RADIO TEST REPORT

Product	:	WLAN TRANSCEIVER
Model Name	:	IP110H
FCC ID	:	AFJ399510
Test Regulation	:	FCC 47 CFR Part 15 Subpart E (Section 15.407)
Received Date	:	2024/1/26
Test Date	:	2024/1/29 ~ 2024/2/1
Issued Date	:	2024/5/9
Applicant	:	Icom Incorporated 1-1-32, Kamiminami, Hirano-Ku, Osaka, 547-0003, Japan
Issued By	:	Underwriters Laboratories Taiwan Co., Ltd. Building A, B and E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Testing Laboratory
3398

REVISION HISTORY

Original Test Report No.: 4791025567-US-R1-V0

Revision	Test report No.	Date	Page revised	Contents
Original	4791025567-US-R1-V0	2024/5/9	-	Initial issue

Table of Contents

1. Attestation of Test Results

APPLICANT:	Icom Incorporated 1-1-32, Kamiminami, Hirano-Ku, Osaka, 547-0003, Japan
MANUFACTURER:	Icom Incorporated 1-1-32, Kamiminami, Hirano-Ku, Osaka, 547-0003, Japan
EUT DESCRIPTION:	WLAN TRANSCEIVER
BRAND:	ICOM
MODEL:	IP110H
SAMPLE STAGE:	Engineering Verification Test sample
DATE of TESTED:	2024/1/29 ~ 2024/2/1

APPLICABLE STANDARDS	
STANDARD	**Test Results**
FCC 47 CFR PART 15 Subpart E (Section 15.407)	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

Cindy Hsin Date : 2024/5/9
Project Handler

Approved and Authorized By:

Eric Lee Date : 2024/5/9
Senior Laboratory Engineer

2. Summary of Test Results

Summary of Test Results		
FCC Clause	**Test Items**	**Result**
15.407(e)	6dB Bandwidth	See Note 3
15.403(i)	26dB Bandwidth	See Note 3
2.1049	Occupied Bandwidth	See Note 1
15.407(a)(1/2/3)	Conducted Output Power	See Note 3
15.407(a)(1/2/3)	Power Spectral Density	See Note 3
15.407(g)	Frequency Stability	See Note 3
15.407(b) (1/2/3/4(i/ii)/9)	Radiated Emissions and Band Edge Measurement	PASS
15.407(b)(9)	AC Power Conducted Emission	PASS
15.203	Antenna Requirement	See Note 3
15.407(h)	Dynamic Frequency Selection & Transmit power control	See Note 2

Note:
1. The Occupied Bandwidth was reference only.
2. The “Dynamic Frequency Selection & Transmit power control measurement” was recorded in Report No.: 4790590080-US-R2-V0
3. This report is as a supplementary report of report no.: 4790590080-US-R1-V1. Except that AC Power Conducted Emission, Radiated Emissions below 1GHz, others result refer to the original report.

3. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with 47 CFR FCC Part 2, KDB 789033 D02 General UNII Test Procedure New Rules v02r01, KDB 414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013.

4. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building A, B and E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.

5. Measurement Uncertainty

For statement of conformity, simple acceptance (Section 3.1.4 of IEC Guide 115) was applied as decision rule for measurement in this test report.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor k=2.

Determining compliance based on the results of the compliance measurement, not considering measurement instrumentation uncertainty.

Measurement	Frequency	Uncertainty
Conducted disturbance at mains terminals ports	150kHz ~ 30MHz	3.1 dB
RF Conducted	9 kHz - 40GHz	2.3 dB
Radiated disturbance below 30MHz	9 kHz - 30 MHz	3.2 dB
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	6.1 dB
Radiated disturbance above 1 GHz	1GHz ~ 40GHz	5.1 dB

