

# FCC TEST REPORT

## (PART 24)



Applicant:	InHand Networks, Inc.
Address:	43671 Trade Center Place, Suite 100, Dulles, VA 20166 United States

Manufacturer or Supplier:	InHand Networks, Inc.
Address:	43671 Trade Center Place, Suite 100, Dulles, VA 20166 United States
Product:	Industrial Cellular Router
Brand Name:	inhand
Model Name:	IR315-FQ38-WLAN v2, IR325-FQ38-WLAN v2, IR355-FQ38-WLAN v2
FCC ID:	2BPWU-IR315
Date of tests:	Apr. 28, 2025 ~May. 11, 2025

The tests have been carried out according to the requirements of the following standard:

☒ **FCC PART 24, Subpart E** ☒ **FCC PART 2**  
☒ **ANSI/TIA/EIA-603-D** ☒ **ANSI/TIA/EIA-603-E** ☒ **ANSI C63.26-2015**

**CONCLUSION:** The submitted sample was found to COMPLY with the test requirement

Prepared by Hanwen Xu Engineer / Mobile Department	Approved by Peibo Sun Manager / Mobile Department
 Date: May. 11, 2025	 Date: May. 11, 2025

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

## TABLE OF CONTENTS

<b>RELEASE CONTROL RECORD .....</b>	<b>4</b>
<b>1 SUMMARY OF TEST RESULTS .....</b>	<b>5</b>
1.1 MEASUREMENT UNCERTAINTY .....	6
1.2 TEST SITE AND INSTRUMENTS .....	7
<b>2 GENERAL INFORMATION .....</b>	<b>9</b>
2.1 GENERAL DESCRIPTION OF EUT .....	9
2.2 CONFIGURATION OF SYSTEM UNDER TEST .....	11
2.3 DESCRIPTION OF SUPPORT UNITS .....	12
2.4 TEST ITEM AND TEST CONFIGURATION .....	12
2.5 EUT OPERATING CONDITIONS .....	13
2.6 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	13
<b>3 TEST TYPES AND RESULTS .....</b>	<b>14</b>
3.1 OUTPUT POWER MEASUREMENT .....	14
3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT .....	14
3.1.2 TEST PROCEDURES .....	14
3.1.3 TEST SETUP .....	15
3.1.4 TEST RESULTS .....	15
3.2 FREQUENCY STABILITY MEASUREMENT .....	22
3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT .....	22
3.2.2 TEST PROCEDURE .....	22
3.2.3 TEST SETUP .....	22
3.2.4 TEST RESULTS .....	22
3.3 OCCUPIED BANDWIDTH MEASUREMENT .....	23
3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT .....	23
3.3.2 TEST SETUP .....	23
3.3.3 TEST PROCEDURES .....	23
3.3.4 TEST RESULTS .....	23
3.4 BAND EDGE MEASUREMENT .....	24
3.4.1 LIMITS OF BAND EDGE MEASUREMENT .....	24
3.4.2 TEST SETUP .....	24
3.4.3 TEST PROCEDURES .....	25
3.4.4 TEST RESULTS .....	25
3.5 CONDUCTED SPURIOUS EMISSIONS .....	26
3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT .....	26
3.5.2 TEST PROCEDURE .....	26
3.5.3 TEST SETUP .....	26
3.5.4 TEST RESULTS .....	26
3.6 RADIATED EMISSION MEASUREMENT .....	27
3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT .....	27
3.6.2 TEST PROCEDURES .....	27
3.6.3 DEVIATION FROM TEST STANDARD .....	27

3.6.4 TEST SETUP .....	28
3.6.5 TEST RESULTS .....	30
3.7 PEAK TO AVERAGE RATIO .....	31
3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT .....	31
3.7.2 TEST SETUP .....	31
3.7.3 TEST PROCEDURES .....	31
3.7.4 TEST RESULTS .....	31
<b>4 INFORMATION ON THE TESTING LABORATORIES .....</b>	<b>32</b>
<b>5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....</b>	<b>32</b>
<b>6 APPENDIX .....</b>	<b>32</b>

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-NQN2505120212RF02	Original release	May. 11, 2025

## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 24 & Part 2		
STANDARD SECTION	TEST TYPE	RESULT
§2.1046	Conducted Output Power	Compliance
§24.232(c)	Equivalent Isotropic Radiated Power	Compliance
§2.1055 §24.235	Frequency Stability	Compliance
§2.1049	Occupied Bandwidth	Compliance
§24.232(d)	Peak to average ratio	Compliance
§24.238(a)(b)	Band Edge Measurements	Compliance
§2.1051 §24.238(a)(b)	Conducted Spurious Emissions	Compliance
§2.1053 §24.238(a)(b)	Radiated Spurious Emissions	Compliance

### \*Test Lab Information Reference

#### Lab A:

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

#### Lab Address:

Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province

**Accredited Test Lab Cert 6613.01**

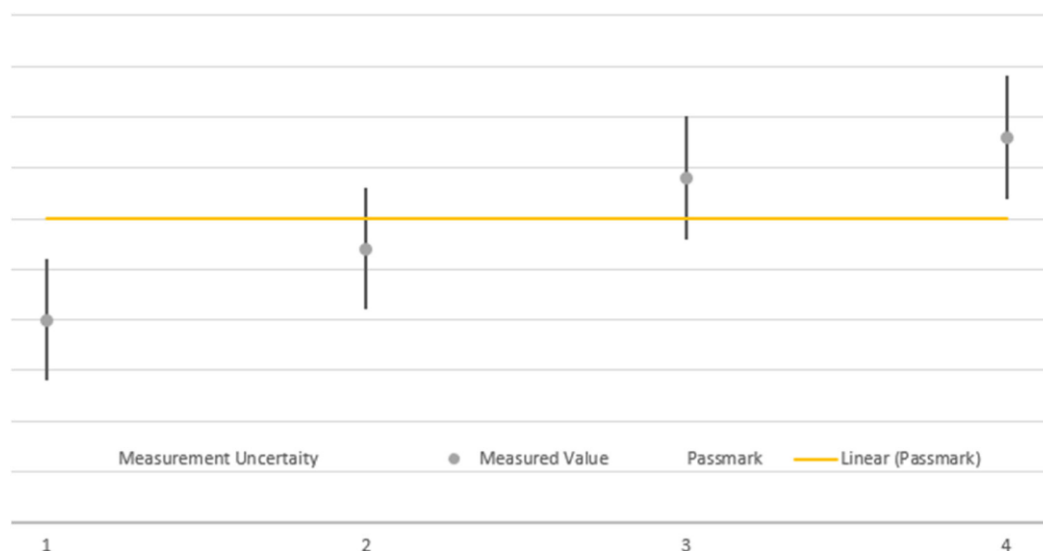
The FCC Site Registration No. is 434559; The Designation No. is CN1325.

