



## FCC TEST REPORT

FOR

Man &amp; Machine Inc.

Itscool wireless dual mode

Test Model: ITSC/BTWI/W5 V2

Additional Model No.: ITSC/EUBTWI/W5 V2

Prepared for : Man & Machine Inc.  
Address : 3706 West Street, Landover, MD 20785 USA

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd  
Address : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei,  
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Date of receipt of test sample : October 10, 2024  
Number of tested samples : 2  
Sample No. : A250210031-1, A250210031-2  
Sample number : Prototype  
Date of Test : October 10, 2024 ~ February 20, 2025  
Date of Report : February 21, 2025



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**FCC TEST REPORT****FCC CFR 47 PART 15 C (15.249)****Report Reference No. .... : LCSA01225022EB****Date of Issue..... : February 21, 2025****Testing Laboratory Name ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.****Address..... : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China****Testing Location/ Procedure ..... : Full application of Harmonised standards ■  
Partial application of Harmonised standards □  
Other standard testing method □****Applicant's Name ..... : Man & Machine Inc.****Address..... : 3706 West Street, Landover, MD 20785 USA****Test Specification****Standard ..... : FCC CFR 47 PART 15 C(15.249) / ANSI C63.10: 2013****Test Report Form No..... : TRF-4-E-189 A/0****TRF Originator..... : Shenzhen LCS Compliance Testing Laboratory Ltd.****Master TRF ..... : Dated 2011-03****Shenzhen LCS Compliance Testing Laboratory Ltd. All rights reserved.**

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**Test Item Description..... : Itscool wireless dual mode****Trade Mark ..... : N/A****Test Model ..... : ITSC/BTWI/W5 V2****Ratings..... : Input: DC 5V  
DC 3.7V by Rechargeable Li-ion Battery, 250mAh****Result ..... : Positive****Compiled by:**

Jack Liu/Administrator

**Supervised by:**

Cary Luo/ Technique principal

**Approved by:**

Gavin Liang/ Manager



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**FCC -- TEST REPORT****Test Report No. : LCSA01225022EB**February 21, 2025

Date of issue

Test Model.....	: ITSC/BTWI/W5 V2
EUT.....	: Itscool wireless dual mode
<b>Applicant.....</b>	<b>: Man &amp; Machine Inc.</b>
Address.....	: 3706 West Street, Landover, MD 20785 USA
Telephone.....	: /
Fax.....	: /
<b>Manufacturer.....</b>	<b>: DONGGUAN NEWMEN ELECTRONICS TECHNOLOGY CO.,LTD</b>
Address.....	: No.5 Xifa Road, Lin Village, Tangxia Town, Dongguan City, Guangdong Province 523710, P.R.China
Telephone.....	: /
Fax.....	: /
<b>Factory.....</b>	<b>: DONGGUAN NEWMEN ELECTRONICS TECHNOLOGY CO.,LTD</b>
Address.....	: No.5 Xifa Road, Lin Village, Tangxia Town, Dongguan City, Guangdong Province 523710, P.R.China
Telephone.....	: /
Fax.....	: /

**Test Result****Positive**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



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## Revision History

Report Version	Issue Date	Revision Content	Revised By
000	February 21, 2025	Initial Issue	--
At the customer's request, the revised report was submitted to LCSA01225022EB applicant by quoting the test data of LCSA10094108EB original report. The Product PCB has changed, and the AC Power line conducted emissions and Radiation parts were re-tested.			





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## 1. GENERAL INFORMATION

### 1.1 Description of Device (EUT)

EUT	: Itscool wireless dual mode
Test Model	: ITSC/BTWI/W5 V2
Additional Model No.	: ITSC/EUBTWI/W5 V2
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Ratings	: Input: DC 5V DC 3.7V by Rechargeable Li-ion Battery, 250mAh
Hardware Version	: V1.1
Software Version	: V1.1
Bluetooth	:
Frequency Range	: 2402MHz~2480MHz
Channel Number	: 40 channels for Bluetooth V5.2 (DTS)
Channel Spacing	: 2MHz for Bluetooth V5.2 (DTS)
Modulation Type	: GFSK for Bluetooth V5.2 (DTS)
Bluetooth Version	: V5.2
Antenna Description	: PCB Antenna, 2.5dBi(Max.)
2.4G	:
Frequency Range	: 2403MHz-2480MHz (2403, 2407, 2414, 2419, 2422, 2426, 2436, 2439, 2441, 2445, 2453, 2459, 2463, 2466, 2473, 2480 (Unit: MHz) )
Channel Number	: 16 channels
Modulation Type	: GFSK
Antenna Description	: PCB Antenna, 2.5dBi(Max.)





## 1.2. Support Equipment List

Manufacturer	Description	Model	Serial Number	Certificate
SHENZHEN TIANYIN ELECTRONICS CO., LTD	Power Adapter	TPA-46050200 UU	---	FCC

Note: The adapter is supplied by lab and only use tested.

## 1.3. External I/O

I/O Port Description	Quantity	Cable
Power Port	1	N/A

## 1.4. Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

Test Firm Registration Number: 254912.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

## 1.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.







## 1.6. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Radiation Uncertainty :	9KHz~30MHz	±3.10dB	(1)
	30MHz~200MHz	±2.96dB	(1)
	200MHz~1000MHz	±3.10dB	(1)
	1GHz~26.5GHz	±3.80dB	(1)
	26.5GHz~40GHz	±3.90dB	(1)
Conduction Uncertainty :	150kHz~30MHz	±1.63dB	(1)
Power disturbance :	30MHz~300MHz	±1.60dB	(1)
Occupied Channel Bandwidth :	1GHz-40GHz	±5%	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 1.7. Description of Test Modes

Operates in the unlicensed ISM Band at 2.4GHz. With basic data rate feature, the data rates can be up to 1 Mb/s by modulating the RF carrier using GFSK techniques. The EUT works in the X-axis, Y-axis, Z-axis. The following operating modes were applied for the related test items. All test modes were tested, only the result of the worst case was recorded in the report.