6. Equipment under Test

6.1. Description of EUT

Product	WLAN TRANSCEIVER	
Brand Name	ICOM	
Model Name	IP110H	
Operating Frequency	5180 ~ 5240 MHz, 5260 ~ 5320 MHz, 5500 ~ 5700 MHz, 5745 ~ 5825 MHz	
Modulation	256QAM, 64QAM, 16QAM, QPSK, BPSK	
Transfer Rate	802.11a: up to 54 Mbps 802.11n: up to MCS7 802.11ac: up to MCS9	
Number of Channel	5180 ~ 5240 MHz	4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		2 for 802.11n (HT40), 802.11ac (VHT40)
		1 for 802.11ac (VHT80)
	5260 ~ 5320 MHz	4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		2 for 802.11n (HT40), 802.11ac (VHT40)
		1 for 802.11ac (VHT80)
	5500 ~ 5700 MHz	11 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		5 for 802.11n (HT40), 802.11ac (VHT40)
		2 for 802.11ac (VHT80)
	5745 ~ 5825 MHz	5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		2 for 802.11n (HT40), 802.11ac (VHT40)
		1 for 802.11ac (VHT80)
Maximum Output Power	5180 ~ 5240 MHz: 7.38 dBm 5260 ~ 5320 MHz: 7.94 dBm 5500 ~ 5700 MHz: 7.84 dBm 5745 ~ 5825 MHz: 7.90 dBm	
Normal Voltage	5Vdc from host 3.75Vdc for battery	
Sample ID	Conducted Test: 6863912 Radiated Test: 6863912	
S/N	399543000464	

Note:

1. This report is as a supplementary report of report no.: 4790590080-US-R1-V1. The differences were as below:
   - Changed BT module, new model name is HRM1086.
   - Add one adapter table as below:

Newly			
Product	**Brand**	**Model**	**Description**
AC Adapter 2	ICOM	BC-258A	Input: 100-240V, 50/60Hz, 0.45A, Output: 5.0V, 2A
Original			
Product	**Brand**	**Model**	**Description**
AC Adapter 1	ICOM	BC-258	Input: 100-240V, 50/60Hz, 0.45A, Output: 5.0V, 2A
USB Cable	ICOM	OPC-2480	Length: 1m
Charger Cradle	ICOM	BC-257	-
AC Adapter (for Cradle)	ICOM	BC-228	-

2. The BT module in this project adopts the Contain ID method, so all conducted output power has been verified. Due to the addition of a new adapter, the worst case of AC Power Conducted Emission and Radiated Spurious Emission (below 1GHz) need to be performed, other test results are referred to the original report.

3. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitters and one receivers.

Modulation Mode	Tx,Rx Function
802.11a	1TX,1RX
802.11n (HT20)	1TX,1RX
802.11n (HT40)	1TX,1RX
802.11ac (VHT20)	1TX,1RX
802.11ac (VHT40)	1TX,1RX
802.11ac (VHT80)	1TX,1RX

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40 / VHT80, therefore investigated worst case to representative mode in test report.

4. The EUT contains following accessory devices.

Product	Brand	Model	Description
AC Adapter 1	ICOM	BC-258	Input: 100-240V, 50/60Hz, 0.45A, Output: 5.0V, 2A
AC Adapter 2	ICOM	BC-258A	Input: 100-240V, 50/60Hz, 0.45A, Output: 5.0V, 2A
USB Cable	ICOM	OPC-2480	Length: 1m
Charger Cradle	ICOM	BC-257	-
AC Adapter (for Cradle)	ICOM	BC-228	-

5. The EUT could be supplied with rechargeable battery as the following table:

Brand Name	Model	Description
ICOM	RB-LB1081	3.75V, 3200mAh 12Wh

6. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual, the laboratory shall not be held responsible.

6.2. Channel List

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

FOR 5260 ~ 5320MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290MHz

FOR 5500 ~ 5700MHz

11 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	-	-

5 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	-	-

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530MHz	122	5610 MHz

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz	-	-

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

6.3. Test Condition

Test Item	Test Site No.	Environmental Condition	Input Power	Test Date	Tested by
Radiated Spurious Emission	966-3	22~26℃/ 62~68%RH	5Vdc from host	2024/01/29	Eric Peng
AC power Line Conducted Emission	SR1	23~26℃/ 60~66%RH	120Vac/ 60Hz	2024/02/01	Eric Peng

FCC Test Firm Registration Number: 498077

Sample Calculation:

Radiated Spurious Emission:

- Where relevant, the follow sample calculation is provided:
  Result Value (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
  Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
  Example: Result Value (34.5dBuV/m) = Reading Value (40.1dBuV) + Antenna Factor (18.7dB/m) + Cable Loss (4.2dB) - Preamp Factor (28.5dB).

