



# TEST REPORT

## FCC ID:2AGNTEF62

## IC:20910-EF62

**Report Number**.....: ZKT-240801L9141E-1

**Date of Test**.....: May.01,2024-Jun.02,2024

**Date of issue**.....: Jun.03,2024

**Total number of pages**..... 30

**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** .....: Autel Robotics Co., Ltd.

**Address** .....: 601,701,801,901, Block B1, Nanshan iPark, No. 1001 Xueyuan Avenue, Nanshan District, Shenzhen, Guangdong, 518055, China

**Manufacturer's name** .....: Autel Robotics Co., Ltd.

**Address** .....: 601,701,801,901, Block B1, Nanshan iPark, No. 1001 Xueyuan Avenue, Nanshan District, Shenzhen, Guangdong, 518055, China

**Factory's name 1**.....: Autel Robotics Co., Ltd.Guangming Branch

**Address** .....: No.701, Jixie Factory, Building 4,Yanxiang Technology Industrial Park, Gaoxin Road, Dongzhou Community, Guangming district, Shenzhen,Guangdong, China

**Factory's name 2**.....: AUTEL ROBOTICS VIETNAM COMPANY LIMITED

**Address** .....: Factory A, in Lot IN3-11\*B, VSIP HaiPhong Township Industrial & Service Park, in Dinh Vu - Cat Hai Economic Zone, Lap Le Commune, Thuy Nguyen District, Hai Phong City, Viet Nam

**Test specification:**

**Standard**.....: FCC CFR Title 47 Part 15 Subpart C Section 15.247  
ANSI C63.10:2013  
RSS-247 Issue 3: August 2023  
RSS-Gen Issue 5 Amendment 2, 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 requirements. And it is applicable only to the tested sample identified in the report.

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**Product name..... : Autel Smart Controller SE V2**

Trademark .....: Autel Robotics

Model/Type reference.....: EF6-2

Adapter:

Model:RLC-537US

Input:AC 100-240V~50/60Hz 0.85A

Output 1:TYPE-C 5V $\overline{\text{---}}$ 3A,9V $\overline{\text{---}}$ 3A,12V $\overline{\text{---}}$ 2.5A

Output 2:TYPE-A 5V $\overline{\text{---}}$ 3A,9V $\overline{\text{---}}$ 3A,12V $\overline{\text{---}}$ 2.5A

Ratings.....:

TYPE-A+TYPE-C:5V $\overline{\text{---}}$ 3.4A

Li-ion Battery:

Model:PT803254-2S

Nominal Voltage:7.7Vdc

Rated Capacity:1900mAh,14.63Wh



**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-240801L9141E-1	Rev.01	Initial issue of report	Jun.03,2024



## 2. Test Summary

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C RSS-247 Issue 3: August 2023			
Standard Section	Test Item	Judgment	Remark
FCC part 15.203 RSS-Gen 6.8	Antenna requirement	PASS	
FCC part 15.207 RSS-Gen	AC Power Line Conducted Emission	PASS	
FCC part 15.247 (b)(3) RSS-247.5.4(b)	Conducted Average Output Power	PASS	
FCC part 15.247 (a)(2) RSS-247.5.1(a) RSS-Gen.6.7	-6dB Bandwidth	PASS	
FCC part 15.247 (e) RSS-247.5.2(b)	Power Spectral Density	PASS	
FCC part 15.247(d) RSS-247 5.5	Band Edge	PASS	
FCC part 15.205/15.209 RSS-247 5.5	Spurious Emission	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  $y \pm U$ , 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 %.