## 1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
Frequency Stability	$\pm 76.97\text{Hz}$
Radiated emissions (9KHz~30MHz)	$\pm 2.68\text{dB}$
Radiated emissions & Radiated Power (30MHz~1GHz)	$\pm 4.98\text{dB}$
Radiated emissions & Radiated Power (1GHz ~6GHz)	$\pm 4.70\text{dB}$
Radiated emissions (6GHz ~18GHz)	$\pm 4.60\text{dB}$
Radiated emissions (18GHz ~40GHz)	$\pm 4.12\text{dB}$
Conducted emissions	$\pm 4.01\text{dB}$
Occupied Channel Bandwidth	$\pm 43.58\text{KHz}$
Conducted Output power	$\pm 2.06\text{dB}$
Band Edge Measurements	$\pm 4.70\text{dB}$
Peak to average ratio	$\pm 0.76\text{dB}$

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



The verdicts in this test report are given according the above diagram:

Case	Measured Value	Uncertainty Range	Verdict
1	below pass mark	below pass mark	Passed
2	below pass mark	within pass mark	Passed
3	above pass mark	within pass mark	Failed
4	above pass mark	above pass mark	Failed

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so-called shared risk principle.

## 1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Pre-Amplifier	R&S	SCU18F1	100815	Aug.30,23	Aug.29,25
Pre-Amplifier	R&S	SCU08F1	101028	Jan.22,24	Jan.21,26
Vector Signal Generator	R&S	SMBV100B	102176	Mar.29,24	Mar.28,26
Signal Generator	R&S	SMB100A	182185	Mar.29,24	Mar.28,26
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.25,22	Nov.24,25
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.25,22	Nov.24,25
EMI TEST Receiver	R&S	ESR26	101734	Mar.28,24	Mar.27,26
EMI TEST Receiver	R&S	ESW44	101973	Mar.28,24	Mar.27,26
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Dec.26,23	Dec.25,25
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,23	Aug.21,25
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Jul.15,24	Jul.14,26
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.22,23	Aug.21,25
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.23,24	Feb.22,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.19,24	Jun.18,26
Test Software	EMC32	EMC32	N/A	N/A	N/A
6DB attenuator	Tonscend Technology Co., Ltd	N/A	23062787	N/A	N/A
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	N/A	N/A
DC Source	HYELEC	HY3010B	551016	Aug.31,23	Aug.30,25
Hygrothermograph	DELI	20210528	SZ014	Sep.06,23	Sep.05,25
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A
CABLE	R&S	W13.02	N/A	Apr.27,25	Apr.26,26
CABLE	R&S	W12.14	N/A	Apr.27,25	Apr.26,26
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.27,25	Apr.26,26
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.27,25	Apr.26,26
Temperature Chamber	votsch	VT4002	58566078100050	May.30,24	May.29,26

- NOTE:**
1. The calibration interval of the above test instruments is 12 / 24/ 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
  2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.
  3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
  4. The FCC Site Registration No. is 434559; The Designation No. is CN1325.



## 2 GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT*</b>	Industrial Cellular Router	
<b>BRAND NAME*</b>	inhand	
<b>MODEL NAME*</b>	IR315-FQ38-WLAN v2, IR325-FQ38-WLAN v2, IR355-FQ38-WLAN v2	
<b>NOMINAL VOLTAGE*</b>	12.0Vdc(adapter or host equipment)	
<b>MODULATION TYPE*</b>	LTE Band 2: QPSK, 16QAM	
<b>FREQUENCY RANGE</b>	LTE Band 2 Channel Bandwidth: 1.4MHz	1850.7MHz ~ 1909.3MHz
	LTE Band 2 Channel Bandwidth: 3MHz	1851.5MHz ~ 1908.5MHz
	LTE Band 2 Channel Bandwidth: 5MHz	1852.5MHz ~ 1907.5MHz
	LTE Band 2 Channel Bandwidth: 10MHz	1855.0MHz ~ 1905.0MHz
	LTE Band 2 Channel Bandwidth: 15MHz	1857.5MHz ~ 1902.5MHz
	LTE Band 2 Channel Bandwidth: 20MHz	1860.0MHz ~ 1900.0MHz
<b>MAX. EIRP POWER</b>	LTE Band 2 Channel Bandwidth: 20MHz	172.58mW
<b>ANTENNA TYPE*</b>	4G sucker antenna Antenna with 2.94dBi gain for LTE B2	
<b>HW VERSION*</b>	V1.5	
<b>SW VERSION*</b>	V3.5	
<b>I/O PORTS*</b>	Refer to user's manual	
<b>EXTREME TEMPERATURE*</b>	-20°C~70 °C	
<b>EXTREME VOLTAGE*</b>	9 Vdc~36Vdc	

**NOTE1:** This product uses the module model EC25-AFXD; EC25-AFXD MINIPICIE and supports LTE frequency bands 2/4/5/12/13/14/66/71. Therefore, for this product, we referred to the test data reported by the EC25-AFXD; EC25-AFXD MINIPICIE module and evaluated the spectrum of radiated emissions and EIRP.