AC power Line Conducted Emission:

- Where relevant, the follow sample calculation is provided:
  Result Value (dBuV) = Reading Value (dBuV) + Correction Factor (dB).
  Correction Factor (dB) = Insertion loss(dB) + Cable loss(dB).
  Example: Result Value (53.7dBuV) = Reading Value (35.1dBuV) + Insertion loss(18.1dB) + Cable loss(0.5dB).

6.4. Description of Available Antennas

Ant. No.	Brand Name	Model Name	Ant. Type	Maximum Gain (dBi)
1	Japan Aviation Electronics Industry, Limited	AN01DL25C00R3200	Split ring	2.4GHz: 1.15 5.18~5.32GHz: 0.15 5.50~5.82GHz:0.62

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual, the laboratory shall not be held responsible.

6.5. Test Mode Applicability and Tested Channel Detail

- This report is as a supplementary report of report no.: 4790590080-US-R1-V1. The differences were as below:
  - Add one adapter, model name is BC-258A.

- According to the changed above, used the normal operation of radiated spurious emission (below 1GHz) and AC power line conduction emission needs to be performed only.

Test Item	Mode
Radiated Emissions (Below 1GHz)	Normal Operation
AC Power Line Conducted Emission	Normal Operation

7. Test Equipment

Test Equipment List					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date**	**Expired date**
Radiated Spurious Emission					
Spectrum Analyzer	Keysight	N9010A	MY56070827	2023/4/7	2024/4/6
EMI Test Receiver	Rohde & Schwarz	ESR7	101754	2023/11/22	2024/11/21
Loop Antenna	ETS lindgren	6502	00213440	2023/12/13	2024/12/12
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	774 & AT-N0538	2024/1/5	2025/1/4
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	01690	2023/12/8	2024/12/7
Horn Antenna (18-40 GHz)	Schwarzbeck	BBHA 9170	781	2023/12/27	2024/12/26
Preamplifier (30-1000 MHz)	EMCI	EMC330E	980405	2023/6/7	2024/6/6
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	2023/2/17	2024/2/16
Preamplifier (18-40GHz)	EMCI	EMC184040SEE	980426	2023/5/9	2024/5/8
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-4 & 170425-2	2023/11/29	2024/11/28
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-1 & 170214-2	2023/11/29	2024/11/28

Test Equipment List					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date**	**Expired date**
AC power Line Conducted Emission					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	2023/10/23	2024/10/22
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	2023/5/24	2024/5/23
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	2023/9/7	2024/9/6
Cables	TITAN	CFD200	T0732ACFD200 20A300-2	2023/5/23	2024/5/22

UL Software		
Description	**Name**	**Version**
Radiated measurement	e3	6.191211 (V6)
AC power Line Conducted Emission	EZ_EMC	UL-3A1.2

8. Description of Test Setup

Support Equipment

ID	Equipment	Brand Name	Model Name	S/N	Remark
A	AC Adapter	ICOM	BC-258A	NA	Supplied by Client
B	Microphone	ICOM	HM179PI	NA	Supplied by Client

