



## Co-location Report

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**FCC ID:** 2AAC2-WL01

**IC:** 24356-WL01

**APPLICANT:** Icomera AB

**Application Type:** Certification

**Product:** Icomera TraXside solution

**Model No.:** WL01

**Brand Name:** Icomera

**FCC Classification:** Unlicensed National Information Infrastructure (UNII)

**Test Date:** August 12, 2019

Reviewed By:

*Jame Yuan*

( Jame Yuan )

Approved By:

*Robin Wu*

( 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
1906RSU020-U3	Rev. 01	Initial Report	08-15-2019	Valid

## 1. Product Information

### 1.1. Equipment Description

Product Name	Icomera TraXside solution
Model No.	WL01
Brand Name	Icomera
Operating Temperature	-20 ~ 70 °C
Power Type	POE input (Power range: 37 ~ 57 Vdc)

Note1: Configuration for FCC Certification (Type 02): Host board (BBD 0009) and 2 \* 5GHz Wi-Fi Modules, M/N: TR-1X. Wi-Fi Module 1 operating in UNII Band 1, Wi-Fi Module 2 operating in UNII Band 3.

### 1.2. Antenna Description

Antenna No.	Antenna Type	Frequency Band (GHz)	T <sub>x</sub> Paths	Max Antenna Gain (dBi)	CDD Directional Gain (dBi)	
					For Power	For PSD
Antenna Configuration 1# (1 * Ant 1 + 1 * Ant 2)						
1	Patch Array	5	2	23	23	26.01
2	Patch Array	5	1	23		
Antenna Configuration 2# (3 * Ant 3)						
3	Monopole	5	1	12	12	15.01

Note:

- The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

For CDD transmissions, directional gain is calculated as follows,  $N_{ANT} = 2$ ,  $N_{SS} = 1$ .

If all antennas have the same gain,  $G_{ANT}$ , Directional gain =  $G_{ANT} + \text{Array Gain}$ , where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,  
Array Gain =  $10 \log (N_{ANT} / N_{SS})$  dB = 3.01;
- For power measurements on IEEE 802.11 devices,  
Array Gain = 0 dB for  $N_{ANT} \leq 4$ ;

- The EUT doesn't support Beam-forming technology.
- Ant 1 has Cross-Polarized design, see the antenna specification for further details.
- Both antenna configurations had been accessed in this report.

## 2. Radiated Emissions for Co-located

### 2.1. Test Limit

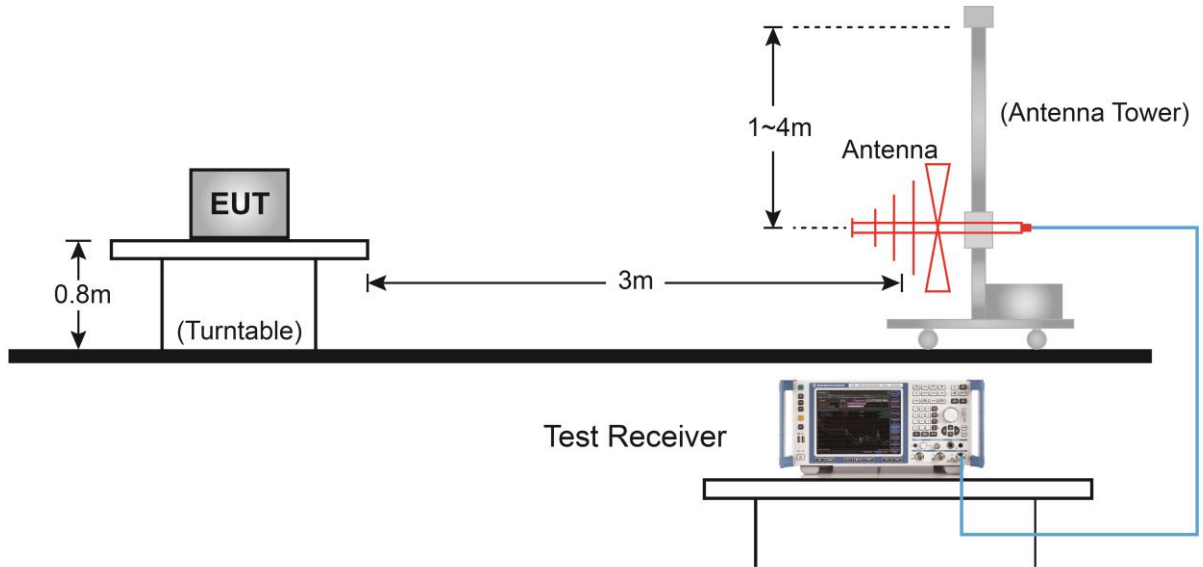
#### FCC Part15.209:

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.

