



# MEASUREMENT REPORT

## FCC PART 15.249

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**FCC ID:** SVNITARD024SAST


**APPLICANT:** Zhejiang Dahua Vision Technology Co., Ltd

**Application Type:** Certification

**Product:** Narrow Wave Tablet Radar

**Model No.:** DHI-ITARD-024SA-ST

**Serial Model No.:** ITARD-024SA-ST

**Brand Name:** 

**FCC Classification:** Part 15 Low Power Communication Device Transmitter (DXX)

**FCC Rule Part(s):** FCC Part 15C (Section 15.249)

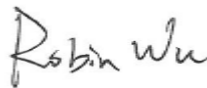
**Test Procedure(s):** ANSI C63.10-2013

**Test Date:** April 01 ~ July 21, 2020

Reviewed By:

  
( Kevin Guo )

Approved By:

  
( Robin Wu )



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

## Revision History

Report No.	Version	Description	Issue Date	Note
2001RSU035-U1	Rev. 01	Initial Report	07-21-2020	Valid

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## General Information

<b>Applicant:</b>	Zhejiang Dahua Vision Technology Co., Ltd
<b>Applicant Address:</b>	No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China
<b>Manufacturer:</b>	Zhejiang Dahua Vision Technology Co., Ltd
<b>Manufacturer Address:</b>	No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China
<b>Test Site:</b>	MRT Technology (Suzhou) Co., Ltd
<b>Test Site Address:</b>	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
<b>Test Device Serial No.:</b>	<input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering

## Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Designation No. CN1166) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications, Radio and SAR testing.



## 1. INTRODUCTION

### 1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada and Certification and Engineering Bureau.


### 1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



## 2. PRODUCT INFORMATION

### 2.1. Equipment Description

Product Name:	Narrow Wave Tablet Radar
Model No.:	DHI-ITARD-024SA-ST
Serial Model No.:	ITARD-024SA-ST
Brand Name:	
Transmitting Frequency	24.15GHz
Modulation Type	FMCW

### 2.2. Test Configuration

The EUT was tested as described in this report is in compliance with the requirements limits of FCC Rules Part 15.207, 15.209, 15.215 and 15.249. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

### 2.3. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

### 2.4. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase.

However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

### **3. DESCRIPTION of TEST**

#### **3.1. Evaluation Procedure**

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the requirement provided in FCC 15.207, 15.209, 15.215 and 15.249 were used in the measurement of the EUT.

#### **3.2. AC Line Conducted Emissions**

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50 $\Omega$ /50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.



### **3.3. Radiated Emissions**

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

## 4. ANTENNA REQUIREMENTS

### **Excerpt from §15.203 of the FCC Rules/Regulations:**

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 shall be considered sufficient to comply with the provisions of this section.”

- The antenna of the unit is **permanently attached**.
- There are no provisions for connection to an external antenna.

### **Conclusion:**

The unit complies with the requirement of §15.203.

## 5. TEST EQUIPMENT CALIBRATION DATE

### Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2021/01/18
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2021/06/11
Thermal Hygrometer	testo	608-H1	MRTSUE06404	1 year	2020/08/08
Shielding Room	MIX-BEP	Chamber-SR2	MRTSUE06215	N/A	N/A

### Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7 (9kHz~7GHz)	MRTSUE06001	1 year	2021/01/18
PXA Signal Analyzer	Keysight	N9030B (3Hz-50GHz)	MRTSUE06395	1 year	2020/09/03
Loop Antenna	Schwarzbeck	FMZB 1519 (9KHz~30MHz)	MRTSUE06025	1 year	2020/11/13
Bilog Period Antenna	Schwarzbeck	VULB 9168 (30~1000MHz)	MRTSUE06172	1 year	2021/04/03
Horn Antenna	Schwarzbeck	BBHA 9120D (1~18GHz)	MRTSUE06023	1 year	2020/10/13
Horn Antenna	Schwarzbeck	BBHA9170 (15~40GHz)	MRTSUE06597	1 year	2020/12/17
Micro-Wave Antenna	MI-WWAVE	261U-25 (40-60GHz)	MRTSUE06273	5 year	2021/12/26
Standard Gain Horn Antenna	A-INFOMW	LB-15-25-A (50~75GHz)	MRTSUE06409	5 year	2022/11/16
Standard Gain Horn Antenna	A-INFOMW	LB-10-25-A (75~110GHz)	MRTSUE06410	5 year	2022/11/16
Waveguide Harmonic Mixer	Keysight	M1970V (50~75GHz)	MRTSUE06271	5 year	2022/01/17
Waveguide Harmonic Mixer	Keysight	M1970W (75~110GHz)	MRTSUE06272	5 year	2021/12/07
Coaxial transmission line	Times Microwave Systems	SLU18-SMSM-01.00M (Serial #94197(TMC))	N/A	5 year	2022/01/17
Coaxial transmission line	Times Microwave Systems	SLU18-SMSM-01.00M (Serial #94198(TMC))	N/A	5 year	2021/12/07
Coaxial transmission line	UCWAVE	SPT67-1.85M1.85M-1.0M	N/A	5 year	2021/12/26
Microwave System Amplifier	Agilent	83017A (0.5~26.5GHz)	MRTSUE06076	1 year	2020/11/15
Preamplifier	Schwarzbeck	BBV 9721 (18~40GHz)	MRTSUE06121	1 year	2020/06/11
Thermohygrometer	Testo	608-H1	MRTSUE06403	1 year	2020/08/08
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2021/04/30