No.	Item	Uncertainty
1	3m chamber 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:	Autel Smart Controller SE V2
Model No.:	EF6-2
Test sample(s) ID:	ZKT-240801L9141
Sample(s) Status:	Engineer sample
Hardware Version:	V2
Software Version:	V1.0
HVIN:	EF6-2
PMN:	Autel Smart Controller SE V2
Operation Frequency:	904MHz~926MHz for 1.4M bandwidth 909MHz~921MHz for 10M bandwidth 914MHz~916MHz for 20M bandwidth
Channel numbers:	23 for 1.4M bandwidth 13 for 10M bandwidth 3 for 20M bandwidth
Channel separation:	1MHz
Modulation type:	QPSK&16QAM
Antenna Type:	External antenna
Antenna gain:	ANT 1:2.0 dBi ANT 2:3.2 dBi
Power supply:	Adapter: Model:RLC-537US Input:AC 100-240V~50/60Hz 0.85A Output 1:TYPE-C 5V $\overline{\text{---}}$ 3A,9V $\overline{\text{---}}$ 3A,12V $\overline{\text{---}}$ 2.5A Output 2:TYPE-A 5V $\overline{\text{---}}$ 3A,9V $\overline{\text{---}}$ 3A,12V $\overline{\text{---}}$ 2.5A TYPE-A+TYPE-C:5V $\overline{\text{---}}$ 3.4A Li-ion Battery: Model:PT803254-2S Nominal Voltage:7.7Vdc Rated Capacity:1900mAh,14.63Wh





1.4MHz: 23channels

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	904	13	916
2	905	14	917
.....	.....	.....	.....
.....	.....	23	926
12	915	24	-

10MHz: 13channels

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	909	8	916
2	910	.....	.....
.....	.....	.....	.....
.....	.....	13	921
7	915	14	-

20MHz:3channels

Channel	Frequency(MHz)
1	914
2	915
3	916

Test Frequency

Bandwidth	Frequency(MHz)		
	Lowest channel	Middle channel	Highest channel
1.4MHz	904	915	926
10MHz	909	915	921
20MHz	914	915	916

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:

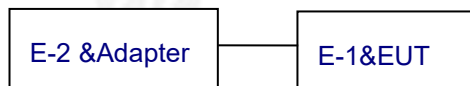


### 3.2 Test mode

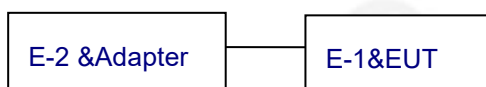
Transmitting mode	Keep the EUT in continuously transmitting mode.
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	

### 3.3 Test Setup Configuration

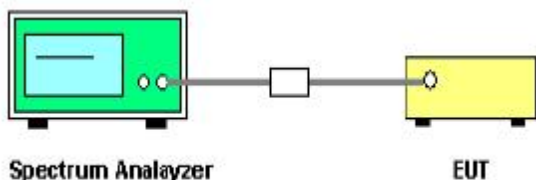
#### Conducted Emission



#### 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	Autel Smart Controller SE V2	Autel Robotics	LPS8v2-915	N/A	EUT
E-2	Power adapter	EZREAL	RLC-537JP	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.	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

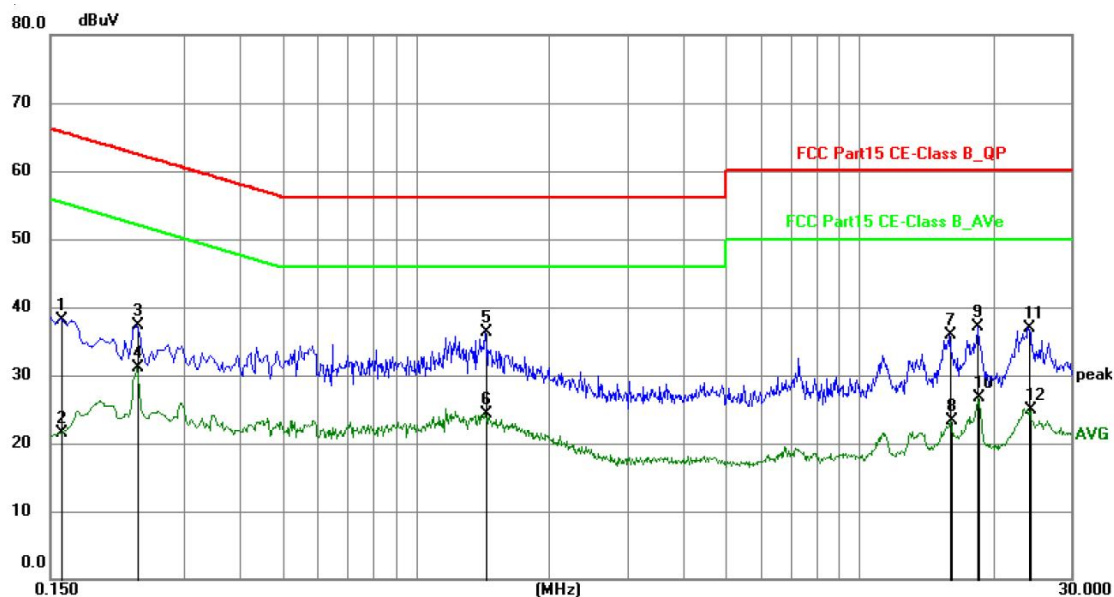
### 4.1 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207 RSS-Gen [8.8]																			
Test Method:	ANSI C63.10:2013 & RSS-Gen																			
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> <p>* Decreases with the logarithm of the frequency.</p>						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:	<div><p style="text-align: center;"><b>Reference Plane</b></p><p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p></div>																			
Test procedure:	<p>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.</p> <p>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).</p> <p>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.</p>																			
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:	AC 120V/60Hz																			
Test results:	PASS																			