Mode of Operations	Channel	Frequency Range (MHz)
GFSK	1	2403
	9	2441
	16	2480
For Radiated Emission		
Test Mode	TX Mode	

Worst-case mode and channel used for 9 KHz-1000 MHz radiated emissions was the mode and channel with the highest output power, that was determined to be TX.

Channel List:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2403	9	2441
2	2407	10	2445
3	2414	11	2453
4	2419	12	2459
5	2422	13	2463
6	2426	14	2466
7	2436	15	2473
8	2439	16	2480







## 2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10: 2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen LCS Compliance Testing Laboratory Ltd.

### 2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

### 2.2. EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209 and 15.249 under the FCC Rules Part 15 Subpart C.

### 2.3. General Test Procedures

#### 2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

#### 2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz and 1.5 m above ground plane above 1GHz. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10-2013





### 3. CONNECTION DIAGRAM OF TEST SYSTEM

#### 3.1. Justification

The system was configured for testing in a continuous transmit condition. Continuous transmitting was pre-programmed. It'll keep transmitting with modulated signal at the lowest channel by installing the batter. When press the "up" button, it'll move to the next channel. Repeat press "up" button, it'll transmitting at each of the channel used.

#### 3.2. EUT Exercise Software

Press the corresponding button, and change the channel.

#### 3.3. Special Accessories

N/A

#### 3.4. Block Diagram/Schematics

Please refer to the related document

#### 3.5. Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

#### 3.6. Test Setup

Please refer to the test setup photo.





#### 4. SUMMARY OF TEST RESULTS

Applied Standard: FCC Part 15 Subpart C §15.249		
FCC Rules	Description Of Test	Result
§15.207(a)	Power Line Conducted Emissions	Compliant
§15.205(a), §15.209(a), §15.249(a), §15.249(c)	Radiated Emissions Measurement	Compliant
§15.249 (d)	Band Edges Measurement	Compliant

Remark:

N/A\* - Not Applicable for this device!!!



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## 5. POWER LINE CONDUCTED EMISSIONS

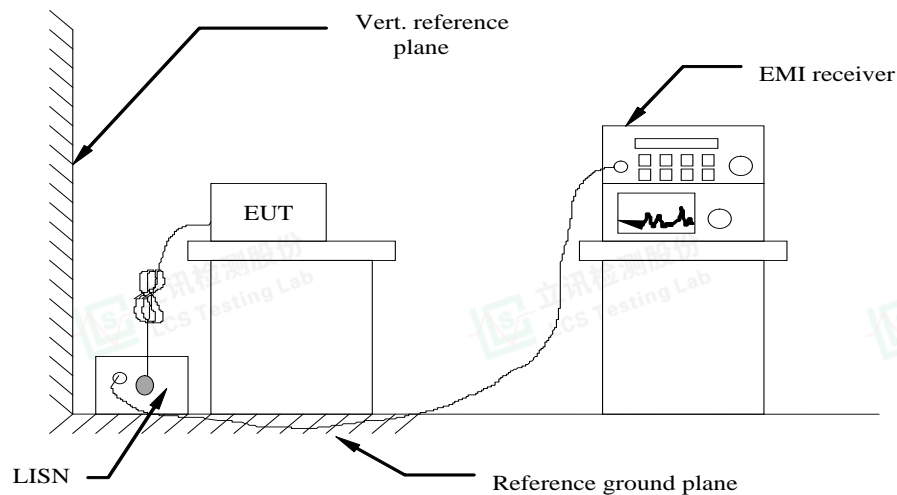
### 5.1. Standard Applicable

According to §15.207 (a) & RSS-Gen § 8.8: For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

\* Decreasing linearly with the logarithm of the frequency

### 5.2. Block Diagram of Test Setup



### 5.3. Test Results

The AC mains conducted disturbance is calculated by adding the 10dB Pulse Limiter and Cable Factor and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$CD \text{ (dB}\mu\text{V)} = RA \text{ (dB}\mu\text{V)} + PL \text{ (dB)} + CL \text{ (dB)}$$

Where CD = Conducted Disturbance	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	PL = 10 dB Pulse Limiter Factor

