TEST REPORT

Applicant:	Quanzhou Skydroid Technology Co., Ltd.
Address of Applicant:	2nd Floor, Building A, Yucheng Base, Fengze District, Quanzhou City, Fujian, China
Manufacturer/ Factory:	Quanzhou Skydroid Technology Co., Ltd.
Address of Manufacturer/ Factory:	2nd Floor, Building A, Yucheng Base, Fengze District, Quanzhou City, Fujian, China

Equipment Under Test (EUT)

Product Name:	H16 remote control
Model No.:	H16, H16PRO
Trade Mark:	SKYDROID
FCC ID:	2ATGZQZYZH16
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	October 21, 2020
Date of Test:	October 22, 2020-November 03, 2020
Date of report issued:	November 04, 2020
Test Result :	PASS *

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

Authorized Signature:

Robinson Lo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	*November 04, 2020*	*Original*

Prepared By: ***Date:*** *November 04, 2020*

Project Engineer

Check By: ***Date:*** *November 04, 2020*

Reviewer

3 Contents

Page

1 COVER PAGE 1

2 VERSION 2

3 CONTENTS 3

4 TEST SUMMARY 4

5 GENERAL INFORMATION 5

5.1 GENERAL DESCRIPTION OF EUT 5
5.2 TEST MODE 7
5.3 DESCRIPTION OF SUPPORT UNITS 7
5.4 DEVIATION FROM STANDARDS 7
5.5 ABNORMALITIES FROM STANDARD CONDITIONS 7
5.6 TEST FACILITY 7
5.7 TEST LOCATION 7
5.8 ADDITIONAL INSTRUCTIONS 7

6 TEST INSTRUMENTS LIST 8

7 TEST RESULTS AND MEASUREMENT DATA 10

7.1 ANTENNA REQUIREMENT 10
7.2 CONDUCTED EMISSIONS 11
7.3 CONDUCTED PEAK OUTPUT POWER 13
7.4 CHANNEL BANDWIDTH 15
7.5 POWER SPECTRAL DENSITY 17
7.6 UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS 19
7.6.1 Conducted Emission Method 19
7.6.2 Radiated Emission Method 22
7.7 SPURIOUS EMISSION 26
7.7.1 Radiated Emission Method 26

8 TEST SETUP PHOTO 33

9 EUT CONSTRUCTIONAL DETAILS 33

4 Test Summary

Test Item	Section	Result
Antenna requirement	FCC part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	FCC part 15.207	Pass
Conducted Peak Output Power	FCC part 15.247 (b)(3)	Pass
Channel Bandwidth & 99% OCB	FCC part 15.247 (a)(2)	Pass
Power Spectral Density	FCC part 15.247 (e)	Pass
Band Edge	FCC part 15.247(d)	Pass
Spurious Emission	FCC part 15.205/15.209	Pass

Remark: Test according to ANSI C63.10:2013 and RSS-Gen

Pass: The EUT complies with the essential requirements in the standard.

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	±3.8039dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 3.9679dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.29dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.44dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	H16 remote control
Model No.:	H16, H16PRO
Test Model No:	H16
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is model name for commercial purpose.	
S/N:	H16V1
Hardware version:	V1.0
Software version:	V1.0
Test sample(s) ID:	GTS202010000110-1
Sample(s) Status	Engineer sample
Operation frequency:	2410MHz~2470MHz
Channel separation:	5MHz
Modulation technology:	Direct Sequence Spread Spectrum (DSSS)
Antenna Type:	Integral Antenna
Antenna gain:	3.0dBi
Power supply:	ADAPTOR MODEL:KXS-012 INPUT: 110V-240V~50/60Hz 0.5A max OUTPUT: 3.6V-6V⎓ 3A or 6V-9V⎓ 32A or 9V-12V⎓ 31.5A Or DC 3.7V Battery

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2410MHz	5	2430MHz	9	2450MHz	13	2470MHz
2	2415MHz	6	2435MHz	10	2455MHz		
3	2420MHz	7	2440MHz	11	2460MHz		
4	2425MHz	8	2445MHz	12	2465MHz		

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:

Test channel	**Frequency (MHz)**
Lowest channel	2410MHz
Middle channel	2440MHz
Highest channel	2470MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode

5.3 Description of Support Units

None

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

● **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default
Version	Ver 1.0

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 25 2020	June. 24 2021
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 25 2020	June. 24 2021
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 25 2020	June. 24 2021
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 25 2020	June. 24 2021
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 25 2020	June. 24 2021
9	Coaxial Cable	GTS	N/A	GTS211	June. 25 2020	June. 24 2021
10	Coaxial cable	GTS	N/A	GTS210	June. 25 2020	June. 24 2021
11	Coaxial Cable	GTS	N/A	GTS212	June. 25 2020	June. 24 2021
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 25 2020	June. 24 2021
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 25 2020	June. 24 2021
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 25 2020	June. 24 2021
15	Band filter	Amindeon	82346	GTS219	June. 25 2020	June. 24 2021
16	Power Meter	Anritsu	ML2495A	GTS540	June. 25 2020	June. 24 2021
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 25 2020	June. 24 2021
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 25 2020	June. 24 2021
19	Splitter	Agilent	11636B	GTS237	June. 25 2020	June. 24 2021
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 25 2020	June. 24 2021
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 18 2020	Oct. 17 2021
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 18 2020	Oct. 17 2021
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 18 2020	Oct. 17 2021
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 25 2020	June. 24 2021

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 25 2020	June. 24 2021
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 25 2020	June. 24 2021
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 25 2020	June. 24 2021
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 25 2020	June. 24 2021
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 25 2020	June. 24 2021

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 25 2020	June. 24 2021
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 25 2020	June. 24 2021
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 25 2020	June. 24 2021
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 25 2020	June. 24 2021
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 25 2020	June. 24 2021
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 25 2020	June. 24 2021
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 25 2020	June. 24 2021

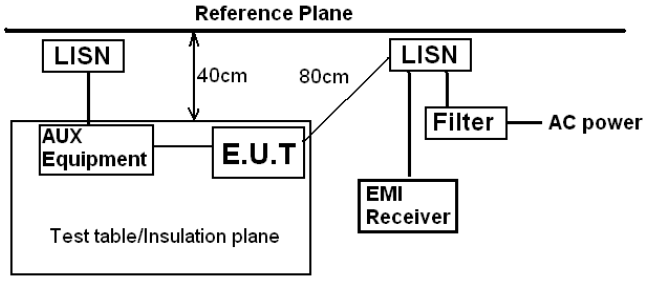
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 25 2020	June. 24 2021
2	Barometer	ChangChun	DYM3	GTS255	June. 25 2020	June. 24 2021