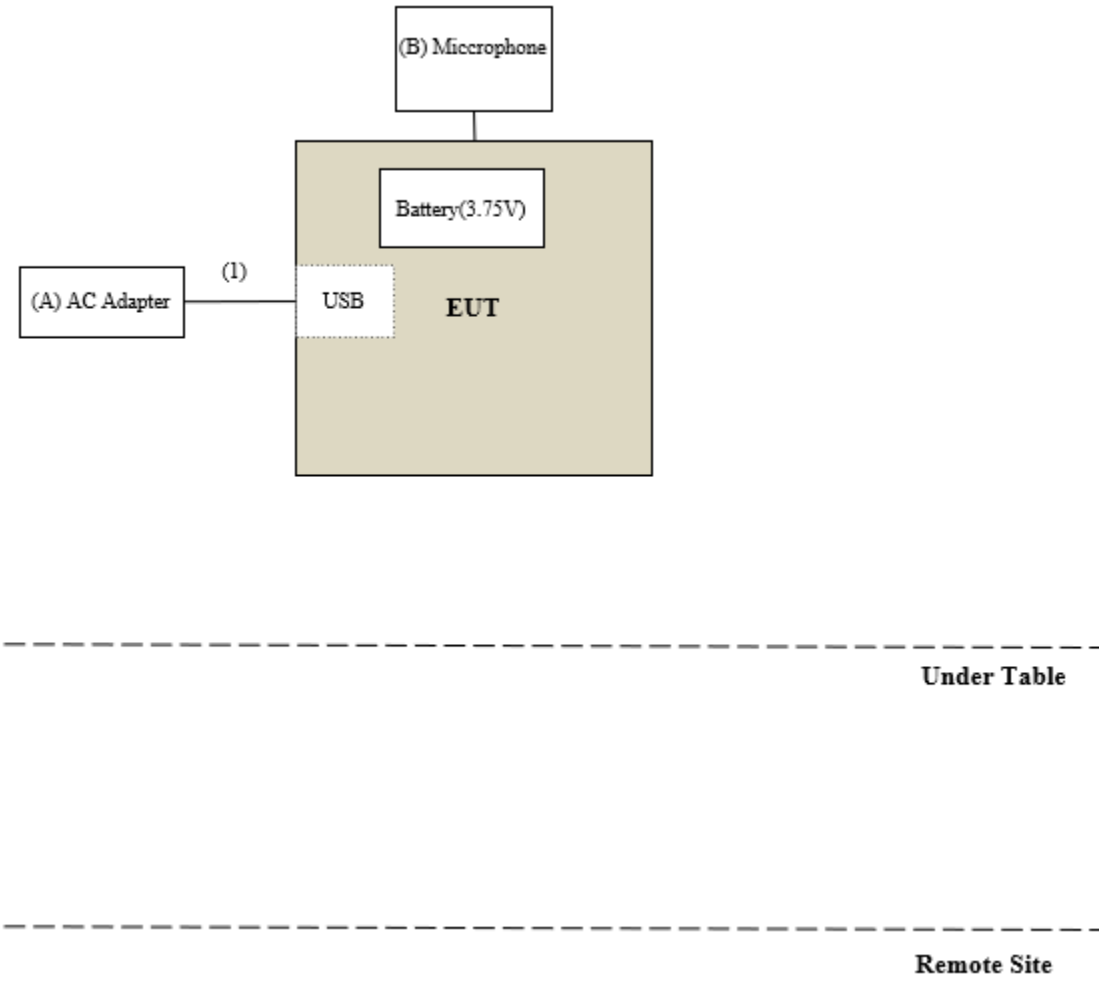
I/O Cables

ID	Equipment	Brand Name	Model Name	Length (m)	Remark
1	USB cable (typeA-typeC)	ICOM	OPC-2480	1	Supplied by Client

Test Setup

Controlled using a bespoke application (MFG Tool) on a test Notebook. The application was used to enable a continuous transmission mode and to select the test channels, data rates, modulation schemes and power setting as required.

Setup Diagram for Test



9. Test Results

9.1. Radiated Spurious Emission

Requirements

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequency(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

NOTE:
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBµV/m)	AV:54 (dBµV/m)
Frequency Band	**Applicable To**	**EIRP Limit**	**Equivalent Field Strength at 3m**
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBµV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	15.407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2(dBµV/m) *1 PK:105.2 (dBµV/m) *2 PK: 110.8(dBµV/m) *3 PK:122.2 (dBµV/m) *4
*1 beyond 75 MHz or more above of the band edge. *2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.			

Note:
The following formula is used to convert the effective isotropic radiated power (eirp) to field strength:

$E = \frac{1000000\sqrt{30P}}{3}$ µV/m, where P is the eirp (Watts).