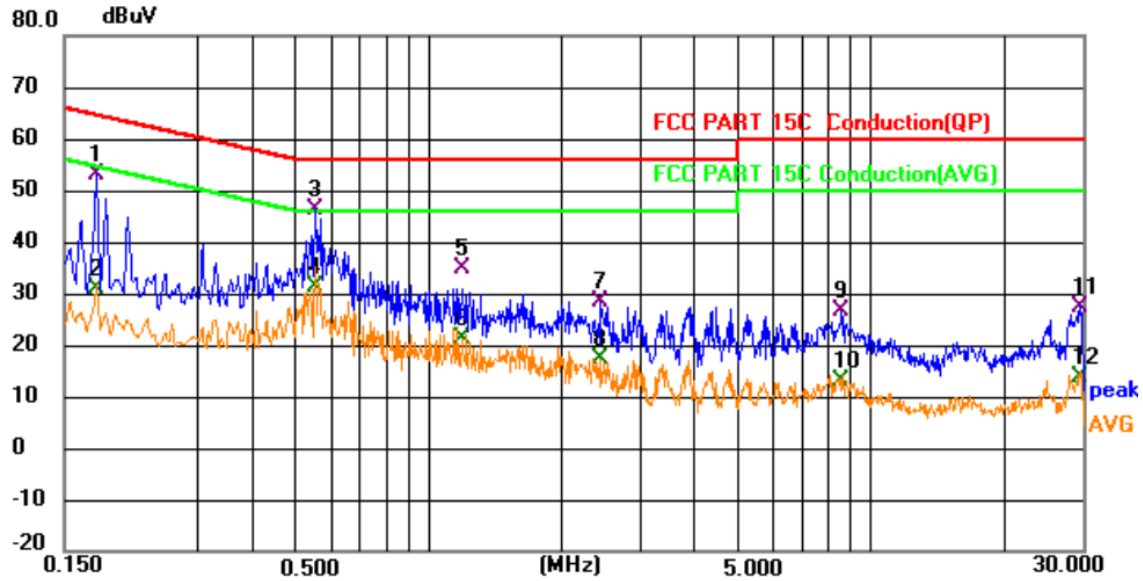
### 5.4. Test Results

Temperature	22.5°C	Humidity	53.7%
Test Engineer	Jay Luo		





Line

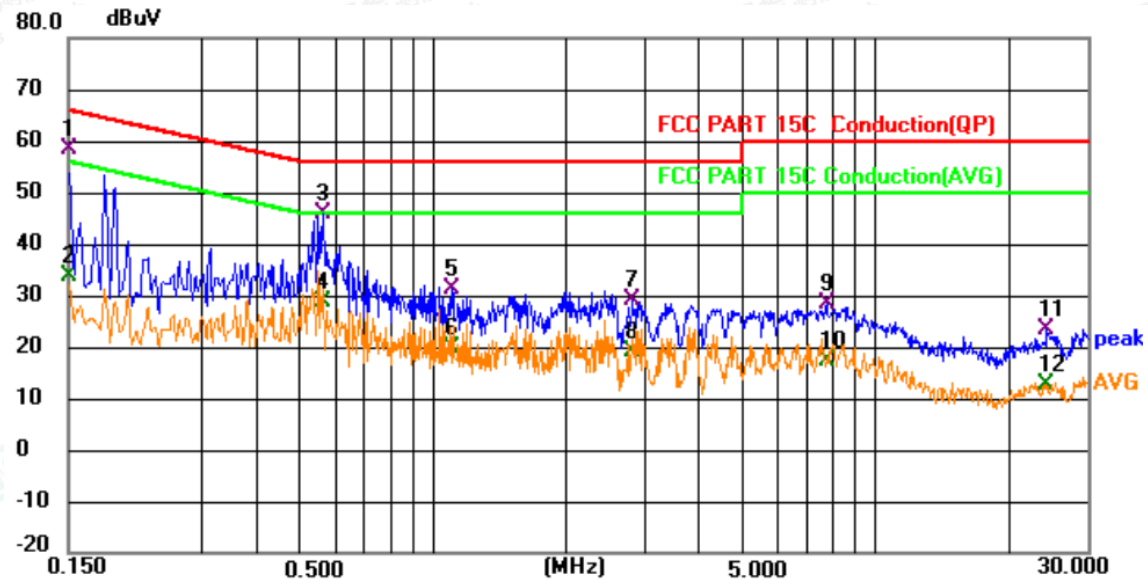


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.177	33.37	19.76	53.13	64.63	-11.50	QP	
2		0.177	11.28	19.76	31.04	54.63	-23.59	AVG	
3	*	0.555	26.56	19.67	46.23	56.00	-9.77	QP	
4		0.555	11.53	19.67	31.20	46.00	-14.80	AVG	
5		1.185	15.57	19.11	34.68	56.00	-21.32	QP	
6		1.185	2.10	19.11	21.21	46.00	-24.79	AVG	
7		2.450	9.25	19.07	28.32	56.00	-27.68	QP	
8		2.450	-1.69	19.07	17.38	46.00	-28.62	AVG	
9		8.574	6.93	19.64	26.57	60.00	-33.43	QP	
10		8.574	-6.69	19.64	12.95	50.00	-37.05	AVG	
11		29.706	8.36	19.14	27.50	60.00	-32.50	QP	
12		29.706	-5.50	19.14	13.64	50.00	-36.36	AVG	





Neutral



No.	Mk.	Freq.	Reading	Correct	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.150	38.71	19.59	58.30	66.00	-7.70	QP	
2		0.150	14.05	19.59	33.64	56.00	-22.36	AVG	
3		0.564	26.50	19.42	45.92	56.00	-10.08	QP	
4		0.564	9.42	19.42	28.84	46.00	-17.16	AVG	
5		1.109	12.33	18.83	31.16	56.00	-24.84	QP	
6		1.109	1.02	18.83	19.85	46.00	-26.15	AVG	
7		2.832	10.09	19.02	29.11	56.00	-26.89	QP	
8		2.832	0.25	19.02	19.27	46.00	-26.73	AVG	
9		7.728	8.46	19.85	28.31	60.00	-31.69	QP	
10		7.728	-2.40	19.85	17.45	50.00	-32.55	AVG	
11		24.302	4.23	19.31	23.54	60.00	-36.46	QP	
12		24.302	-6.59	19.31	12.72	50.00	-37.28	AVG	

\*\*\*Note: Pre-scan all modes and recorded the worst case results in this report.  
Measurement= Reading + Correct Factor, Margin = Measurement – Limit.  
Correct Factor=Lisn Factor+Cable Factor+Insertion loss of Pulse Limiter







## 6. RADIATED EMISSION MEASUREMENT

### 6.1. Standard Applicable

According to FCC § 15.249: Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) and 15.249 limit in the table below has to be followed.

Fundamental Frequency	Field Strength of fundamental (millivolts/meter)	Field Strength of harmonics (microvolts/meter)
902-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

According to RSS-210 B.10:

The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively.

The field strength limits shall be measured using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using an International Special Committee on Radio Interference (CISPR) quasi-peak detector.

Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

### 6.2. Instruments Setting

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10 <sup>th</sup> carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average



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Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

### 6.3. Test Procedure

#### 1) Sequence of testing 9 kHz to 30 MHz

##### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

##### Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1.0 meter.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

##### Final measurement:

- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).
- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.