7 Test results and Measurement Data

7.1 Antenna requirement

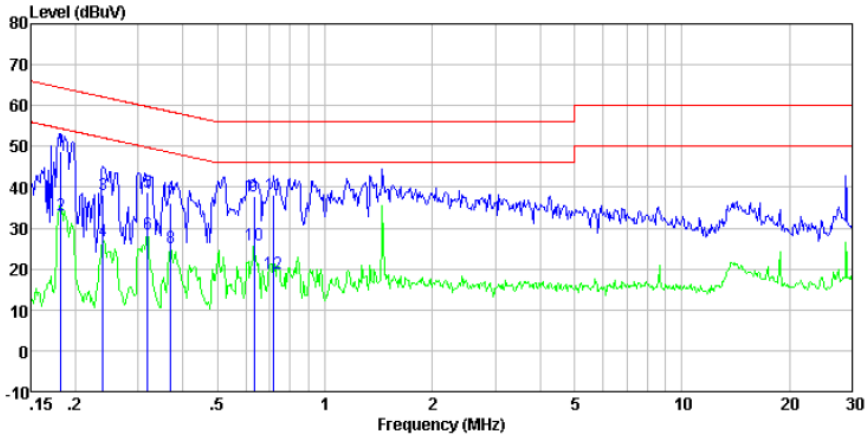
Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique 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 antennas are integral antenna, the best case gain of the antennas are 3.0dBi, reference to the appendix II for details	

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, 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 C63.10:2013 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 results:	Pass

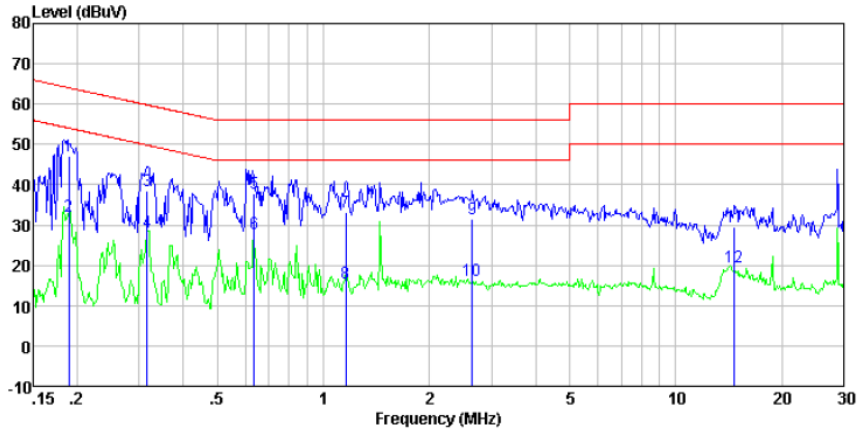
Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Measurement data
Line:



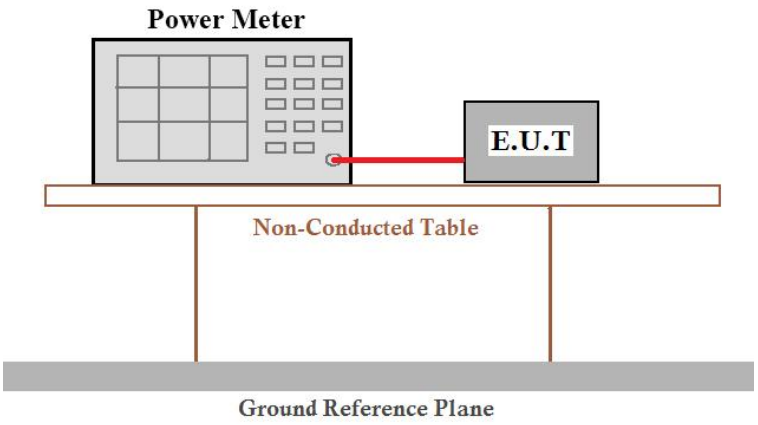
Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.18	28.28	20.40	0.10	48.78	64.37	-15.59	QP
0.18	12.57	20.40	0.10	33.07	54.37	-21.30	Average
0.24	17.76	20.40	0.11	38.27	62.13	-23.86	QP
0.24	6.26	20.40	0.11	26.77	52.13	-25.36	Average
0.32	18.18	20.39	0.10	38.67	59.75	-21.08	QP
0.32	8.16	20.39	0.10	28.65	49.75	-21.10	Average
0.37	15.66	20.37	0.10	36.13	58.52	-22.39	QP
0.37	4.57	20.37	0.10	25.04	48.52	-23.48	Average
0.63	17.35	20.28	0.12	37.75	56.00	-18.25	QP
0.63	5.52	20.28	0.12	25.92	46.00	-20.08	Average
0.72	17.63	20.25	0.13	38.01	56.00	-17.99	QP
0.72	-1.45	20.25	0.13	18.93	46.00	-27.07	Average

Neutral:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.19	26.66	20.40	0.10	47.16	64.06	-16.90	QP
0.19	11.53	20.40	0.10	32.03	54.06	-22.03	Average
0.32	18.06	20.39	0.10	38.55	59.80	-21.25	QP
0.32	7.71	20.39	0.10	28.20	49.80	-21.60	Average
0.64	17.45	20.27	0.12	37.84	56.00	-18.16	QP
0.64	7.41	20.27	0.12	27.80	46.00	-18.20	Average
1.16	12.89	20.20	0.16	33.25	56.00	-22.75	QP
1.16	-4.94	20.20	0.16	15.42	46.00	-30.58	Average
2.65	11.24	20.20	0.19	31.63	56.00	-24.37	QP
2.65	-4.19	20.20	0.19	16.20	46.00	-29.80	Average
14.67	9.08	20.20	0.21	29.49	60.00	-30.51	QP
14.67	-0.73	20.20	0.21	19.68	50.00	-30.32	Average

7.3 Conducted Peak Output Power

Test Requirement :	FCC Part15 C Section 15.247 (b)(3)
Test Method :	KDB558074 D01 DTS Meas Guidance V05or02
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