Test Procedures

[For 9 kHz ~ 30 MHz]

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

NOTE:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

[For above 30 MHz]

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The height of antenna 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.
d. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

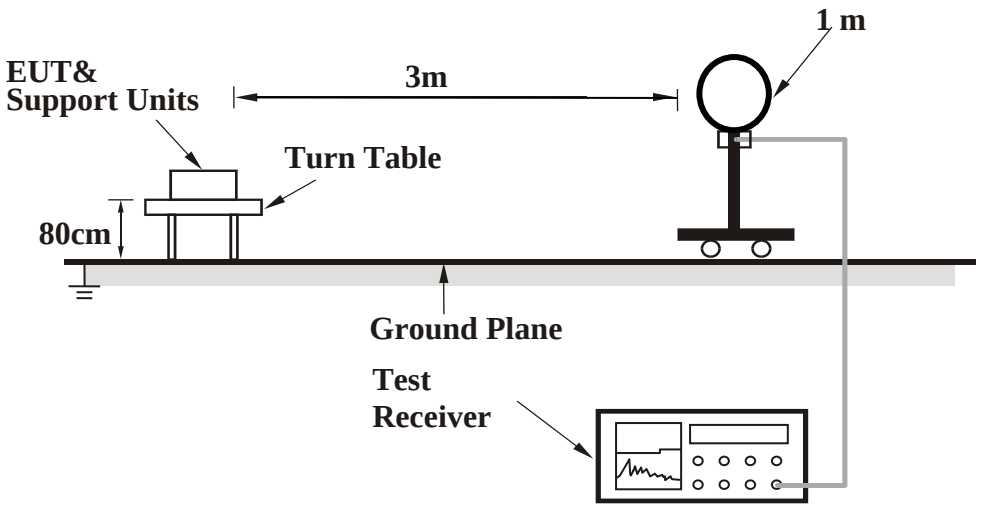
a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
b. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.

Configuration	Average	
	RBW	VBW
802.11a	1MHz	Duty cycle refer to original report.
802.11ac (VHT20)		
802.11ac (VHT40)		
802.11ac (VHT80)		

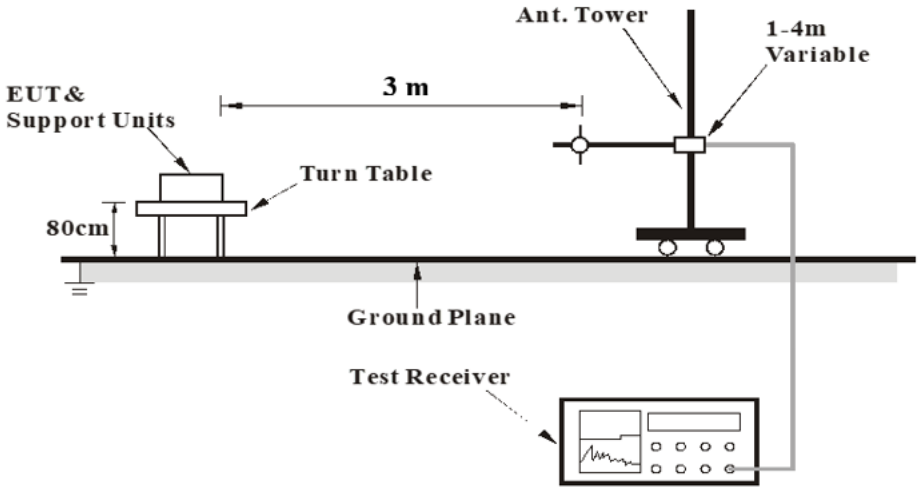
d. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
e. Test data of Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
f. Test data of Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
g. Test data of Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
h. Test data of Notation "@" = Fundamental Frequency
i. Test data of Notation " * " = Only required peak limit or the peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.

