TEST REPORT
FCC ID:ZHZLPS8V2-915

Report Number.....:	**ZKT-240425L4279E-1**
Date of Test.....	Apr.07,2024 to May.16,2024
Date of issue.....:	May.17,2024
Total number of pages.....	43
Test Result.....:	PASS
Testing Laboratory.....:	**Shenzhen ZKT Technology Co., Ltd.**
Address .....:	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name .....:	**Dragino Technology Co., Limited**
Address .....:	Room 202, Block B, BCT Incubation Bases, No.8 CaiYunRoad LongCheng Street, LongGang District ; Shenzhen 518116,China
Manufacturer's name .....:	**Dragino Technology Co., Limited**
Address .....:	Room 202, Block B, BCT Incubation Bases, No.8 CaiYunRoad LongCheng Street, LongGang District ; Shenzhen 518116,China
Test specification:	
Standard.....:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Test procedure.....:	/
Non-standard test method .....:	N/A
Test Report Form No.....:	TRF-EL-110_V0
Test Report Form(s) Originator.....:	ZKT Testing
Master TRF .....:	Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Product name.....:	**LoRaWAN Gateway**
Trademark .....:	DRAGINO
Model/Type reference.....:	LPS8v2-915
Ratings.....:	AC/DC ADAPTER MODEL:QL010-0502000UU INPUT:100-240V~50/0Hz 0.45A OUTPUT:5.0A⎓2.0A

Testing procedure and testing location:

Testing Laboratory.....:	**Shenzhen ZKT Technology Co., Ltd.**
Address.....:	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Tested by (name + signature).....:	Jim Liu
Reviewer (name + signature).....:	Jackson Fang
Approved (name + signature).....:	Lake Xie

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1.Version

Report No.	Version	Description	Approved
ZKT-240425L4279E-1	Rev.01	Initial issue of report	May.17,2024

2. Test Summary

Test Item	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)(1)	Pass
-6dB Occupied Bandwidth&-20dB Occupied Bandwidth	15.247 (a)(1)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(i)	Pass
Dwell Time	15.247 (a)(1)	Pass
Power Spectral Density	15.247 (e)	Pass
Emissions in non-restricted frequency bands	15.247(b)(4)	Pass
Radiated Emission	15.205/15.209	Pass
Band Edge	15.247(d)	Pass

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.

Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225

Designation Number: CN1299

IC Registered No.: 27033

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U， where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2， providing a level of confidence of approximately 95 %。

No.	Item	Uncertainty
1	3m camber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission(6GHz-40GHz)	U=5.0dB
5	Conducted disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF power conducted	U=1.86dB
8	RF conducted Spurious Emission	U=2.2dB
9	RF Occupied Bandwidth	U=1.8dB
10	RF Power Spectral Density	U=1.75dB
11	humidity uncertainty	U=5.3%
12	Temperature uncertainty	U=0.59℃

3. General Information

3.1 General Description of EUT

Product Name:	LoRaWAN Gateway
Model No.:	LPS8v2-915
Test model:	LPS8v2-915
Model difference	-
Test sample(s) ID:	ZKT-240425L42769-1
Sample(s) Status:	Engineer sample
Serial No.:	Lps8v2n510330
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	902.3MHz~927.7MHz for 125KHz bandwidth 923.3MHz~927.5MHz for 500KHz bandwidth
Channel numbers:	128 for 125KHz bandwidth 8 for 500KHz bandwidth
Channel separation:	0.2MHz for 125KHz bandwidth 0.6MHz for 500KHz bandwidth
Modulation type:	Lora
Antenna Type:	External antenna
Antenna gain:	5.0dBi
Power supply:	AC/DC ADAPTER MODEL:QL010-0502000UU INPUT:100-240V~50/0Hz 0.45A OUTPUT:5.0A⎓2.0A

125KHz for FHSS:

Operation Frequency each of channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	902.3	33	908.7	65	915.1	97	921.5
2	902.5	34	908.9	66	915.3	98	921.7
3	902.7	35	909.1	67	915.5	99	921.9
4	902.9	36	909.3	68	915.7	100	922.1
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29	907.9	61	914.3	93	920.7	125	927.1
30	908.1	62	914.5	94	920.9	126	927.3
31	908.3	63	914.7	95	921.1	127	927.5
32	908.5	64	914.9	96	921.3	128	927.7

Channel	Frequency(125KHz)
The lowest channel	902.30MHz
The middle channel	915.10MHz
The Highest channel	927.70MHz

500KHz for DTS:

Operation Frequency each of channel					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	923.30	4	925.10	7	926.90
2	923.90	5	925.70	8	927.50
3	924.50	6	926.30		

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, and the selected channel see below:

Channel	Frequency(1.6MHz)
The lowest channel	923.30MHz
The middle channel	925.70MHz
The Highest channel	927.50MHz

3.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

3.3 Test Setup Configuration

Conducted Emission

Radiated Emission

Conducted Spurious

3.4 Support Equipment

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	LoRaWAN Gateway	DRAGINO	LPS8v2-915	Lps8v2n510330	EUT
E-2	AC Adapter	DRAGINO	QL010-0502000UU	N/A	EUT
E-3	PC	RedmiBook	XMA1901-DA	24822/00099525	AE

Item	Shielded Type	Ferrite Core	Length	Note

Note:
(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

3.5 Test Instruments list

Radiation Test equipment

Radiation Test equipment

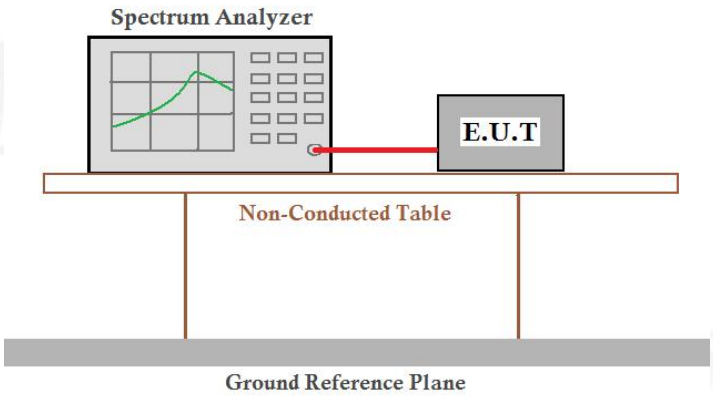
Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	A.17.05	Nov. 02, 2023	Nov. 01, 2024
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Nov. 02, 2023	Nov. 01, 2024
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	100969	4.32	Nov. 02, 2023	Nov. 01, 2024
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	N/A	N/A	Nov. 13, 2023	Nov. 12, 2024
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	N/A	Nov. 13, 2023	Nov. 12, 2024
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	N/A	Nov. 13, 2023	Nov. 12, 2024
7	Loop Antenna	TESEQ	HLA6121	58357	N/A	Nov. 16, 2023	Nov. 15, 2024
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	60747	N/A	Nov. 02, 2023	Nov. 01, 2024
9	Amplifier (1GHz-26.5GHz)	HuiPu	8449B	3008A00315	N/A	Nov. 02, 2023	Nov. 01, 2024
10	Amplifier (500MHz-40GHz)	QuanJuDa	DLE-161	097	N/A	Nov. 02, 2023	Nov. 01, 2024
11	Test Cable	N/A	R-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
12	Test Cable	N/A	R-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
13	Test Cable	N/A	R-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
14	Test Cable	N/A	RF-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
15	Test Cable	N/A	RF-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
16	Test Cable	N/A	RF-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
17	ESG Signal Generator	Agilent	E4421B	N/A	B.03.84	Nov. 02, 2023	Nov. 01, 2024
18	Signal Generator	Agilent	N5182A	N/A	A.01.87	Nov. 02, 2023	Nov. 01, 2024
19	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	N/A	Nov. 16, 2023	Nov. 15, 2024
20	Wideband Radio Communication Test	R&S	CMW500	106504	V 3.7.22	Nov. 02, 2023	Nov. 01, 2024
21	MWRF Power Meter Test system	MW	MW100-RFCB	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
22	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	\	\
23	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\
24	RF Software	MW	MTS8310	V2.0.0.0	N/A	\	\
25	Turntable	MF	MF-7802BS	N/A	N/A	\	\
26	Antenna tower	MF	MF-7802BS	N/A	N/A	\	\

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	N/A	Nov. 14, 2023	Nov. 13, 2024
2	LISN	CYBERTEK	EM5040A	E1850400149	N/A	Nov. 02, 2023	Nov. 01, 2024
3	Test Cable	N/A	C-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
4	Test Cable	N/A	C-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
5	Test Cable	N/A	C-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
6	EMI Test Receiver	R&S	ESCI3	101393	4.42 SP3	Nov. 02, 2023	Nov. 01, 2024
7	Triple-Loop Antenna	N/A	RF300	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
8	Absorbing Clamp	DZ	ZN23201	15034	N/A	Nov. 07, 2023	Nov. 06, 2024
9	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\