## 2) Sequence of testing 30 MHz to 1 GHz

### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

### Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 to 3 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

### Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ( $\pm 45^\circ$ ) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP detector with an EMI receiver.
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.





### 3) Sequence of testing 1 GHz to 18 GHz

#### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

#### Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 2.5 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

#### Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ( $\pm 45^\circ$ ) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.





#### 4) Sequence of testing above 18 GHz

##### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 1 meter.
- The EUT was set into operation.

##### Premeasurement:

- The antenna is moved spherical over the EUT in different polarizations of the antenna.

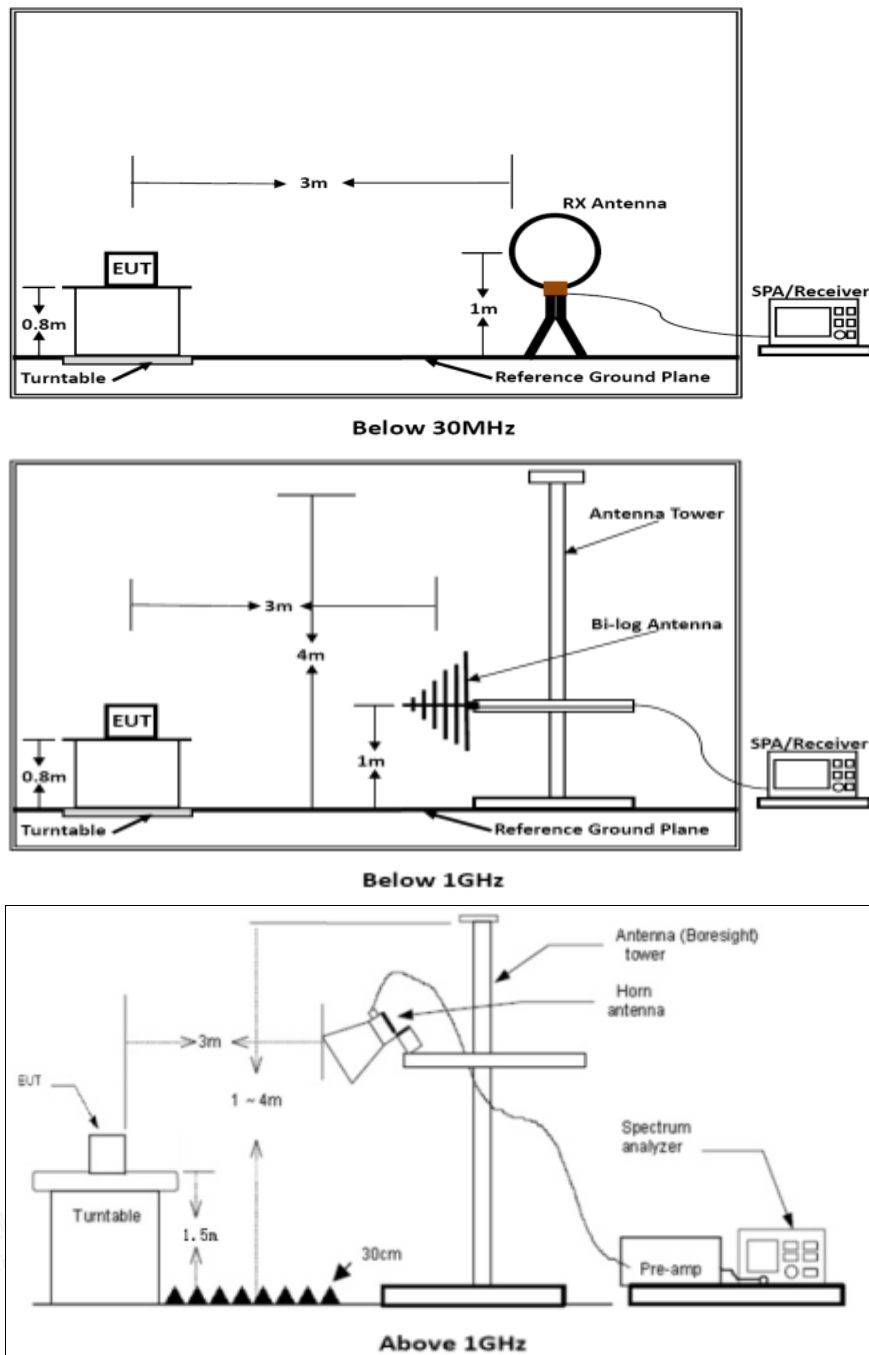
##### Final measurement:

- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.





#### 6.4. Block Diagram of Test Setup



Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

#### 6.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.





## 6.6. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS \text{ (dBuV/m)} = RA \text{ (dBuV)} + AF \text{ (dB/m)} + CL \text{ (dB)} - AG \text{ (dB)}$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

## 6.7. Test Results of Radiated Emissions (9 KHz~30 MHz)

Temperature	23.8℃	Humidity	52.1%
Test Engineer	Jay Luo		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