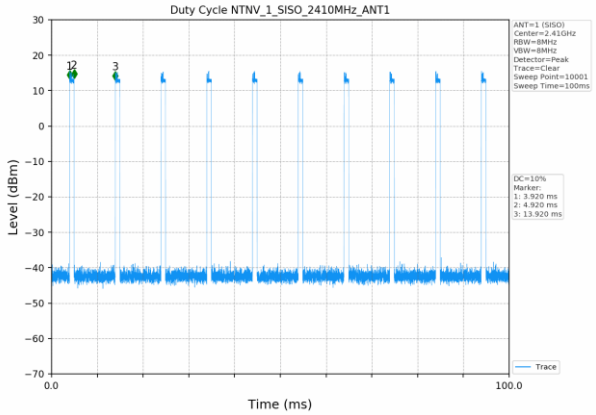
Measurement Data

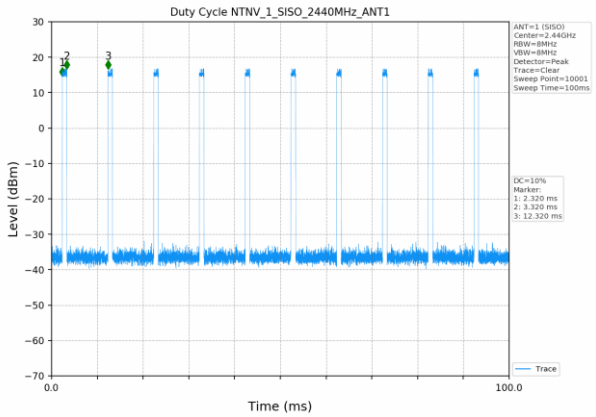
Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1		
1	2410	SISO	18.13	30	PASS
	2440	SISO	19.94	30	PASS
	2470	SISO	20.43	30	PASS

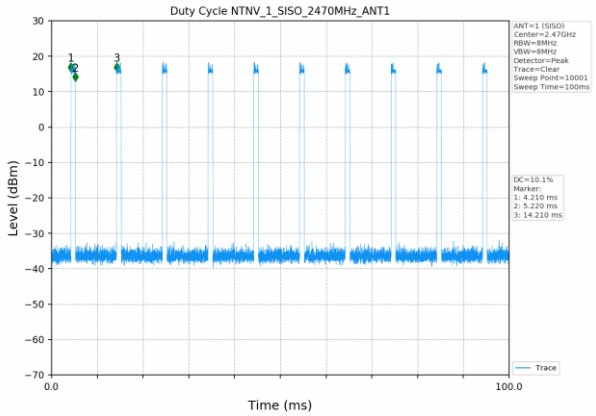
Duty Cycle:

Test Mode	Channel Frequency(MHz)	TX Type	ANT No.	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
1	2410	SISO	1	1.000	10.000	10.00	10.00
	2440	SISO	1	1.000	10.000	10.00	10.00
	2470	SISO	1	1.010	10.000	10.10	9.96

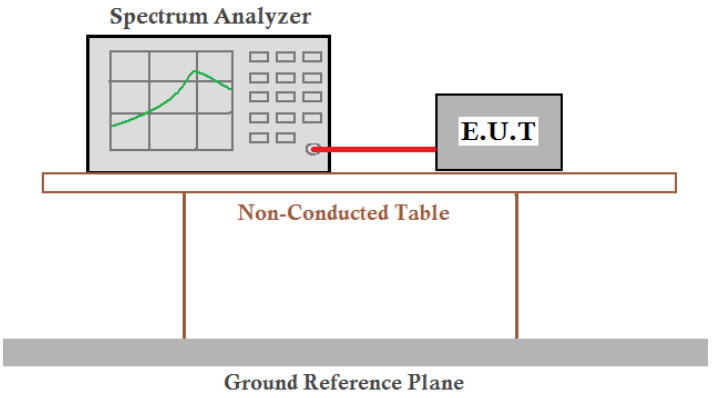
Test Graph


Duty Cycle NTNV_1_SISO_2410MHz_ANT1
Level (dBm)
Time (ms)
ANT=1 (SISO)
Center=2.410GHz
RBW=8MHz
VBW=8MHz
Detector=Peak
Trace=Clear
Sweep Point=10001
Sweep Time=100ms
DC=10%
Marker:
1: 3.920 ms
2: 4.920 ms
3: 13.920 ms
Trace


Duty Cycle NTNV_1_SISO_2440MHz_ANT1
Level (dBm)
Time (ms)
ANT=1 (SISO)
Center=2.440GHz
RBW=8MHz
VBW=8MHz
Detector=Peak
Trace=Clear
Sweep Point=10001
Sweep Time=100ms
DC=10%
Marker:
1: 2.320 ms
2: 3.320 ms
3: 12.320 ms
Trace


Duty Cycle NTNV_1_SISO_2470MHz_ANT1
Level (dBm)
Time (ms)
ANT=1 (SISO)
Center=2.470GHz
RBW=8MHz
VBW=8MHz
Detector=Peak
Trace=Clear
Sweep Point=10001
Sweep Time=100ms
DC=10.1%
Marker:
1: 4.210 ms
2: 5.220 ms
3: 14.210 ms
Trace

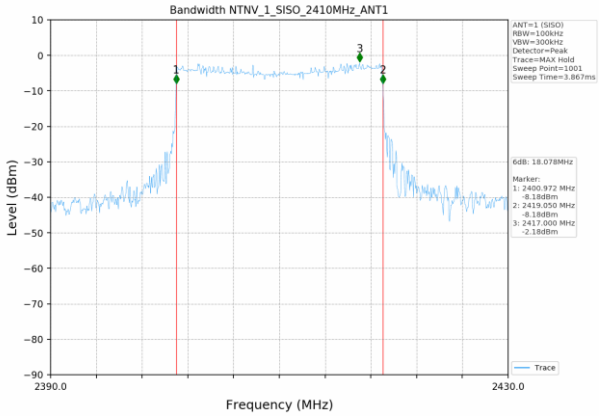
7.4 Channel Bandwidth

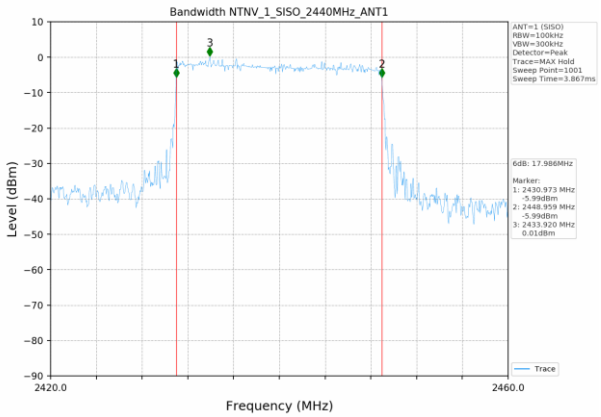
Test Requirement :	FCC Part15 C Section 15.247 (a)(2)
Test Method :	KDB558074 D01 DTS Meas Guidance V05or02
Limit:	>500KHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