4 Test Items

4.1 Conducted Peak Output Power

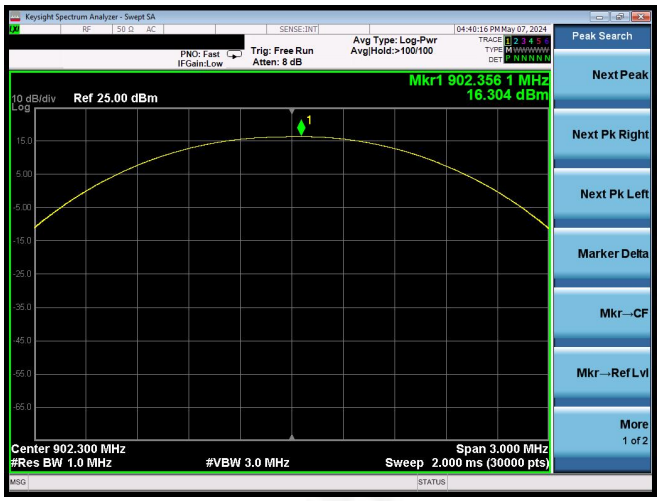
Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data:

Mode	Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
125KHz Bandwidth	Lowest	16.304	30.00	Pass
	Middle	16.731		
	Highest	15.608		
500KHz Bandwidth	Lowest	15.660		Pass
	Middle	15.500		
	Highest	15.460		

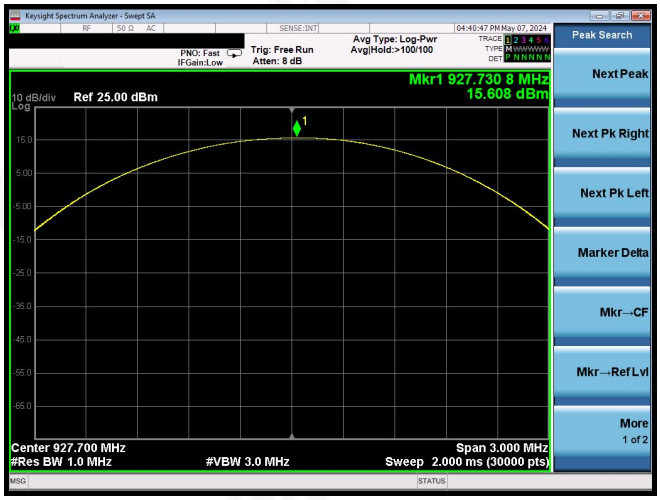
125KHz:

Test plot as follows:



Lowest channel

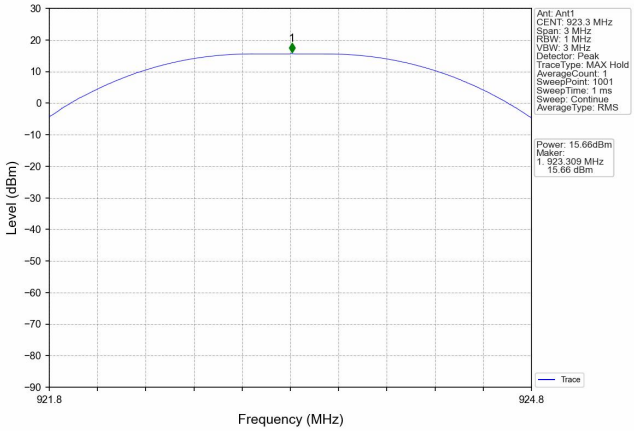
Middle channel



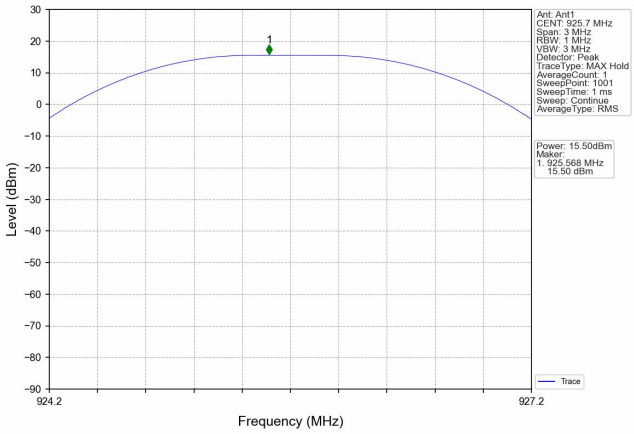
Highest channel

500KHz:

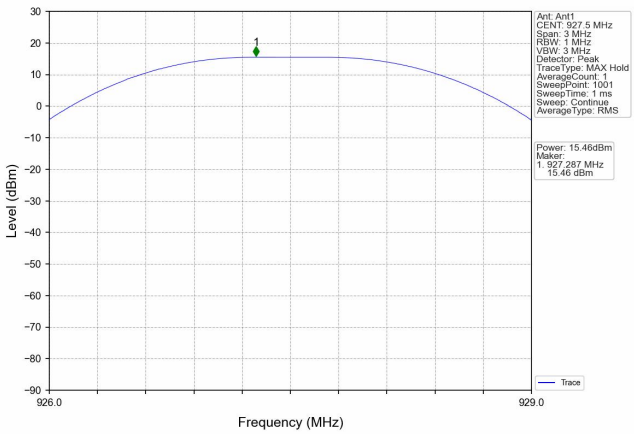
Test plot as follows:



Lowest channel

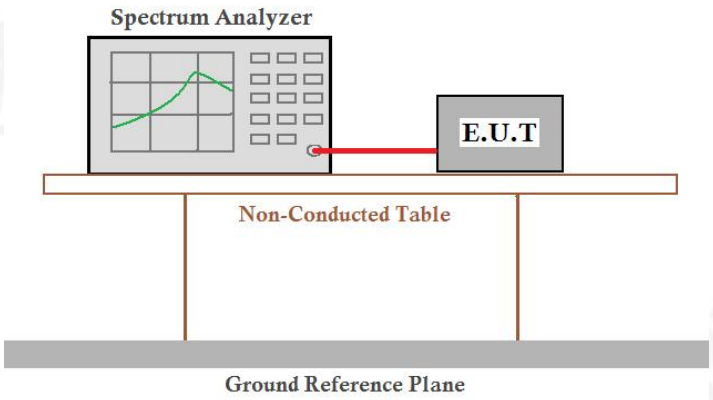


Middle channel



Highest channel

4.2 -6dB Occupied Bandwidth & -20dB Occupied Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance v05r02
Limit:	>500KHz for -6dB Bandwidth N/A for -20dB Bandwidth
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

125KHz Bandwidth:

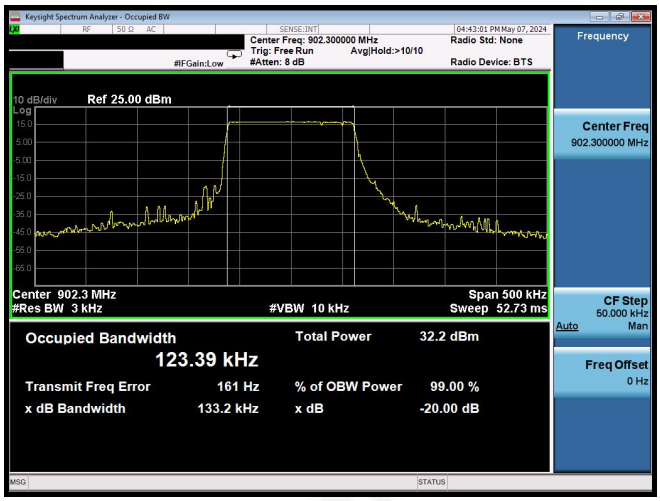
Mode	Test channel	20dB Bandwidth (kHz)	Result
125KHz Bandwidth	Lowest	133.2	Pass
	Meddle	133.1	
	Highest	133.6	

500KHz Bandwidth:

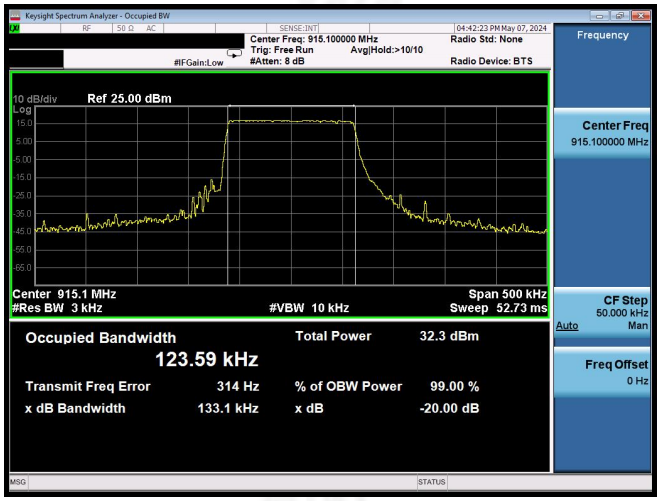
Test channel	Channel Bandwidth (KHz)	Limit(KHz)	Result
Lowest	627	>500	Pass
Meddle	630		
Highest	630		

Test plot as follows:

125KHz:



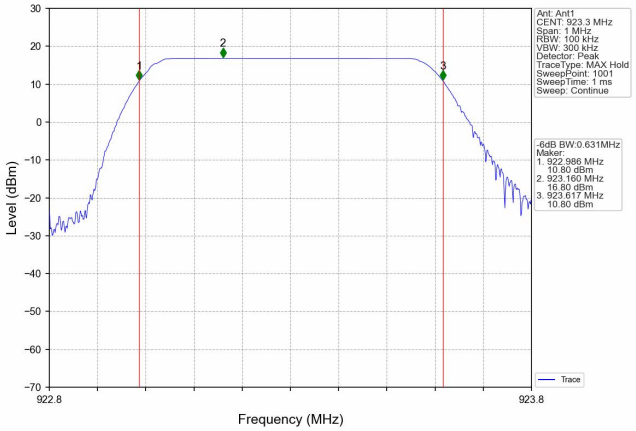
Lowest channel



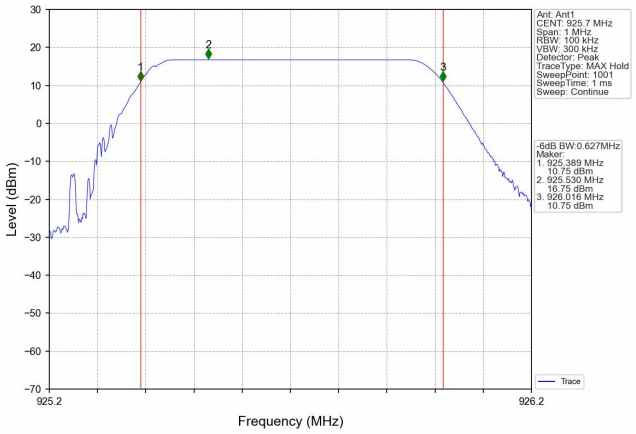
Meddle channel

Highest channel

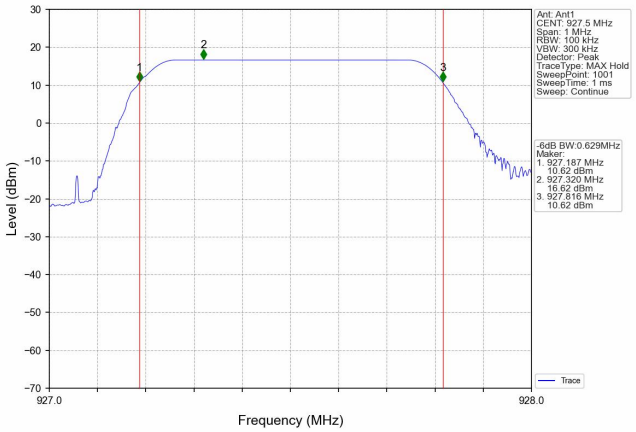
Test plot as follows:
500KHz



Lowest channel

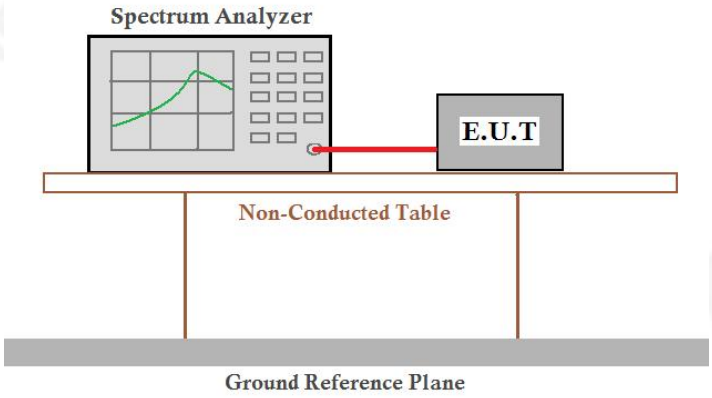


Meddle channel



Highest channel

4.3 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1) RSS-247 issue 2 5.1 (b)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=3KHz, VBW=10KHz, detector=Peak
Limit:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

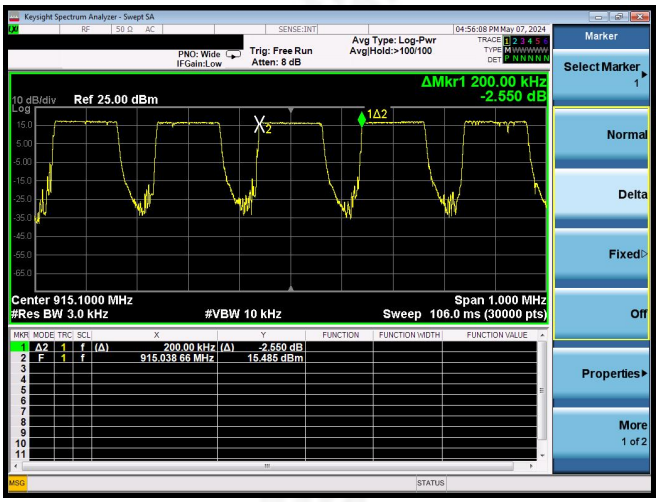
Measurement Data

Mode	Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
125KHz Bandwidth	Lowest	200.0	25KHz or 20dB Bandwidth	Pass
	Middle	200.0		Pass
	Highest	200.0		Pass

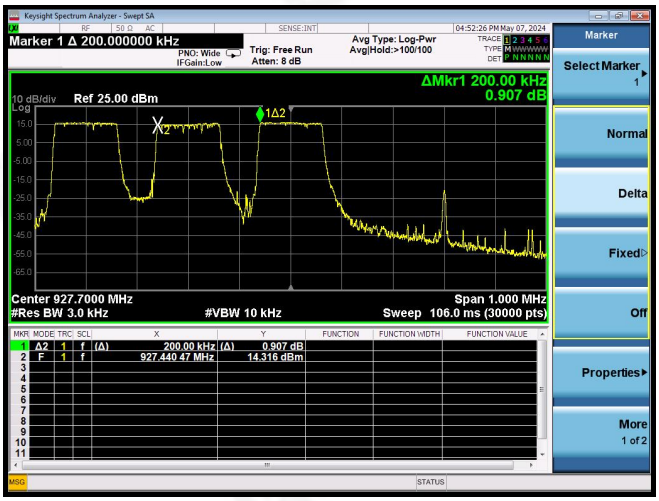
Test plot as follows:

Modulation mode:	125KHz Bandwidth

Lowest channel

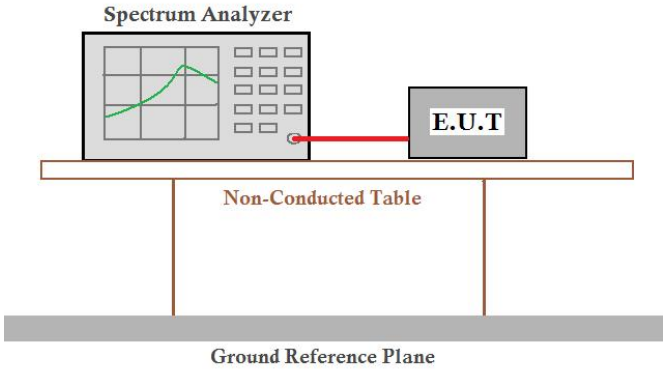


Middle channel



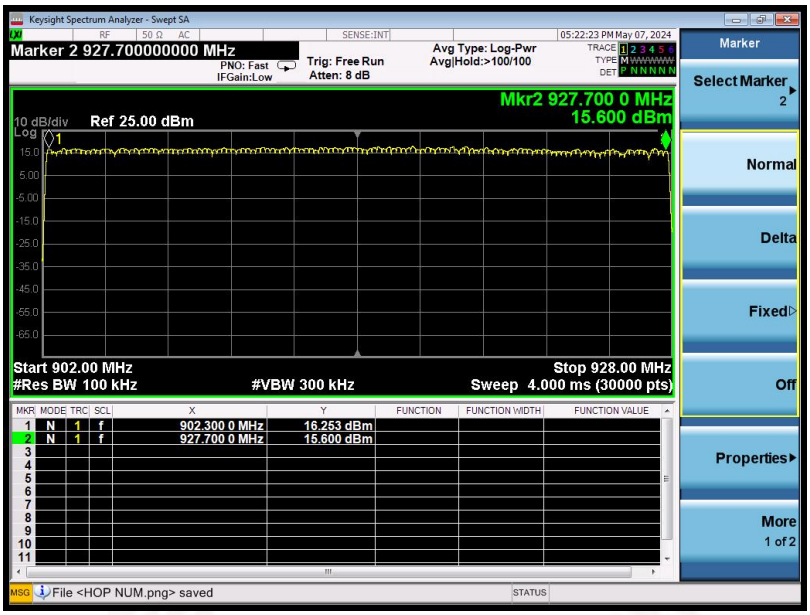
Highest channel

4.4 Hopping Channel Number

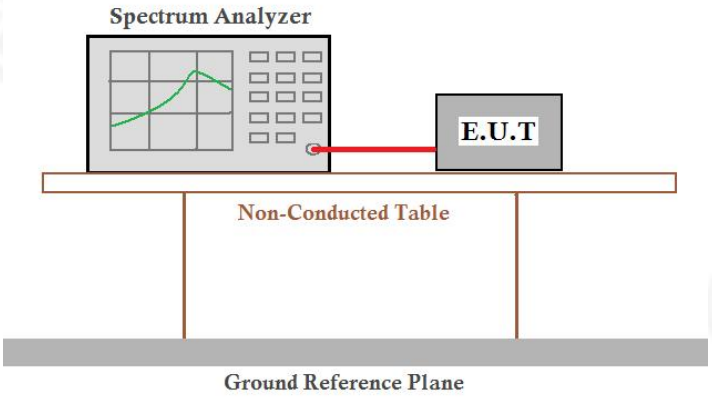
Test Requirement:	FCC Part15 C Section 15.247 (a)(1) RSS-247 issue 2 5.1 (c)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=902-928MHz, Detector=Peak
Limit:	If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data:

Mode	Hopping channel numbers	Limit	Result
125KHz Bandwidth	128	50	Pass



4.5 Dwell Time

Test Requirement:	FCC Part15 C Section 15.247 (a)(1) RSS-247 issue 2 5.1 (c)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=10kHz, VBW=30KHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

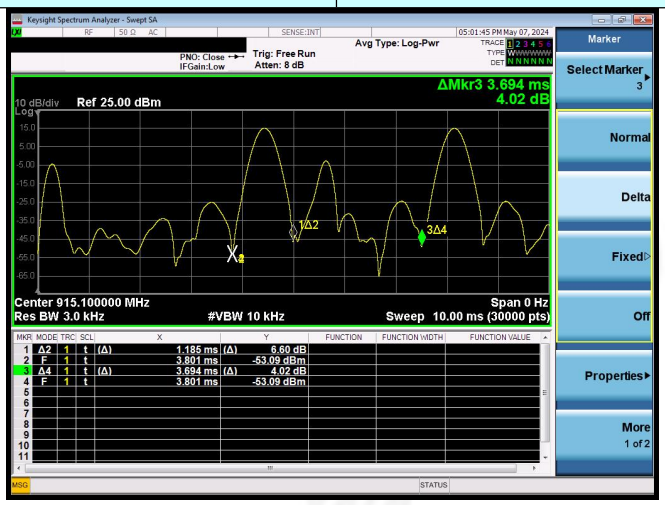
Measurement Data

Mode	Ton(ms)	Tcycle(ms)	Dwell time(ms)	Limit(ms)	Result
125KHz Bandwidth	1.118	3.694	111.497	400	Pass

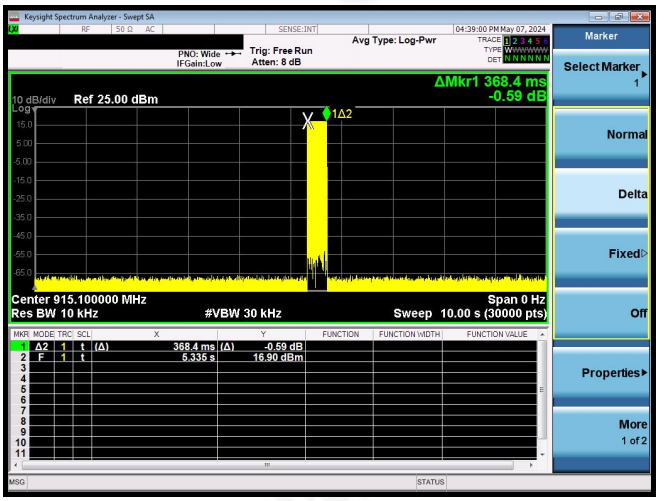
Note: Transmit numbers= Continue TX Time/Tcycle
Dwell time=Transmit numbers*Ton

Test plot as follows:

Test Mode:	125KHz Bandwidth

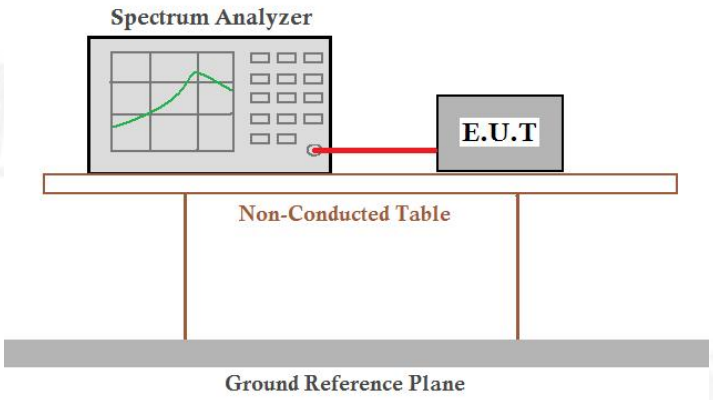


Ton&Tcycle



Continue TX Time

4.6 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance v05r02
Limit:	8dBm/3kHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

125KHz

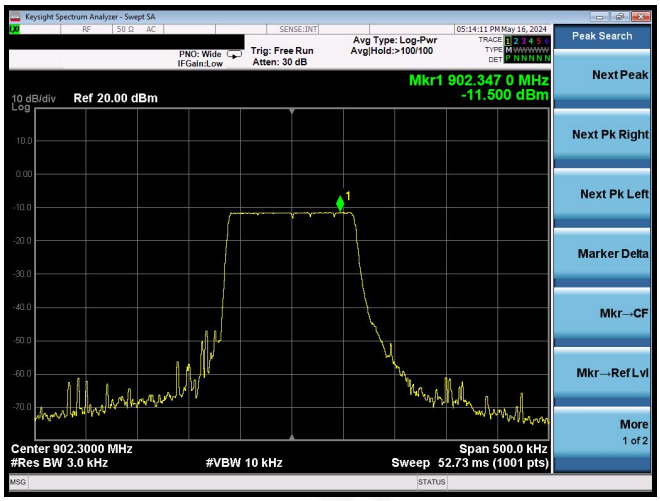
Test channel	Power Spectral Density (dBm/3kHz)	Limit(dBm/3kHz)	Result
Lowest	-11.500	8.00	Pass
Middle	-11.401		
Highest	-12.250		

500KHz

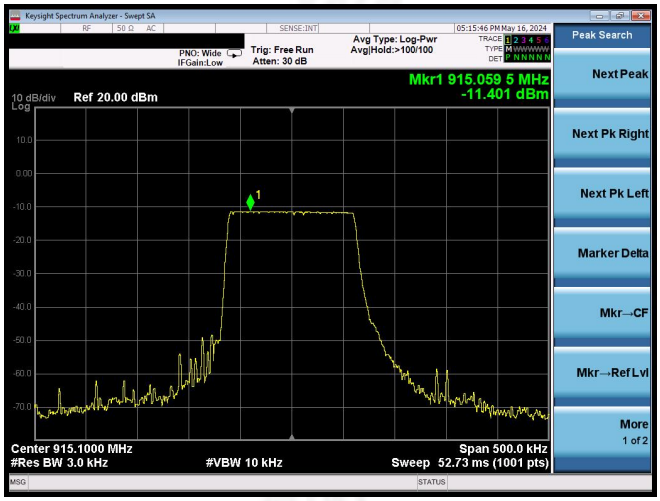
Test channel	Power Spectral Density (dBm/3kHz)	Limit(dBm/3kHz)	Result
Lowest	-18.44	8.00	Pass
Middle	-17.17		
Highest	-14.05		

125KHz

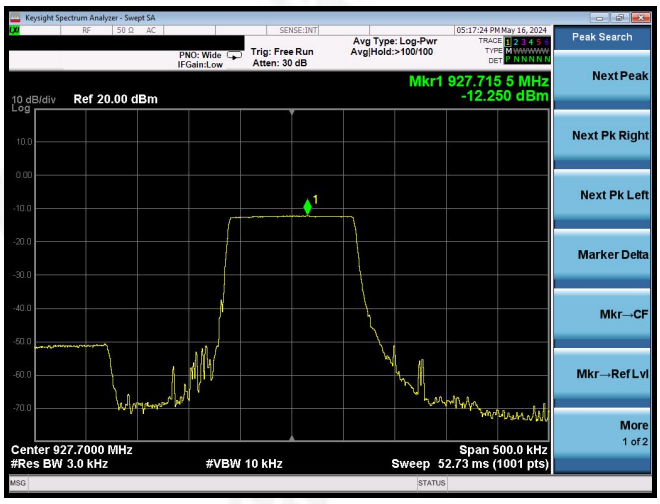
Test plot as follows:



Lowest channel

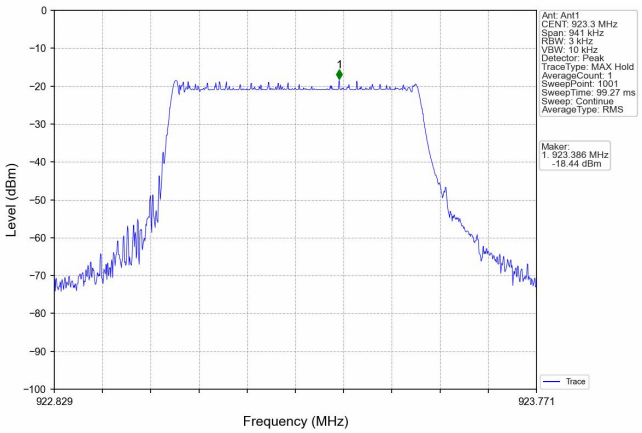


Medlle channel

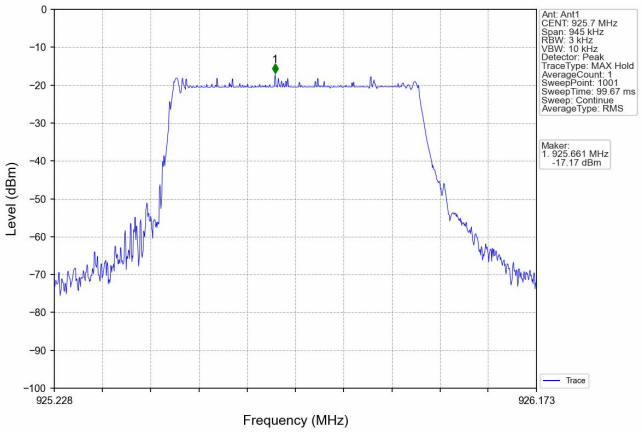


Highest channel

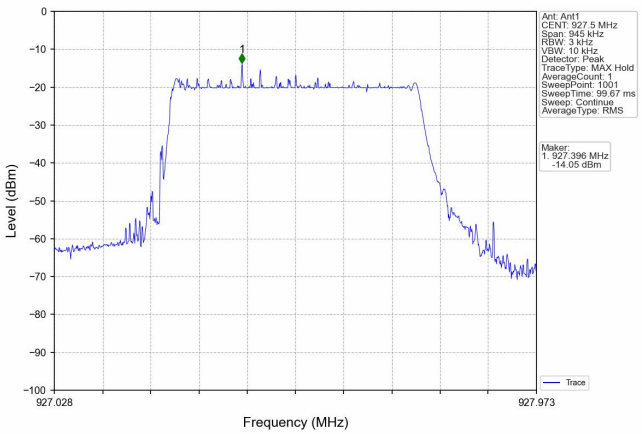
Test plot as follows:
500KHz



Lowest channel

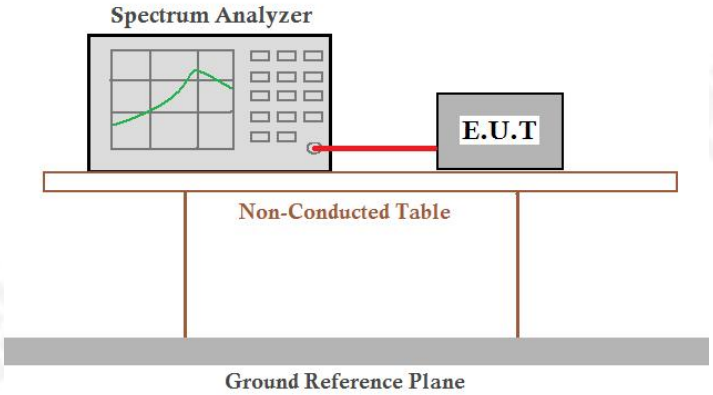


Medlle channel



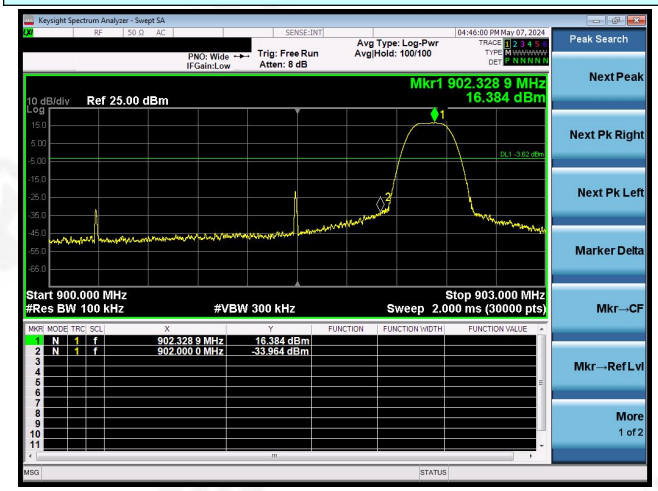
Highest channel

4.7 Band edges

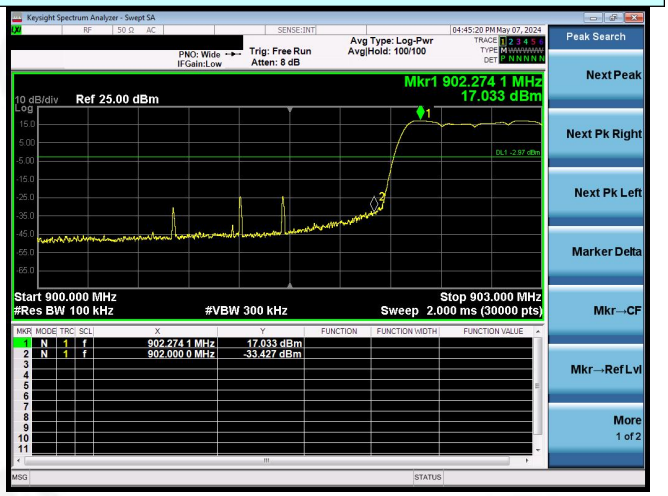
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance v05r02
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional 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 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

125KHz Bandwidth:

Test channel:	Lowest channel

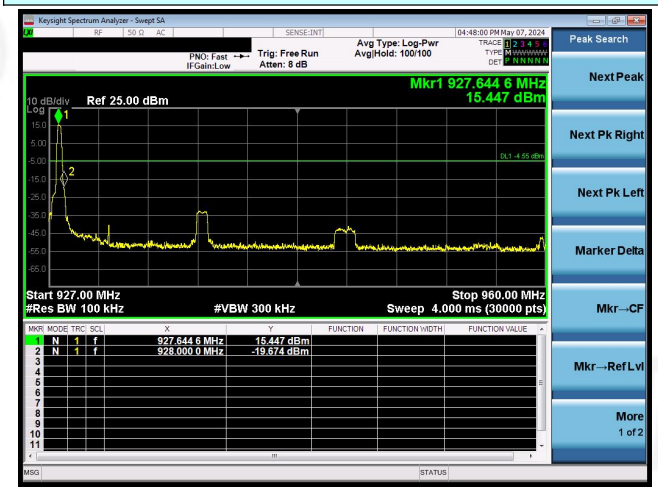


No-hopping mode

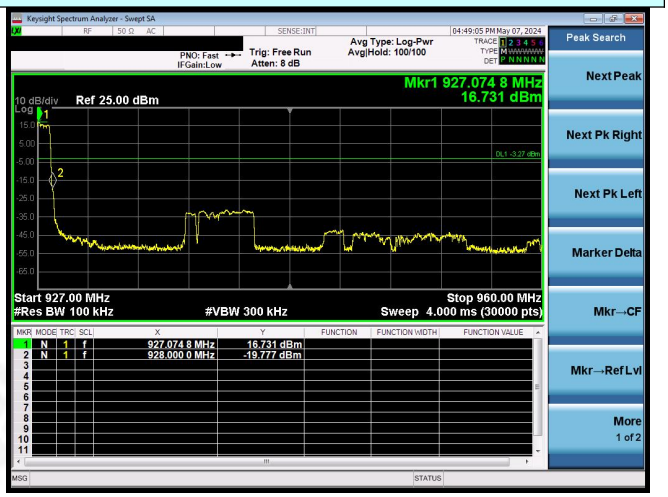


Hopping mode

Test channel:	Highest channel



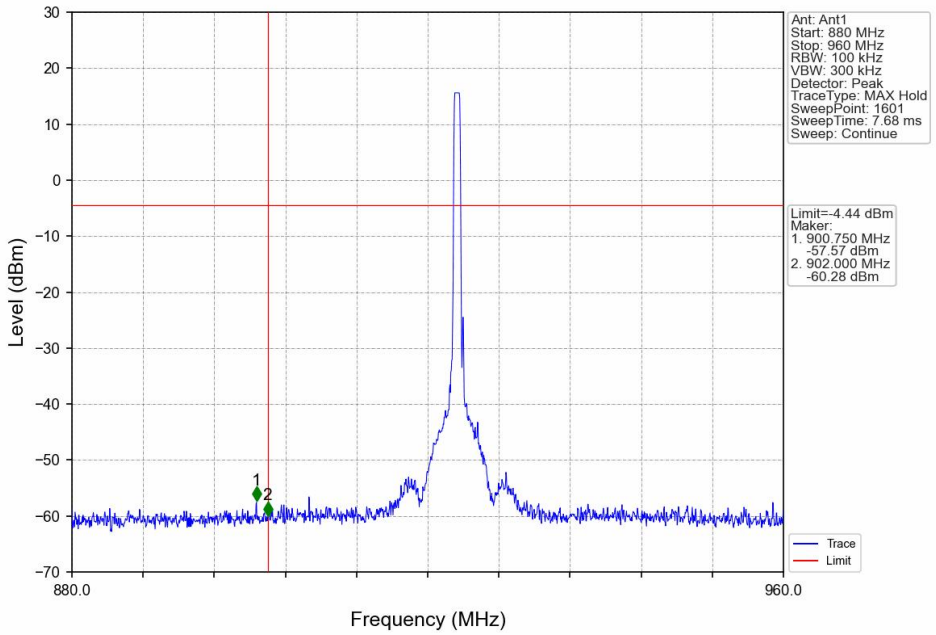
No-hopping mode



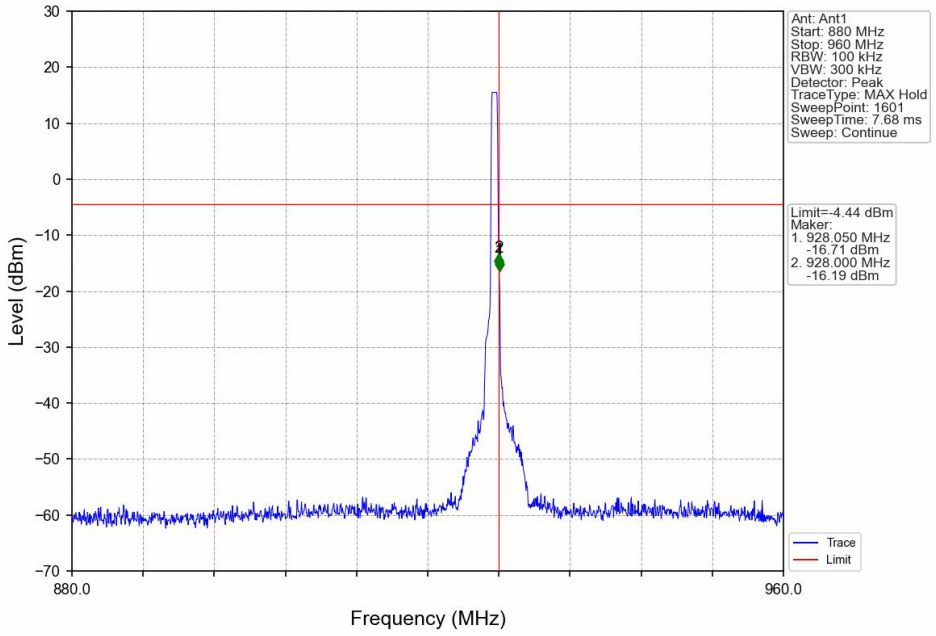
Hopping mode

Test plot as follows:

500KHz



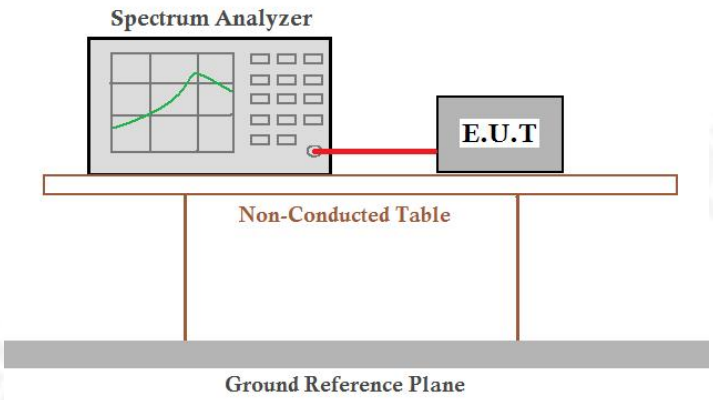
Lowest Channel



Highest Channel

4.8 Spurious Emission

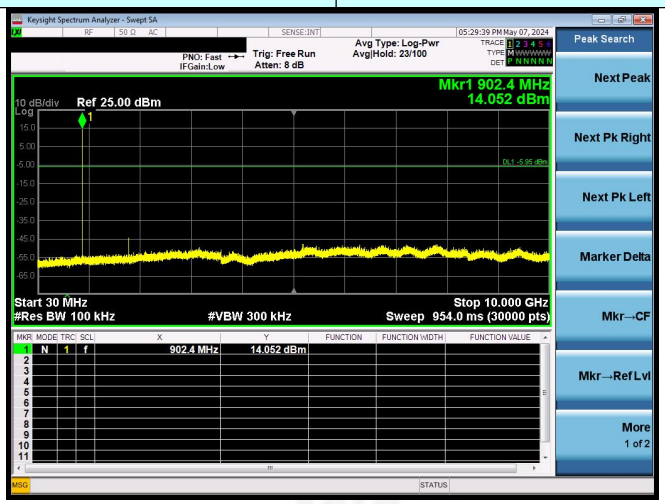
Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance v05r02
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 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Test plot as follows:

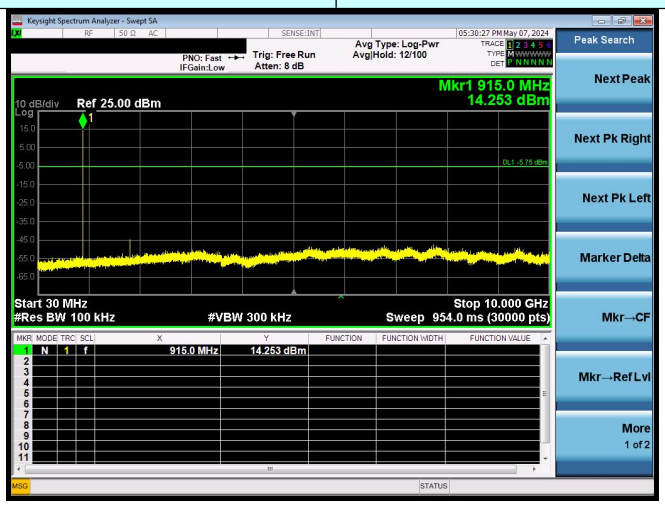
125KHz

Test channel:	Lowest channel



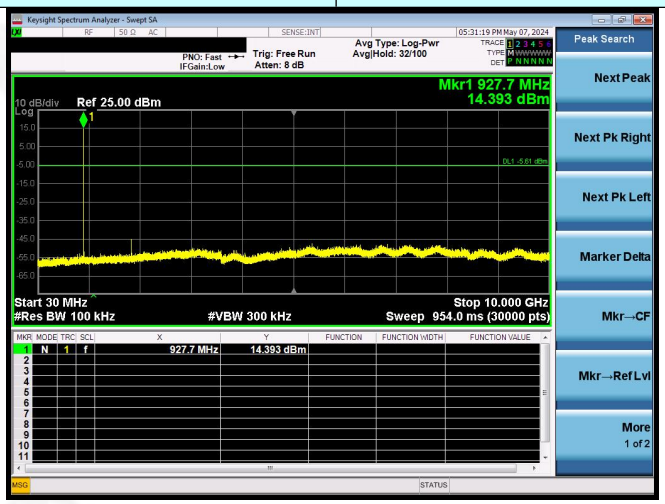
30MHz~10GHz

Test channel:	Middle channel



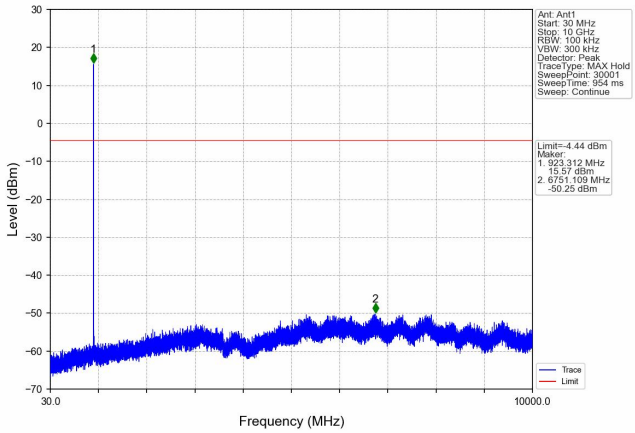
30MHz~10GHz

Test channel:	Highest channel



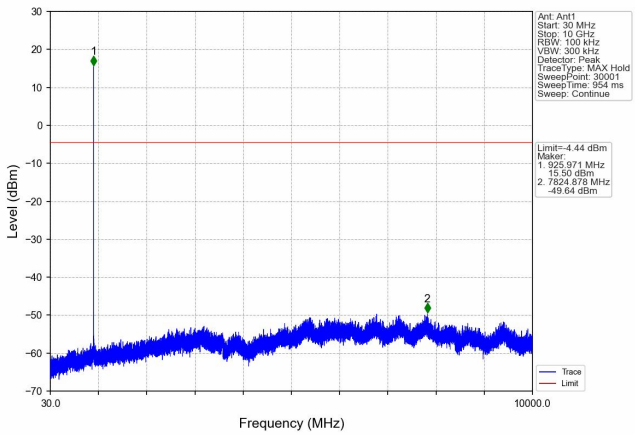
500KHz

Test channel:	Lowest channel



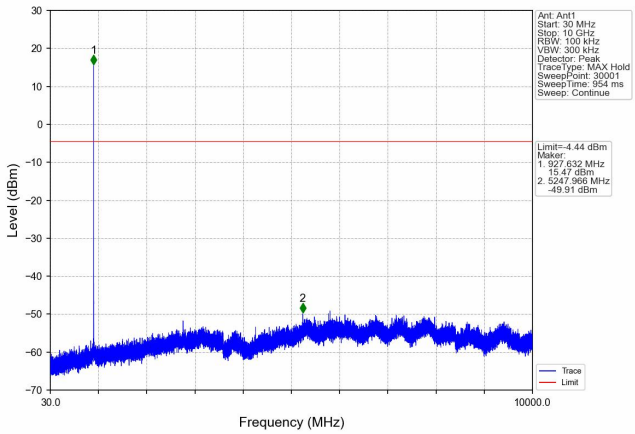
30MHz~10GHz

Test channel:	Middle channel

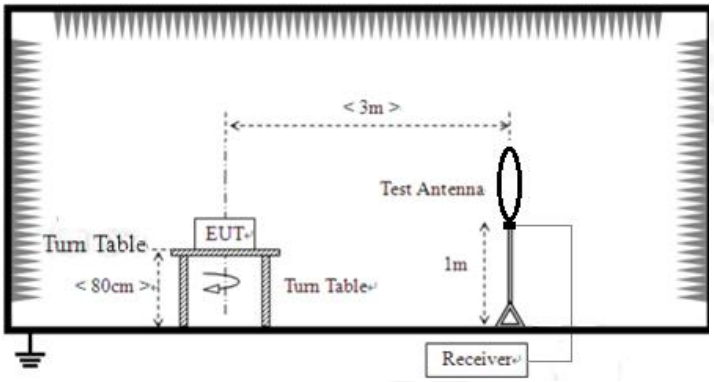


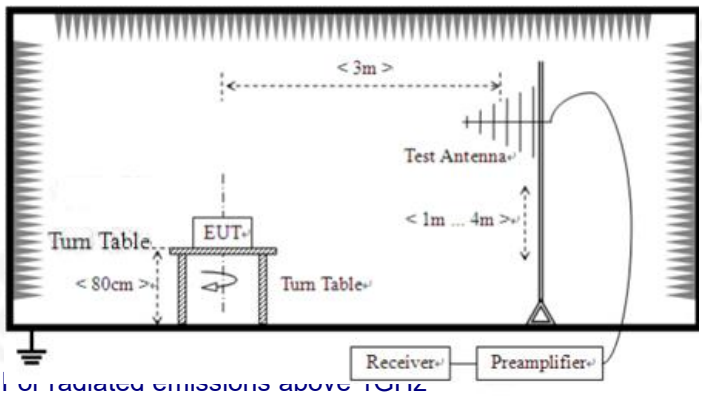
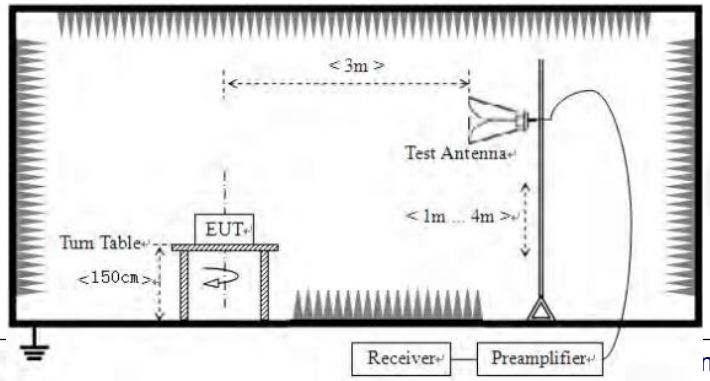
30MHz~10GHz

Test channel:	Highest channel



4.9 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 25GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9KHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>600Hz</td><td>Quasi-peak</td></tr>
<tr><td>150KHz-30MHz</td><td>Quasi-peak</td><td>9KHz</td><td>30KHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>30m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="6">3m</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>500</td><td>Average</td></tr>
<tr><td>5000</td><td>Peak</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions from 9kHz to 30MHz
 
</td></tr>
</table>

	For radiated emissions from 30MHz to1GHz  For radiated emissions above 1GHz 
Test Procedure:	m for below 1G and 1.5m for above 1G) 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. 1. 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. 2. 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. 3. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 4. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1012mbar
Test voltage:	DC 3V
Test results:	Pass

Measurement data:

Remark:
Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

- **9kHz~30MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

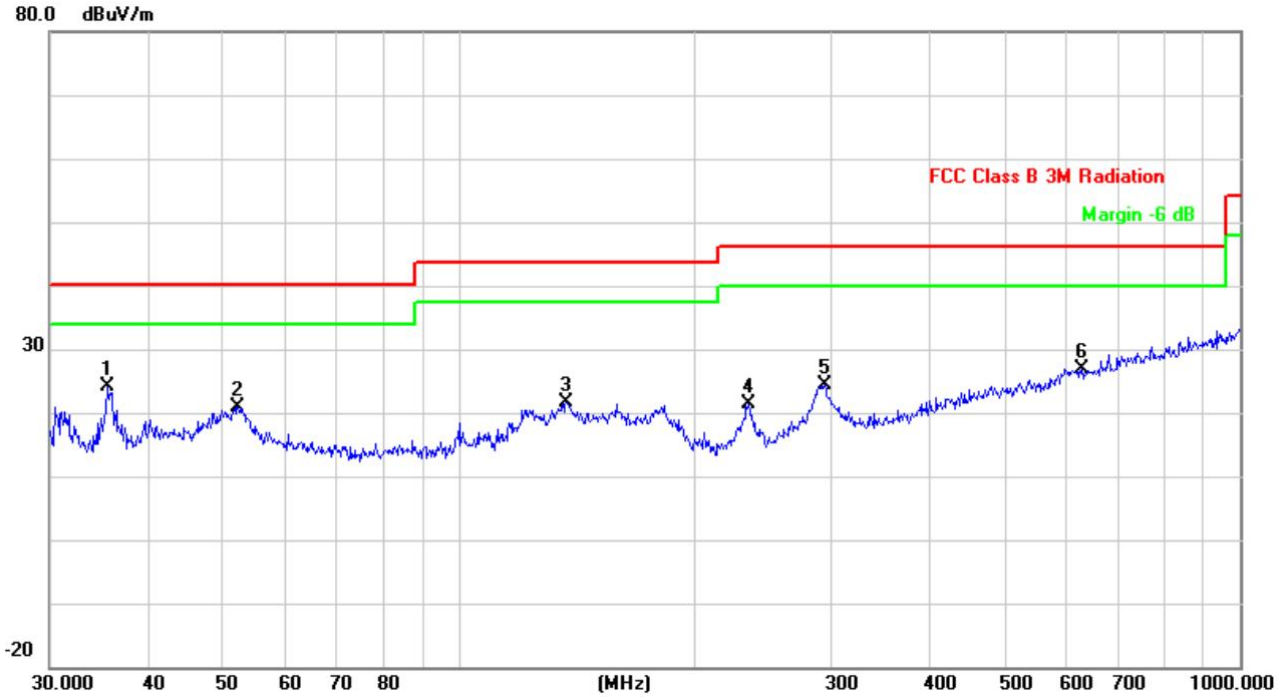
■ **Below 1GHz**

Horizontal:

Note: Pre-scan all modes and recorded the worst case results in this report which is LORA 500K mode.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1	*	49.7066	42.57	-9.45	33.12	40.00	-6.88
2		119.8556	43.73	-10.52	33.21	43.50	-10.29
3		179.3863	35.76	-10.53	25.23	43.50	-18.27
4		291.0360	31.25	-9.37	21.88	46.00	-24.12
5		454.3100	28.44	-4.37	24.07	46.00	-21.93
6		679.9600	29.53	-0.12	29.41	46.00	-16.59

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1	*	35.6240	34.39	-10.28	24.11	40.00	-15.89
2		52.2078	30.11	-9.21	20.90	40.00	-19.10
3		137.4202	30.50	-8.77	21.73	43.50	-21.77
4		234.9910	32.68	-11.25	21.43	46.00	-24.57
5		294.1137	33.52	-9.23	24.29	46.00	-21.71
6		627.2737	27.73	-0.83	26.90	46.00	-19.10

Notes:

1. *The EUT was test at 3m in field chamber.*
2. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*

■ **Above 1GHz**

Note: Pre-scan all modes and recorded the worst case results in this report which is LORA 500K mode.

Test channel:	Lowest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1846.60	43.75	25.25	4.85	34.08	39.77	74.00	-34.23	Vertical
2769.90	36.93	28.12	5.66	33.68	37.03	74.00	-36.97	Vertical
3693.20	35.19	29.19	7.25	37.37	34.26	74.00	-39.74	Vertical
4616.50	*					74.00		Vertical
5539.80	*					74.00		Vertical
6463.10	*					74.00		Vertical
1846.60	41.20	25.25	4.85	34.08	37.22	74.00	-36.78	Horizontal
2769.90	35.82	28.12	5.66	33.68	35.92	74.00	-38.08	Horizontal
3693.20	33.67	29.19	7.25	37.37	32.74	74.00	-41.26	Horizontal
4616.50	*					74.00		Horizontal
5539.80	*					74.00		Horizontal
6463.10	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1846.60	31.46	25.25	4.85	34.08	27.48	54.00	-26.52	Vertical
2769.90	24.57	28.12	5.66	33.68	24.67	54.00	-29.33	Vertical
3693.20	25.07	29.19	7.25	37.37	24.14	54.00	-29.86	Vertical
4616.50	*					54.00		Vertical
5539.80	*					54.00		Vertical
6463.10	*					54.00		Vertical
1846.60	30.56	25.25	4.85	34.08	26.58	54.00	-27.42	Horizontal
2769.90	24.78	28.12	5.66	33.68	24.88	54.00	-29.12	Horizontal
3693.20	24.21	29.19	7.25	37.37	23.28	54.00	-30.72	Horizontal
4616.50	*					54.00		Horizontal
5539.80	*					54.00		Horizontal
6463.10	*					54.00		Horizontal

Remarks:

3. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
4. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
5. *"*", means this data is the too weak instrument of signal is unable to test.*

Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1855.60	41.61	25.43	4.89	34.12	37.81	74.00	-36.19	Vertical
2782.40	37.18	28.34	5.68	33.57	37.63	74.00	-36.37	Vertical
3710.20	35.40	29.42	7.29	37.66	34.45	74.00	-39.55	Vertical
4637.00	*					74.00		Vertical
5565.80	*					74.00		Vertical
6492.50	*					74.00		Vertical
1855.60	42.00	25.43	4.89	34.12	38.20	74.00	-35.80	Horizontal
2782.40	38.09	28.34	5.68	33.57	38.54	74.00	-35.46	Horizontal
3710.20	35.76	29.42	7.29	37.66	34.81	74.00	-39.19	Horizontal
4637.00	*					74.00		Horizontal
5565.80	*					74.00		Horizontal
6492.50	*					74.00		Horizontal