## Radiated Emission - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Keysight	N9038A (20Hz~26.5GHz)	MRTSUE06125	1 year	2020/08/01
PXA Signal Analyzer	Keysight	N9030B (3Hz-50GHz)	MRTSUE06395	1 year	2020/09/03
Loop Antenna	Schwarzbeck	FMZB 1519 (9KHz~30MHz)	MRTSUE06025	1 year	2020/11/13
Bilog Period Antenna	Schwarzbeck	VULB 9162 (30MHz~7GHz)	MRTSUE06022	1 year	2020/10/13
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D (1~18GHz)	MRTSUE06171	1 year	2020/10/27
Horn Antenna	Schwarzbeck	BBHA9170 (15~40GHz)	MRTSUE06597	1 year	2020/12/17
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718 (1~18GHz)	MRTSUE06176	1 year	2020/11/15
Preamplifier	Schwarzbeck	BBV 9721 (18~40GHz)	MRTSUE06121	1 year	2020/06/11
Micro-Wave Antenna	MI-WWAVE	261U-25 (40-60GHz)	MRTSUE06273	5 year	2021/12/26
Standard Gain Horn Antenna	A-INFOMW	LB-15-25-A (50~75GHz)	MRTSUE06409	5 year	2022/11/16
Standard Gain Horn Antenna	A-INFOMW	LB-10-25-A (75~110GHz)	MRTSUE06410	5 year	2022/11/16
Waveguide Harmonic Mixer	Keysight	M1970V (50~75GHz)	MRTSUE06271	5 year	2022/01/17
Waveguide Harmonic Mixer	Keysight	M1970W (75~110GHz)	MRTSUE06272	5 year	2021/12/07
Coaxial transmission line	Times Microwave Systems	SLU18-SMSM-01.00M (Serial #94197(TMC))	N/A	5 year	2022/01/17
Coaxial transmission line	Times Microwave Systems	SLU18-SMSM-01.00M (Serial #94198(TMC))	N/A	5 year	2021/12/07
Coaxial transmission line	UCWAVE	SPT67-1.85M1.85M-1.0M	N/A	5 year	2021/12/26
Temperature/Humidity Meter	Minggao	ETH529	MRTSUE06170	1 year	2020/12/15
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2021/04/30

Software	Version	Function
EMI Software	V3	EMI Test Software

## 6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .

### Conducted Emission Measurement - SR2

The maximum measurement uncertainty is evaluated as:

9kHz~150kHz: 3.84dB

150kHz~30MHz: 3.46dB

### Radiated Emission Measurement - AC1

The maximum measurement uncertainty is evaluated as:

Horizontal: 30MHz~300MHz: 4.07dB

300MHz~1GHz: 3.63dB

1GHz~18GHz: 4.16dB

18GHz~40GHz: 4.98dB

Vertical: 30MHz~300MHz: 4.18dB

300MHz~1GHz: 3.60dB

1GHz~18GHz: 4.76dB

18GHz~40GHz: 5.63dB

### Radiated Emission Measurement - AC2

The maximum measurement uncertainty is evaluated as:

Horizontal: 30MHz~300MHz: 3.75dB

300MHz~1GHz: 3.53dB

1GHz~18GHz: 4.28dB

18GHz~40GHz: 4.88dB

Vertical: 30MHz~300MHz: 3.86dB

300MHz~1GHz: 3.53dB

1GHz~18GHz: 4.33dB

18GHz~40GHz: 5.06dB

## 7. TEST RESULT

### 7.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	N/A	Section 7.2
15.209 15.249	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 & clause 8.10	Radiated	Pass	Section 7.3 & 7.4
15.215(c)	20dB Spectrum Bandwidth	20 dB bandwidth of the emission in the specific band	Conducted	Pass	Section 7.5

**Notes:**

1. The test results shown in the following sections represent the worst-case emissions.
2. "N/A" means that this item is not applicable, and the detail information refer to relevant section.

## 7.2. AC Conducted Emissions Measurement

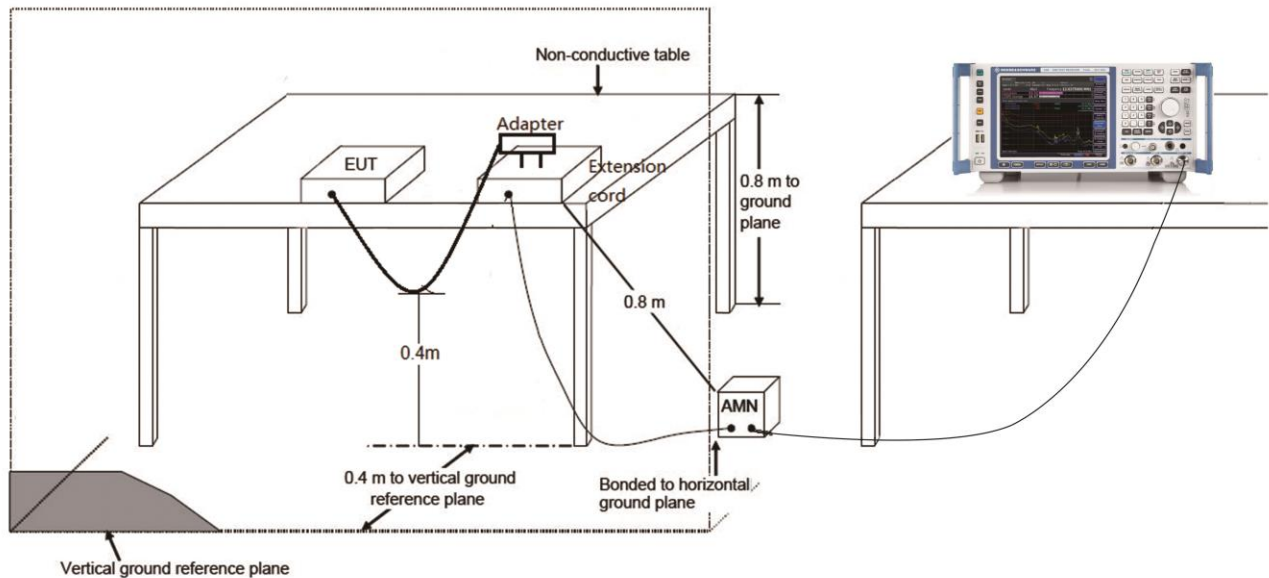
### 7.2.1. Test Limit

FCC 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 ~ 0.50	66 ~ 56	56 ~ 46
0.50 ~ 5.0	56	46
5.0 ~ 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

### 7.2.2. Test Setup



### 7.2.3. Test Result

The device is powered by DC source, so this item is not applicable.

### 7.3. Radiated Emission

#### 7.3.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.249		
Fundamental Frequency (MHz)	Field Strength of Fundamental (mV/m)	Field Strength of Harmonics (uV/m)
902 ~ 908	50	500
2400 ~ 2483.5	50	500
5725 ~ 5875	50	500
24000 ~ 24250	250	2500

Note: FCC Part 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.