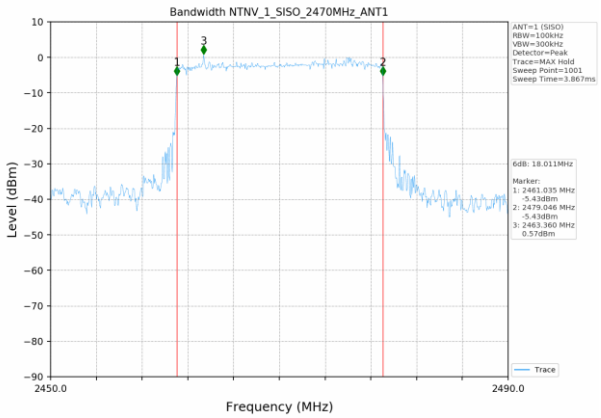
Measurement Data

Test Mode	Frequency (MHz)	TX Type	ANT No.	-6dB Bandwidth		Verdict
				Test Result (MHz)	Limits (MHz)	
1	2410	SISO	1	18.078	≥0.5	PASS
	2440	SISO	1	17.986	≥0.5	PASS
	2470	SISO	1	18.011	≥0.5	PASS

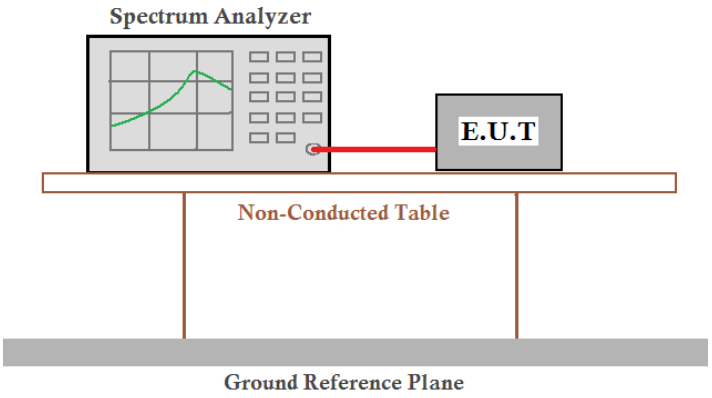
Test plot as follows:







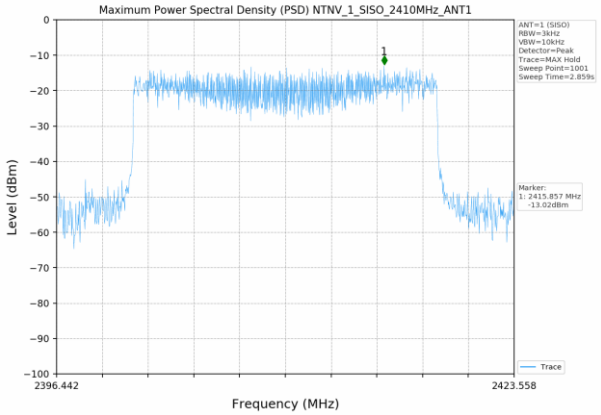
7.5 Power Spectral Density

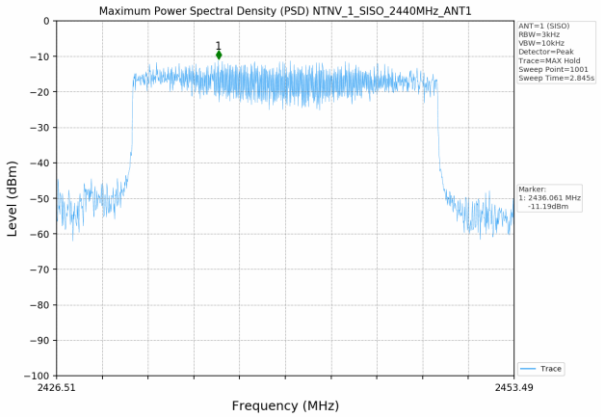
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074 D01 DTS Meas Guidance V05or02
Limit:	8dBm/3kHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

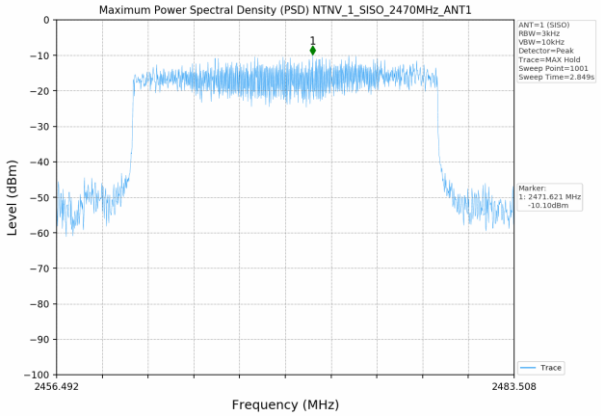
Measurement Data

Test Mode	Frequency (MHz)	Tx Type	Maximum Power Spectral Density (dBm/3KHz)	Limits (dBm/3kHz)	Verdict
			Ant 1		
1	2410	SISO	-13.02	≤8	PASS
	2440	SISO	-11.19	≤8	PASS
	2470	SISO	-10.10	≤8	PASS

Test plot as follows:

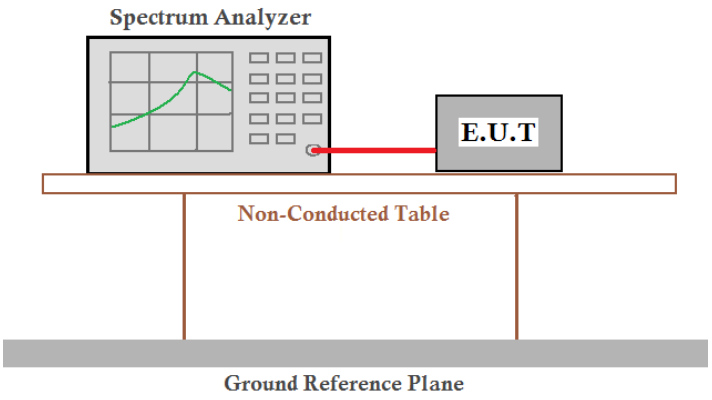




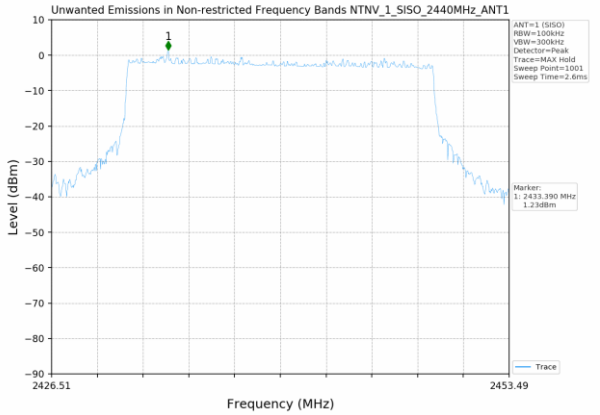


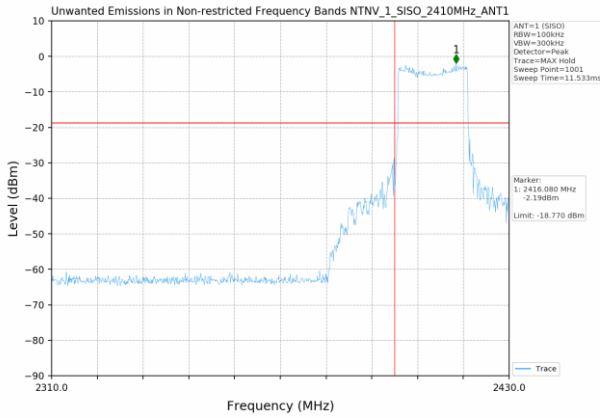
7.6 Unwanted Emissions in Non-restricted Frequency Bands