Test Setup

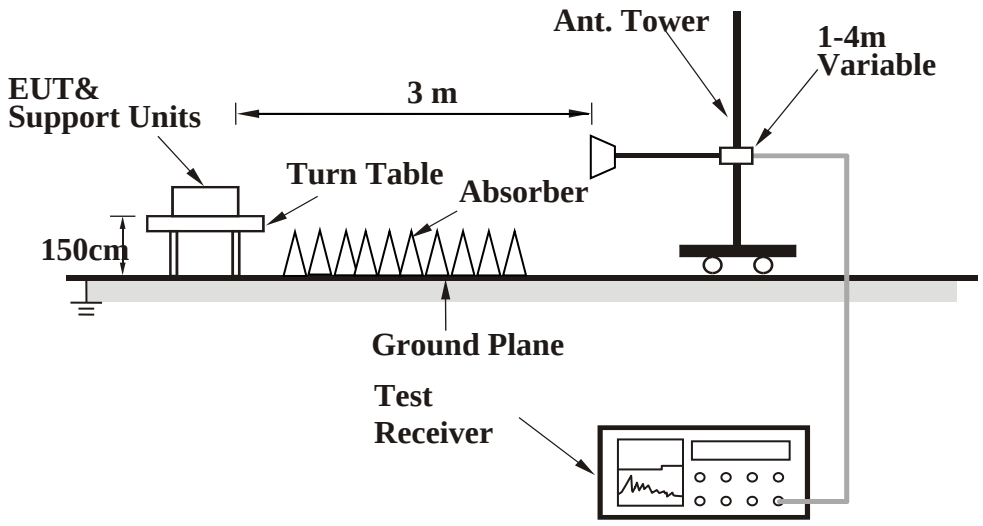
<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range 30 MHz ~ 1 GHz >



<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the Setup Configurations.

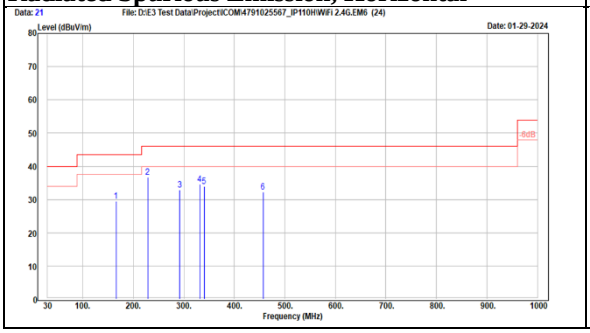
Test Data

Below 1 GHz

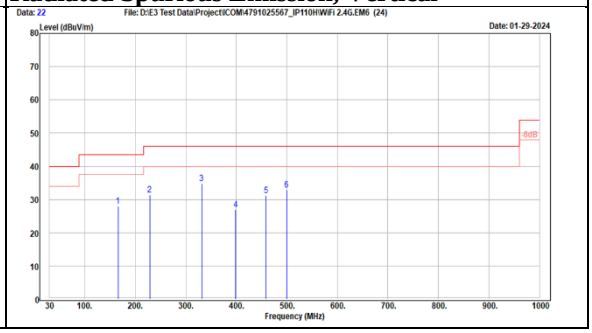
Mode	Normal operation	Channel	N/A

Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		165.8	40.07	-10.67	29.4	43.5	-14.1	PK
		228.85	50.05	-13.31	36.74	46	-9.26	PK
		291.9	42.83	-9.95	32.88	46	-13.12	PK
		331.67	43.36	-8.69	34.67	46	-11.33	PK
		340.4	42.46	-8.6	33.86	46	-12.14	PK
		456.8	37.44	-5.24	32.2	46	-13.8	PK
Vertical		165.8	38.59	-10.67	27.92	43.5	-15.58	PK
		228.85	44.79	-13.31	31.48	46	-14.52	PK
		331.67	43.47	-8.69	34.78	46	-11.22	PK
		398.6	33.98	-7.08	26.9	46	-19.1	PK
		458.74	36.42	-5.19	31.23	46	-14.77	PK
		499.48	37.37	-4.38	32.99	46	-13.01	PK

TX, Normal operation (N/A)
Radiated Spurious Emission, Horizontal



TX, Normal operation (N/A)
Radiated Spurious Emission, Vertical



9 kHz ~ 30 MHz Data:

For 9 kHz to 30 MHz radiated emission have performed all modes of operation were investigated. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

No non-compliance noted:

KDB 414788 D01 OATS and Chamber Correlation Justification

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- OATs and chamber correlation testing had been performed and chamber measured test results is the worst case test result.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

