



TEST REPORT

FCC ID:ZHSLHT65N

IC:21459-LHT65N

Report Number.: ZKT-2206244311E

Date of Test: May.01, 2022 to Jun 27, 2022

Date of issue: Jul 27, 2022

Total number of pages: 36

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
RSS-247 Issue 2, February 2017
RSS-Gen Issue 5, Amendment 1, February 2021

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 and IC requirements. And it is applicable only to the tested sample identified in the report.

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Product name.....: **LoRaWAN Temperature & Humidity Sensor**

Trademark: DRAGINO

Model/Type reference: LHT65N

Ratings: DC 3V CR17450



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

Jim Liu

Reviewer (name + signature).....: Tom Zou

Tom Zou

Approved (name + signature): Lake Xie





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1.Version

Report No.	Version	Description	Approved
ZKT-2206244311E	Rev.01	Initial issue of report	Jul 27, 2022



2. Test Summary

FCC Part 15.247, Subpart C RSS-247 Issue 2		
Test Item	Standard	Result
Antenna Requirement	15.203/15.247 (c) RSS-Gen 6.8	Pass
AC Power Line Conducted Emission	15.207 RSS-Gen 8.8	N/A
Conducted Peak Output Power	15.247 (b)(1) RSS-247 5.4 (a)	Pass
20dB Occupied Bandwidth	15.247 (a)(1) RSS-247 5.1 (c)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(i) RSS-247 5.1 (c)	Pass
Dwell Time	15.247 (a)(1) RSS-247 5.1 (c)	Pass
Emissions in non-restricted frequency bands	15.247(b)(4) RSS-247 5.5	Pass
Radiated Emission	15.205/15.209 RSS-GEN Clause 8.9, 8.10	Pass
Band Edge	15.247(d) RSS-247 5.5	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

CAB identifier: CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

N .	Item	Uncer ainty
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 Temperature & Humidity Sensor
Model No.:	LHT65N
Sample(s) Status:	Engineer sample
Serial No.:	HT65N490051
Hardware Version:	N/A
Software Version:	N/A
Operation Frequency:	902MHz~928MHz
Channel numbers:	64 for 125KHz bandwidth
Channel separation:	200KHz for 125KHz bandwidth
Modulation type:	GFSK
Antenna Type:	Internal antenna
Antenna gain:	2dBi
Power supply:	DC 3V CR17450



125KHz for FHSS:

Operation Frequency each of channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	902.3	21	906.3	41	910.3	61	914.3
2	902.5	22	906.5	42	910.5	62	914.5
3	902.7	23	906.7	43	910.7	63	914.7
4	902.9	24	906.9	44	910.9	64	914.9
.	.	.	.	.	.	.	.
.	.	32	908.5	.	.	.	.
.	.	.	.	.	.	.	.
17	905.5	37	909.5	57	913.5	.	.
18	905.7	38	909.7	58	913.7	.	.
19	905.9	39	909.9	59	913.9	.	.
20	906.1	40	910.1	60	914.1	.	.

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(125KHz)
The lowest channel	902.30MHz
The middle channel	908.50MHz
The Highest channel	914.90MHz



3.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
<i>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.</i>	

Test Software: FCC Tool; Power Setting: Default

3.3 Test Setup Configuration

Radiated Emission

EUT

Conducted Spurious

EUT

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 Temperature & Humidity Sensor	DRAGINO	LHT65N	N/A	EUT

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



Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY45109572	Sep. 22, 2021	Sep. 21, 2022
2	Spectrum Analyzer (1GHz-40GHz)	Agilent	E4446A	100363	Sep. 22, 2021	Sep. 21, 2022
3	Test Receiver (9kHz-7GHz)	R&S	ESCI7	101169	Sep. 22, 2021	Sep. 21, 2022
4	Bilog Antenna (30MHz-1400MHz)	Schwarzbeck	VULB9168	00877	Sep. 22, 2021	Sep. 21, 2022
5	Horn Antenna (1GHz-18GHz)	SCHWARZBEC K	BBHA9120D	1541	Sep. 22, 2021	Sep. 21, 2022
6	Horn Antenna (18GHz-40GHz)	A.H. System	SAS-574	588	Sep. 22, 2021	Sep. 21, 2022
7	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	N/A	Sep. 22, 2021	Sep. 21, 2022
8	Amplifier (1GHz-40GHz)	全聚达	DLE-161	097	Sep. 22, 2021	Sep. 21, 2022
9	Loop Antenna (9KHz-30MHz)	SCHWARZBEC K	FMZB1519B	014	Sep. 22, 2021	Sep. 21, 2022
10	RF cables1 (9kHz-30MHz)	N/A	9kHz-30MHz	N/A	Sep. 22, 2021	Sep. 21, 2022
11	RF cables2 (30MHz-1GHz)	N/A	30MHz-1GHz	N/A	Sep. 22, 2021	Sep. 21, 2022
12	RF cables3 (1GHz-40GHz)	N/A	1GHz-40GHz	N/A	Sep. 22, 2021	Sep. 21, 2022
13	CMW500 Test	R&S	CMW500	106504	Sep. 22, 2021	Sep. 21, 2022
14	ESG Signal Generator	Agilent	E4421B	GB40051203	Sep. 22, 2021	Sep. 21, 2022
15	Signal Generator	Agilent	N5182A	MY47420215	Sep. 22, 2021	Sep. 21, 2022
16	D.C. Power Supply	LongWei	TPR-6405D	\	\	\
17	Software	Frad	EZ-EMC	FA-03A2 RE	\	\

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Sep. 22, 2021	Sep. 21, 2022
2	LISN	CYBERTEK	EM5040A	E185040014 9	Sep. 22, 2021	Sep. 21, 2022
3	Test Cable	N/A	C01	N/A	Sep. 22, 2021	Sep. 21, 2022
4	Test Cable	N/A	C02	N/A	Sep. 22, 2021	Sep. 21, 2022
5	EMI Test Receiver	R&S	ESRP3	101946	Sep. 22, 2021	Sep. 21, 2022
6	Absorbing Clamp	DZ	ZN23201	N/A	Sep. 22, 2021	Sep. 21, 2022