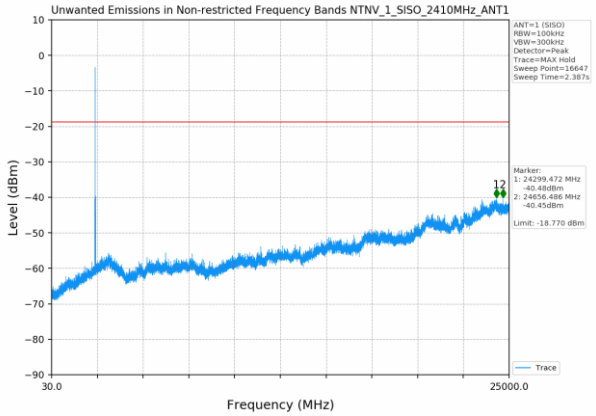
7.6.1 Conducted Emission Method

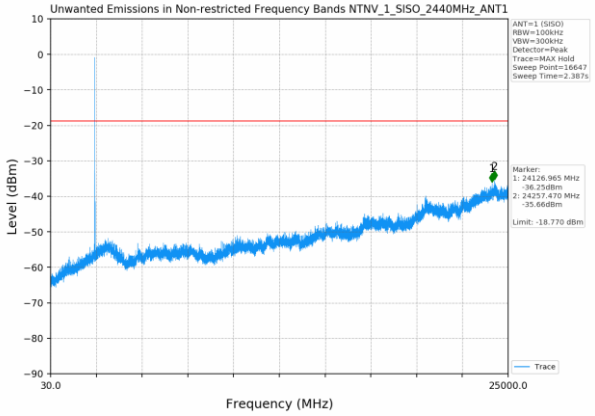
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D01 DTS Meas Guidance V05or02
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall 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

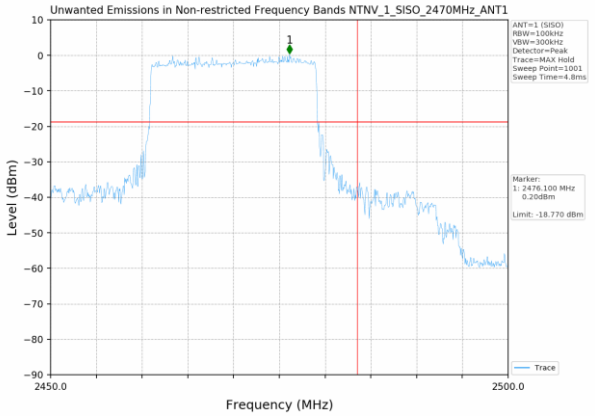
Test plot as follows:

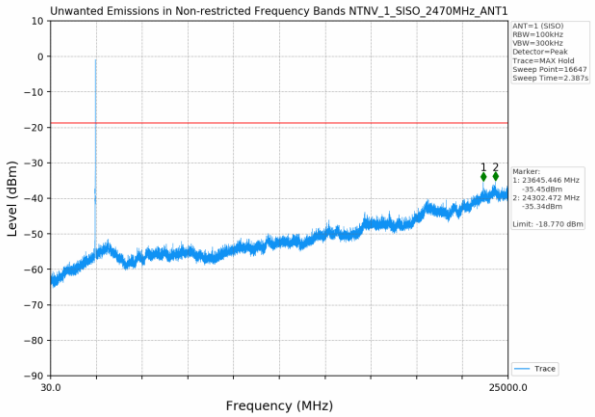







Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2440MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=16647
Sweep Time=2.387s
Marker:
1: 24126.965 MHz
-36.25dBm
2: 24257.470 MHz
-35.66dBm
Limit: -18.770 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0


Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2470MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=4.8ms
Marker:
1: 2476.100 MHz
0.20dBm
Limit: -18.770 dBm
Trace
Level (dBm)
Frequency (MHz)
2450.0
2500.0


Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2470MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=16647
Sweep Time=2.387s
Marker:
1: 23645.446 MHz
-35.45dBm
2: 24302.472 MHz
-35.34dBm
Limit: -18.770 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

7.6.2 Radiated Emission Method

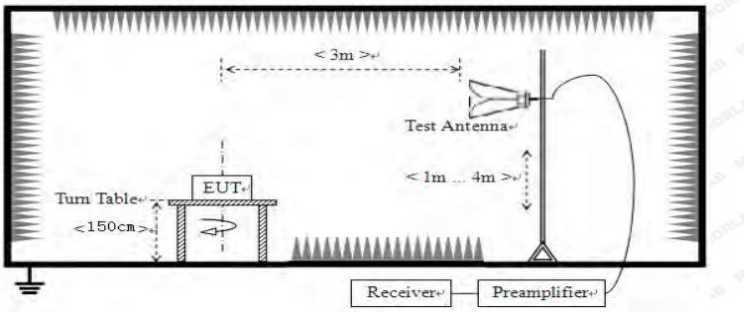
Test Requirement:	FCC Part15 C Section 15.209 and 15.20
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.
Test site:	Measurement Distance: 3m
Receiver setup:	

Frequency	Detector	RBW	VBW	Value
Above 1GHz	Peak	1MHz	3MHz	Peak
	Average	1MHz	3MHz	Average

Limit:

Frequency	Limit (dBuV/m @3m)	Value
Above 1GHz	54.00	Average
	74.00	Peak

Test setup:



Test Procedure:

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 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.
7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

Test mode:	802.11b	Test channel:	Lowest

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
2310.00	39.48	27.14	6.19	42.04	30.77	74.00	-43.23	Horizontal
2390.00	47.77	27.37	6.31	42.11	39.34	74.00	-34.66	Horizontal
2310.00	38.01	27.14	6.19	42.04	29.30	74.00	-44.70	Vertical
2390.00	48.98	27.37	6.31	42.11	40.55	74.00	-33.45	Vertical

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
2310.00	29.87	27.14	6.19	42.04	21.16	54.00	-32.84	Horizontal
2390.00	36.93	27.37	6.31	42.11	28.50	54.00	-25.50	Horizontal
2310.00	28.52	27.14	6.19	42.04	19.81	54.00	-34.19	Vertical
2390.00	38.89	27.37	6.31	42.11	30.46	54.00	-23.54	Vertical