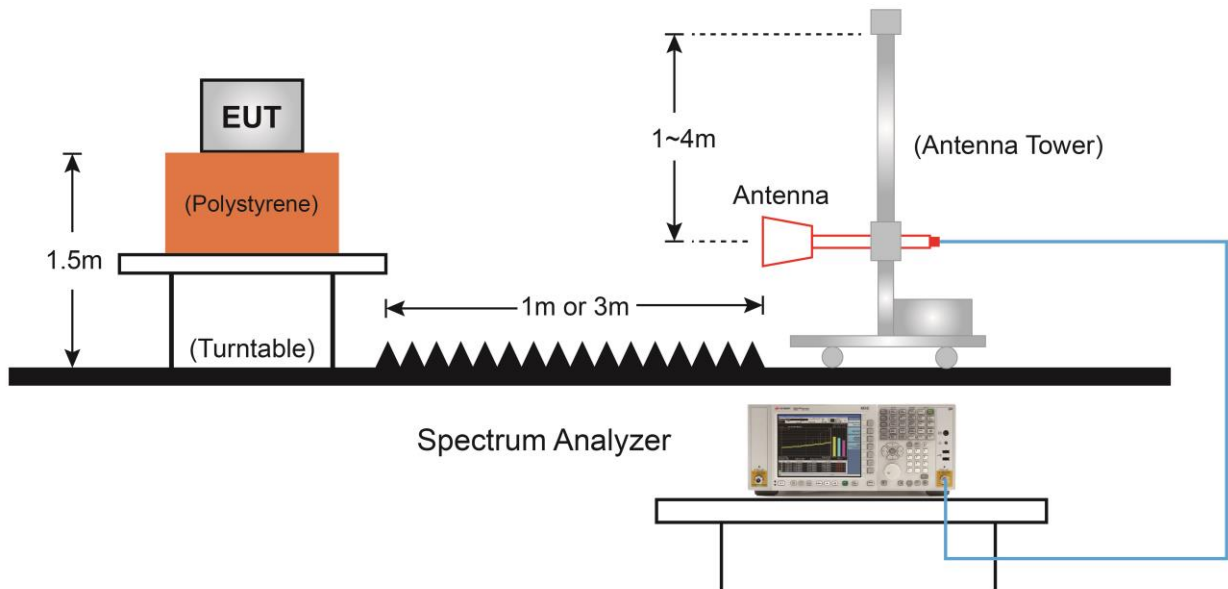
FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Field Strength ( $\mu\text{V}/\text{m}$ )	Measured Distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