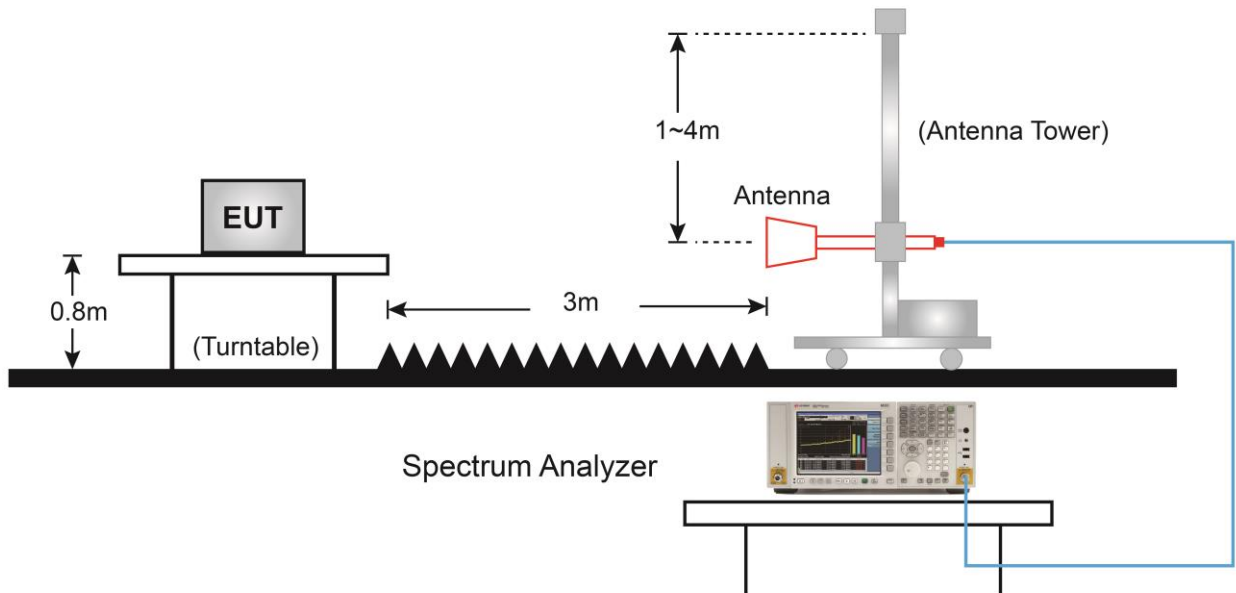
FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100**	3
88 ~ 216	150**	3
216 ~ 960	200**	3
Above 960	500	3

Note 1: The lower limit shall apply at the transition frequency.  
Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.  
Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m).

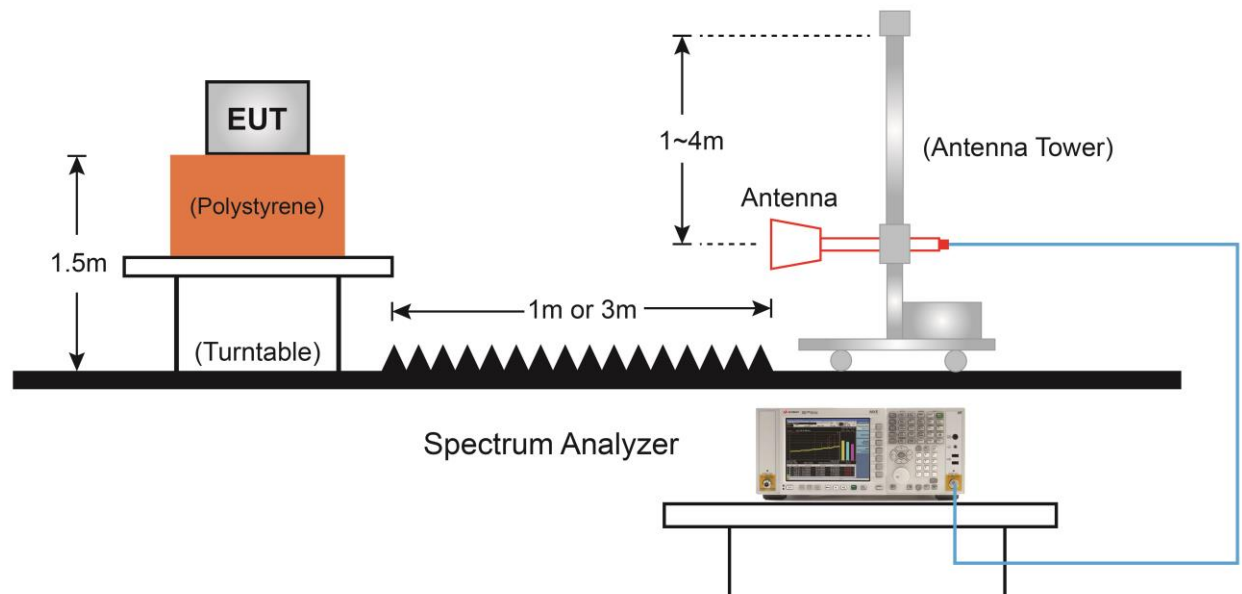


### 7.3.2. Test Setup

#### Below 1GHz Test Setup:



#### Above 1GHz Test Setup:



### 7.3.3. Test Result

Product	Narrow Wave Tablet Radar	Temperature	25°C
Test Engineer	Milo Li	Relative Humidity	56%
Test Site	AC2	Test Date	2020/05/07
Remark:	<b>Fundamental</b> Radiated Emission		

Frequency (GHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
24.15	90.6	-9.8	80.8	128.0	-47.2	Peak	Horizontal
	65.9	-9.8	56.1	108.0	-51.9	Average	Horizontal
	107.6	-9.8	97.8	128.0	-30.2	Peak	Vertical
	79.1	-9.8	69.3	108.0	-38.7	Average	Vertical

Note 1: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

Note 2: Average Limit (dBμV/m) =  $20 * \log(250\text{mV/m}) = 108.0\text{dB}\mu\text{V/m}$