Temperature:	26 °C	Relative Humidity:	55%
Pressure:	1009hPa	Phase :	Neutral
Test Voltage :	AC 120V/60Hz	Test Mode:	Transmitting mode

**Note: Pre-scan all modes and recorded the worst case results in this report which is QPSK-1.4M BW mode.**

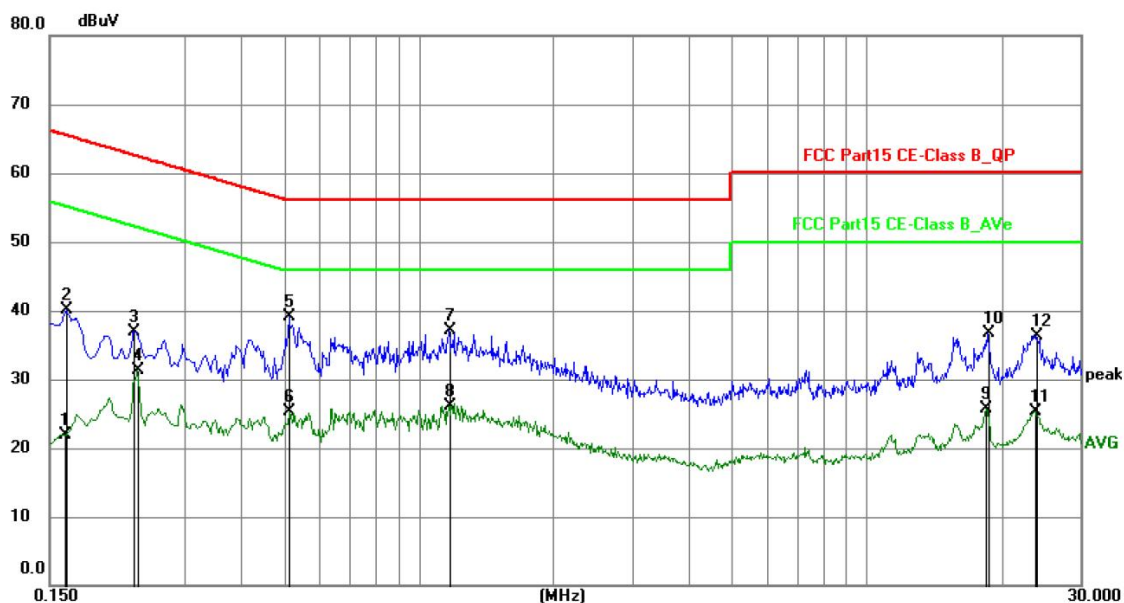


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1590	17.29	20.90	38.19	65.52	-27.33	QP	P
2	0.1590	0.55	20.90	21.45	55.52	-34.07	AVG	P
3	0.2355	16.38	21.02	37.40	62.25	-24.85	QP	P
4	0.2355	10.07	21.02	31.09	52.25	-21.16	AVG	P
5	1.4369	15.29	20.99	36.28	56.00	-19.72	QP	P
6	1.4369	3.26	20.99	24.25	46.00	-21.75	AVG	P
7	16.0035	12.95	23.04	35.99	60.00	-24.01	QP	P
8	16.1385	0.19	23.06	23.25	50.00	-26.75	AVG	P
9	18.4605	13.57	23.45	37.02	60.00	-22.98	QP	P
10	18.5459	3.33	23.46	26.79	50.00	-23.21	AVG	P
11	24.0405	12.62	24.36	36.98	60.00	-23.02	QP	P
12	24.3420	0.49	24.41	24.90	50.00	-25.10	AVG	P