Please Refer to Module report EC25-AFXD; EC25-AFXD MINIPICIE  
 ( Report No.: R2203A0238-R2 FCC ID : XMR202008EC25AFXD )

**NOTE2:**

1. \*Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, Test Lab is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.
2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
LTE	1TX/2RX

4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
5. Antenna gain and EUT conducted cable loss are provided by the customer, and the laboratory will record the results based on these items that involve these two parameters.

**NOTE3 DIFFERENCE DESCRIPTION:**

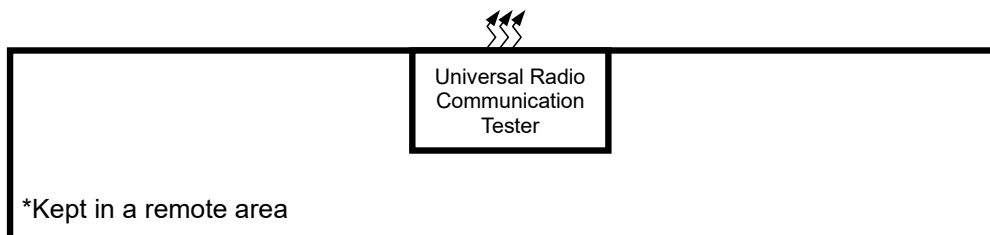
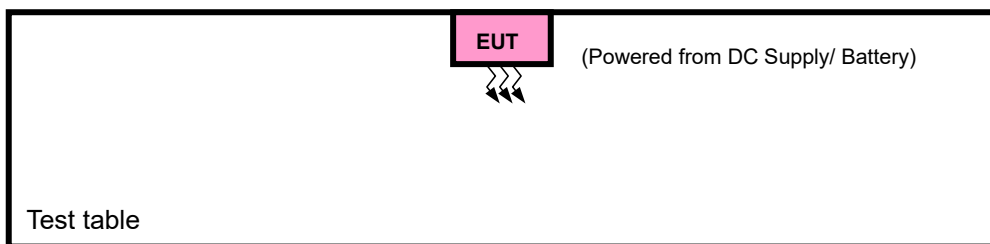
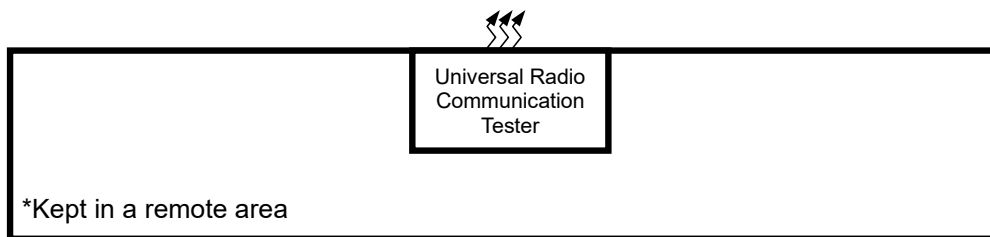
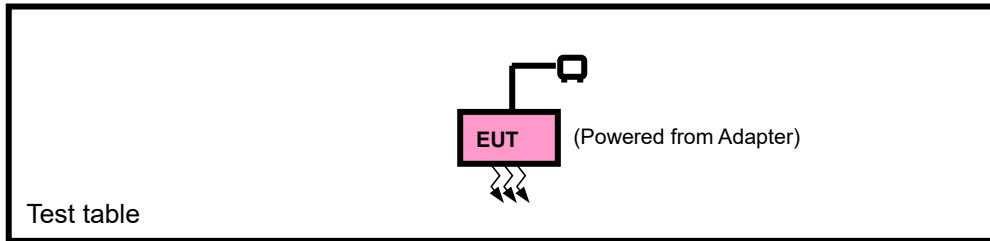
Test Model No.: IR315-FQ38-WLAN v2

Series Models NO: IR325-FQ38-WLAN v2, IR355-FQ38-WLAN v2

These three models are the same in these: appearance, PCB layout and basic software function; The only difference is that the products are used in different markets.

## 2.2 CONFIGURATION OF SYSTEM UNDER TEST

### FOR RADIATION EMISSION TEST



## 2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC Source	HYELEC	HY3010B	551016	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m

## 2.4 TEST ITEM AND TEST CONFIGURATION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case in EIRP and radiated emission was found when positioned on X-plane for GSM/EDGE/ LTE. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	EUT + Adapter with LTE link
B	EUT + DC Supply LTE link

### LTE BAND 2 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
A	EIRP	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM	1 RB / 0 RB Offset

**Note:** 1.This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

**TEST CONDITION:**

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP	25deg. C, 57%RH	DC12V By Adapter	Hanwen Xu
RADIATED EMISSION	23deg. C, 70%RH	DC12V By Adapter	Hanwen Xu

## 2.5 EUT OPERATING CONDITIONS

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

## 2.6 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 24**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**

**ANSI/TIA/EIA-603-D**

**ANSI/TIA/EIA-603-E**

**ANSI C63.26-2015**

**NOTE:** All test items have been performed and recorded as per the above standards.

## 3 TEST TYPES AND RESULTS

### 3.1 OUTPUT POWER MEASUREMENT

#### 3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile and portable stations are limited to 2 watts EIRP.

#### 3.1.2 TEST PROCEDURES

##### EIRP MEASUREMENT:

Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_T - L_C$$

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively

(expressed in the same units as  $P_{\text{Meas}}$ , typically dBW or dBm);

$P_{\text{Meas}}$  = measured transmitter output power or PSD, in dBm or dBW;