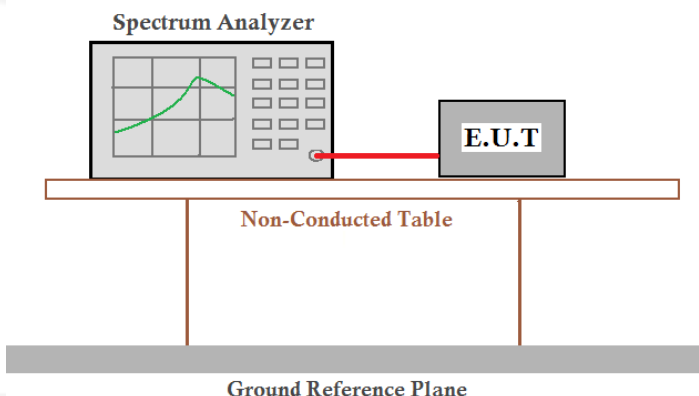
4. EMC EMISSION TEST

4.1 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207 RSS-Gen Issue 5,Section 8.8																			
Test Method:	ANSI C63.10:2013																			
Test Frequency Range:	150KHz to 30MHz																			
Class / Severity:	Class B																			
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto																			
Limit:	<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.						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
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																		
Test setup:	Reference Plane Remark: E.U.T: Equipment Under Test LISN: Line Impedance 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 C63.10:2013 on conducted measurement.																			
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:	N/A																			



4.2 Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3) RSS-247 issue 2 5.4 (a)																				
Test Method:	ANSI C63.10:2013																				
Limit:	<table><tr><th colspan="5">FCC Part 15.247,Subpart C RSS-247 Issue 2</th></tr><tr><th>Section</th><th>Test Item</th><th>Limit</th><th>Frequency Range (MHz)</th><th>Result</th></tr><tr><td>15.247(b)(3) RSS 247 Issue 2</td><td>Output Power</td><td>1 watt or 30dBm</td><td>902-928</td><td>PASS</td></tr><tr><td>RSS-247</td><td>EIRP</td><td>4W</td><td>902-928</td><td>PASS</td></tr></table>	FCC Part 15.247,Subpart C RSS-247 Issue 2					Section	Test Item	Limit	Frequency Range (MHz)	Result	15.247(b)(3) RSS 247 Issue 2	Output Power	1 watt or 30dBm	902-928	PASS	RSS-247	EIRP	4W	902-928	PASS
FCC Part 15.247,Subpart C RSS-247 Issue 2																					
Section	Test Item	Limit	Frequency Range (MHz)	Result																	
15.247(b)(3) RSS 247 Issue 2	Output Power	1 watt or 30dBm	902-928	PASS																	
RSS-247	EIRP	4W	902-928	PASS																	
Test setup:	Spectrum Analyzer  Non-Conducted Table Ground Reference Plane																				
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	17.847	30.00	Pass
	Middle	16.994		
	Highest	19.279		

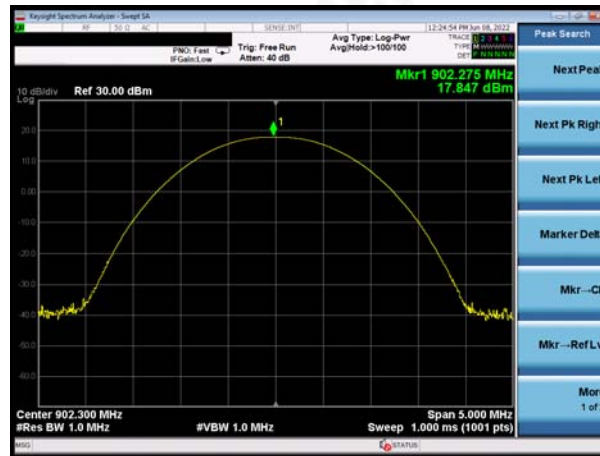
Test channel	EIRP (dBm)	Antenna Gain (dBi)	Limit(dBm)	Result
Lowest	19.847	2.0	36.02	Pass
Middle	18.994	2.0		
Highest	21.279	2.0		



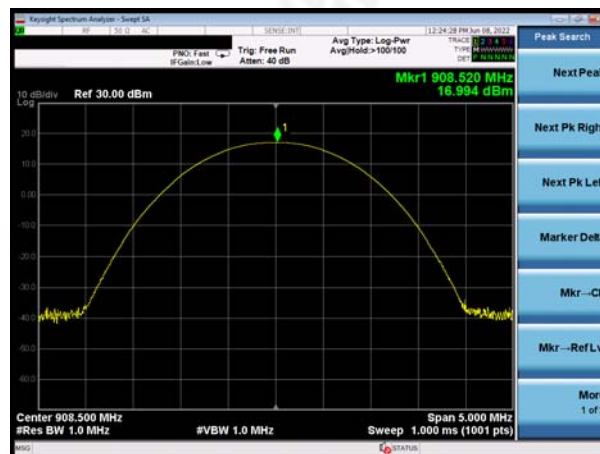
Test plot as follows:

Test mode:

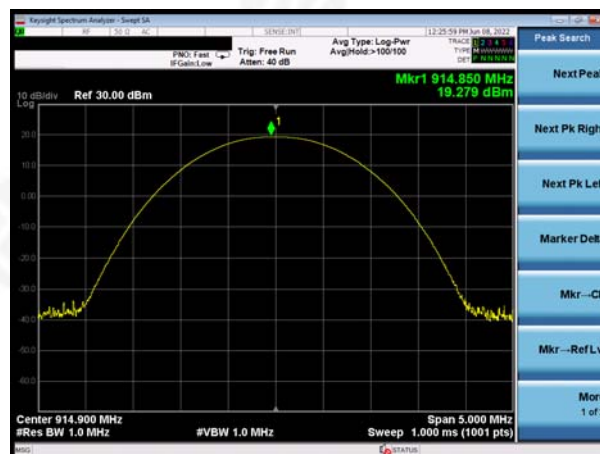
125KHz Bandwidth



Lowest channel



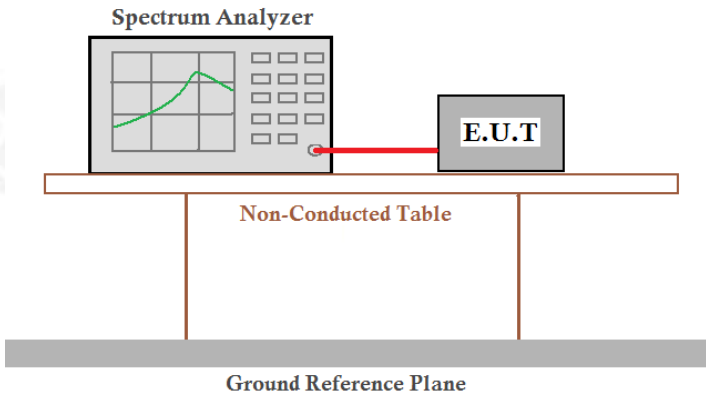
Middle channel



Highest channel



4.3 20dB Emission Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2) RSS-247 issue 2 5.1 (c)
Test Method:	ANSI C63.10:2013
Limit:	N/A
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