Peak Limit (dBμV/m) = Average Limit (dBμV/m) + 20dB = 128.0 dBμV/m

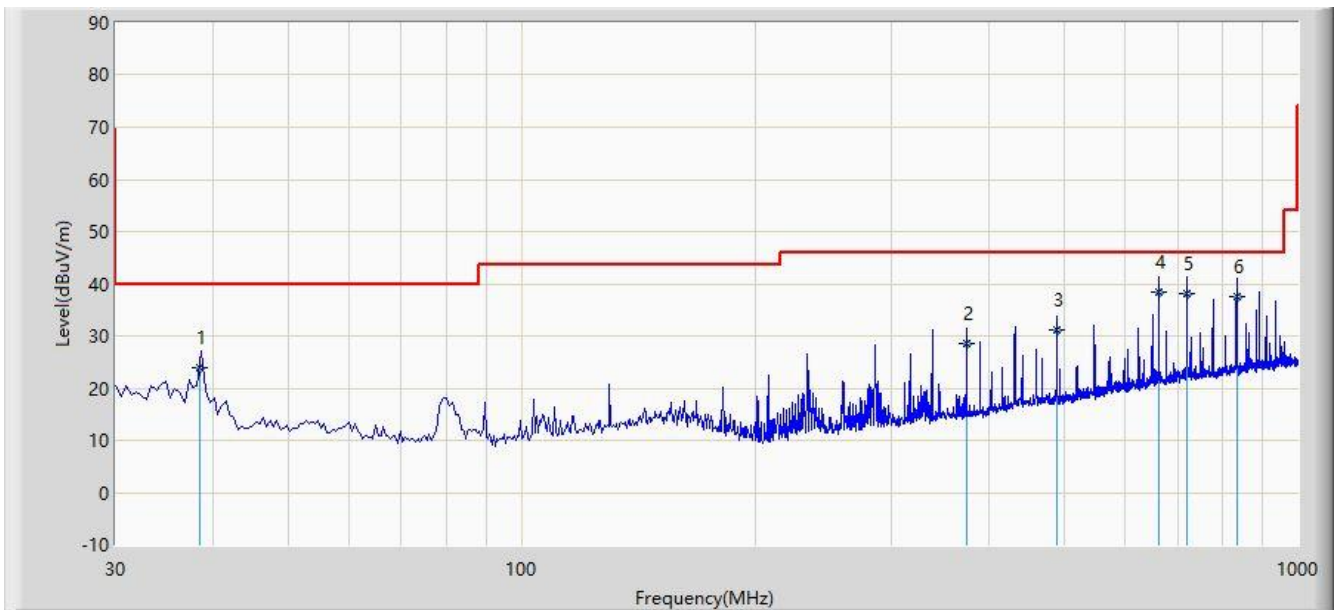
Product	Narrow Wave Tablet Radar	Temperature	25°C
Test Engineer	Milo Li	Relative Humidity	56%
Test Site	AC2	Test Date	2020/04/17 ~2020/07/21
Remark:	<b>Harmonics</b> Radiated Emission		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Measurement Distance = 3m (1GHz ~ 18 GHz)								
	6040.5	34.7	6.3	41.0	74.0	-33.0	Peak	Horizontal
	7001.0	33.6	10.7	44.3	74.0	-29.7	Peak	Horizontal
	7545.0	35.5	12.3	47.8	74.0	-26.2	Peak	Horizontal
	11191.5	30.6	18.4	49.0	74.0	-25.0	Peak	Horizontal
	5505.0	35.8	4.4	40.2	74.0	-33.8	Peak	Vertical
	6448.5	34.2	8.4	42.6	74.0	-31.4	Peak	Vertical
	10809.0	31.2	17.5	48.7	74.0	-25.3	Peak	Vertical
	11506.0	28.9	19.3	48.2	74.0	-25.8	Peak	Vertical
Measurement Distance = 3m (18 GHz ~ 40 GHz)								
	22565.0	58.5	-10.0	48.5	74.0	-25.5	Peak	Horizontal
	23852.0	58.2	-9.8	48.4	74.0	-25.6	Peak	Horizontal
	26800.0	58.5	-8.6	49.9	74.0	-24.1	Peak	Horizontal
	28934.0	60.5	-9.9	50.6	74.0	-23.4	Peak	Horizontal
	22312.0	58.2	-10.3	47.9	74.0	-26.1	Peak	Vertical
	22818.0	58.5	-9.8	48.7	74.0	-25.3	Peak	Vertical
	26591.0	58.9	-8.9	50.0	74.0	-24.0	Peak	Vertical
	28714.0	60.6	-10.0	50.6	74.0	-23.4	Peak	Vertical
Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB) Note 2: Average measurement was not performed when the peak level lower than average limit.								

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Measurement Distance = 1m (40GHz ~ 75GHz)								
	48300.0	24.9	46.0	70.9	97.5	-26.6	Peak	Horizontal
	48300.0	24.8	46.0	70.8	97.5	-26.7	Peak	Vertical
	72450.0	38.9	42.4	81.3	97.5	-16.2	Peak	Horizontal
	72450.0	27.7	42.4	70.1	77.5	-7.4	Average	Horizontal
	72450.0	39.5	42.4	81.9	97.5	-15.6	Peak	Vertical
	72450.0	24.7	42.4	67.1	77.5	-10.4	Average	Vertical
Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB) Note 2: According to FCC Part 15.205(d)(9) and Part 15.249(a) requirements, Average Limit (dBμV/m) @1m = $20 \cdot \log(2500\mu\text{V/m}) + 20 \cdot \log(3/1) = 77.5\text{dB}\mu\text{V/m}$ Peak Limit (dBμV/m) @1m = Average Limit (dBμV/m) + 20dB = 97.5 dBμV/m Note 3: Average measurement was not performed when the peak level lower than average limit.								
Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Measurement Distance = 0.25m (75GHz ~ 100GHz)								
	96600.0	39.1	44.5	83.6	95.6	-12.0	Peak	Horizontal
	96600.0	27.9	44.5	72.4	75.6	-3.2	Average	Horizontal
	96600.0	38.0	44.5	82.5	95.6	-13.1	Peak	Vertical
	96600.0	27.7	44.5	72.2	75.6	-3.4	Average	Vertical
Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB) Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB) Note 2: Average Limit (dBμV/m) @1m = $54\text{dB}\mu\text{V/m} + 20 \cdot \log(3/0.25) = 75.6\text{dB}\mu\text{V/m}$ Peak Limit (dBμV/m) @1m = Average Limit (dBμV/m) + 20dB = 95.6dBμV/m								

## The worst case of Radiated Emission below 1GHz

Site: AC2	Time: 2020/04/15 - 18:44
Limit: FCC_Part15.209_RSE(3m)	Engineer: Tyler Yuan
Probe: AC2_VULB 9168 _20-2000MHz-yuanqu	Polarity: Horizontal
EUT: Narrow Wave Tablet Radar	Power: DC 12V
Note: Transmit at 24.15GHz	