$G_T$  = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

$L_C$  = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

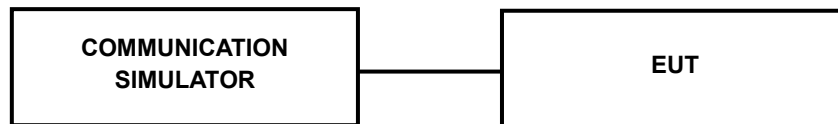
##### CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

### 3.1.3 TEST SETUP

**EIRP / ERP Measurement:**

**CONDUCTED POWER MEASUREMENT:**



### 3.1.4 TEST RESULTS

**CONDUCTED OUTPUT POWER (dBm)**

**Note :** The gain of this product has changed, therefore Power has been revaluated test. Please refer to the referenced module report for other test item results

**B2\_1.4MHz\_EIRP**

Band: 2 / Bandwidth: 1.4MHz / NTNV								
Modulation	Frequency (MHz)	RB Allocation		Conducted Power (dBm)	Gain (dBi)	EIRP (dBm)		Verdict
		Size	Offset			Result	Limit	
QPSK	1850.7	1	0	23.77	2.94	26.71	<=33.01	Pass
			2	24.06	2.94	27.00	<=33.01	Pass
			5	23.92	2.94	26.86	<=33.01	Pass
		3	0	23.92	2.94	26.86	<=33.01	Pass
			2	23.96	2.94	26.90	<=33.01	Pass
			3	23.91	2.94	26.85	<=33.01	Pass
		6	0	22.81	2.94	25.75	<=33.01	Pass
	1880	1	0	23.66	2.94	26.60	<=33.01	Pass
			2	23.90	2.94	26.84	<=33.01	Pass
			5	23.64	2.94	26.58	<=33.01	Pass
		3	0	23.61	2.94	26.55	<=33.01	Pass
			2	23.65	2.94	26.59	<=33.01	Pass
			3	23.58	2.94	26.52	<=33.01	Pass
		6	0	22.86	2.94	25.80	<=33.01	Pass
	1909.3	1	0	23.66	2.94	26.60	<=33.01	Pass
			2	23.73	2.94	26.67	<=33.01	Pass
			5	23.69	2.94	26.63	<=33.01	Pass
		3	0	23.75	2.94	26.69	<=33.01	Pass
			2	23.76	2.94	26.70	<=33.01	Pass
			3	23.76	2.94	26.70	<=33.01	Pass
		6	0	22.76	2.94	25.70	<=33.01	Pass
16QAM	1850.7	1	0	22.40	2.94	25.34	<=33.01	Pass
			2	22.62	2.94	25.56	<=33.01	Pass
			5	22.22	2.94	25.16	<=33.01	Pass
		3	0	22.49	2.94	25.43	<=33.01	Pass
			2	22.55	2.94	25.49	<=33.01	Pass
			3	22.51	2.94	25.45	<=33.01	Pass
		6	0	21.76	2.94	24.70	<=33.01	Pass
	1880	1	0	22.58	2.94	25.52	<=33.01	Pass
			2	22.54	2.94	25.48	<=33.01	Pass
			5	22.33	2.94	25.27	<=33.01	Pass
		3	0	22.59	2.94	25.53	<=33.01	Pass
			2	22.62	2.94	25.56	<=33.01	Pass
			3	22.45	2.94	25.39	<=33.01	Pass
		6	0	21.58	2.94	24.52	<=33.01	Pass
	1909.3	1	0	22.36	2.94	25.30	<=33.01	Pass
			2	22.56	2.94	25.50	<=33.01	Pass
			5	22.73	2.94	25.67	<=33.01	Pass
		3	0	22.83	2.94	25.77	<=33.01	Pass
			2	22.64	2.94	25.58	<=33.01	Pass
			3	22.35	2.94	25.29	<=33.01	Pass
		6	0	21.52	2.94	24.46	<=33.01	Pass

Note1: EIRP=Conducted Power+Antenna Gain



**B2\_3MHz\_EIRP**

Band: 2 / Bandwidth: 3MHz / NTNV								
Modulation	Frequency (MHz)	RB Allocation		Conducted Power (dBm)	Gain (dBi)	EIRP (dBm)		Verdict
		Size	Offset			Result	Limit	
QPSK	1851.5	1	0	23.91	2.94	26.85	<=33.01	Pass
			7	24.03	2.94	26.97	<=33.01	Pass
			14	24.12	2.94	27.06	<=33.01	Pass
		8	0	23.00	2.94	25.94	<=33.01	Pass
			4	22.95	2.94	25.89	<=33.01	Pass
			7	22.93	2.94	25.87	<=33.01	Pass
		15	0	22.91	2.94	25.85	<=33.01	Pass
			7	22.91	2.94	25.85	<=33.01	Pass
			14	22.91	2.94	25.85	<=33.01	Pass
	1880	1	0	23.76	2.94	26.70	<=33.01	Pass
			7	23.92	2.94	26.86	<=33.01	Pass
			14	23.91	2.94	26.85	<=33.01	Pass
		8	0	22.86	2.94	25.80	<=33.01	Pass
			4	22.83	2.94	25.77	<=33.01	Pass
			7	22.95	2.94	25.89	<=33.01	Pass
		15	0	22.87	2.94	25.81	<=33.01	Pass
			7	22.87	2.94	25.81	<=33.01	Pass
			14	22.87	2.94	25.81	<=33.01	Pass
	1908.5	1	0	23.57	2.94	26.51	<=33.01	Pass
			7	23.75	2.94	26.69	<=33.01	Pass
			14	23.69	2.94	26.63	<=33.01	Pass
		8	0	22.80	2.94	25.74	<=33.01	Pass
			4	22.44	2.94	25.38	<=33.01	Pass
			7	22.59	2.94	25.53	<=33.01	Pass
		15	0	22.69	2.94	25.63	<=33.01	Pass
			7	22.69	2.94	25.63	<=33.01	Pass
			14	22.69	2.94	25.63	<=33.01	Pass
16QAM	1851.5	1	0	22.61	2.94	25.55	<=33.01	Pass
			7	22.47	2.94	25.41	<=33.01	Pass
			14	22.43	2.94	25.37	<=33.01	Pass
		8	0	21.90	2.94	24.84	<=33.01	Pass
			4	21.95	2.94	24.89	<=33.01	Pass
			7	21.94	2.94	24.88	<=33.01	Pass
		15	0	21.89	2.94	24.83	<=33.01	Pass
			7	21.89	2.94	24.83	<=33.01	Pass
			14	21.89	2.94	24.83	<=33.01	Pass
	1880	1	0	22.49	2.94	25.43	<=33.01	Pass
			7	22.41	2.94	25.35	<=33.01	Pass
			14	22.49	2.94	25.43	<=33.01	Pass
		8	0	21.50	2.94	24.44	<=33.01	Pass
			4	21.64	2.94	24.58	<=33.01	Pass
			7	21.56	2.94	24.50	<=33.01	Pass
		15	0	21.65	2.94	24.59	<=33.01	Pass
			7	21.65	2.94	24.59	<=33.01	Pass
			14	21.65	2.94	24.59	<=33.01	Pass
	1908.5	1	0	22.59	2.94	25.53	<=33.01	Pass
			7	22.46	2.94	25.40	<=33.01	Pass
			14	21.72	2.94	24.66	<=33.01	Pass
		8	0	21.48	2.94	24.42	<=33.01	Pass
			4	21.47	2.94	24.41	<=33.01	Pass
			7	21.36	2.94	24.30	<=33.01	Pass
		15	0	21.72	2.94	24.66	<=33.01	Pass
			7	21.72	2.94	24.66	<=33.01	Pass
			14	21.72	2.94	24.66	<=33.01	Pass