## 2.2. Test Setup

### Below 1GHz Test Setup:



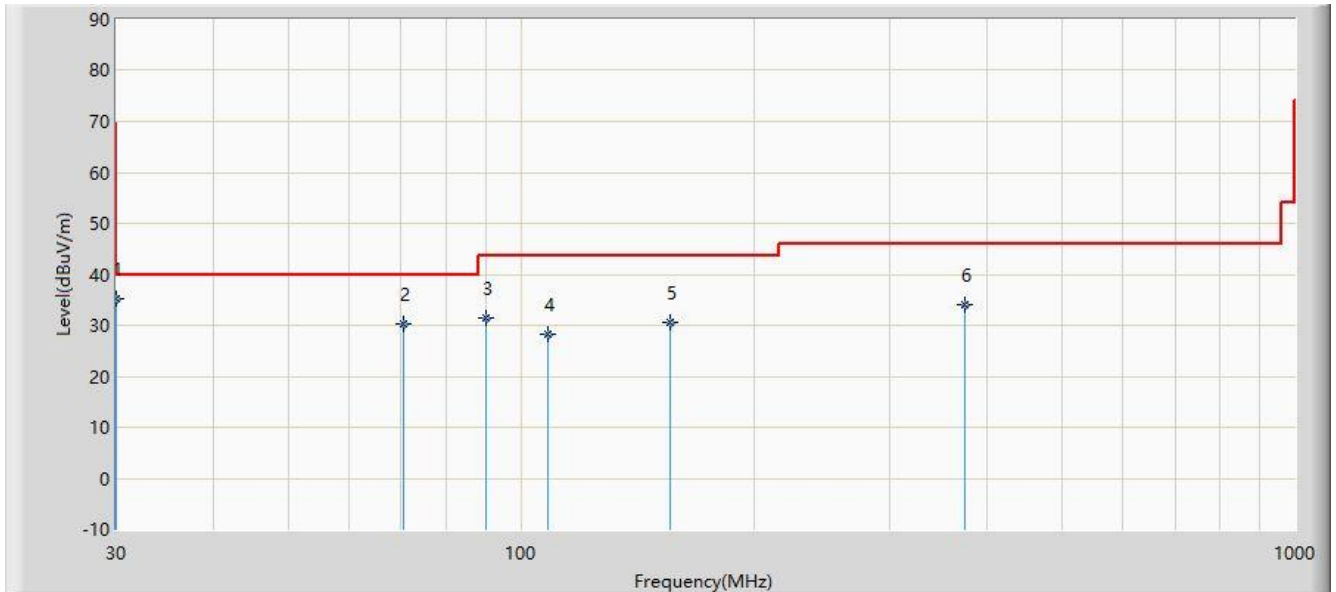
### Above 1GHz Test Setup:



### 2.3. Test Result of Radiated Emissions for Co-located

#### For Antenna Configuration 1# (Antenna = 23dBi)

Test Mode	Transmit by NII-1 & NII-3	Test Site	AC1
Test Engineer	Kyrie Xie	Polarity	Horizontal
Remark	There is the ambient noise within frequency range 9kHz~30MHz and 18GHz~40GHz, the permissible value is not show in the report.		



No	Mark	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Type
1	*	30.0	21.5	13.8	35.3	40.0	-4.7	QP
2		70.5	18.6	11.6	30.2	40.0	-9.8	QP
3		90.1	21.0	10.4	31.4	43.5	-12.1	QP
4		108.6	16.3	12.0	28.3	43.5	-15.2	QP
5		155.6	15.0	15.4	30.4	43.5	-13.1	QP
6		374.8	18.0	16.2	34.2	46.0	-11.8	QP

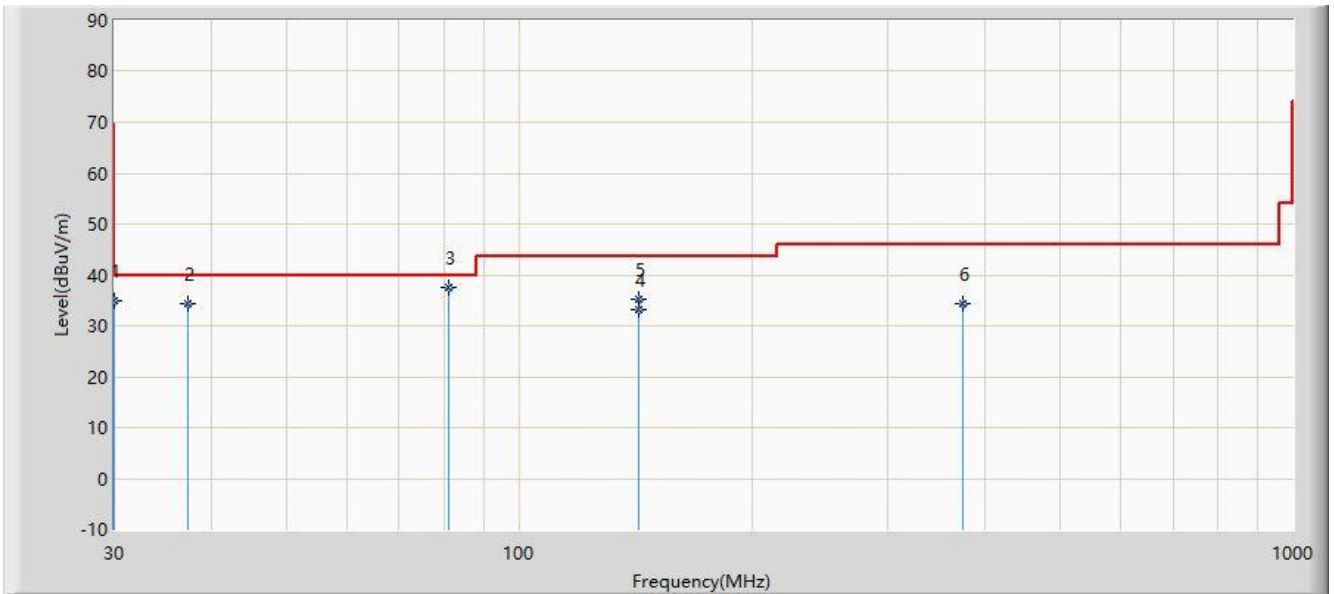
Note 1: Measure Level (dBuV/m) = Reading Level (dBuV/m) + Factor (dB)