9.2. AC Power Line Conducted Emission

Requirements

Frequency (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

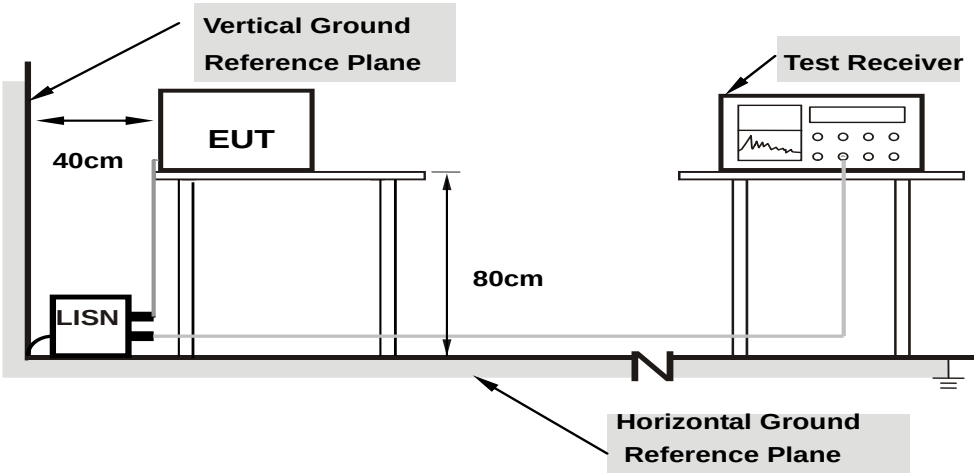
Note:
1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE:
1. The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.
2. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
3. Test data of Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB).
4. Test data of Margin(dB) = Result value (dBuV) - Limit value (dBuV).
5. Test data of Correction Factor (dB) = Insertion loss(dB) + Cable loss(dB).

Test Setup



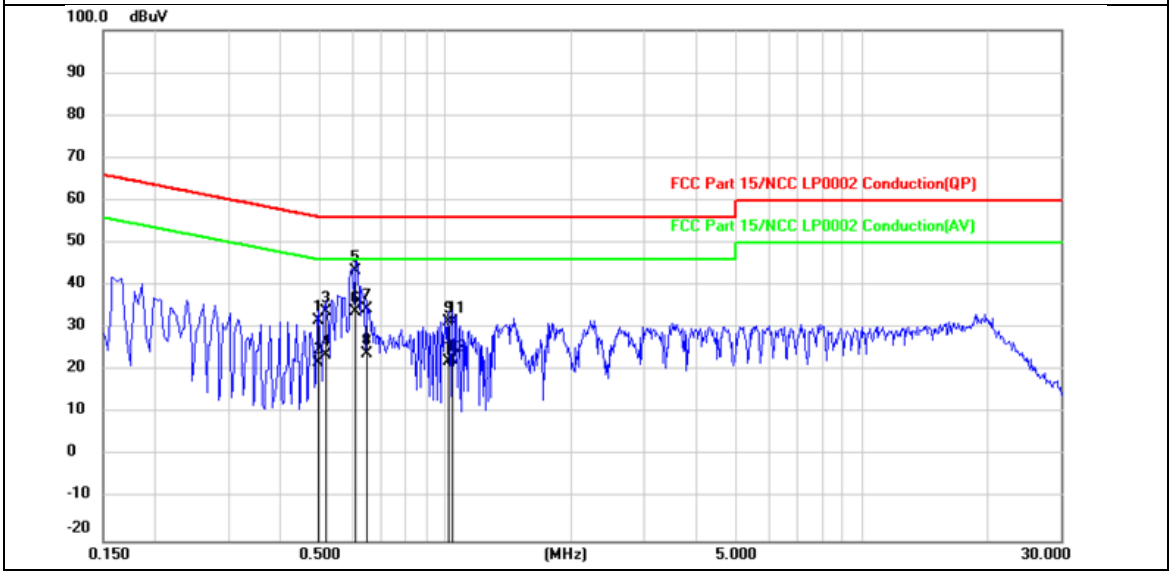
Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the Setup Configurations.