Note1: EIRP=Conducted Power+Antenna Gain

**B2\_5MHz\_EIRP**

Band: 2 / Bandwidth: 5MHz / NTNV								
Modulation	Frequency (MHz)	RB Allocation		Conducted Power (dBm)	Gain (dBi)	EIRP (dBm)		Verdict
		Size	Offset			Result	Limit	
QPSK	1852.5	1	0	23.82	2.94	26.76	<=33.01	Pass
			13	23.85	2.94	26.79	<=33.01	Pass
			24	23.86	2.94	26.80	<=33.01	Pass
		12	0	22.75	2.94	25.69	<=33.01	Pass
			6	22.79	2.94	25.73	<=33.01	Pass
			13	22.81	2.94	25.75	<=33.01	Pass
		25	0	22.78	2.94	25.72	<=33.01	Pass
	1880	1	0	23.62	2.94	26.56	<=33.01	Pass
			13	23.56	2.94	26.50	<=33.01	Pass
			24	23.72	2.94	26.66	<=33.01	Pass
		12	0	22.63	2.94	25.57	<=33.01	Pass
			6	22.71	2.94	25.65	<=33.01	Pass
			13	22.65	2.94	25.59	<=33.01	Pass
		25	0	22.65	2.94	25.59	<=33.01	Pass
	1907.5	1	0	23.68	2.94	26.62	<=33.01	Pass
			13	23.54	2.94	26.48	<=33.01	Pass
			24	23.38	2.94	26.32	<=33.01	Pass
		12	0	22.08	2.94	25.02	<=33.01	Pass
			6	22.77	2.94	25.71	<=33.01	Pass
			13	22.34	2.94	25.28	<=33.01	Pass
		25	0	22.07	2.94	25.01	<=33.01	Pass
16QAM	1852.5	1	0	22.34	2.94	25.28	<=33.01	Pass
			13	22.23	2.94	25.17	<=33.01	Pass
			24	22.51	2.94	25.45	<=33.01	Pass
		12	0	21.55	2.94	24.49	<=33.01	Pass
			6	21.23	2.94	24.17	<=33.01	Pass
			13	21.53	2.94	24.47	<=33.01	Pass
		25	0	21.64	2.94	24.58	<=33.01	Pass
	1880	1	0	22.19	2.94	25.13	<=33.01	Pass
			13	22.34	2.94	25.28	<=33.01	Pass
			24	22.47	2.94	25.41	<=33.01	Pass
		12	0	21.42	2.94	24.36	<=33.01	Pass
			6	21.43	2.94	24.37	<=33.01	Pass
			13	21.43	2.94	24.37	<=33.01	Pass
		25	0	21.61	2.94	24.55	<=33.01	Pass
	1907.5	1	0	22.46	2.94	25.40	<=33.01	Pass
			13	22.13	2.94	25.07	<=33.01	Pass
			24	22.13	2.94	25.07	<=33.01	Pass
		12	0	21.67	2.94	24.61	<=33.01	Pass
			6	21.60	2.94	24.54	<=33.01	Pass
			13	21.30	2.94	24.24	<=33.01	Pass
		25	0	21.27	2.94	24.21	<=33.01	Pass