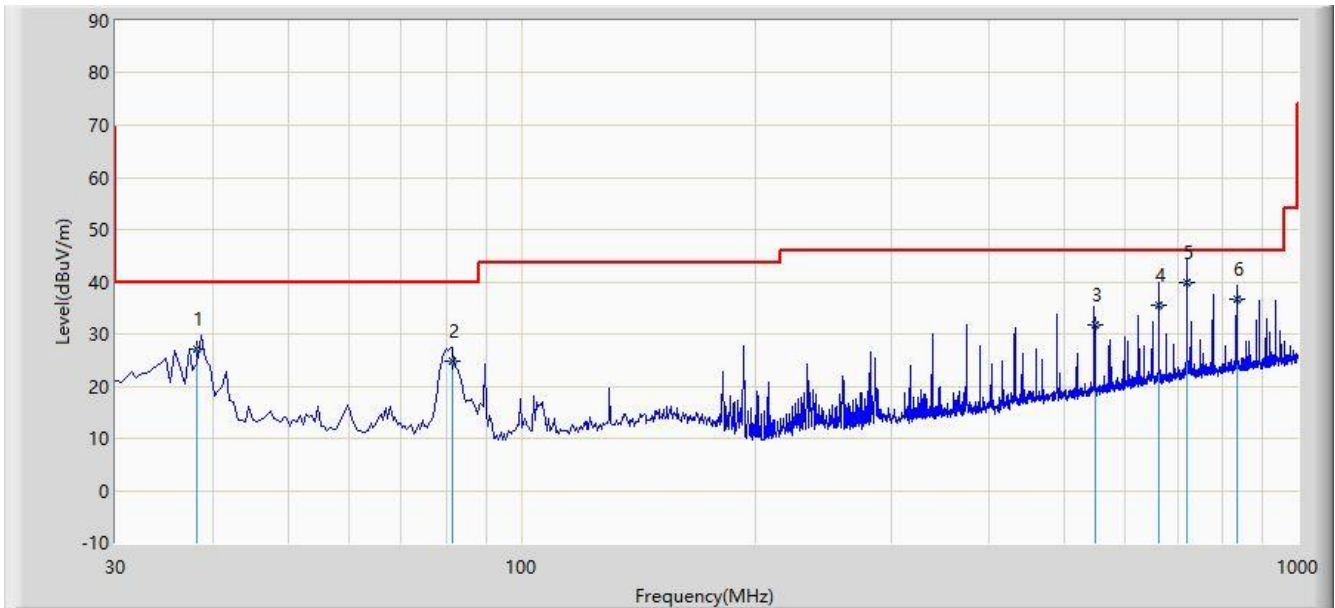
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			38.596	23.908	9.660	-16.092	40.000	14.248	QP
2			374.362	28.675	13.220	-17.325	46.000	15.456	QP
3			489.632	31.257	13.560	-14.743	46.000	17.698	QP
4		*	662.310	38.335	17.550	-7.665	46.000	20.786	QP
5			720.160	38.060	16.550	-7.940	46.000	21.510	QP
6			835.162	37.617	14.950	-8.383	46.000	22.667	QP

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The amplitude of Radiated emissions (the test frequency range: 9kHz ~ 30MHz), is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

Site: AC2	Time: 2020/04/15 - 18:47
Limit: FCC_Part15.209_RSE(3m)	Engineer: Tyler Yuan
Probe: AC2_VULB 9168 _20-2000MHz-yuanqu	Polarity: Vertical
EUT: Narrow Wave Tablet Radar	Power: DC 12V
Note: Transmit at 24.15GHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			38.260	27.190	12.990	-12.810	40.000	14.201	QP
2			81.326	24.876	15.030	-15.124	40.000	9.846	QP
3			547.626	31.732	12.990	-14.268	46.000	18.742	QP
4			662.356	35.476	14.690	-10.524	46.000	20.786	QP
5		*	719.866	39.806	18.300	-6.194	46.000	21.506	QP
6			835.165	36.697	14.030	-9.303	46.000	22.667	QP

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The amplitude of Radiated emissions (the test frequency range: 9kHz ~ 30MHz), is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

## 7.4. Radiated Restricted Band Edge Measurement

### 7.4.1. Test Limit

#### For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

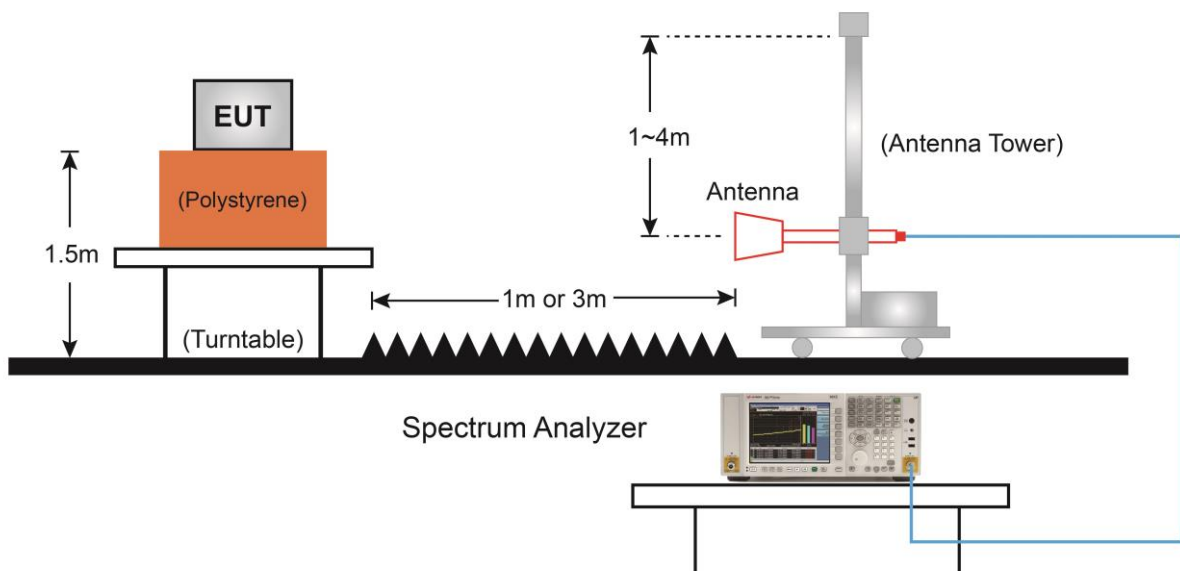
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [ $\mu\text{V}/\text{m}$ ]	Measured Distance [Meter]
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