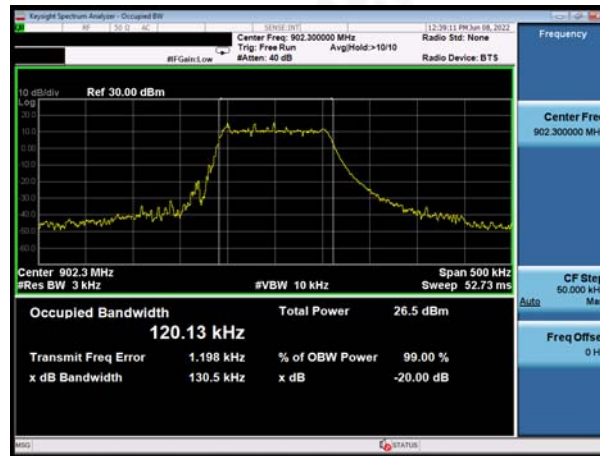
Mode	Test channel	20dB Bandwidth (kHz)	99% Bandwidth (kHz)	Result
125KHz Bandwidth	Lowest	130.5	120.13	Pass
	Meddle	131.9	121.14	
	Highest	138.8	120.52	



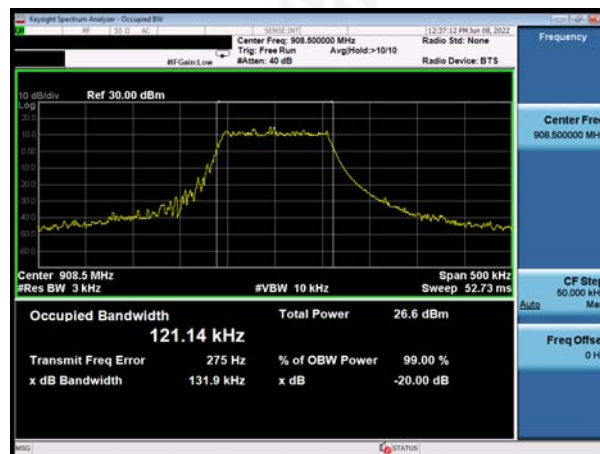
Test plot as follows:

Test mode:

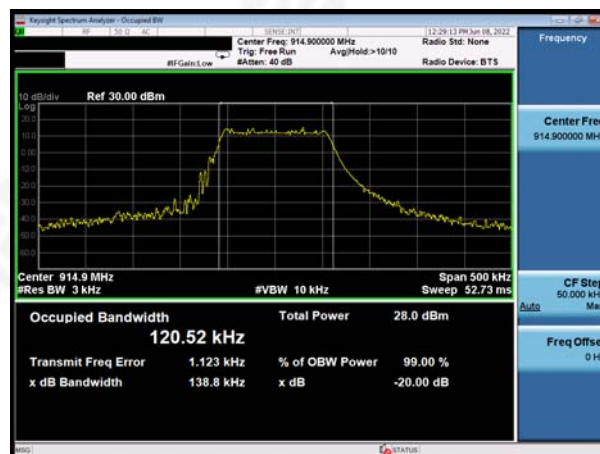
125KHz Bandwidth



Lowest channel



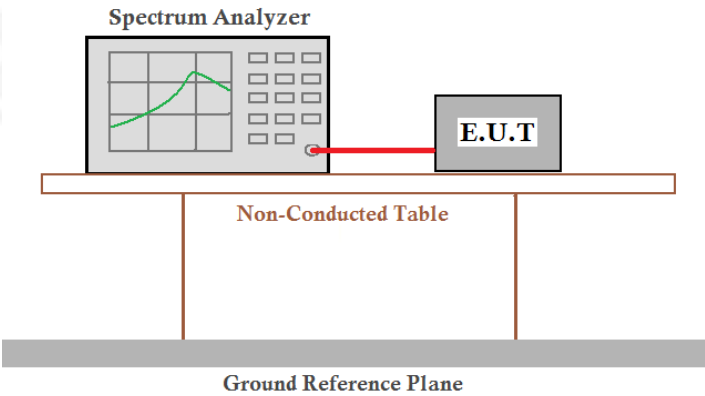
Middle channel



Highest channel



4.4 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=100KHz, VBW=300KHz, 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

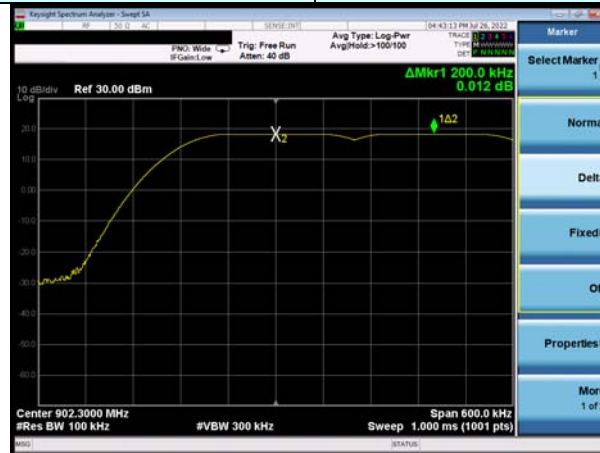
Measurement Data

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

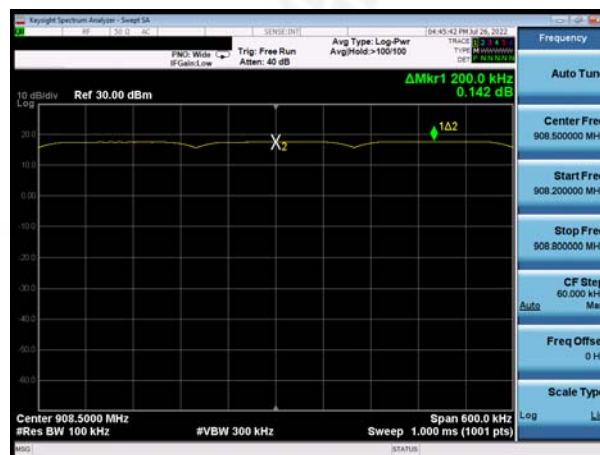


Test plot as follows:

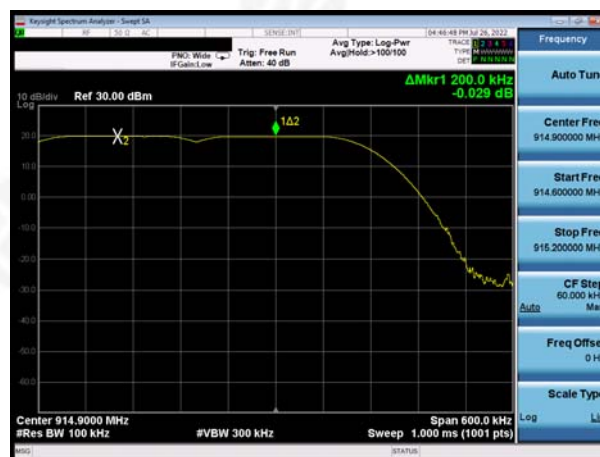
Modulation mode:	125KHz Bandwidth
------------------	------------------



Lowest channel



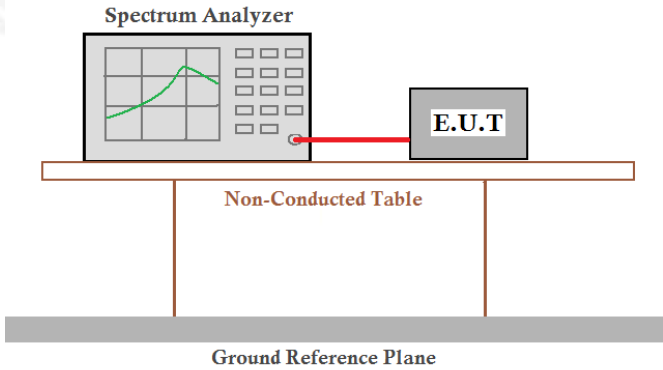
Middle channel



Highest channel

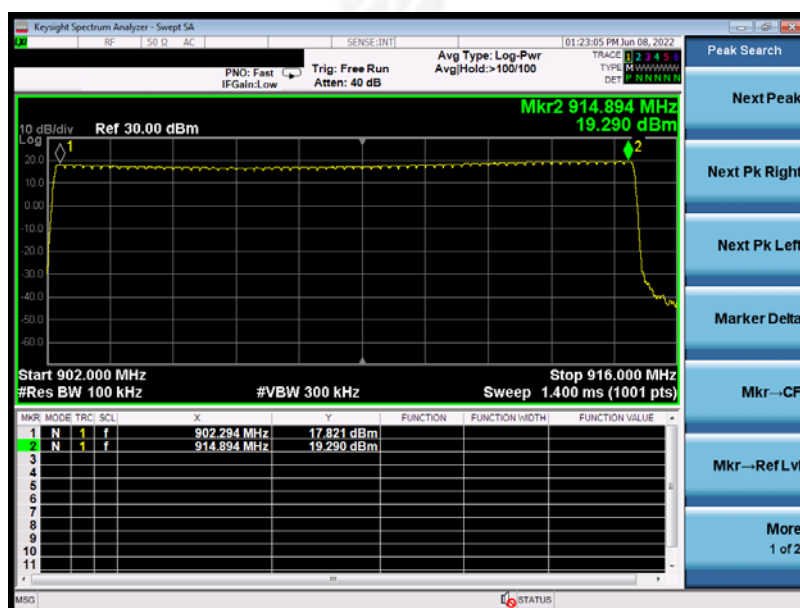


4.5 Hopping Channel Number

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=902-916MHz, 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

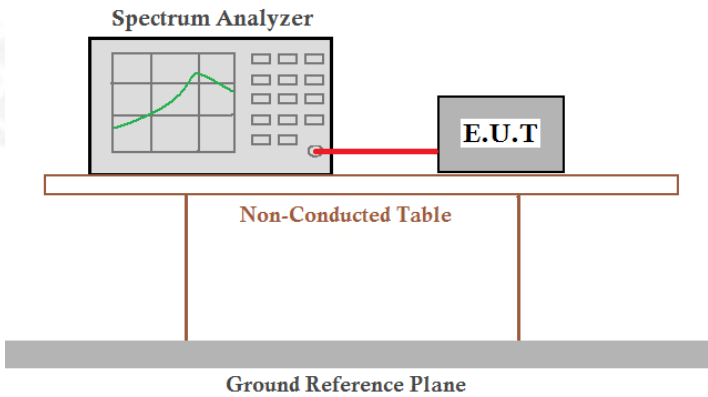
Measurement Data:

Mode	Hopping channel numbers	Limit	Result
125KHz Bandwidth	64	50	Pass





4.6 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:	 The diagram illustrates the test setup for dwell time measurement. 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, which is supported by two vertical legs. Below the table is a Ground Reference Plane.
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	1.96	8.14	91.498	400	Pass

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



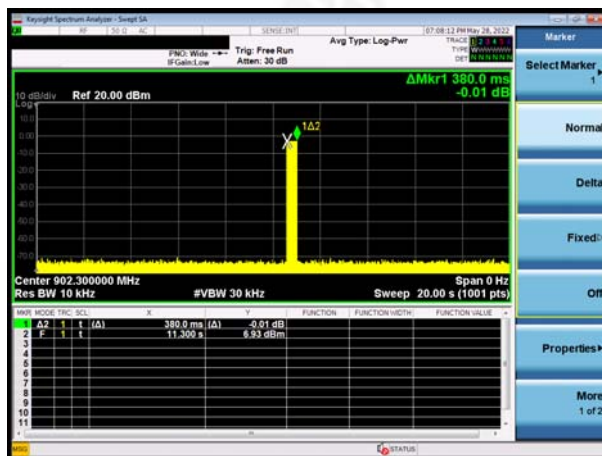
Test plot as follows:

Test Mode:

125KHz Bandwidth



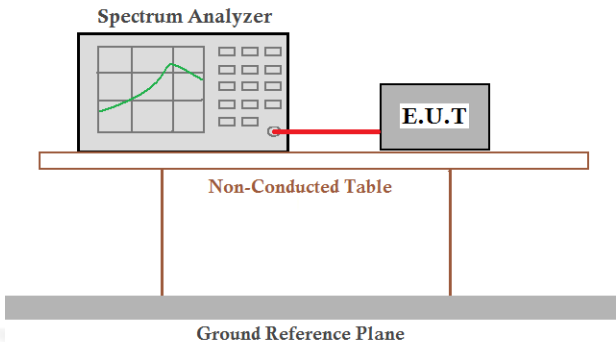
Ton&Tcycle



Continue TX Time



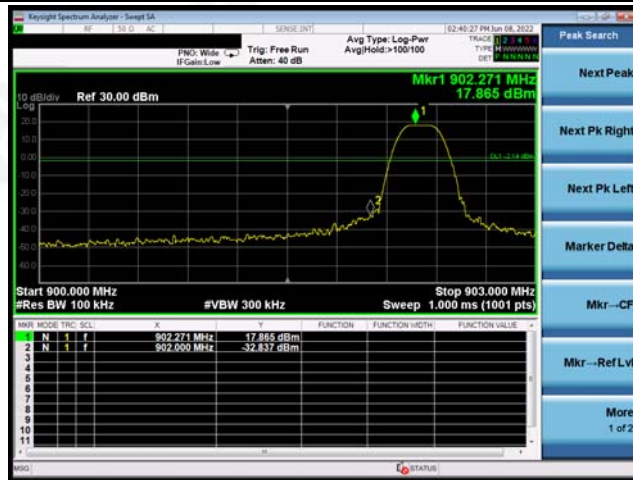
4.7 Band Edge

Test Requirement:	FCC Part15 C Section 15.247 (d) RSS-247 issue 2 5.5
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by two vertical legs. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass



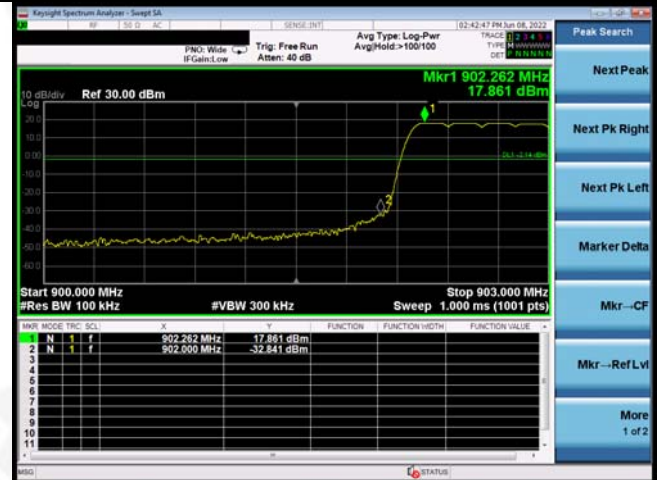
Test plot as follows:
125KHz Bandwidth:

Test channel:



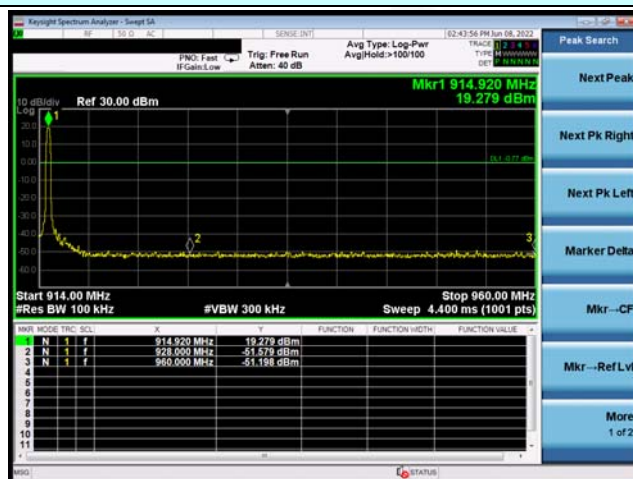
No-hopping mode

Lowest channel



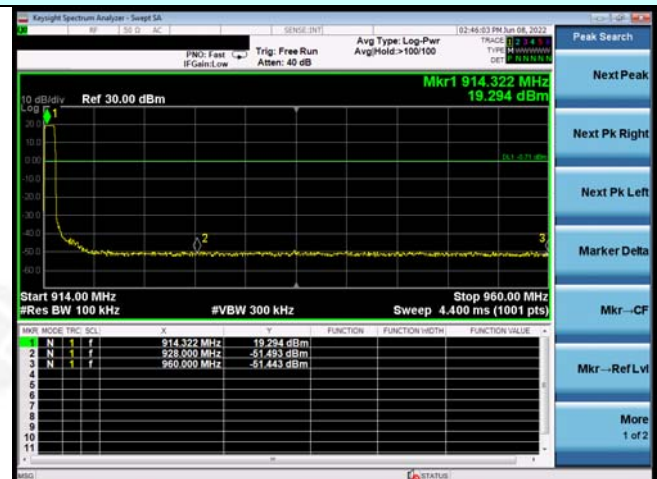
Hopping mode

Test channel:



No-hopping mode

Highest channel



Hopping mode

**Measurement Data**

Test channel:

Lowest channel

Quasi-peak :

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
902.00	33.98	22.30	4.87	37.60	23.55	46.00	-22.45	Horizontal
902.00	35.01	22.30	4.87	37.60	24.58	46.00	-21.42	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
902.00	28.67	22.30	4.87	37.60	18.24	46.00	-27.76	Horizontal
902.00	28.38	22.30	4.87	37.60	17.95	46.00	-28.05	Vertical