Note1: EIRP=Conducted Power+Antenna Gain

**B2\_10MHz\_EIRP**

Band: 2 / Bandwidth: 10MHz / NTN								
Modulation	Frequency (MHz)	RB Allocation		Conducted Power (dBm)	Gain (dBi)	EIRP (dBm)		Verdict
		Size	Offset			Result	Limit	
QPSK	1855	1	0	23.64	2.94	26.58	<=33.01	Pass
			25	24.30	2.94	27.24	<=33.01	Pass
			49	24.20	2.94	27.14	<=33.01	Pass
		25	0	22.69	2.94	25.63	<=33.01	Pass
			13	22.78	2.94	25.72	<=33.01	Pass
			25	22.70	2.94	25.64	<=33.01	Pass
		50	0	22.72	2.94	25.66	<=33.01	Pass
	1880	1	0	23.43	2.94	26.37	<=33.01	Pass
			25	23.60	2.94	26.54	<=33.01	Pass
			49	23.41	2.94	26.35	<=33.01	Pass
		25	0	22.61	2.94	25.55	<=33.01	Pass
			13	22.57	2.94	25.51	<=33.01	Pass
			25	22.47	2.94	25.41	<=33.01	Pass
		50	0	22.50	2.94	25.44	<=33.01	Pass
	1905	1	0	23.57	2.94	26.51	<=33.01	Pass
			25	23.82	2.94	26.76	<=33.01	Pass
			49	23.52	2.94	26.46	<=33.01	Pass
		25	0	22.46	2.94	25.40	<=33.01	Pass
			13	22.40	2.94	25.34	<=33.01	Pass
			25	22.46	2.94	25.40	<=33.01	Pass
		50	0	22.44	2.94	25.38	<=33.01	Pass
16QAM	1855	1	0	22.23	2.94	25.17	<=33.01	Pass
			25	22.42	2.94	25.36	<=33.01	Pass
			49	22.19	2.94	25.13	<=33.01	Pass
		25	0	21.66	2.94	24.60	<=33.01	Pass
			13	21.75	2.94	24.69	<=33.01	Pass
			25	21.77	2.94	24.71	<=33.01	Pass
		50	0	21.79	2.94	24.73	<=33.01	Pass
	1880	1	0	22.36	2.94	25.30	<=33.01	Pass
			25	22.32	2.94	25.26	<=33.01	Pass
			49	22.29	2.94	25.23	<=33.01	Pass
		25	0	21.36	2.94	24.30	<=33.01	Pass
			13	21.40	2.94	24.34	<=33.01	Pass
			25	21.33	2.94	24.27	<=33.01	Pass
		50	0	21.41	2.94	24.35	<=33.01	Pass
	1905	1	0	22.23	2.94	25.17	<=33.01	Pass
			25	22.43	2.94	25.37	<=33.01	Pass
			49	22.16	2.94	25.10	<=33.01	Pass
		25	0	21.25	2.94	24.19	<=33.01	Pass
			13	21.58	2.94	24.52	<=33.01	Pass
			25	21.48	2.94	24.42	<=33.01	Pass
		50	0	21.54	2.94	24.48	<=33.01	Pass

Note1: EIRP=Conducted Power+Antenna Gain

**B2\_15MHz\_EIRP**

Band: 2 / Bandwidth: 15MHz / NTN								
Modulation	Frequency (MHz)	RB Allocation		Conducted Power (dBm)	Gain (dBi)	EIRP (dBm)		Verdict
		Size	Offset			Result	Limit	
QPSK	1857.5	1	0	23.54	2.94	26.48	<=33.01	Pass
			38	23.29	2.94	26.23	<=33.01	Pass
			74	23.60	2.94	26.54	<=33.01	Pass
		36	0	22.61	2.94	25.55	<=33.01	Pass
			18	22.62	2.94	25.56	<=33.01	Pass
			39	22.62	2.94	25.56	<=33.01	Pass
		75	0	22.45	2.94	25.39	<=33.01	Pass
	1880	1	0	23.52	2.94	26.46	<=33.01	Pass
			38	23.43	2.94	26.37	<=33.01	Pass
			74	23.35	2.94	26.29	<=33.01	Pass
		36	0	22.48	2.94	25.42	<=33.01	Pass
			18	22.47	2.94	25.41	<=33.01	Pass
			39	22.43	2.94	25.37	<=33.01	Pass
		75	0	22.46	2.94	25.40	<=33.01	Pass
	1902.5	1	0	23.56	2.94	26.50	<=33.01	Pass
			38	23.58	2.94	26.52	<=33.01	Pass
			74	23.31	2.94	26.25	<=33.01	Pass
		36	0	22.48	2.94	25.42	<=33.01	Pass
			18	22.48	2.94	25.42	<=33.01	Pass
			39	22.40	2.94	25.34	<=33.01	Pass
		75	0	22.36	2.94	25.30	<=33.01	Pass
16QAM	1857.5	1	0	22.29	2.94	25.23	<=33.01	Pass
			38	22.20	2.94	25.14	<=33.01	Pass
			74	22.14	2.94	25.08	<=33.01	Pass
		36	0	21.15	2.94	24.09	<=33.01	Pass
			18	21.52	2.94	24.46	<=33.01	Pass
			39	21.45	2.94	24.39	<=33.01	Pass
		75	0	21.36	2.94	24.30	<=33.01	Pass
	1880	1	0	22.16	2.94	25.10	<=33.01	Pass
			38	22.19	2.94	25.13	<=33.01	Pass
			74	22.12	2.94	25.06	<=33.01	Pass
		36	0	21.21	2.94	24.15	<=33.01	Pass
			18	21.30	2.94	24.24	<=33.01	Pass
			39	21.25	2.94	24.19	<=33.01	Pass
		75	0	21.42	2.94	24.36	<=33.01	Pass
	1902.5	1	0	22.23	2.94	25.17	<=33.01	Pass
			38	22.23	2.94	25.17	<=33.01	Pass
			74	21.38	2.94	24.32	<=33.01	Pass
		36	0	21.53	2.94	24.47	<=33.01	Pass
			18	21.54	2.94	24.48	<=33.01	Pass
			39	21.41	2.94	24.35	<=33.01	Pass
		75	0	21.35	2.94	24.29	<=33.01	Pass