Test mode:	802.11b	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
2483.50	48.21	27.66	6.45	42.01	40.31	74.00	-33.69	Horizontal
2500.00	40.73	27.70	6.47	42.00	32.90	74.00	-41.10	Horizontal
2483.50	48.03	27.66	6.45	42.01	40.13	74.00	-33.87	Vertical
2500.00	41.86	27.70	6.47	42.00	34.03	74.00	-39.97	Vertical

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
2483.50	36.91	27.66	6.45	42.01	29.01	54.00	-24.99	Horizontal
2500.00	33.42	27.70	6.47	42.00	25.59	54.00	-28.41	Horizontal
2483.50	37.66	27.66	6.45	42.01	29.76	54.00	-24.24	Vertical
2500.00	32.22	27.70	6.47	42.00	24.39	54.00	-29.61	Vertical

Test mode:	802.11g	Test channel:	Lowest

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
2310.00	39.89	27.14	6.19	42.04	31.18	74.00	-42.82	Horizontal
2390.00	48.31	27.37	6.31	42.11	39.88	74.00	-34.12	Horizontal
2310.00	38.45	27.14	6.19	42.04	29.74	74.00	-44.26	Vertical
2390.00	49.63	27.37	6.31	42.11	41.20	74.00	-32.80	Vertical

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
2310.00	30.16	27.14	6.19	42.04	21.45	54.00	-32.55	Horizontal
2390.00	37.26	27.37	6.31	42.11	28.83	54.00	-25.17	Horizontal
2310.00	28.84	27.14	6.19	42.04	20.13	54.00	-33.87	Vertical
2390.00	39.25	27.37	6.31	42.11	30.82	54.00	-23.18	Vertical

Test mode:	802.11g	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
2483.50	48.79	27.66	6.45	42.01	40.89	74.00	-33.11	Horizontal
2500.00	41.18	27.70	6.47	42.00	33.35	74.00	-40.65	Horizontal
2483.50	48.69	27.66	6.45	42.01	40.79	74.00	-33.21	Vertical
2500.00	42.39	27.70	6.47	42.00	34.56	74.00	-39.44	Vertical

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
2483.50	37.26	27.66	6.45	42.01	29.36	54.00	-24.64	Horizontal
2500.00	33.69	27.70	6.47	42.00	25.86	54.00	-28.14	Horizontal
2483.50	38.04	27.66	6.45	42.01	30.14	54.00	-23.86	Vertical
2500.00	32.50	27.70	6.47	42.00	24.67	54.00	-29.33	Vertical

Test mode:	802.11n(HT20)	Test channel:	Lowest

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
2310.00	40.01	27.14	6.19	42.04	31.30	74.00	-42.70	Horizontal
2390.00	48.47	27.37	6.31	42.11	40.04	74.00	-33.96	Horizontal
2310.00	38.57	27.14	6.19	42.04	29.86	74.00	-44.14	Vertical
2390.00	49.82	27.37	6.31	42.11	41.39	74.00	-32.61	Vertical

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
2310.00	30.24	27.14	6.19	42.04	21.53	54.00	-32.47	Horizontal
2390.00	37.36	27.37	6.31	42.11	28.93	54.00	-25.07	Horizontal
2310.00	28.93	27.14	6.19	42.04	20.22	54.00	-33.78	Vertical
2390.00	39.36	27.37	6.31	42.11	30.93	54.00	-23.07	Vertical

Test mode:	802.11n(HT20)	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
2483.50	48.96	27.66	6.45	42.01	41.06	74.00	-32.94	Horizontal
2500.00	41.31	27.70	6.47	42.00	33.48	74.00	-40.52	Horizontal
2483.50	48.88	27.66	6.45	42.01	40.98	74.00	-33.02	Vertical
2500.00	42.54	27.70	6.47	42.00	34.71	74.00	-39.29	Vertical

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
2483.50	37.36	27.66	6.45	42.01	29.46	54.00	-24.54	Horizontal
2500.00	33.77	27.70	6.47	42.00	25.94	54.00	-28.06	Horizontal
2483.50	38.16	27.66	6.45	42.01	30.26	54.00	-23.74	Vertical
2500.00	32.59	27.70	6.47	42.00	24.76	54.00	-29.24	Vertical

Remarks:

1. *The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.*
2. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

7.7 Spurious Emission

7.7.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	9kHz to 25GHz
Test site:	Measurement Distance: 3m

Receiver setup:

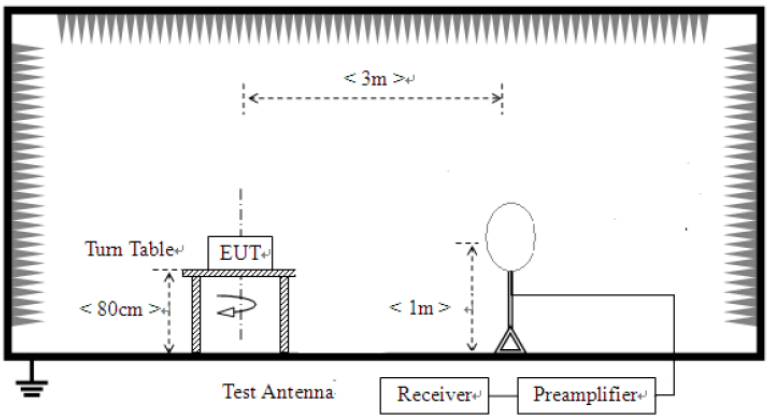
Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Limit:

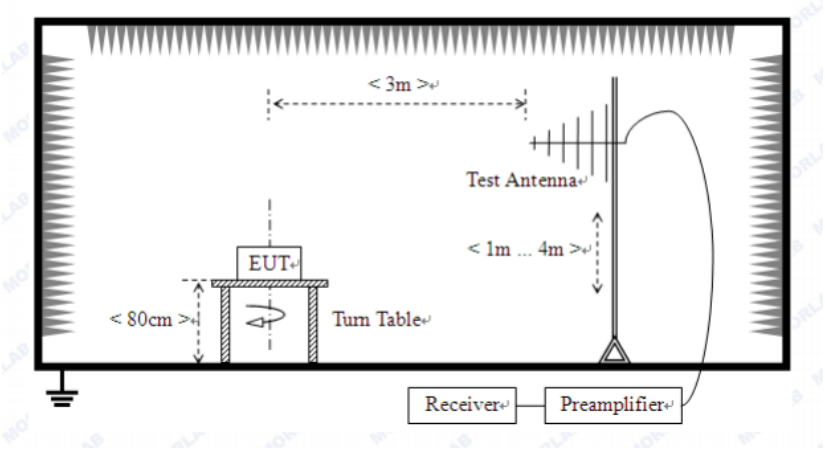
Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	30m
1.705MHz-30MHz	30	QP	30m
30MHz-88MHz	100	QP	3m
88MHz-216MHz	150	QP	
216MHz-960MHz	200	QP	
960MHz-1GHz	500	QP	
Above 1GHz	500	Average	
	5000	Peak	