Test channel:

Highest channel

Quasi-peak:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
928.00	36.89	22.41	4.96	37.57	26.69	46.00	-19.31	Horizontal
928.00	38.94	22.41	4.96	37.57	28.74	46.00	-17.26	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
928.00	32.35	22.41	4.96	37.57	22.15	46.00	-23.85	Horizontal
928.00	31.44	22.41	4.96	37.57	21.24	46.00	-24.76	Vertical

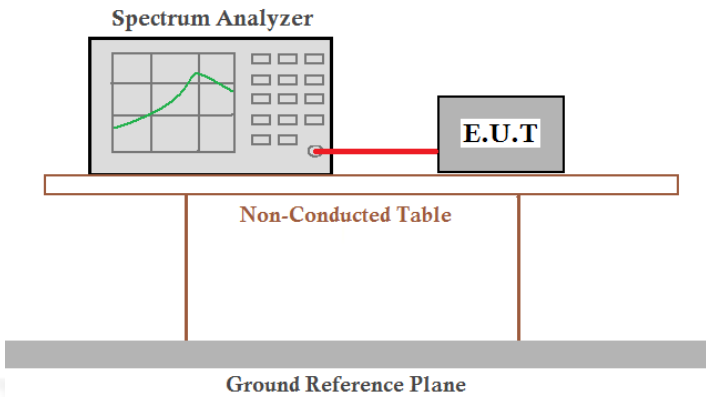
Remarks:

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. The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.



4.8 Spurious Emission

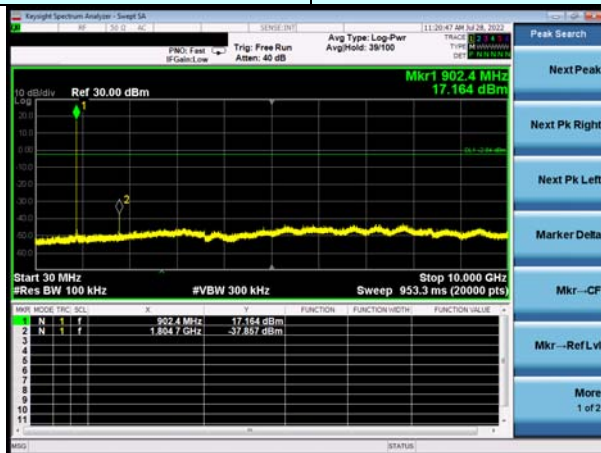
Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d) RSS-GEN issue 5 clause 8.9, 8.10
Test Method:	ANSI C63.10:2013
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 The diagram illustrates the test setup for conducted emission measurement. 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, which is positioned above a Ground Reference Plane.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass



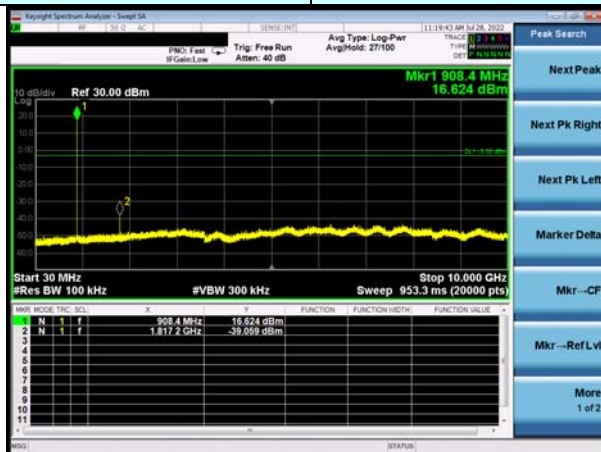
125KHz Bandwidth:

Test channel:	Lowest channel
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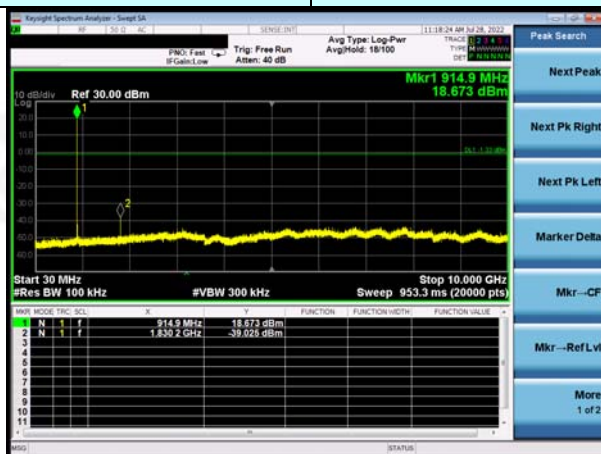
30MHz~10GHz

Test channel:	Middle channel
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30MHz~10GHz

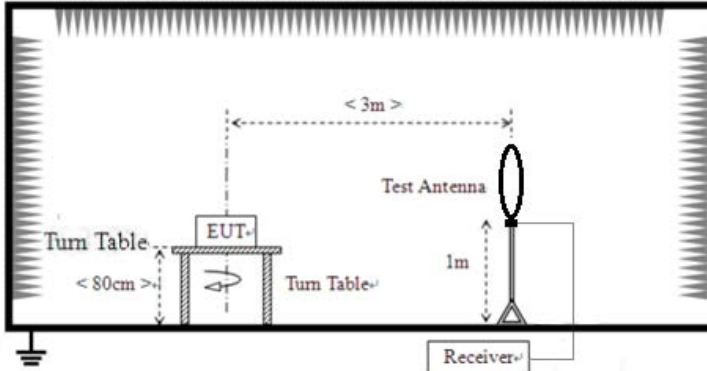
Test channel:	Highest channel
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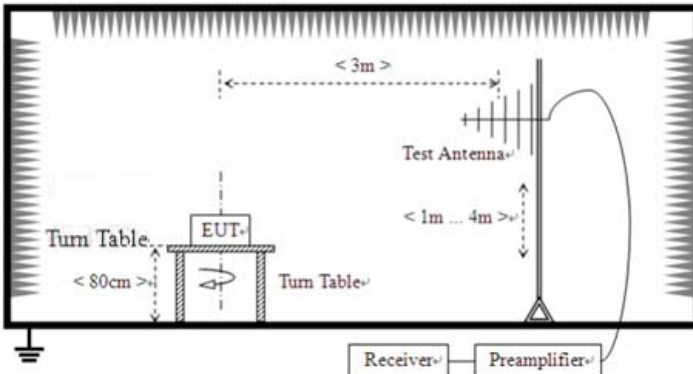
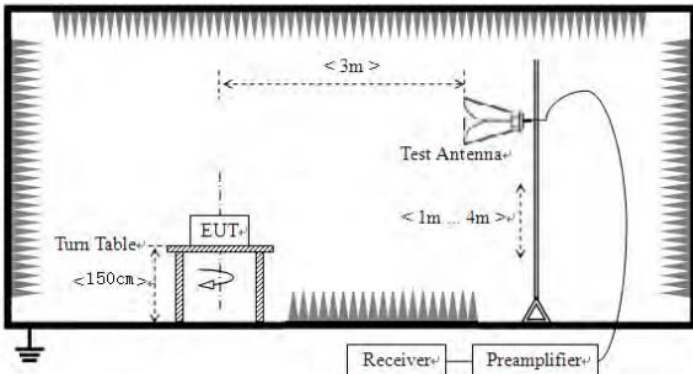
30MHz~10GHz



Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 RSS-GEN issue 5 clause 8.9, 8.10				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	30m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
		5000	Peak		
Test setup:	For radiated emissions from 9kHz to 30MHz				
					



	For radiated emissions from 30MHz to1GHz 					
	For radiated emissions above 1GHz 					
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m 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. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.					
Test Instruments:	Refer to section 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:

Remarks:

1. 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**

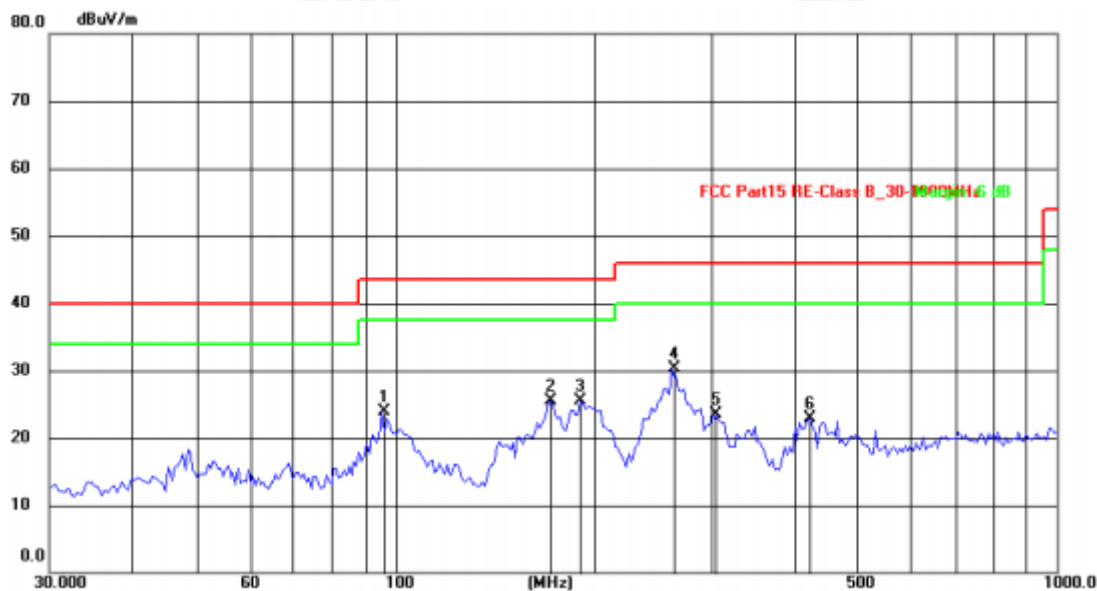
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.



■ Below 1GHz

Pre-scan all test modes, found worst case at lowest channel of 125KHz bandwidth, so only show the worst case on the report.

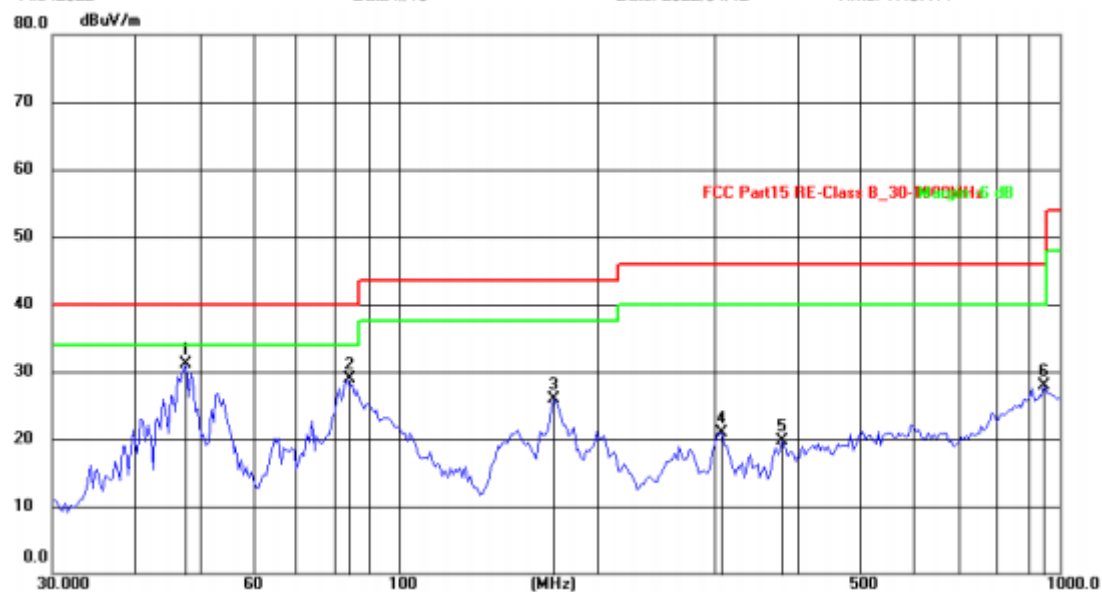
Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	95.4270	43.88	-19.99	23.89	43.50	-19.61	QP
2	171.6933	43.35	-17.87	25.48	43.50	-18.02	QP
3	190.7390	44.78	-19.27	25.51	43.50	-17.99	QP
4	261.5164	47.33	-17.08	30.25	46.00	-15.75	QP
5	306.2163	42.46	-18.96	23.50	46.00	-22.50	QP
6	423.5402	40.27	-17.41	22.86	46.00	-23.14	QP



Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	47.7422	48.34	-17.20	31.14	40.00	-8.86	QP
2	83.6688	50.58	-21.73	28.85	40.00	-11.15	QP
3	171.6933	46.55	-20.70	25.85	43.50	-17.65	QP
4	308.9125	40.95	-20.04	20.91	46.00	-25.09	QP
5	381.2485	37.35	-17.65	19.70	46.00	-26.30	QP
6	948.7609	30.29	-2.48	27.81	46.00	-18.19	QP



■ Above 1GHz

Test channel:	Lowest channel
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1823.72	41.23	26.46	4.67	34.04	38.32	74.00	-35.68	Vertical
2714.89	34.35	29.34	5.43	33.25	35.87	74.00	-38.13	Vertical
3621.32	33.53	27.24	7.11	37.34	30.54	74.00	-43.46	Vertical
4532.43	*					74.00		Vertical
5408.58	*					74.00		Vertical
6314.22	*					74.00		Vertical
1823.72	43.53	26.76	4.67	34.04	40.92	74.00	-33.08	Horizontal
2714.89	33.45	27.83	5.43	33.25	33.46	74.00	-40.54	Horizontal
3621.32	33.53	29.85	7.11	37.34	33.15	74.00	-40.85	Horizontal
4532.43	*					74.00		Horizontal
5408.58	*					74.00		Horizontal
6314.22	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1812.43	32.21	25.35	4.67	34.04	28.19	54.00	-25.81	Vertical
2721.52	21.23	28.26	5.43	33.25	21.67	54.00	-32.33	Vertical
3618.45	22.13	29.18	7.11	37.34	21.08	54.00	-32.92	Vertical
4506.50	*					54.00		Vertical
5431.46	*					54.00		Vertical
6322.24	*					54.00		Vertical
1812.43	32.12	25.35	4.67	34.04	28.1	54.00	-25.9	Horizontal
2721.52	25.21	28.26	5.43	33.25	25.65	54.00	-28.35	Horizontal
3618.45	21.23	29.18	7.11	37.34	20.18	54.00	-33.82	Horizontal
4506.50	*					54.00		Horizontal
5431.46	*					54.00		Horizontal
6322.24	*					54.00		Horizontal



Test channel:	Middle channel
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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
1835.34	41.23	25.43	4.89	34.12	37.43	74.00	-36.57	Vertical
2752.12	39.31	28.34	5.68	33.57	39.76	74.00	-34.24	Vertical
3664.57	36.23	29.42	7.29	37.66	35.28	74.00	-38.72	Vertical
4567.45	*					74.00		Vertical
5485.53	*					74.00		Vertical
6412.35	*					74.00		Vertical
1835.34	40.13	25.43	4.89	34.12	36.33	74.00	-37.67	Horizontal
2752.12	35.26	28.34	5.68	33.57	35.71	74.00	-38.29	Horizontal
3664.57	35.53	29.42	7.29	37.66	34.58	74.00	-39.42	Horizontal
4567.45	*					74.00		Horizontal
5485.53	*					74.00		Horizontal
6412.35	*					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
1826.42	28.23	25.43	4.89	34.12	24.43	54.00	-29.57	Vertical
2762.47	25.21	28.34	5.68	33.57	25.66	54.00	-28.34	Vertical
3658.27	21.51	29.42	7.29	37.66	20.56	54.00	-33.44	Vertical
4582.48	*					54.00		Vertical
5485.58	*					54.00		Vertical
6403.57	*					54.00		Vertical
1826.42	29.12	25.43	4.89	34.12	25.32	54.00	-28.68	Horizontal
2762.47	26.32	28.34	5.68	33.57	26.77	54.00	-27.23	Horizontal
3658.27	25.21	29.42	7.29	37.66	24.26	54.00	-29.74	Horizontal
4582.48	*					54.00		Horizontal
5485.58	*					54.00		Horizontal
6403.57	*					54.00		Horizontal



Test channel:	Highest channel
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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
1857.23	43.42	25.64	4.75	34.67	39.14	74.00	-34.86	Vertical
2781.24	38.26	28.46	5.87	33.83	38.76	74.00	-35.24	Vertical
3721.54	36.21	29.75	7.59	37.76	35.79	74.00	-38.21	Vertical
4646.27	*					74.00		Vertical
5558.42	*					74.00		Vertical
6485.68	*					74.00		Vertical
1857.23	41.53	25.64	4.75	34.67	37.25	74.00	-36.75	Horizontal
2781.24	34.64	28.46	5.87	33.83	35.14	74.00	-38.86	Horizontal
3721.54	34.35	29.75	7.59	37.76	33.93	74.00	-40.07	Horizontal
4646.27	*					74.00		Horizontal
5558.42	*					74.00		Horizontal
6485.68	*					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
1847.23	36.17	25.64	4.75	34.67	31.89	54.00	-22.11	Vertical
2787.12	27.48	28.46	5.87	33.83	27.98	54.00	-26.02	Vertical
3706.36	25.17	29.75	7.59	37.76	24.75	54.00	-29.25	Vertical
4643.56	*					54.00		Vertical
5569.35	*					54.00		Vertical
6499.02	*					54.00		Vertical
1847.23	38.69	25.64	4.75	34.67	34.41	54.00	-19.59	Horizontal
2787.12	27.84	28.46	5.87	33.83	28.34	54.00	-25.66	Horizontal
3706.36	22.32	29.75	7.59	37.76	21.9	54.00	-32.1	Horizontal
4643.56	*					54.00		Horizontal
5569.35	*					54.00		Horizontal
6499.02	*					54.00		Horizontal

Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. The test data shows only the worst case 125KHz bandwidth mode.



5. Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c) RSS-Gen 6.8
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 Internal antenna, the antennas is 2dBi, 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 *****