Temperature:	26 °C	Relative Humidity:	55%
Pressure:	1009hPa	Phase :	Neutral
Test Voltage :	AC 120V/60Hz	Test Mode:	Transmitting mode



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1624	1.03	20.88	21.91	55.34	-33.43	AVG	P
2	0.1635	19.24	20.89	40.13	65.28	-25.15	QP	P
3	0.2310	16.00	20.99	36.99	62.41	-25.42	QP	P
4	0.2355	10.30	20.99	31.29	52.25	-20.96	AVG	P
5	0.5144	18.19	20.85	39.04	56.00	-16.96	QP	P
6	0.5144	4.38	20.85	25.23	46.00	-20.77	AVG	P
7	1.1669	16.09	20.94	37.03	56.00	-18.97	QP	P
8	1.1759	5.13	20.94	26.07	46.00	-19.93	AVG	P
9	18.5235	2.21	23.52	25.73	50.00	-24.27	AVG	P
10	18.6450	13.09	23.54	36.63	60.00	-23.37	QP	P
11	23.6895	1.03	24.35	25.38	50.00	-24.62	AVG	P
12	23.8920	12.01	24.39	36.40	60.00	-23.60	QP	P

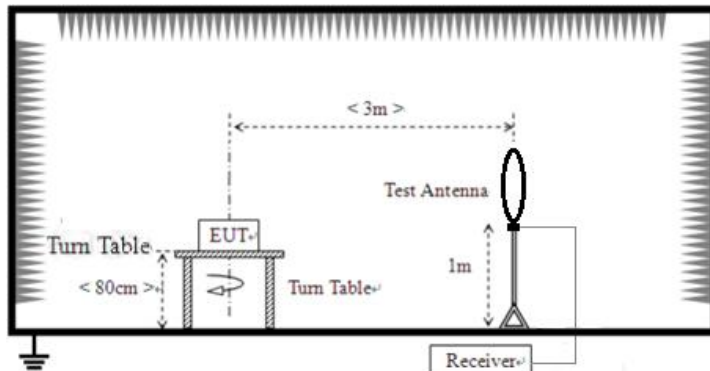
Notes:

- 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

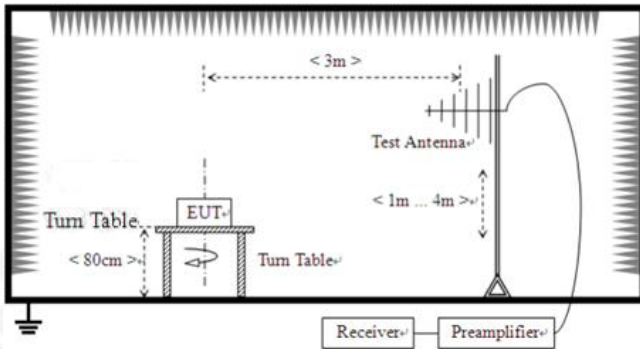
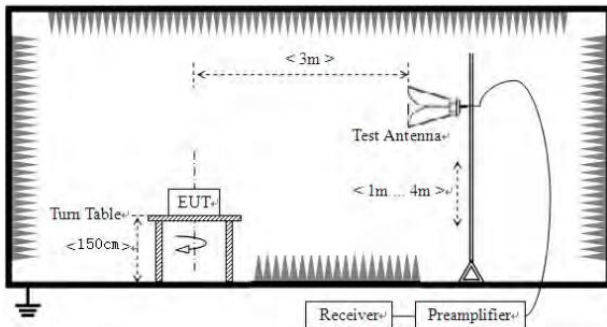