Note1: EIRP=Conducted Power+Antenna Gain

**B2\_20MHz\_EIRP**

Band: 2 / Bandwidth: 20MHz / NTN								
Modulation	Frequency (MHz)	RB Allocation		Conducted Power (dBm)	Gain (dBi)	EIRP (dBm)		Verdict
		Size	Offset			Result	Limit	
QPSK	1860	1	0	23.66	2.94	26.60	<=33.01	Pass
			50	23.74	2.94	26.68	<=33.01	Pass
			99	23.54	2.94	26.48	<=33.01	Pass
		50	0	22.37	2.94	25.31	<=33.01	Pass
			25	22.52	2.94	25.46	<=33.01	Pass
			50	22.37	2.94	25.31	<=33.01	Pass
		100	0	22.36	2.94	25.30	<=33.01	Pass
			0	23.13	2.94	26.07	<=33.01	Pass
			50	23.57	2.94	26.51	<=33.01	Pass
	1880	1	99	23.38	2.94	26.32	<=33.01	Pass
			0	22.31	2.94	25.25	<=33.01	Pass
			25	22.38	2.94	25.32	<=33.01	Pass
		50	50	22.32	2.94	25.26	<=33.01	Pass
			0	22.38	2.94	25.32	<=33.01	Pass
			0	23.09	2.94	26.03	<=33.01	Pass
		1	50	23.66	2.94	26.60	<=33.01	Pass
			99	23.39	2.94	26.33	<=33.01	Pass
			0	22.45	2.94	25.39	<=33.01	Pass
	1900	50	25	22.40	2.94	25.34	<=33.01	Pass
			50	22.29	2.94	25.23	<=33.01	Pass
			0	22.28	2.94	25.22	<=33.01	Pass
16QAM	1860	1	0	21.99	2.94	24.93	<=33.01	Pass
			50	22.16	2.94	25.10	<=33.01	Pass
			99	21.91	2.94	24.85	<=33.01	Pass
		50	0	21.34	2.94	24.28	<=33.01	Pass
			25	21.59	2.94	24.53	<=33.01	Pass
			50	21.39	2.94	24.33	<=33.01	Pass
		100	0	21.16	2.94	24.10	<=33.01	Pass
	1880	1	0	21.99	2.94	24.93	<=33.01	Pass
			50	22.21	2.94	25.15	<=33.01	Pass
			99	21.97	2.94	24.91	<=33.01	Pass
		50	0	21.35	2.94	24.29	<=33.01	Pass
			25	21.37	2.94	24.31	<=33.01	Pass
			50	21.41	2.94	24.35	<=33.01	Pass
		100	0	21.45	2.94	24.39	<=33.01	Pass
	1900	1	0	22.10	2.94	25.04	<=33.01	Pass
			50	22.26	2.94	25.20	<=33.01	Pass
			99	21.95	2.94	24.89	<=33.01	Pass
		50	0	21.35	2.94	24.29	<=33.01	Pass
			25	21.29	2.94	24.23	<=33.01	Pass
			50	21.30	2.94	24.24	<=33.01	Pass
		100	0	21.35	2.94	24.29	<=33.01	Pass

Note1: EIRP=Conducted Power+Antenna Gain

## 3.2 FREQUENCY STABILITY MEASUREMENT

### 3.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

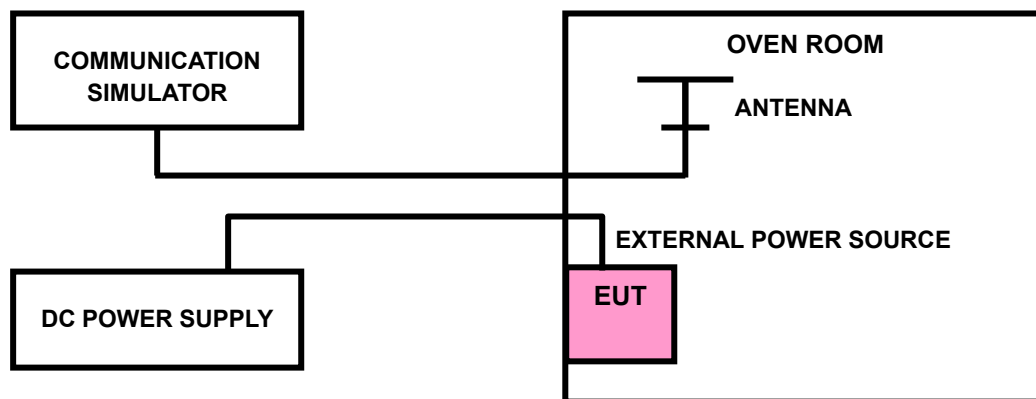
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### 3.2.2 TEST PROCEDURE

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

**NOTE:** The frequency error was recorded frequency error from the communication simulator.

### 3.2.3 TEST SETUP



### 3.2.4 TEST RESULTS

Please Refer to module EC25-AFXD; EC25-AFXD MINIPCIE report.

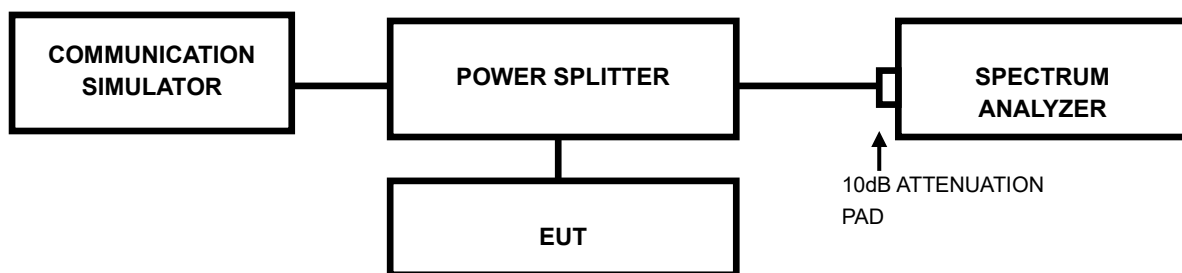
( Report No.: R2203A0238-R2 FCC ID : XMR202008EC25AFXD )

### 3.3 OCCUPIED BANDWIDTH MEASUREMENT

#### 3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

#### 3.3.2 TEST SETUP



#### 3.3.3 TEST PROCEDURES

- The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

#### 3.3.4 TEST RESULTS

Please Refer to module EC25-AFXD; EC25-AFXD MINIPCIE report.