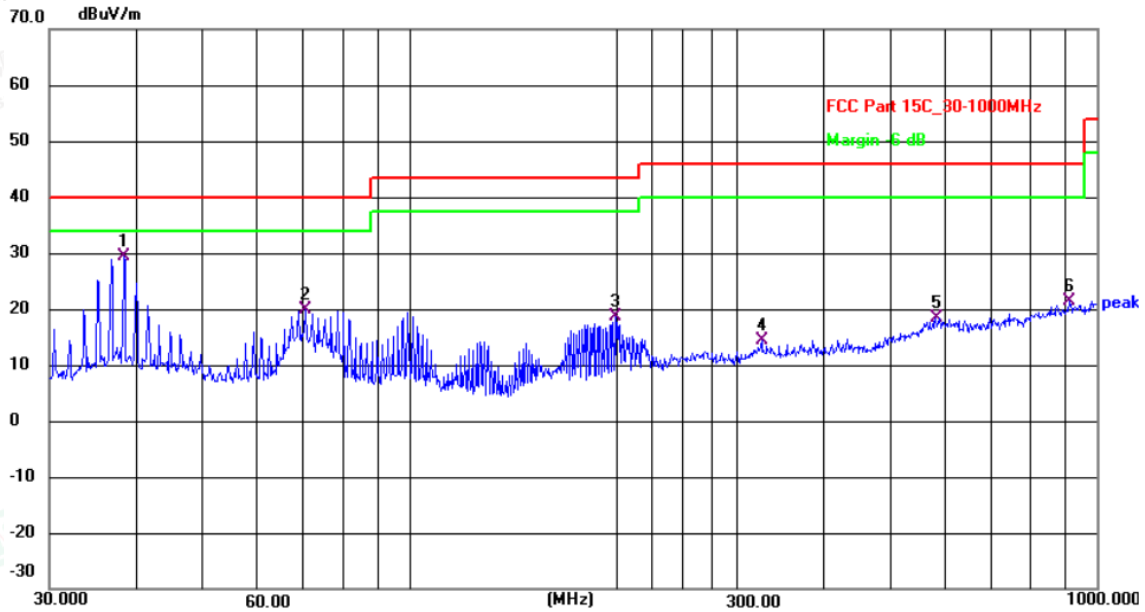
## 6.8. Test Results of Radiated Emissions (30 MHz – 1000 MHz)

Temperature	23.8℃	Humidity	52.1%
Test Engineer	Jay Luo		





Vertical



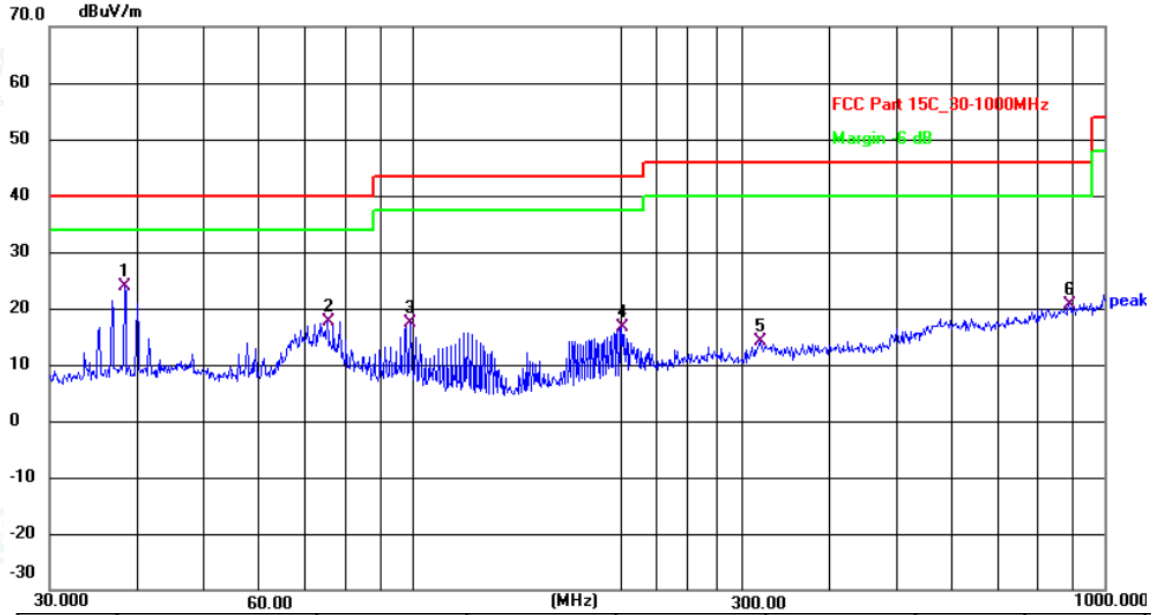
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.4809	47.09	-17.62	29.47	40.00	-10.53	QP
2	70.5836	39.33	-19.49	19.84	40.00	-20.16	QP
3	199.2855	36.14	-17.45	18.69	43.50	-24.81	QP
4	325.5958	28.69	-14.21	14.48	46.00	-31.52	QP
5	582.7425	29.09	-10.73	18.36	46.00	-27.64	QP
6	912.8620	29.53	-8.12	21.41	46.00	-24.59	QP







## Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.4809	40.95	-17.13	23.82	40.00	-16.18	QP
2	75.4464	37.18	-19.56	17.62	40.00	-22.38	QP
3	99.5281	34.91	-17.58	17.33	43.50	-26.17	QP
4	200.6881	35.00	-18.47	16.53	43.50	-26.97	QP
5	318.8170	29.53	-15.37	14.16	46.00	-31.84	QP
6	887.6099	28.51	-7.99	20.52	46.00	-25.48	QP

## Note:

- 1). Pre-scan all modes and recorded the worst case results in this report.
- 2). Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3). Level = Reading + Factor, Margin = Level – Limit,  
Factor = Antenna Factor + Cable Loss - Preamp Factor





## 6.9. Results for Radiated Emissions (1 – 26 GHz)

Field Strength of Fundamental (TX-2403 MHz)					
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2403	H	87.14	114	94	Pass
2403	V	85.13	114	94	Pass

## Channel 1 / 2403 MHz

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4806.00	54.34	33.06	35.04	3.94	56.30	74.00	-17.70	Peak	Horizontal
4806.00	42.61	33.06	35.04	3.94	44.57	54.00	-9.43	Average	Horizontal
4806.00	56.75	33.06	35.04	3.94	58.71	74.00	-15.29	Peak	Vertical
4806.00	43.86	33.06	35.04	3.94	45.82	54.00	-8.18	Average	Vertical

Field Strength of Fundamental (TX-2441 MHz)					
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2441	H	86.12	114	94	Pass
2441	V	85.21	114	94	Pass