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

Note 2: We selected the worst-case mode of radiated spurious emissions in the UNII report.

Test Mode: Transmit by 802.11a at channel 5180MHz & Transmit by 802.11n-HT20 at channel 5825MHz

Test Mode	Transmit by NII-1 & NII-3	Test Site	AC1
Test Engineer	Kyrie Xie	Polarity	Vertical
Remark:	There is the ambient noise within frequency range 9kHz~30MHz and 18GHz~40GHz, the permissible value is not show in the report.		



No	Mark	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Type
1		30.0	21.1	13.8	34.9	40.0	-5.1	QP
2		37.3	20.0	14.3	34.3	40.0	-5.7	QP
3	*	81.2	27.3	10.2	37.5	40.0	-2.5	QP
4		143.0	18.3	14.9	33.2	43.5	-10.3	QP
5		143.0	20.2	14.9	35.1	43.5	-8.4	QP
6		374.8	18.2	16.2	34.4	46.0	-11.6	QP

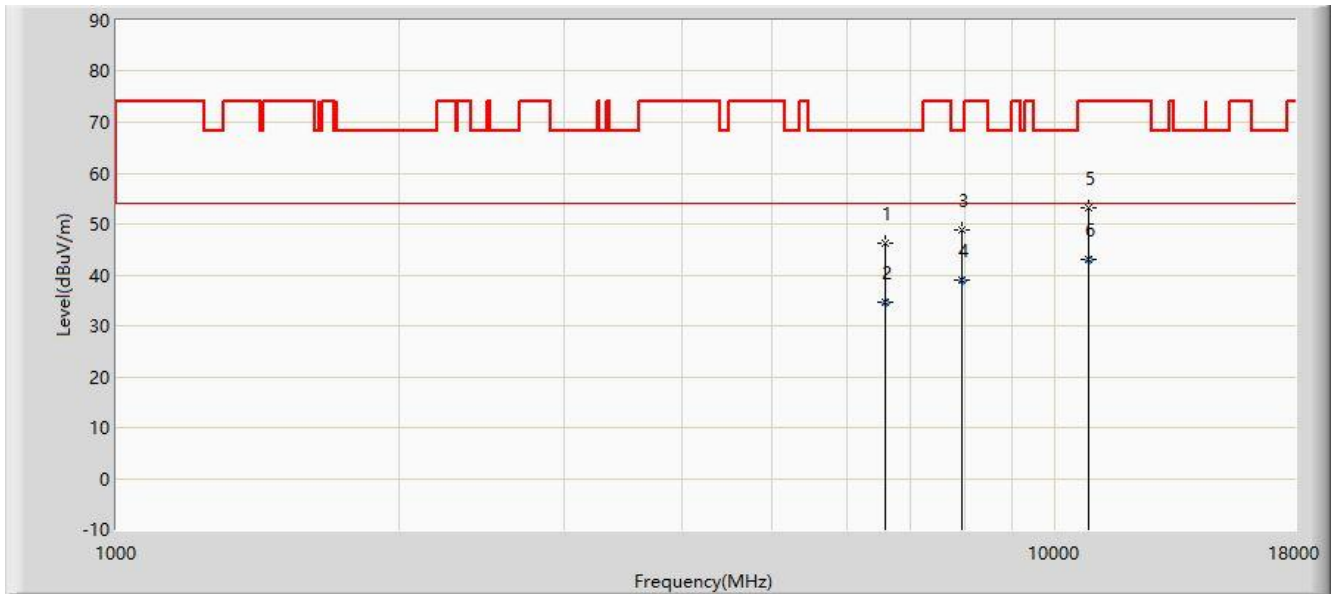
Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

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

Note 2: We selected the worst-case mode of radiated spurious emissions in the UNII report.