Test setup:

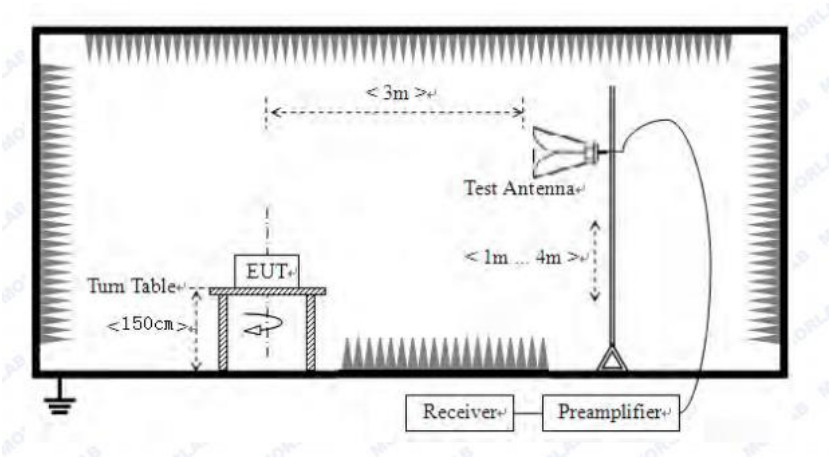
For radiated emissions from 9kHz to 30MHz



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 results:	Pass					

Remarks:

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

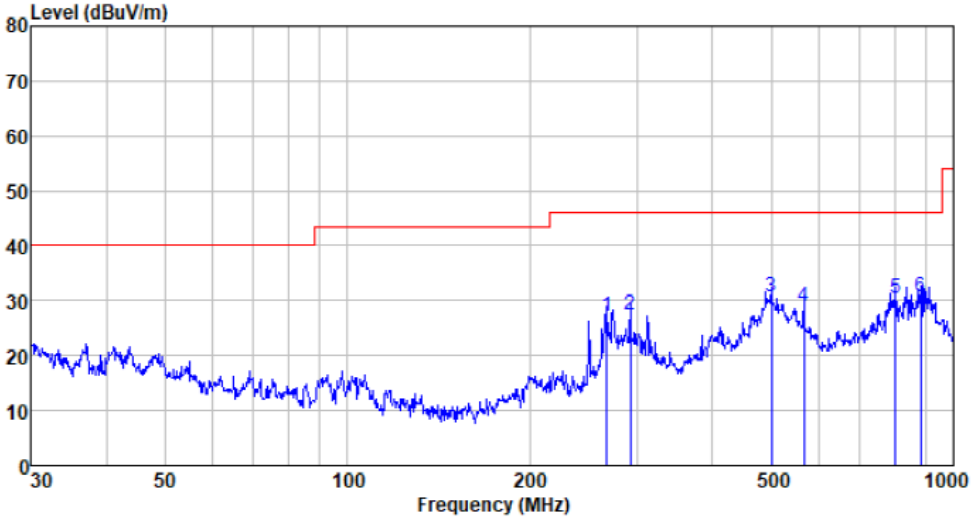
Measurement data:

- **9kHz~30MHz**

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

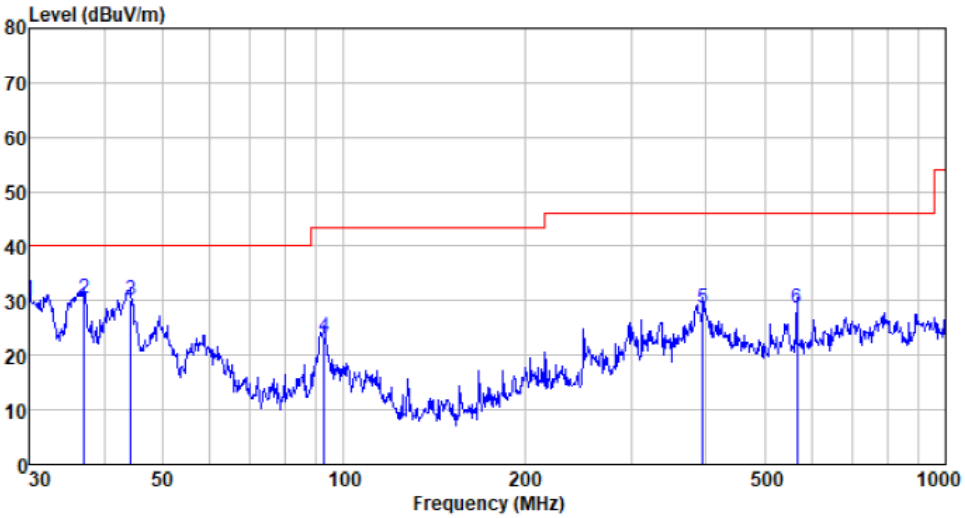
■ **Below 1GHz**

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
267.546	49.56	12.69	2.21	37.39	27.07	46.00	-18.93	QP
293.084	49.27	13.42	2.32	37.41	27.60	46.00	-18.40	QP
501.179	47.46	17.30	3.31	37.51	30.56	46.00	-15.44	QP
566.622	44.16	18.78	3.59	37.53	29.00	46.00	-17.00	QP
801.786	42.20	21.40	4.46	37.62	30.44	46.00	-15.56	QP
881.407	41.49	22.13	4.79	37.60	30.81	46.00	-15.19	QP

Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
30.000	53.38	11.20	0.55	35.00	30.13	40.00	-9.87	QP
37.025	53.62	11.70	0.63	35.49	30.46	40.00	-9.54	QP
44.275	52.99	12.25	0.71	35.90	30.05	40.00	-9.95	QP
92.787	47.80	11.11	1.13	36.66	23.38	43.50	-20.12	QP
394.855	48.20	15.25	2.83	37.52	28.76	46.00	-17.24	QP
566.622	43.91	18.78	3.59	37.53	28.75	46.00	-17.25	QP