## Channel 9/ 2441 MHz

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4882.00	55.40	33.16	35.15	3.96	57.37	74.00	-16.63	Peak	Horizontal
4882.00	43.23	33.16	35.15	3.96	45.20	54.00	-8.80	Average	Horizontal
4882.00	60.08	33.16	35.15	3.96	62.05	74.00	-11.95	Peak	Vertical
4882.00	44.62	33.16	35.15	3.96	46.59	54.00	-7.41	Average	Vertical

Field Strength of Fundamental (TX-2480 MHz)					
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2480	H	85.04	114	94	Pass
2480	V	84.59	114	94	Pass

## Channel 16/ 2480 MHz

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4960.00	59.90	33.26	35.14	3.98	62.00	74.00	-12.00	Peak	Horizontal
4960.00	43.44	33.26	35.14	3.98	45.54	54.00	-8.46	Average	Horizontal
4960.00	52.99	33.26	35.14	3.98	55.09	74.00	-18.91	Peak	Vertical
4960.00	44.78	33.26	35.14	3.98	46.88	54.00	-7.12	Average	Vertical

## Notes:

- 1). Measuring frequencies from 9 KHz - 10<sup>th</sup> harmonic (ex. 26GHz), at least have 20dB margin found between lowest internal used/generated frequency to 30 MHz.
- 2). Radiated emissions measured in frequency range from 9 KHz - 10<sup>th</sup> harmonic (ex. 26GHz) were made with an instrument using Peak detector mode.
- 3). 18~25 GHz at least have 20dB margin. No recording in the test report.
- 4). Measured Level = Reading Level + Factor, Margin = Measured Level – Limit, Factor = Antenna Factor + Cable Loss - Preamp Factor



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Scan code to check authenticity

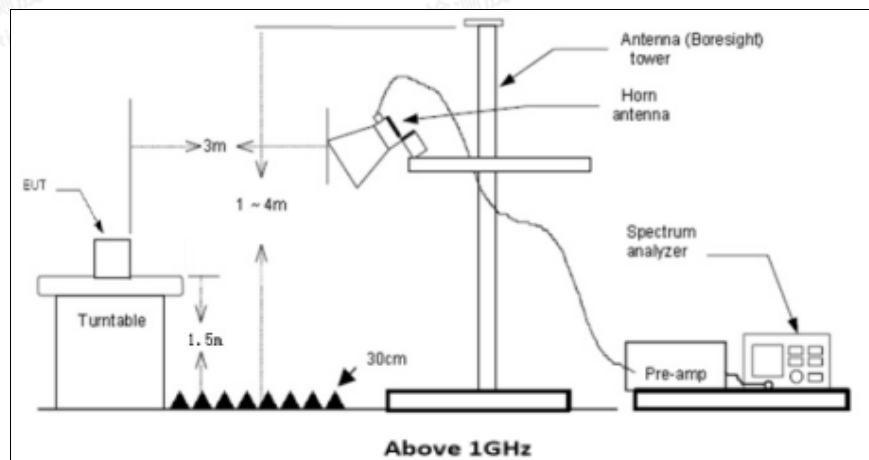
## 7. RESULTS FOR BAND EDGE TESTING

### 7.1. Standard Applicable

According to FCC §15.249 (d): Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

According to RSS-210 B.10 (b): Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

### 7.2. Test Setup Layout



### 7.3. Measuring Instruments and Setting

Please refer to equipment list in this report. The following table is the setting of Spectrum Analyzer.

### 7.4. Test Procedures

#### 3) Sequence of testing 1 GHz to 18 GHz

##### Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.



**Premeasurement:**

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 2.5 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

**Final measurement:**

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ( $\pm 45^\circ$ ) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

**7.5. Measuring Instruments and Setting**

Temperature	23.5°C	Humidity	52.1%
Test Engineer	Jay Luo		

PASS

**Remark:**

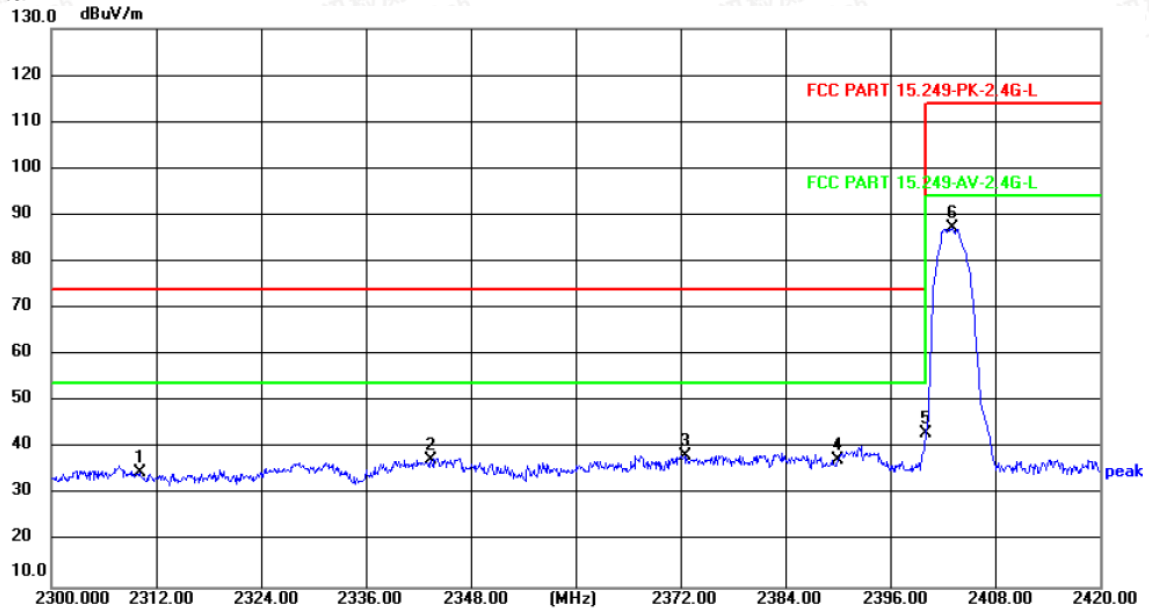
1. The other emission levels were very low against the limit.
2. The average measurement was not performed when the peak measured data under the limit of average detection.
3. Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=330Hz/Sweep time=Auto/Detector=Peak;
4. Please refer to following test plots;