Test Mode: Transmit by 802.11a at channel 5180MHz & Transmit by 802.11n-HT20 at channel 5825MHz

Test Mode	Transmit by NII-1 & NII-3	Test Site	AC1
Test Engineer	Kyrie Xie	Polarity	Horizontal
Remark	There is the ambient noise within frequency range 9kHz~30MHz and 18GHz~40GHz, the permissible value is not show in the report.		



No	Mark	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Type
1		6593.0	36.6	9.8	46.4	68.2	-21.8	PK
2		6593.0	24.8	9.8	34.6	54.0	-19.4	AV
3		7944.5	36.4	12.6	49.0	68.2	-19.2	PK
4		7944.5	26.5	12.6	39.1	54.0	-14.9	AV
5		10851.5	35.5	17.8	53.3	74.0	-20.7	PK
6	*	10851.5	25.2	17.8	43.0	54.0	-11.0	AV

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

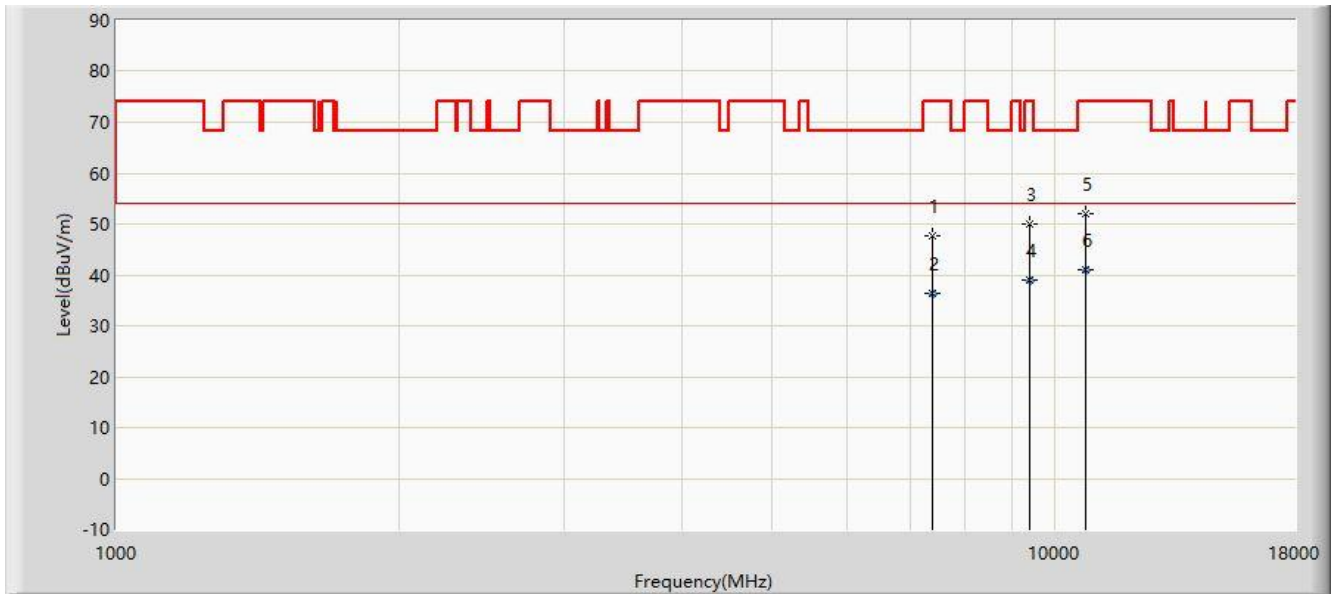
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB).

Note 2: We selected the worst-case mode of radiated spurious emissions in the UNII report.

Test Mode: Transmit by 802.11a at channel 5180MHz & Transmit by 802.11n-HT20 at channel 5825MHz



Test Mode	Transmit by NII-1 & NII-3	Test Site	AC1
Test Engineer	Kyrie Xie	Polarity	Vertical
Remark	There is the ambient noise within frequency range 9kHz~30MHz and 18GHz~40GHz, the permissible value is not show in the report.		