#### 7.4.2.Test Setup

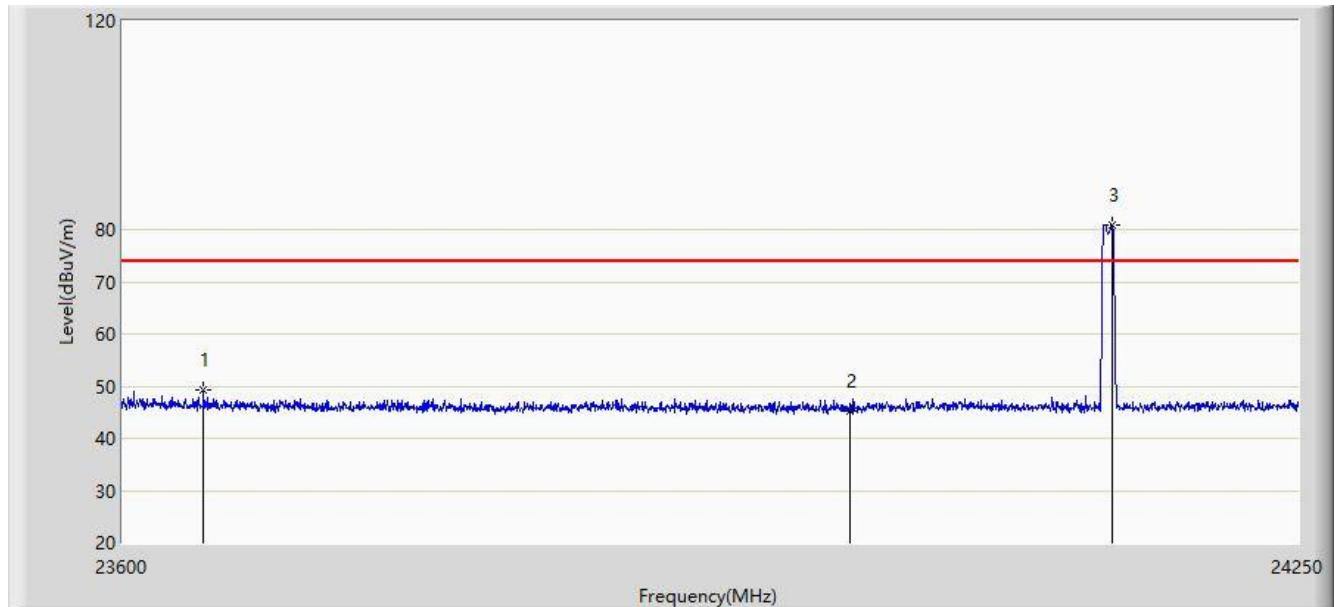
Above 1GHz Test Setup:





### 7.4.3.Test Result

Site: AC2	Time: 2020/05/07 - 10:26
Limit: FCC_Part15.249_RE(3m)	Engineer: Tyler Yuan
Probe: BBHA9170_18-40GHz	Polarity: Horizontal
EUT: Narrow Wave Tablet Radar	Power: DC 12V
Note: Transmit at 24.15GHz	

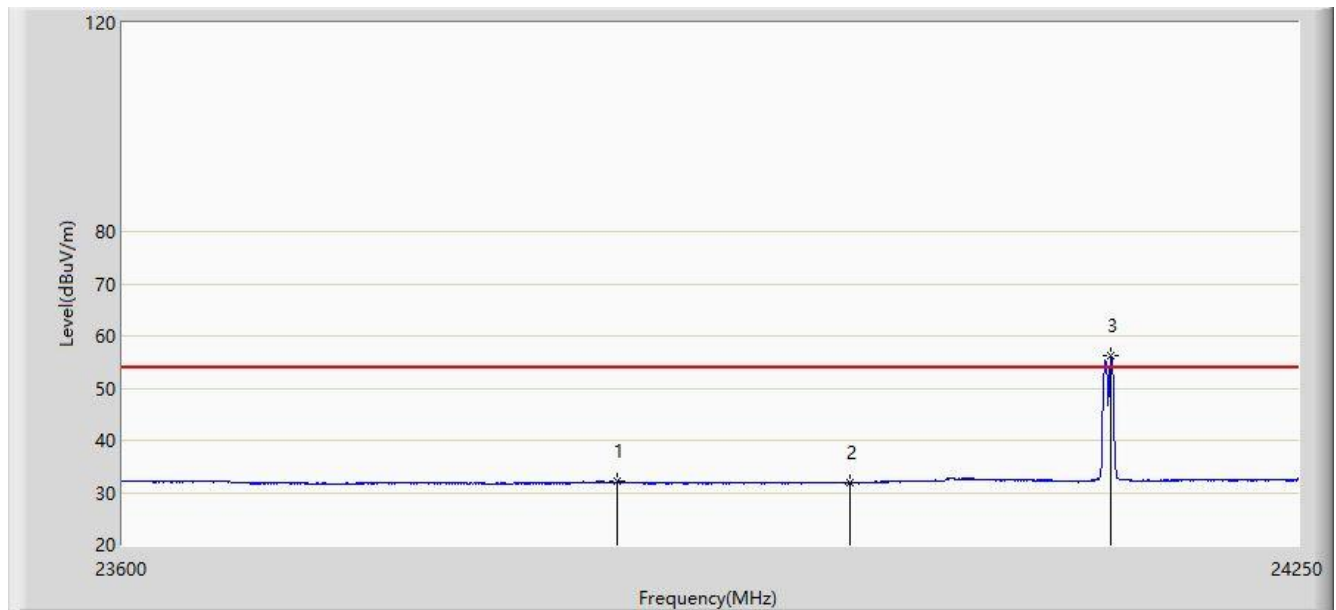


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			23644.525	49.172	58.622	-24.828	74.000	-9.450	PK
2			24000.000	45.183	54.985	-28.817	74.000	-9.803	PK
3		*	24146.324	80.856	90.628	N/A	N/A	-9.773	PK

Note: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

Site: AC2	Time: 2020/05/07 - 10:30
Limit: FCC_Part15.249_RE(3m)	Engineer: Tyler Yuan
Probe: BBHA9170_18-40GHz	Polarity: Horizontal
EUT: Narrow Wave Tablet Radar	Power: DC 12V
Note: Transmit at 24.15GHz	