Channel 1 / 2403 MHz

Horizontal



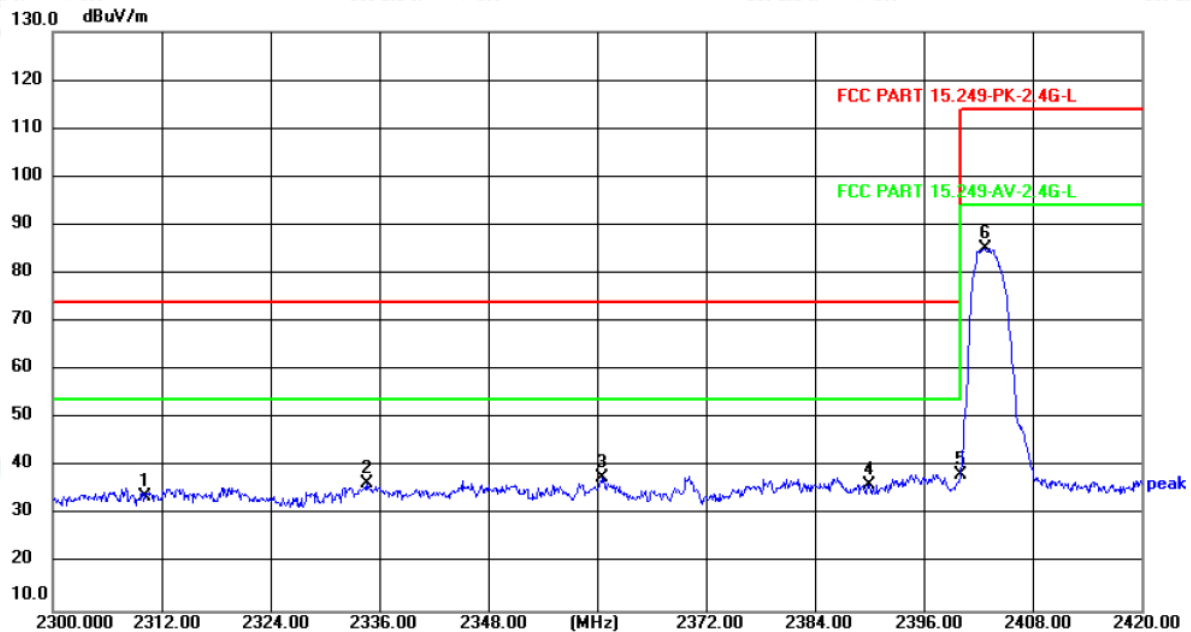
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2310.000	45.12	-10.42	34.70	74.00	-39.30	peak
2	2343.440	48.12	-10.58	37.54	74.00	-36.46	peak
3	2372.480	49.12	-10.77	38.35	74.00	-35.65	peak
4	2390.000	48.27	-10.89	37.38	74.00	-36.62	peak
5	2400.000	54.13	-10.96	43.17	74.00	-30.83	peak
6	2403.080	98.08	-10.94	87.14	114.00	-26.86	peak





Channel 1 / 2403 MHz

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2310.000	45.87	-12.02	33.85	74.00	-40.15	peak
2	2334.560	48.45	-11.93	36.52	74.00	-37.48	peak
3	2360.600	49.55	-11.83	37.72	74.00	-36.28	peak
4	2390.000	47.88	-11.73	36.15	74.00	-37.85	peak
5	2400.000	50.05	-11.70	38.35	74.00	-35.65	peak
6	2402.720	96.82	-11.69	85.13	114.00	-28.87	peak