#### 4.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and RSS-247Section 3.3				
Test Method:	ANSI C63.10:2013 & RSS-Gen section 8.9 & Section 8.10				
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:	<div><div>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.</div><div>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.</div></div> <div><div>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.</div><div>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.</div><div>3. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div><div>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.</div></div>					
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**

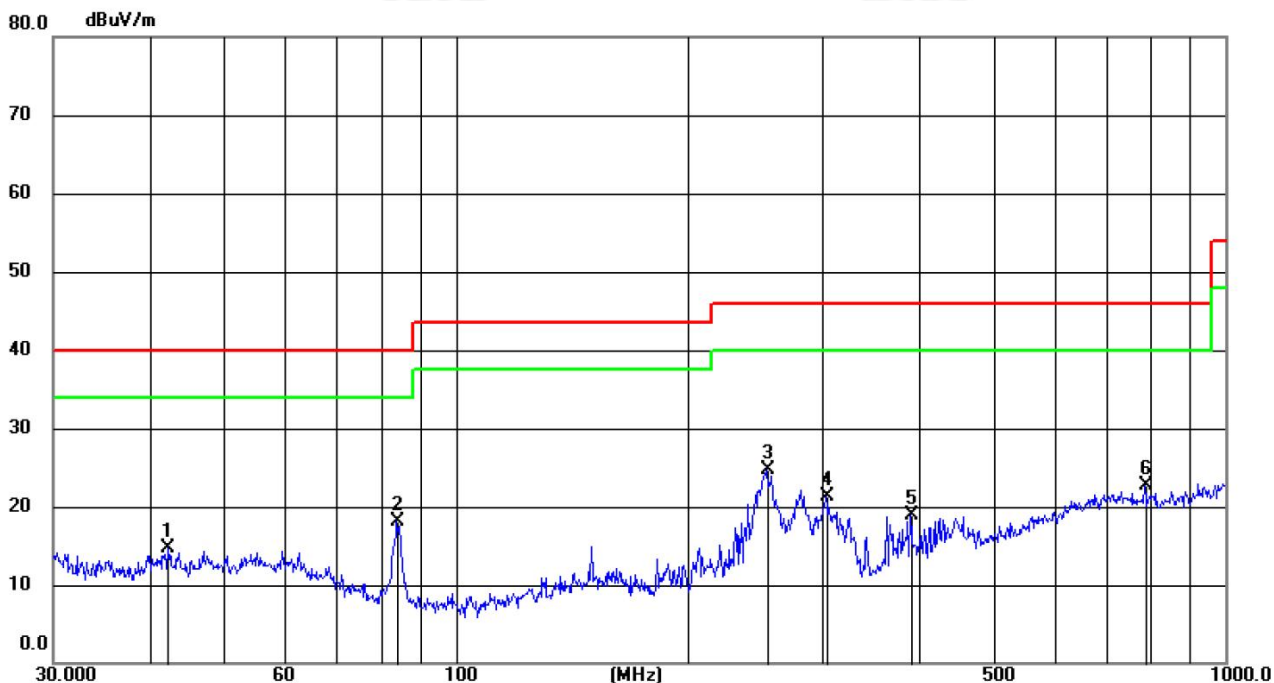
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.



■ Below 1GHz

Temperature:	26 °C	Relative Humidity:	55%
Pressure:	1009hPa	Phase :	Vertical:
Test Voltage :	AC 120V/60Hz	Test Mode:	Transmitting mode

