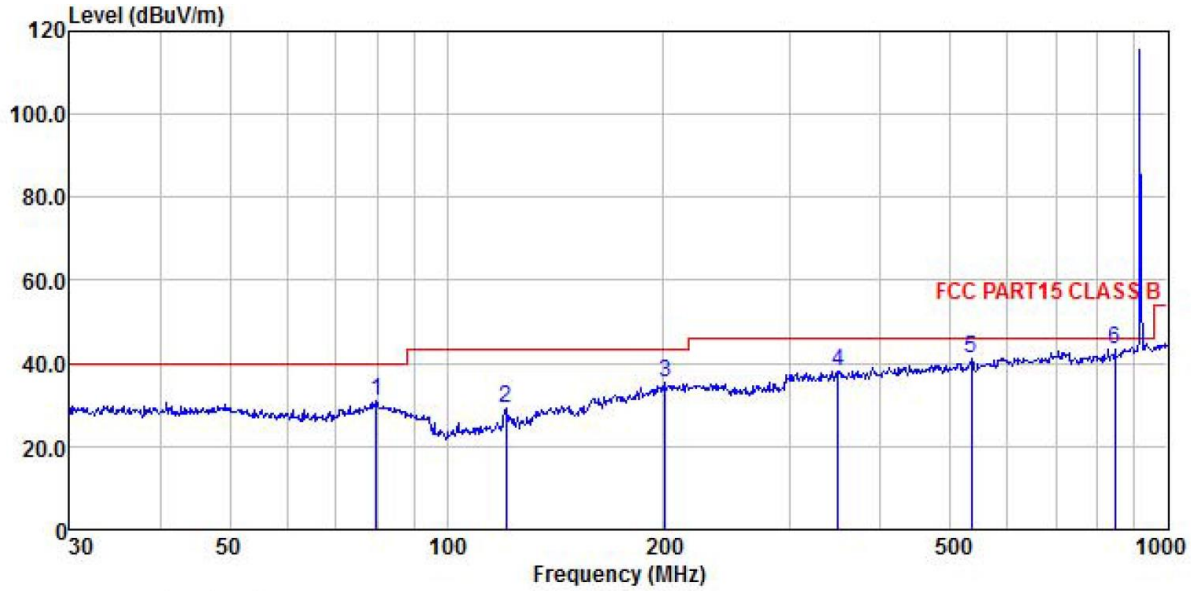


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	34.882	17.70	12.58	0.39	0.00	0.00	30.67	40.00	-9.33	QP
2	80.644	18.28	12.66	0.69	0.00	0.00	31.63	40.00	-8.37	QP
3	191.745	15.20	17.55	1.37	0.00	0.00	34.12	43.50	-9.38	QP
4	332.519	18.27	18.77	1.85	0.00	0.00	38.89	46.00	-7.11	QP
5	699.305	20.30	20.50	2.83	0.00	0.00	43.63	46.00	-2.37	QP
6	968.934	18.64	22.92	3.55	0.00	0.00	45.11	54.00	-8.89	QP

Remark:

1. *Final Level = Receiver Read level + 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.*
3. *The Aux Factor is a notch filter switch box loss, this item is not used.*

Product Name:	LoRa Module	Product Model:	WT5518
Test By:	Yaro	Test mode:	Lora Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	CR 17345 3V	Environment:	Temp: 24℃ Huni: 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	79.800	17.74	12.73	0.69	0.00	0.00	31.16	40.00	-8.84	QP
2	120.699	17.60	10.82	0.90	0.00	0.00	29.32	43.50	-14.18	QP
3	200.688	15.55	18.30	1.43	0.00	0.00	35.28	43.50	-8.22	QP
4	349.250	17.60	18.80	1.89	0.00	0.00	38.29	46.00	-7.71	QP
5	533.832	19.16	19.54	2.43	0.00	0.00	41.13	46.00	-4.87	QP
6	845.088	18.81	21.34	3.21	0.00	0.00	43.36	46.00	-2.64	QP

Remark:

1. *Final Level = Receiver Read level + 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.*
3. *The Aux Factor is a notch filter switch box loss, this item is not used.*

Above 1GHz

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
1831.00	71.92	25.33	7.82	0.00	54.71	50.36	74.00	-23.64	Vertical
1831.00	74.35	25.33	7.82	0.00	54.71	52.79	74.00	-21.21	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
1831.00	61.88	25.33	7.82	0.00	54.71	40.32	54.00	-13.68	Vertical
1831.00	64.36	25.33	7.82	0.00	54.71	42.80	54.00	-11.20	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.*