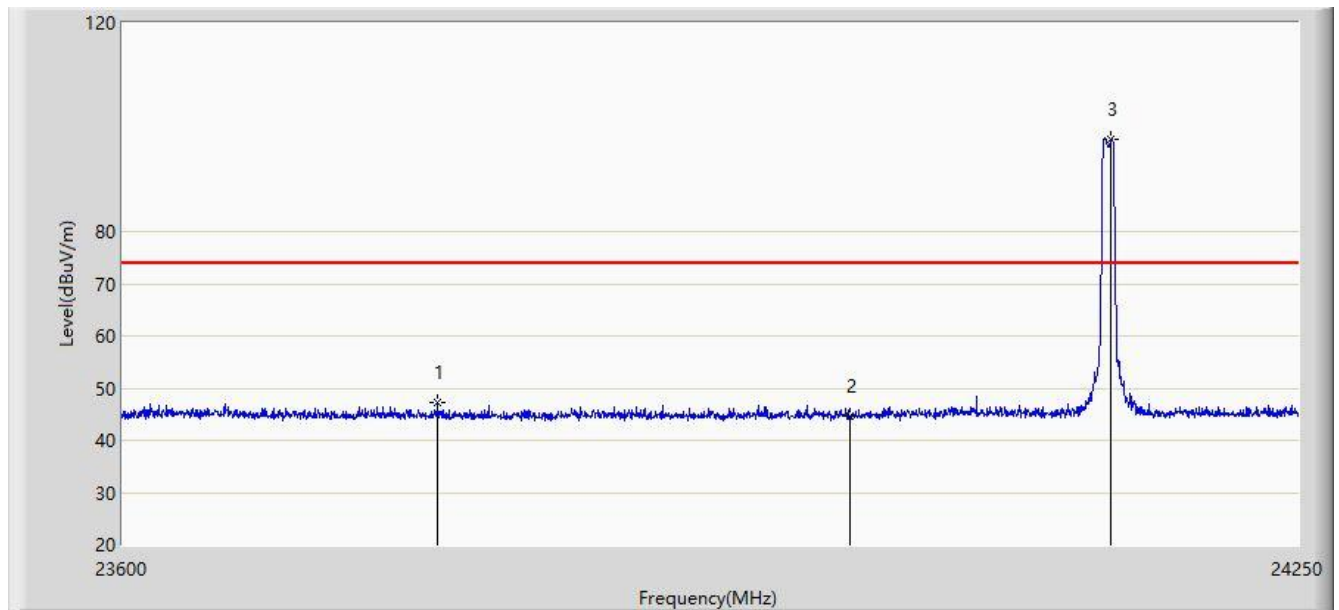


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			23871.375	32.054	41.637	-21.946	54.000	-9.582	AV
2			24000.000	31.935	41.737	-22.065	54.000	-9.803	AV
3		*	24145.350	56.140	65.913	N/A	N/A	-9.773	AV

Note: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

Site: AC2	Time: 2020/05/07 - 10:32
Limit: FCC_Part15.249_RE(3m)	Engineer: Tyler Yuan
Probe: BBHA9170_18-40GHz	Polarity: Vertical
EUT: Narrow Wave Tablet Radar	Power: DC 12V
Note: Transmit at 24.15GHz	

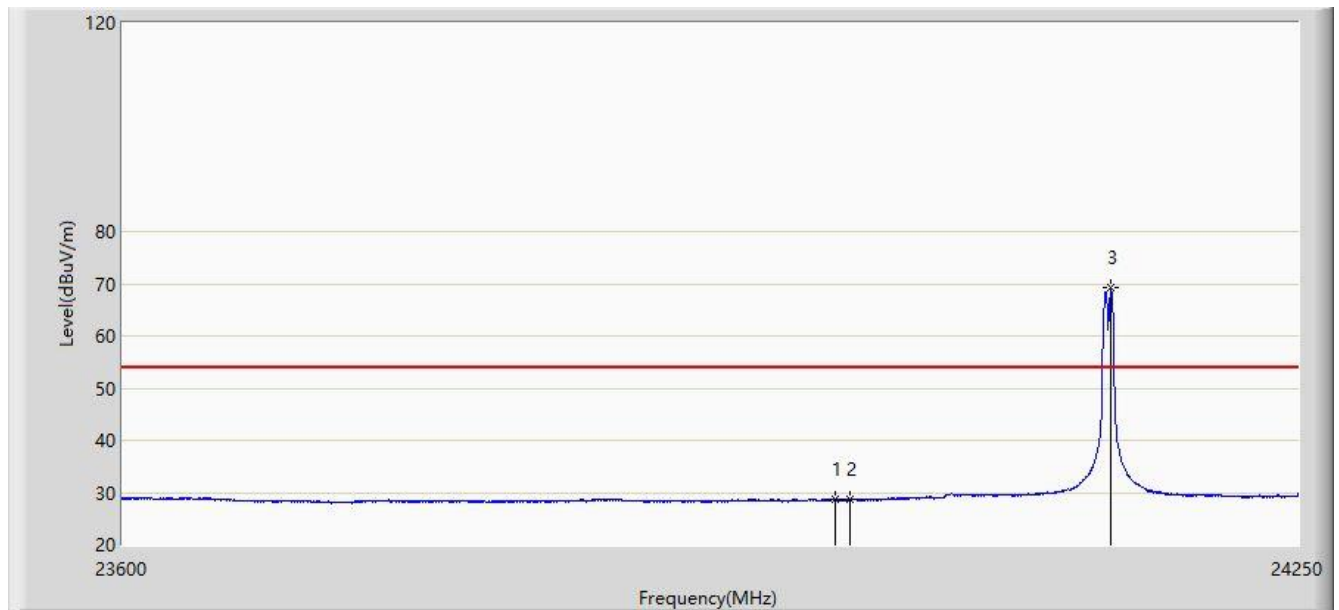


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			23772.900	47.198	56.784	-26.802	74.000	-9.586	PK
2			24000.000	44.603	54.405	-29.397	74.000	-9.803	PK
3		*	24145.676	97.822	107.595	N/A	N/A	-9.773	PK

Note: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

Site: AC2	Time: 2020/05/07 - 10:35
Limit: FCC_Part15.249_RE(3m)	Engineer: Tyler Yuan
Probe: BBHA9170_18-40GHz	Polarity: Vertical
EUT: Narrow Wave Tablet Radar	Power: DC 12V
Note: Transmit at 24.15GHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			23991.949	28.745	38.517	-25.255	54.000	-9.773	AV
2			24000.000	28.702	38.504	-25.298	54.000	-9.803	AV
3		*	24145.676	69.364	79.137	N/A	N/A	-9.773	AV

Note: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

## 7.5. Emission Bandwidth Measurement

### 7.5.1. Test Limit

20 dB bandwidth of the emission shall be contained within the frequency band 24.00 ~ 24.25 GHz.