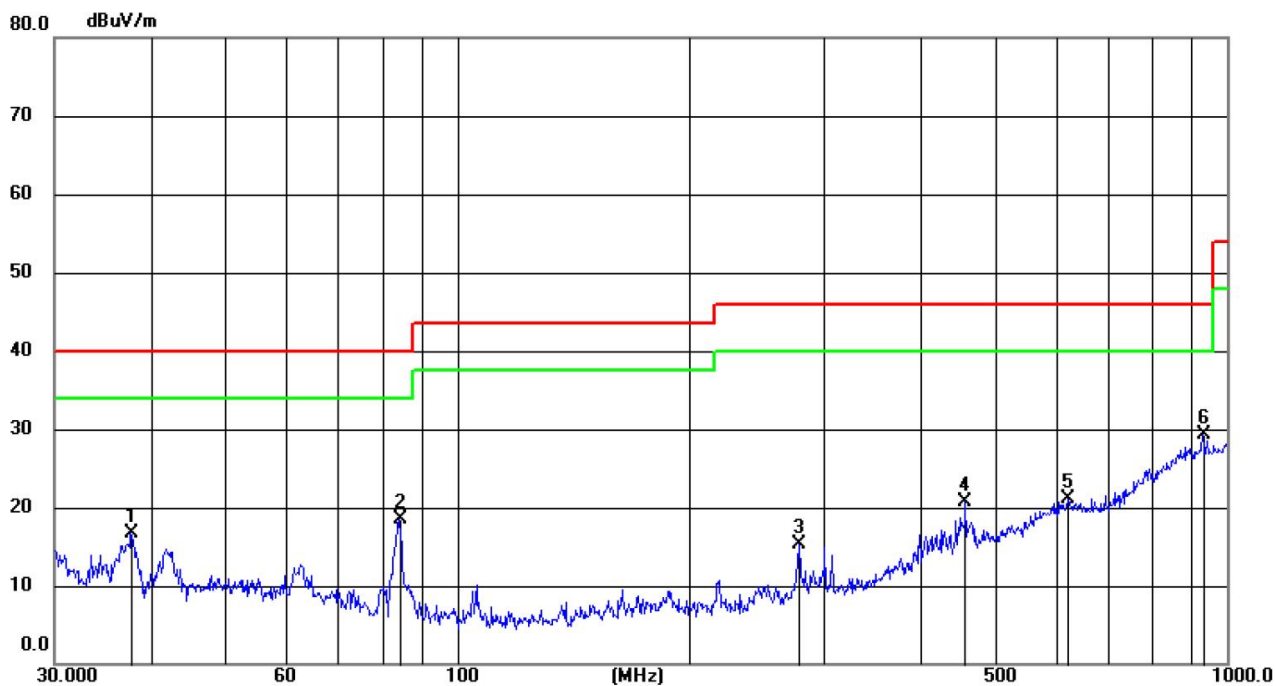
Note: Pre-scan all modes and recorded the worst case results in this report which is QPSK-1.4M BW mode.



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	42.3022	28.91	-14.12	14.79	40.00	-25.21	QP
2	83.8156	37.79	-19.75	18.04	40.00	-21.96	QP
3	253.8367	40.55	-15.78	24.77	46.00	-21.23	QP
4	302.4812	38.18	-16.97	21.21	46.00	-24.79	QP
5	389.3549	35.42	-16.61	18.81	46.00	-27.19	QP
6	785.0935	29.70	-6.92	22.78	46.00	-23.22	QP



Temperature:	26 °C	Relative Humidity:	55%
Pressure:	1009hPa	Phase :	Horizontal:
Test Voltage :	AC 120V/60Hz	Test Mode:	Transmitting mode



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	37.6798	33.99	-17.20	16.79	40.00	-23.21	QP
2	84.1100	40.31	-21.72	18.59	40.00	-21.41	QP
3	278.0668	34.40	-19.01	15.39	46.00	-30.61	QP
4	457.5073	33.65	-13.04	20.61	46.00	-25.39	QP
5	622.8900	28.93	-7.73	21.20	46.00	-24.80	QP
6	929.0082	29.93	-0.58	29.35	46.00	-16.65	QP

Notes:

1. The EUT was test at 3m in field chamber.
2. Final Level =Receiver Read level +Antenna Factor
3. The emission levels of other frequencies are very lower than the limit and not show in test report.