No	Mark	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Type
1		7409.0	36.0	11.7	47.7	74.0	-26.3	PK
2		7409.0	24.7	11.7	36.4	54.0	-17.6	AV
3		9389.5	34.9	15.0	49.9	74.0	-24.1	PK
4		9389.5	24.1	15.0	39.1	54.0	-14.9	AV
5		10792.0	34.5	17.5	52.0	74.0	-22.0	PK
6	*	10792.0	23.5	17.5	41.0	54.0	-13.0	AV

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

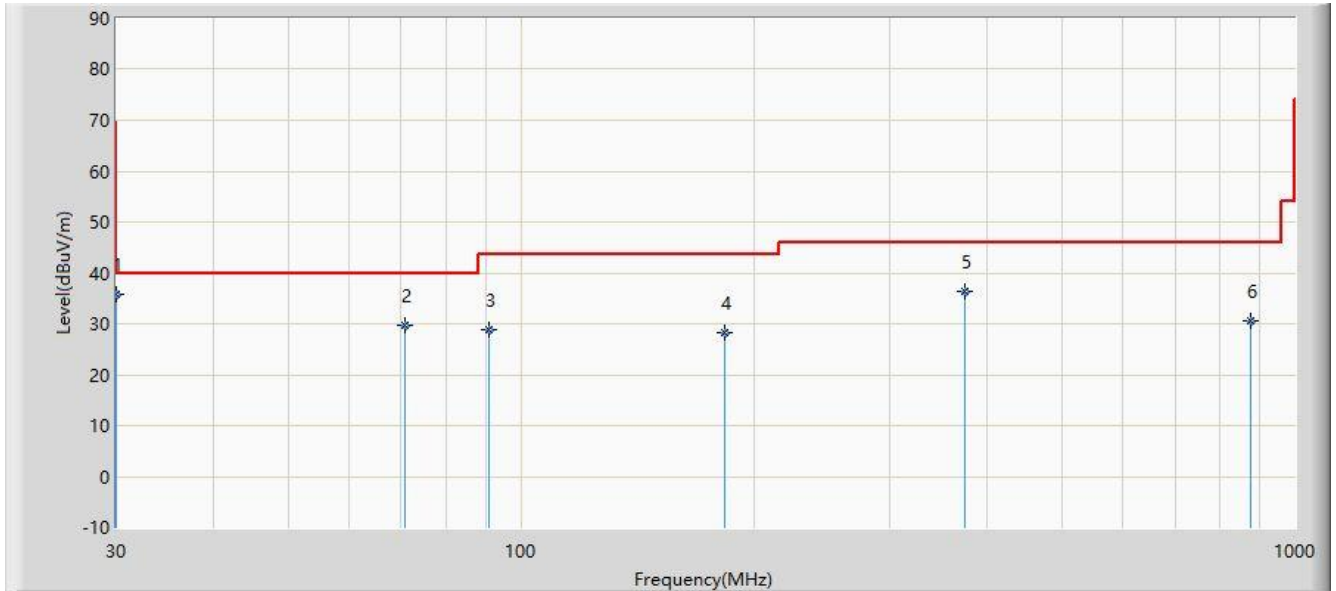
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB).

Note 2: We selected the worst-case mode of radiated spurious emissions in the UNII report.

Test Mode: Transmit by 802.11a at channel 5180MHz & Transmit by 802.11n-HT20 at channel 5825MHz

**For Antenna Configuration 2# (Antenna = 12dBi)**

Test Mode	Transmit by NII-1 & NII-3	Test Site	AC1
Test Engineer	Kyrie Xie	Polarity	Horizontal
Remark	There is the ambient noise within frequency range 9kHz~30MHz and 18GHz~40GHz, the permissible value is not show in the report.		