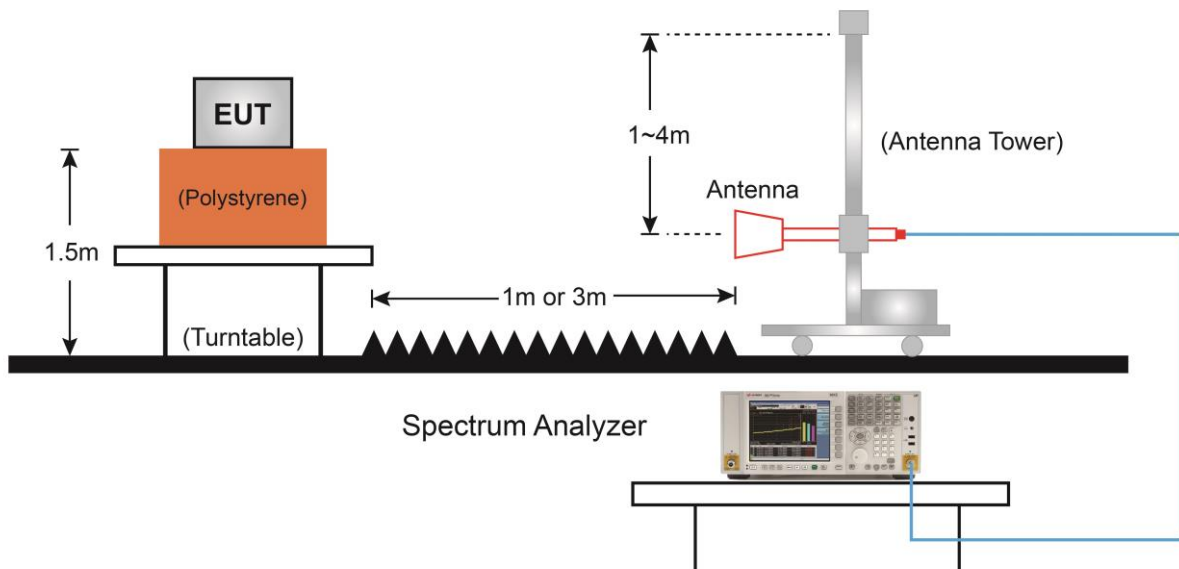
### 7.5.2. Test Procedure used

ANSI C63.10 Section 6.9.2 and Section 6.9.3

### 7.5.3. Test Setting

1. The analyzers' automatic bandwidth measurement capability was used to perform the 99% or 20dB bandwidth measurement. The bandwidth measurement was not influenced by any intermediated power nulls in the fundamental emission.
2. RBW = approximately 1% to 5% of the OBW.
3. VBW  $\geq 3 \times$  RBW.
4. Detector = Peak.
5. Trace mode = max hold.

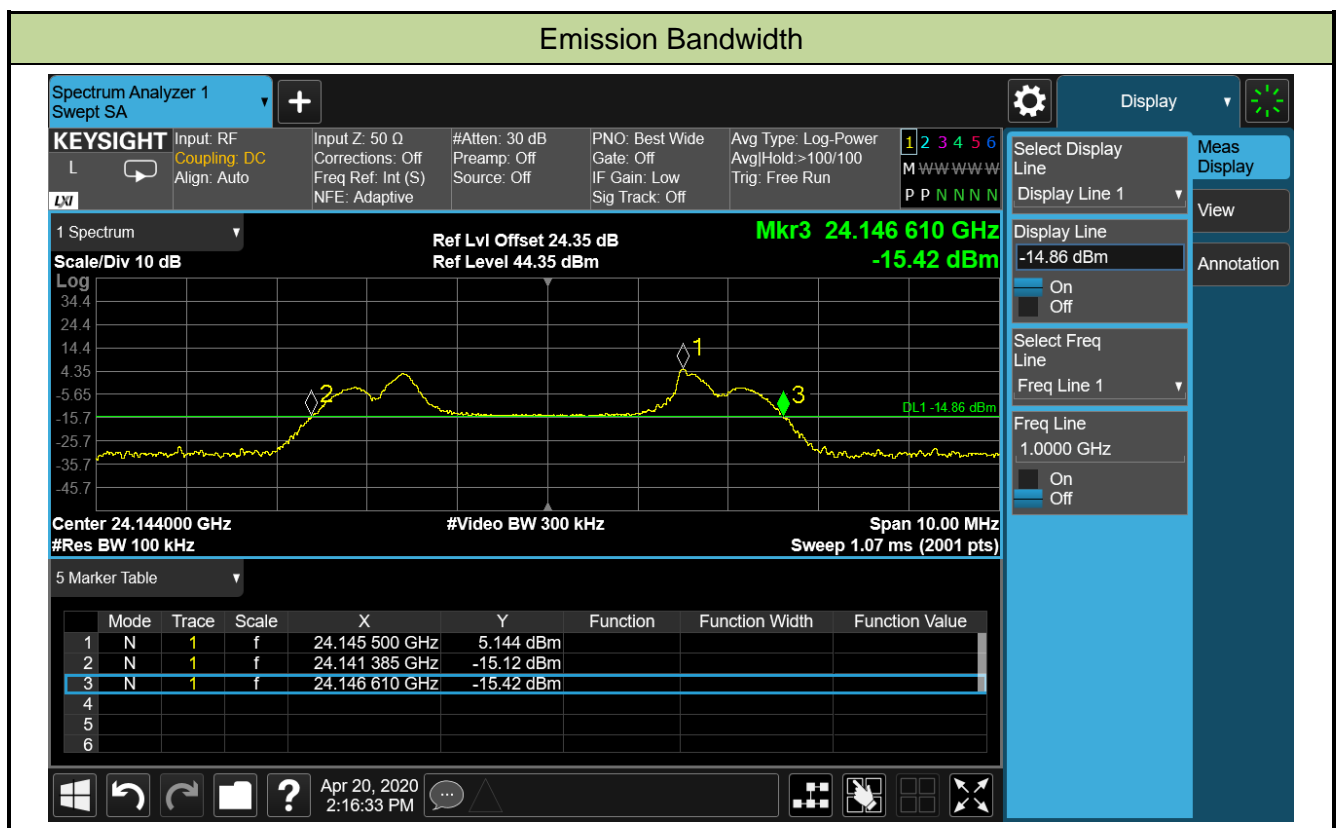
### 7.5.4. Test Setup



### 7.5.5. Test Result

Product	Narrow Wave Tablet Radar	Temperature	25°C
Test Engineer	Milo Li	Relative Humidity	56%
Test Site	AC2	Test Date	2020/04/20

Frequency (MHz)	20dB Bandwidth (MHz)	Frequency Range (MHz)	Limit (MHz)	Result
24150	5.225	24141.39	> 24000	Pass
		24146.61	< 24250	Pass



## **8. CONCLUSION**

The data collected relate only the item(s) tested and show that the unit is in compliance with Part 15C of the FCC Rules.

\_\_\_\_\_ The End \_\_\_\_\_

## **Appendix A - Test Setup Photograph**

Refer to "2001RSU035-UT" file.



## **Appendix B - EUT Photograph**

Refer to "2001RSU035-UE" file.