Average value:

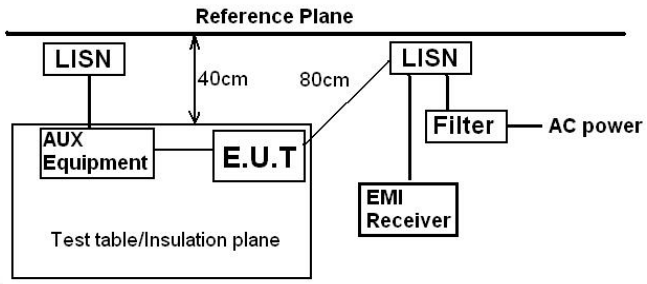
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1855.60	32.38	25.43	4.89	34.12	28.58	54.00	-45.42	Vertical
2782.40	24.56	28.34	5.68	33.57	25.01	54.00	-48.99	Vertical
3710.20	24.73	29.42	7.29	37.66	23.78	54.00	-50.22	Vertical
4637.00	*					54.00		Vertical
5565.80	*					54.00		Vertical
6492.50	*					54.00		Vertical
1855.60	32.07	25.43	4.89	34.12	28.27	54.00	-45.73	Horizontal
2782.40	24.19	28.34	5.68	33.57	24.64	54.00	-49.36	Horizontal
3710.20	24.94	29.42	7.29	37.66	23.99	54.00	-50.01	Horizontal
4637.00	*					54.00		Horizontal
5565.80	*					54.00		Horizontal
6492.50	*					54.00		Horizontal

Remarks:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *"*", means this data is the too weak instrument of signal is unable to test.*

5. EMC EMISSION TEST

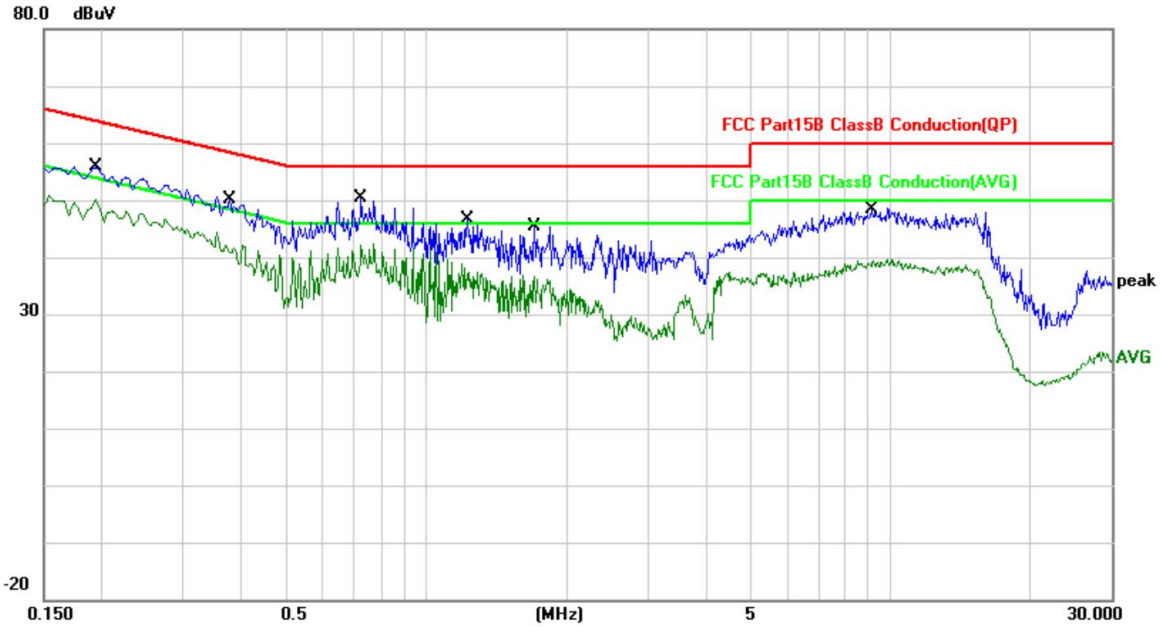
5.1 Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td colspan="5">ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">150KHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="5">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="5">RBW=9KHz, VBW=30KHz, Sweep time=auto</td></tr>
<tr><td>Limit:</td><td colspan="5">
<table>
<tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr>
<tr><th>Quasi-peak</th><th>Average</th></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Test setup:</td><td colspan="5"> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test procedure:</td><td colspan="5">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 C63.10:2013 on conducted measurement.</td></tr>
<tr><td>Test Instruments:</td><td colspan="5">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="5">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
<tr><td>Test voltage:</td><td colspan="5">AC 120V/60Hz</td></tr>
<tr><td>Test results:</td><td colspan="5">PASS</td></tr>
</table>

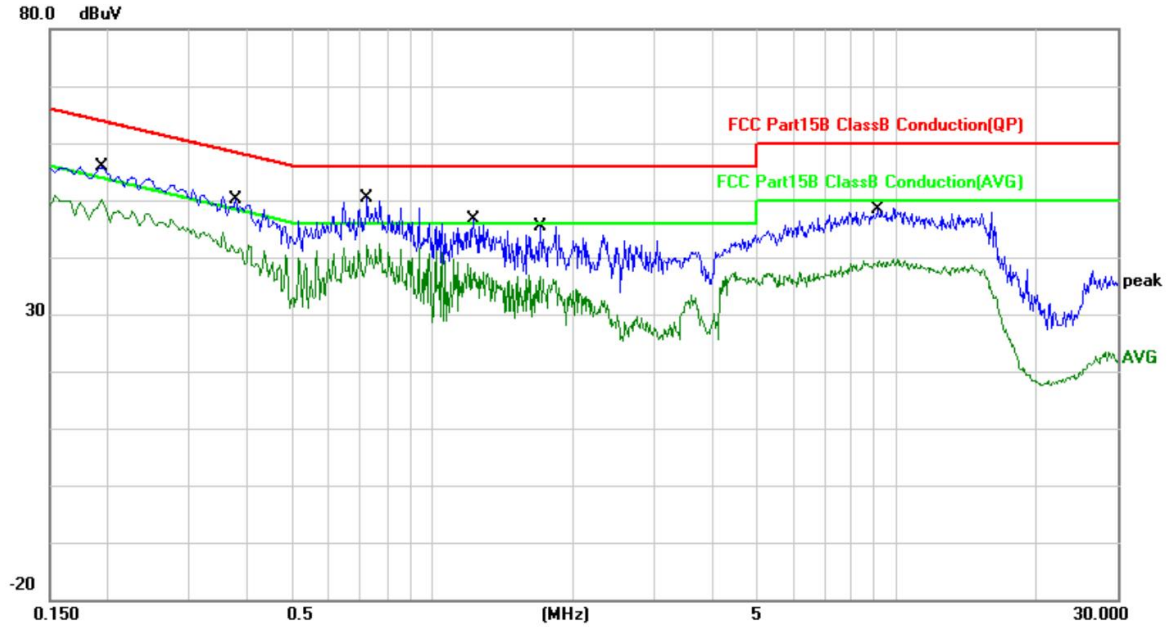
Temperature:	26 ℃	Relative Humidity:	55%
Pressure:	1009hPa	Phase :	Neutral
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 1

Note: Pre-scan all modes and recorded the worst case results in this report which is LORA 500K mode.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1940	34.05	19.88	53.93	63.86	-9.93	QP
2	*	0.1940	29.45	19.88	49.33	53.86	-4.53	AVG
3		0.3780	24.52	19.88	44.40	58.32	-13.92	QP
4		0.3780	20.46	19.88	40.34	48.32	-7.98	AVG
5		0.7260	27.12	19.88	47.00	56.00	-9.00	QP
6		0.7260	20.40	19.88	40.28	46.00	-5.72	AVG
7		1.2260	24.72	19.89	44.61	56.00	-11.39	QP
8		1.2260	20.88	19.89	40.77	46.00	-5.23	AVG
9		1.7100	17.12	19.90	37.02	56.00	-18.98	QP
10		1.7100	11.66	19.90	31.56	46.00	-14.44	AVG
11		9.0963	28.37	19.95	48.32	60.00	-11.68	QP
12		9.0963	19.44	19.95	39.39	50.00	-10.61	AVG

Temperature:	26 ℃	Relative Humidity:	55%
Pressure:	1009hPa	Phase :	Neutral
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 1



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
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7		1.2260	24.72	19.89	44.61	56.00	-11.39	QP
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9		1.7100	17.12	19.90	37.02	56.00	-18.98	QP
10		1.7100	11.66	19.90	31.56	46.00	-14.44	AVG
11		9.0963	28.37	19.95	48.32	60.00	-11.68	QP
12		9.0963	19.44	19.95	39.39	50.00	-10.61	AVG

Notes:

1 An initial pre-scan was performed on the live and neutral lines with peak detector.

2 Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

Final Level =Receiver Read level + LISN Factor + Cable Loss

5. Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
EUT Antenna:	
The antenna is External antenna, the best case gain of the antennas is 5.0dBi, reference to the appendix II for details	

6. Test Setup Photo

Reference to the appendix I for details.

7. EUT Constructional Details

Reference to the appendix II for details.

※※※※※ END OF REPORT ※※※※※