No	Mark	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Type
1	*	30.0	22.1	13.8	35.9	40.0	-4.1	QP
2		70.7	18.2	11.6	29.8	40.0	-10.2	QP
3		91.1	18.3	10.5	28.8	43.5	-14.7	QP
4		183.7	15.8	12.6	28.4	43.5	-15.1	QP
5		374.8	20.1	16.2	36.3	46.0	-9.7	QP
6		875.4	6.2	24.4	30.6	46.0	-15.4	QP

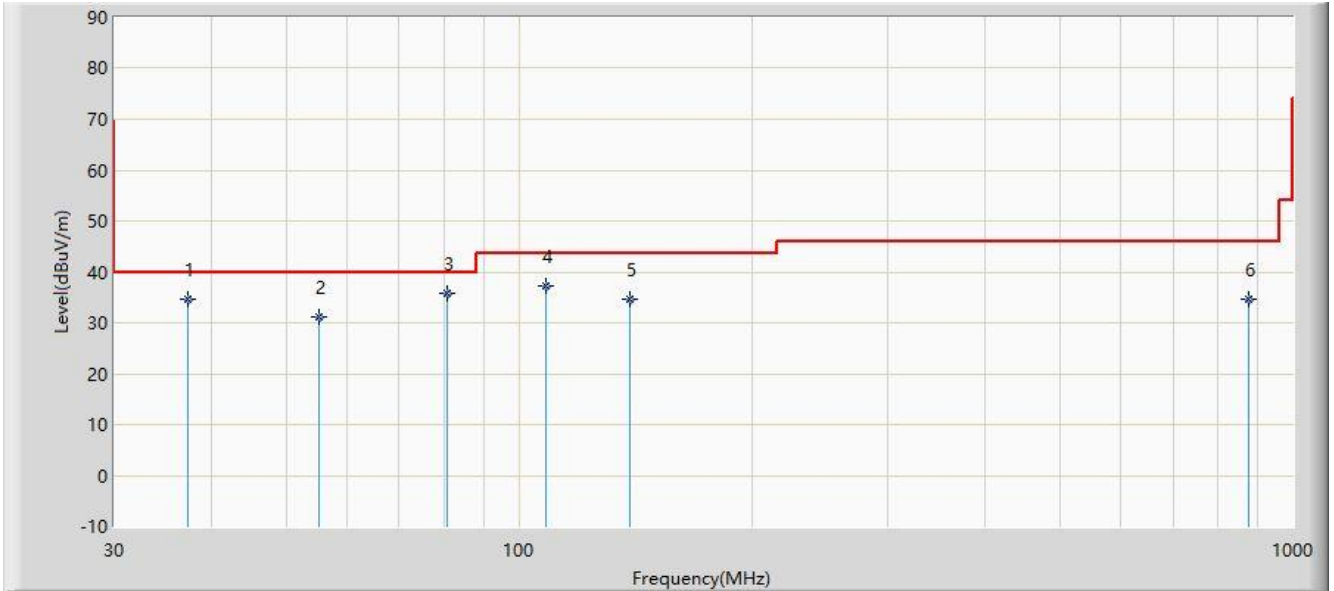
Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

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

Note 2: We selected the worst-case mode of radiated spurious emissions in the UNII report.

Test Mode: Transmit by 802.11ac-VHT80 at channel 5210MHz & Transmit by 802.11n-HT40 at channel 5795MHz

Test Mode	Transmit by NII-1 & NII-3	Test Site	AC1
Test Engineer	Kyrie Xie	Polarity	Vertical
Remark:	There is the ambient noise within frequency range 9kHz~30MHz and 18GHz~40GHz, the permissible value is not show in the report.		



No	Mark	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Type
1		37.3	20.2	14.3	34.5	40.0	-5.5	QP
2		55.2	17.4	13.9	31.3	40.0	-8.7	QP
3	*	80.9	25.7	10.2	35.9	40.0	-4.1	QP
4		108.6	25.1	12.0	37.1	43.5	-6.4	QP
5		139.1	20.1	14.6	34.7	43.5	-8.8	QP
6		875.4	10.3	24.4	34.7	46.0	-11.3	QP