■ Above 1GHz

**Note:**Pre-scan all modes and recorded the worst case results in this report which is QPSK 1.4M mode.

Test channel:	Lowest 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
1808.00	44.87	25.25	4.85	34.08	58.55	74.00	-15.45	Vertical
2712.00	38.05	28.12	5.66	33.68	49.27	74.00	-24.73	Vertical
3616.00	36.31	29.19	7.25	37.37	51.74	74.00	-22.26	Vertical
4520.00	*					74.00		Vertical
5424.00	*					74.00		Vertical
6328.00	*					74.00		Vertical
1808.00	42.32	25.25	4.85	34.08	56.00	74.00	-18.00	Horizontal
2712.00	36.94	28.12	5.66	33.68	48.16	74.00	-25.84	Horizontal
3616.00	34.79	29.19	7.25	37.37	50.22	74.00	-23.78	Horizontal
4520.00	*					74.00		Horizontal
5424.00	*					74.00		Horizontal
6328.00	*					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
1808.00	32.58	25.25	4.85	34.08	46.26	54.00	-7.74	Vertical
2712.00	25.69	28.12	5.66	33.68	36.91	54.00	-37.09	Vertical
3616.00	26.19	29.19	7.25	37.37	41.62	54.00	-12.38	Vertical
4520.00	*					54.00		Vertical
5424.00	*					54.00		Vertical
6328.00	*					54.00		Vertical
1808.00	31.68	25.25	4.85	34.08	45.36	54.00	-8.64	Horizontal
2712.00	25.9	28.12	5.66	33.68	37.12	54.00	-36.88	Horizontal
3616.00	25.33	29.19	7.25	37.37	40.76	54.00	-13.24	Horizontal
4520.00	*					54.00		Horizontal
5424.00	*					54.00		Horizontal
6328.00	*					54.00		Horizontal

**Remarks:**

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





Test channel:

Middle 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
1830.00	42.73	25.43	4.89	34.12	56.31	74.00	-17.69	Vertical
2745.00	38.3	28.34	5.68	33.57	49.21	74.00	-24.79	Vertical
3660.00	36.52	29.42	7.29	37.66	52.05	74.00	-21.95	Vertical
4575.00	*					74.00		Vertical
5490.00	*					74.00		Vertical
6405.00	*					74.00		Vertical
1830.00	43.12	25.43	4.89	34.12	56.70	74.00	-17.30	Horizontal
2745.00	39.21	28.34	5.68	33.57	50.12	74.00	-23.88	Horizontal
3660.00	36.88	29.42	7.29	37.66	52.41	74.00	-21.59	Horizontal
4575.00	*					74.00		Horizontal
5490.00	*					74.00		Horizontal
6405.00	*					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
1830.00	33.5	25.43	4.89	34.12	47.08	54.00	-6.92	Vertical
2745.00	25.68	28.34	5.68	33.57	36.59	54.00	-17.41	Vertical
3660.00	25.85	29.42	7.29	37.66	41.38	54.00	-12.62	Vertical
4575.00	*					54.00		Vertical
5490.00	*					54.00		Vertical
6405.00	*					54.00		Vertical
1830.00	33.19	25.43	4.89	34.12	46.77	54.00	-7.23	Horizontal
2745.00	25.31	28.34	5.68	33.57	36.22	54.00	-17.78	Horizontal
3660.00	26.06	29.42	7.29	37.66	41.59	54.00	-12.41	Horizontal
4575.00	*					54.00		Horizontal
5490.00	*					54.00		Horizontal
6405.00	*					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 too weak, the instrument of signal is unable to test.*



Test channel:	Highest
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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
1852.00	42.73	25.43	4.89	34.12	56.31	74.00	-17.69	Vertical
2778.00	38.3	28.34	5.68	33.57	49.21	74.00	-24.79	Vertical
3704.00	36.52	29.42	7.29	37.66	52.05	74.00	-21.95	Vertical
4630.00	*					74.00		Vertical
5556.00	*					74.00		Vertical
6482.00	*					74.00		Vertical
1852.00	43.12	25.43	4.89	34.12	56.7	74.00	-17.3	Horizontal
2778.00	39.21	28.34	5.68	33.57	50.12	74.00	-23.88	Horizontal
3704.00	36.88	29.42	7.29	37.66	52.41	74.00	-21.59	Horizontal
4630.00	*					74.00		Horizontal
5556.00	*					74.00		Horizontal
6482.00	*					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
1852.00	33.5	25.43	4.89	34.12	47.08	54.00	-6.92	Vertical
2778.00	25.68	28.34	5.68	33.57	36.59	54.00	-17.41	Vertical
3704.00	25.85	29.42	7.29	37.66	41.38	54.00	-12.62	Vertical
4630.00	*					54.00		Vertical
5556.00	*					54.00		Vertical
6482.00	*					54.00		Vertical
1852.00	33.19	25.43	4.89	34.12	46.77	54.00	-7.23	Horizontal
2778.00	25.31	28.34	5.68	33.57	36.22	54.00	-17.78	Horizontal
3704.00	26.06	29.42	7.29	37.66	41.59	54.00	-12.41	Horizontal
4630.00	*					54.00		Horizontal
5556.00	*					54.00		Horizontal
6482.00	*					54.00		Horizontal