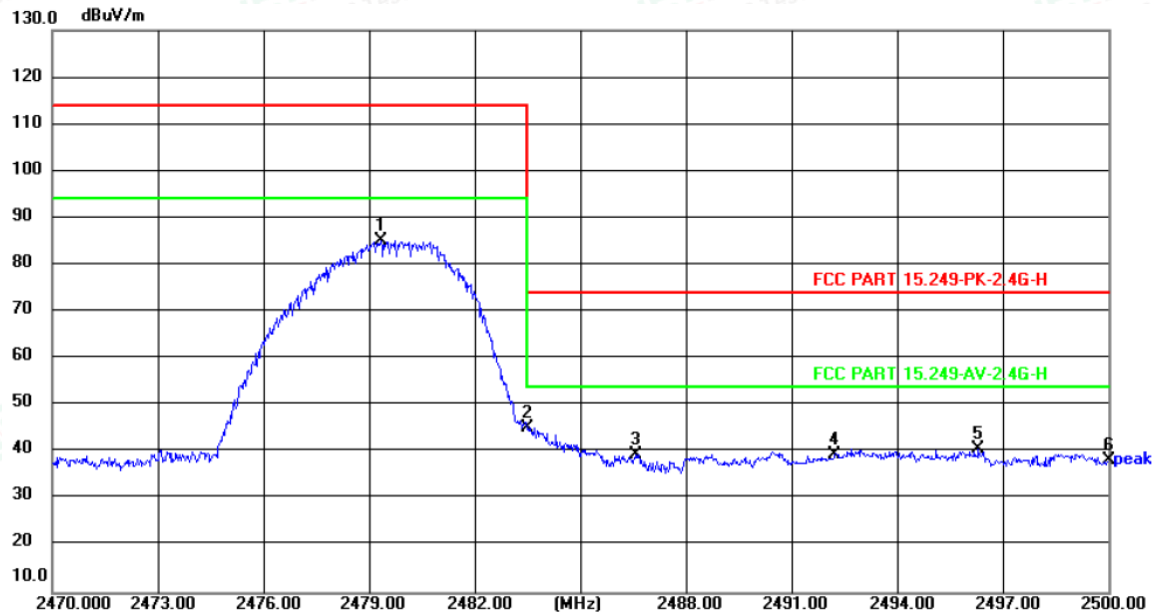






Channel 16/2480 MHz

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2479.330	96.46	-11.42	85.04	114.00	-28.96	peak
2	2483.500	56.75	-11.40	45.35	74.00	-28.65	peak
3	2486.590	50.94	-11.39	39.55	74.00	-34.45	peak
4	2492.230	50.84	-11.37	39.47	74.00	-34.53	peak
5	2496.310	51.98	-11.36	40.62	74.00	-33.38	peak
6	2500.000	49.76	-11.34	38.42	74.00	-35.58	peak

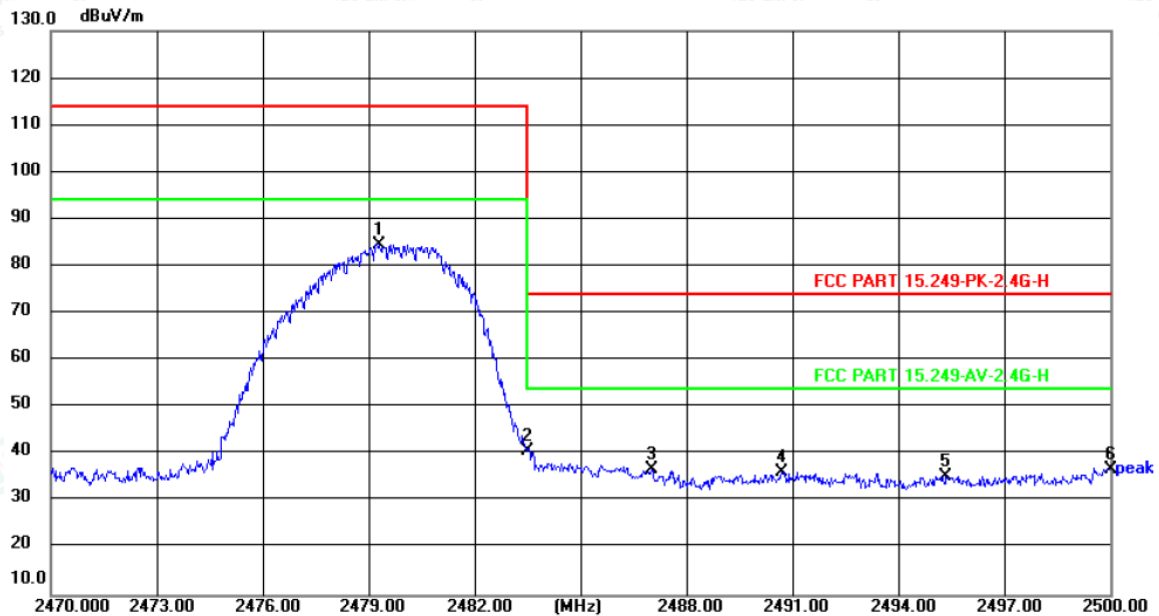






Channel 16/2480 MHz

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2479.300	95.51	-10.92	84.59	114.00	-29.41	peak
2	2483.500	51.73	-10.96	40.77	74.00	-33.23	peak
3	2487.010	47.93	-11.00	36.93	74.00	-37.07	peak
4	2490.700	47.33	-11.04	36.29	74.00	-37.71	peak
5	2495.350	46.34	-11.09	35.25	74.00	-38.75	peak
6	2500.000	47.98	-11.14	36.84	74.00	-37.16	peak

Note: Due to the measure PK emission level less than the AV limit value. No necessary to take down the AV emission level.





## 8. LIST OF MEASURING EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2024-10-08	2025-10-07
2	DC Power Supply	Agilent	E3642A	N/A	2024-10-08	2025-10-07
3	Temperature & Humidity Chamber	Baro	/	/	2024-06-12	2025-06-11
4	EMI Test Software	AUDIX	E3	/	N/A	N/A
5	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2024-06-06	2025-06-05
6	Positioning Controller	Max-Full	MF7802BS	MF780208586	N/A	N/A
7	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2024-07-13	2027-07-12
8	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2024-08-03	2027-08-02
9	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2024-07-13	2027-07-12
10	EMI Test Receiver	R&S	ESR 7	101181	2024-06-06	2025-06-05
11	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2024-06-06	2025-06-05
12	Low-frequency amplifier	SchwarzZBECK	BBV9745	00253	2024-10-08	2025-10-07
13	High-frequency amplifier	JS Denki Pte	PA0118-43	JSPA21009	2024-10-08	2025-10-07
14	EMI Test Receiver	R&S	ESPI	101940	2024-06-06	2025-06-05
15	Artificial Mains	R&S	ENV216	101288	2024-06-06	2025-06-05
16	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2024-06-06	2025-06-05
17	EMI Test Software	Farad	EZ	/	N/A	N/A
18	Antenna Mast	Max-Full	MFA-515BSN	1308572	N/A	N/A
19	Pulse Limiter	R&S	ESH3-Z2	102750-NB	2024-06-06	2025-06-05
20	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2024-07-13	2027-07-12
21	Broadband Preamplifier	SCHWARZBECK	BBV9719	9719-025	2024-07-30	2025-07-29



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## 9. TEST SETUP PHOTOGRAPHS OF THE EUT

Please refer to separated files for Test Setup Photos of the EUT.

## 10. EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

## 11. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

-----THE END OF REPORT-----



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