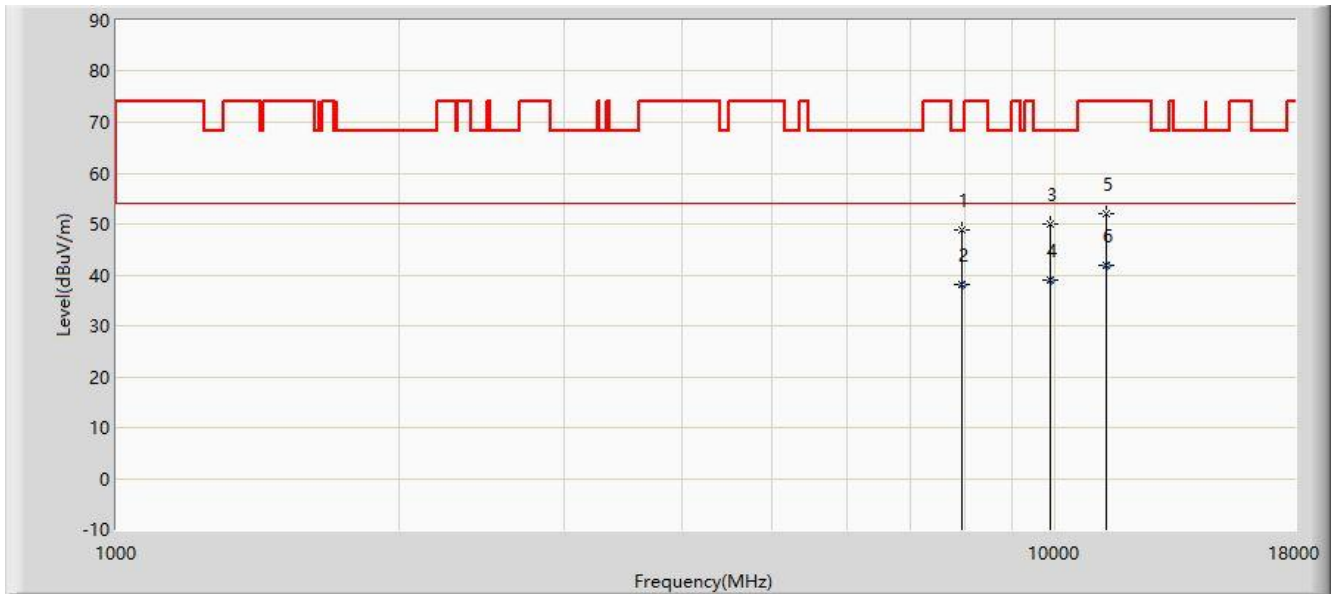
Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

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

Note 2: We selected the worst-case mode of radiated spurious emissions in the UNII report.

Test Mode: Transmit by 802.11ac-VHT80 at channel 5210MHz & Transmit by 802.11n-HT40 at channel 5795MHz

Test Mode	Transmit by NII-1 & NII-3	Test Site	AC1
Test Engineer	Kyrie Xie	Polarity	Horizontal
Remark	There is the ambient noise within frequency range 9kHz~30MHz and 18GHz~40GHz, the permissible value is not show in the report.		



No	Mark	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Type
1		7944.5	36.4	12.6	49.0	68.2	-19.2	PK
2		7944.5	25.6	12.6	38.2	54.0	-15.8	AV
3		9874.0	33.9	16.1	50.0	68.2	-18.2	PK
4		9874.0	22.9	16.1	39.0	54.0	-15.0	AV
5		11353.0	34.5	17.6	52.1	74.0	-21.9	PK
6	*	11353.0	24.2	17.6	41.8	54.0	-12.2	AV

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

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

Note 2: We selected the worst-case mode of radiated spurious emissions in the UNII report.

Test Mode: Transmit by 802.11ac-VHT80 at channel 5210MHz & Transmit by 802.11n-HT40 at channel 5795MHz

Test Mode	Transmit by NII-1 & NII-3	Test Site	AC1
Test Engineer	Kyrie Xie	Polarity	Vertical
Remark	There is the ambient noise within frequency range 9kHz~30MHz and 18GHz~40GHz, the permissible value is not show in the report.		



No	Mark	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Type
1		7961.5	35.9	12.5	48.4	68.2	-19.8	PK
2		7961.5	24.2	12.5	36.7	54.0	-17.3	AV
3		9916.5	34.6	16.0	50.6	68.2	-17.6	PK
4		9916.5	23.0	16.0	39.0	54.0	-15.0	AV
5		12228.5	35.3	17.0	52.3	74.0	-21.7	PK
6	*	12228.5	23.6	17.0	40.6	54.0	-13.4	AV

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

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

Note 2: We selected the worst-case mode of radiated spurious emissions in the UNII report.

Test Mode: Transmit by 802.11ac-VHT80 at channel 5210MHz & Transmit by 802.11n-HT40 at channel 5795MHz

The End

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

Refer to "1906RSU020-UT" file.

## **Appendix B - EUT Photograph**

Refer to "1906RSU020-UE" file.