Test Data

Mode	Normal operation	Channel	N/A

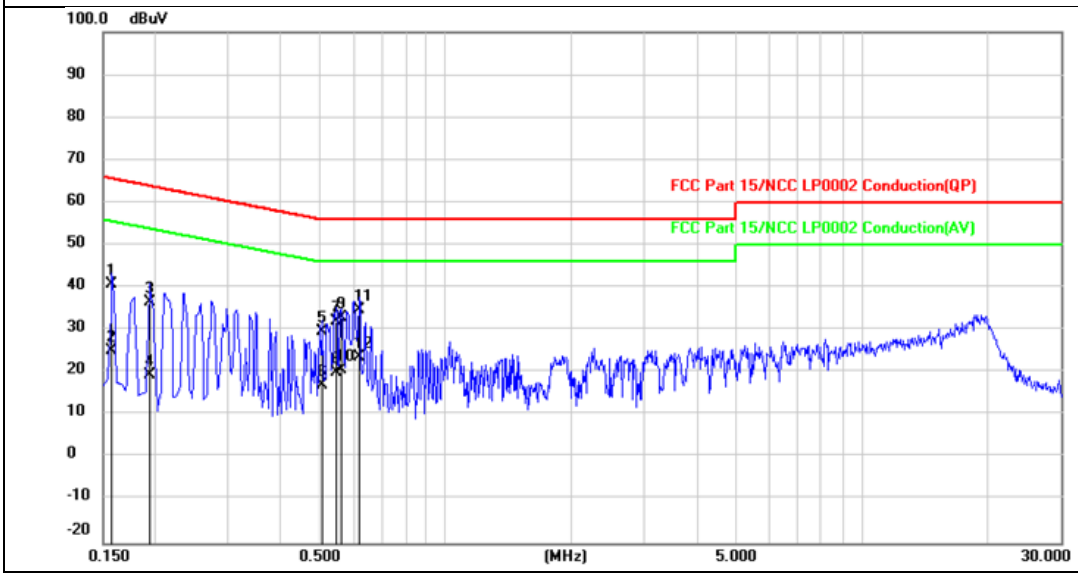
Phase: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.4940	21.70	9.95	31.65	56.10	-24.45	QP
2	0.4940	11.85	9.95	21.80	46.10	-24.30	AVG
3	0.5140	23.84	9.95	33.79	56.00	-22.21	QP
4	0.5140	13.64	9.95	23.59	46.00	-22.41	AVG
5	0.6060	33.52	9.96	43.48	56.00	-12.52	QP
6	0.6060	23.79	9.96	33.75	46.00	-12.25	AVG
7	0.6460	24.36	9.96	34.32	56.00	-21.68	QP
8	0.6460	13.91	9.96	23.87	46.00	-22.13	AVG
9	1.0140	21.39	9.98	31.37	56.00	-24.63	QP
10	1.0140	12.12	9.98	22.10	46.00	-23.90	AVG
11	1.0339	21.56	9.98	31.54	56.00	-24.46	QP
12	1.0339	12.35	9.98	22.33	46.00	-23.67	AVG

Mode	Normal operation	Channel	N/A

Phase: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	30.77	9.95	40.72	65.57	-24.85	QP
2	0.1580	15.13	9.95	25.08	55.57	-30.49	AVG
3	0.1940	26.66	9.94	36.60	63.86	-27.26	QP
4	0.1940	9.65	9.94	19.59	53.86	-34.27	AVG
5	0.5060	19.67	9.95	29.62	56.00	-26.38	QP
6	0.5060	7.19	9.95	17.14	46.00	-28.86	AVG
7	0.5460	22.17	9.95	32.12	56.00	-23.88	QP
8	0.5460	9.97	9.95	19.92	46.00	-26.08	AVG
9	0.5620	22.89	9.95	32.84	56.00	-23.16	QP
10	0.5620	10.77	9.95	20.72	46.00	-25.28	AVG
11	0.6180	24.81	9.95	34.76	56.00	-21.24	QP
12	0.6180	13.74	9.95	23.69	46.00	-22.31	AVG

END OF REPORT