**Remarks:**

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



Band Edge:

Note: Note: Pre-scan all modes and recorded the worst case results in this report which is QPSK 1.4M  
Measurement Data

Test channel:

Lowest channel

Quasi-peak :

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
902.00	51.52	22.30	4.87	37.60	41.09	46.00	-4.91	Horizontal
902.00	52.55	22.30	4.87	37.60	42.12	46.00	-3.88	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
902.00	46.21	22.30	4.87	37.60	35.78	46.00	-10.22	Horizontal
902.00	45.92	22.30	4.87	37.60	35.49	46.00	-10.51	Vertical

Test channel:

Highest channel

Quasi-peak:

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
928.00	50.46	22.41	4.96	37.57	40.26	46.00	-5.74	Horizontal
928.00	52.51	22.41	4.96	37.57	42.31	46.00	-3.69	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
928.00	45.92	22.41	4.96	37.57	35.72	46.00	-10.28	Horizontal
928.00	45.01	22.41	4.96	37.57	34.81	46.00	-11.19	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.






#### 4.3 Conducted Average Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3) RSS-247.5.4(4)
Test Method:	ANSI C63.10:2013
Limit:	30dBm
Test setup:	 <pre>graph LR; EUT[EUT] --- SA[SPECTRUM ANALYZER]</pre>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

**Measurement Data** : The detailed test data see Appendix I




#### 4.4 6dB Bandwidth & 99% Occupied Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2) RSS-247.5.1(2)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance v05r02 RSS-Gen.6.7
Limit:	>500KHz for 6dB Bandwidth
Test setup:	 <pre>graph LR; EUT[EUT] --- SA[SPECTRUM ANALYZER]</pre>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

**Measurement Data :** The detailed test data see Appendix I




#### 4.5 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e) and RSS-247 Section 5.2(b)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance v05r02 RSS-247 Section 5.2(b)
Limit:	8dBm/3kHz
Test setup:	 <pre>graph LR; EUT[EUT] --- SA[SPECTRUM ANALYZER]</pre>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

**Measurement Data :** The detailed test data see Appendix I



#### 4.6 Band edges


Test Requirement:	FCC Part15 C Section 15.247 (d) and RSS-247 5.5
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:	 <pre>graph LR; EUT[EUT] --- SA[SPECTRUM ANALYZER]</pre>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

**Measurement Data** : The detailed test data see Appendix I



#### 4.7 Spurious Emission

##### Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d) and RSS-247 5.5
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:	 <pre>graph LR; EUT[EUT] --- SA[SPECTRUM ANALYZER]</pre>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

**Measurement Data :** The detailed test data see Appendix I



#### 4.8. Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203 & RSS-Gen 6.8
<p>The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.</p> <p>For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).</p> <p>When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.</p> <p>The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.</p> <p>For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:</p> <p>This radio transmitter [enter the device's ISCED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.</p> <p>Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.</p> <p>15.203 requirement:</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>15.247(c) (1)(i) requirement:</p> <p>(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</p>	
<b>EUT Antenna:</b>	
<p>The antenna is External antenna, the antennas1 is 2.0dBi, antenna 2 is 3.2dBi reference to the Appendix -EUT PHOTO Internal Photos for details</p>	



## 5. Test Setup Photo

Reference to the appendix **Test Setup Photo** for details.

## 6. EUT Constructional Details

Reference to the appendix External Photos & Internal Photos for details.

\*\*\*\*\* **END OF REPORT** \*\*\*\*\*