■ **Above 1GHz**

Test channel:	Lowest

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
4820.00	35.40	31.22	4.63	37.73	33.52	74.00	-40.48	Vertical
7230.00	33.06	36.20	6.50	35.63	40.13	74.00	-33.87	Vertical
9640.00	36.14	37.97	7.98	34.95	47.14	74.00	-26.86	Vertical
12050.00	36.93	38.51	8.94	36.22	48.16	74.00	-25.84	Vertical
14460.00	35.39	41.49	9.85	36.06	50.67	74.00	-23.33	Vertical
16870.00	37.78	39.62	11.14	36.21	52.33	74.00	-21.67	Vertical
4820.00	36.44	31.22	4.63	37.73	34.56	74.00	-39.44	Horizontal
7230.00	35.33	36.20	6.50	35.63	42.40	74.00	-31.60	Horizontal
9640.00	34.97	37.97	7.98	34.95	45.97	74.00	-28.03	Horizontal
12050.00	37.30	38.51	8.94	36.22	48.53	74.00	-25.47	Horizontal
14460.00	37.70	41.49	9.85	36.06	52.98	74.00	-21.02	Horizontal
16870.00	35.49	39.62	11.14	36.21	50.04	74.00	-23.96	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
4820.00	25.39	31.22	4.63	37.73	23.51	54.00	-30.49	Vertical
7230.00	28.44	36.20	6.50	35.63	35.51	54.00	-18.49	Vertical
9640.00	24.50	37.97	7.98	34.95	35.50	54.00	-18.50	Vertical
12050.00	27.39	38.51	8.94	36.22	38.62	54.00	-15.38	Vertical
14460.00	27.05	41.49	9.85	36.06	42.33	54.00	-11.67	Vertical
16870.00	24.40	39.62	11.14	36.21	38.95	54.00	-15.05	Vertical
4820.00	24.15	31.22	4.63	37.73	22.27	54.00	-31.73	Horizontal
7230.00	25.20	36.20	6.50	35.63	32.27	54.00	-21.73	Horizontal
9640.00	28.43	37.97	7.98	34.95	39.43	54.00	-14.57	Horizontal
12050.00	24.60	38.51	8.94	36.22	35.83	54.00	-18.17	Horizontal
14460.00	25.98	41.49	9.85	36.06	41.26	54.00	-12.74	Horizontal
16870.00	26.24	39.62	11.14	36.21	40.79	54.00	-13.21	Horizontal

Test channel:	Middle

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
4880.00	37.09	31.31	4.69	37.75	35.34	74.00	-38.66	Vertical
7320.00	34.37	36.43	6.63	35.60	41.83	74.00	-32.17	Vertical
9760.00	35.09	38.10	8.03	35.03	46.19	74.00	-27.81	Vertical
12200.00	33.62	38.57	8.96	36.31	44.84	74.00	-29.16	Vertical
14640.00	33.14	41.10	9.94	35.77	48.41	74.00	-25.59	Vertical
17080.00	36.69	40.22	11.24	36.29	51.86	74.00	-22.14	Vertical
4880.00	33.86	31.31	4.69	37.75	32.11	74.00	-41.89	Horizontal
7320.00	33.80	36.43	6.63	35.60	41.26	74.00	-32.74	Horizontal
9760.00	33.37	38.10	8.03	35.03	44.47	74.00	-29.53	Horizontal
12200.00	37.03	38.57	8.96	36.31	48.25	74.00	-25.75	Horizontal
14640.00	37.14	41.10	9.94	35.77	52.41	74.00	-21.59	Horizontal
17080.00	36.56	40.22	11.24	36.29	51.73	74.00	-22.27	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
4880.00	27.76	31.31	4.69	37.75	26.01	54.00	-27.99	Vertical
7320.00	27.54	36.43	6.63	35.60	35.00	54.00	-19.00	Vertical
9760.00	25.78	38.10	8.03	35.03	36.88	54.00	-17.12	Vertical
12200.00	25.18	38.57	8.96	36.31	36.40	54.00	-17.60	Vertical
14640.00	24.81	41.10	9.94	35.77	40.08	54.00	-13.92	Vertical
17080.00	26.48	40.22	11.24	36.29	41.65	54.00	-12.35	Vertical
4880.00	24.60	31.31	4.69	37.75	22.85	54.00	-31.15	Horizontal
7320.00	24.73	36.43	6.63	35.60	32.19	54.00	-21.81	Horizontal
9760.00	27.04	38.10	8.03	35.03	38.14	54.00	-15.86	Horizontal
12200.00	27.64	38.57	8.96	36.31	38.86	54.00	-15.14	Horizontal
14640.00	28.76	41.10	9.94	35.77	44.03	54.00	-9.97	Horizontal
17080.00	24.12	40.22	11.24	36.29	39.29	54.00	-14.71	Horizontal

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
4940.00	37.01	31.41	4.77	37.78	35.41	74.00	-38.59	Vertical
7410.00	33.11	36.62	6.73	35.57	40.89	74.00	-33.11	Vertical
9880.00	34.83	38.23	8.07	35.11	46.02	74.00	-27.98	Vertical
12350.00	34.52	38.64	8.97	36.42	45.71	74.00	-28.29	Vertical
14820.00	33.33	40.70	10.03	35.53	48.53	74.00	-25.47	Vertical
17290.00	37.53	41.26	11.42	36.27	53.94	74.00	-20.06	Vertical
4940.00	33.57	31.41	4.77	37.78	31.97	74.00	-42.03	Horizontal
7410.00	37.90	36.62	6.73	35.57	45.68	74.00	-28.32	Horizontal
9880.00	33.84	38.23	8.07	35.11	45.03	74.00	-28.97	Horizontal
12350.00	33.74	38.64	8.97	36.42	44.93	74.00	-29.07	Horizontal
14820.00	36.60	40.70	10.03	35.53	51.80	74.00	-22.20	Horizontal
17290.00	36.72	41.26	11.42	36.27	53.13	74.00	-20.87	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
4940.00	24.96	31.41	4.77	37.78	23.36	54.00	-30.64	Vertical
7410.00	28.81	36.62	6.73	35.57	36.59	54.00	-17.41	Vertical
9880.00	26.05	38.23	8.07	35.11	37.24	54.00	-16.76	Vertical
12350.00	25.17	38.64	8.97	36.42	36.36	54.00	-17.64	Vertical
14820.00	27.03	40.70	10.03	35.53	42.23	54.00	-11.77	Vertical
17290.00	27.32	41.26	11.42	36.27	43.73	54.00	-10.27	Vertical
4940.00	25.99	31.41	4.77	37.78	24.39	54.00	-29.61	Horizontal
7410.00	25.59	36.62	6.73	35.57	33.37	54.00	-20.63	Horizontal
9880.00	24.79	38.23	8.07	35.11	35.98	54.00	-18.02	Horizontal
12350.00	25.16	38.64	8.97	36.42	36.35	54.00	-17.65	Horizontal
14820.00	27.11	40.70	10.03	35.53	42.31	54.00	-11.69	Horizontal
17290.00	26.93	41.26	11.42	36.27	43.34	54.00	-10.66	Horizontal

Remark:

1 Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

------End------