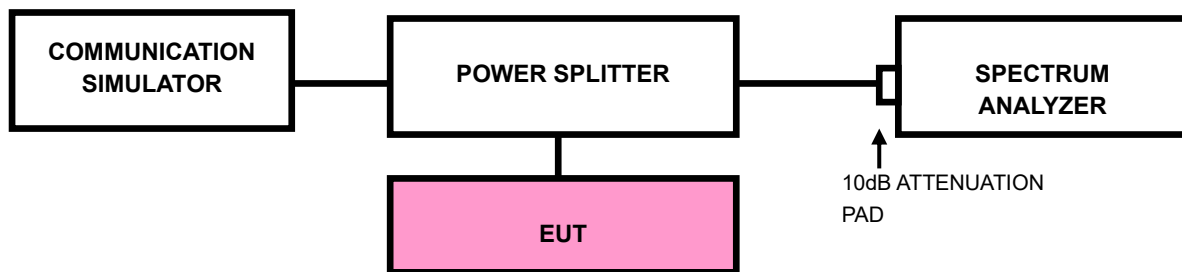
( Report No.: R2203A0238-R2 FCC ID : XMR202008EC25AFXD )

### 3.4 BAND EDGE MEASUREMENTC

#### 3.4.1 LIMITS OF BAND EDGE MEASUREMENT

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

#### 3.4.2 TEST SETUP





### 3.4.3 TEST PROCEDURES

- a) All measurements were done at low and high operational frequency range
- b) Connect the transmitter to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.
- c) Tune the analyzer to the nominal center frequency of the emission bandwidth (EBW)
- d) .Set the resolution bandwidth (RBW)  $\geq 1\%$  EBW in the 1MHz band immediately outside and adjacent to the band edge.
- e) Beyond the 1MHz band from the band edge, RBW=1MHz was used.
- f) Set the video bandwidth (VBW) to  $\geq 3 \times$  RBW.
- g) Select the average power (RMS) display detector.
- h) Set the number of measurement points to  $\geq 1001$ .
- i) Use auto-coupled sweep time.
- j) Perform the measurement over an interval of time when the transmission is continuous and at its maximum power level.
- k) The RF fundamental frequency should be excluded against the limit line in the operating frequency band and use RBW is 10KHz or 100KHz.
- l) Record the max trace plot into the test report.

### 3.4.4. TEST RESULTS

Please Refer to module EC25-AFXD; EC25-AFXD MINIPCIE report.  
( Report No.: R2203A0238-R2 FCC ID : XMR202008EC25AFXD )

### 3.5 CONDUCTED SPURIOUS EMISSIONS

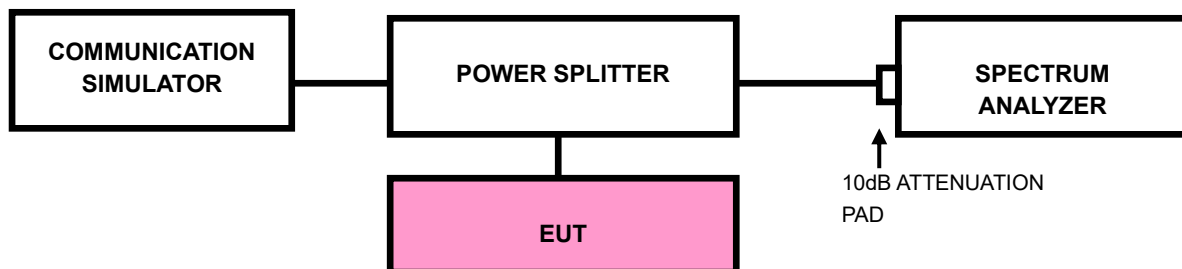
#### 3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to  $-13\text{dBm}$ .

#### 3.5.2 TEST PROCEDURE

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 30MHz up to a frequency including its 10<sup>th</sup> harmonic. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

#### 3.5.3 TEST SETUP



#### 3.5.4 TEST RESULTS

NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

Please Refer to module EC25-AFXD; EC25-AFXD MINIPCIE report.

( Report No.: R2203A0238-R2 FCC ID : XMR202008EC25AFXD )

### 3.6 RADIATED EMISSION MEASUREMENT

#### 3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to  $-13\text{dBm}$ .

#### 3.6.2 TEST PROCEDURES

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G
- c.  $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$

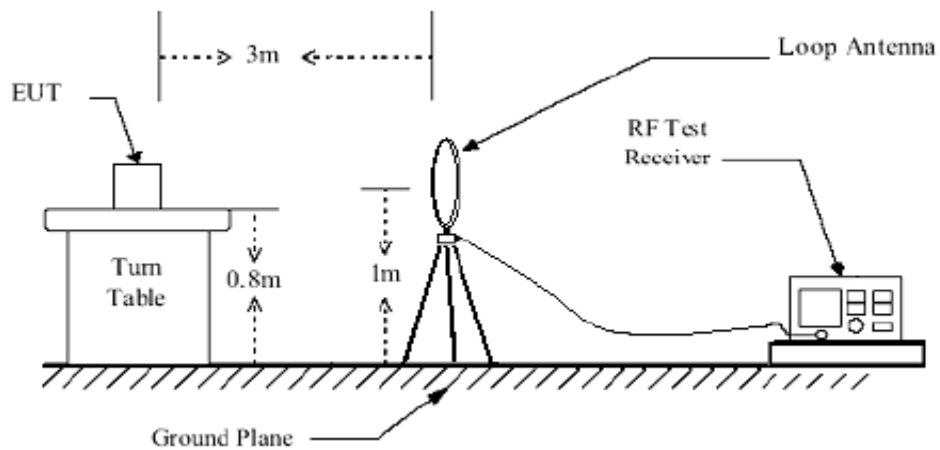
**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

#### 3.6.3 DEVIATION FROM TEST STANDARD

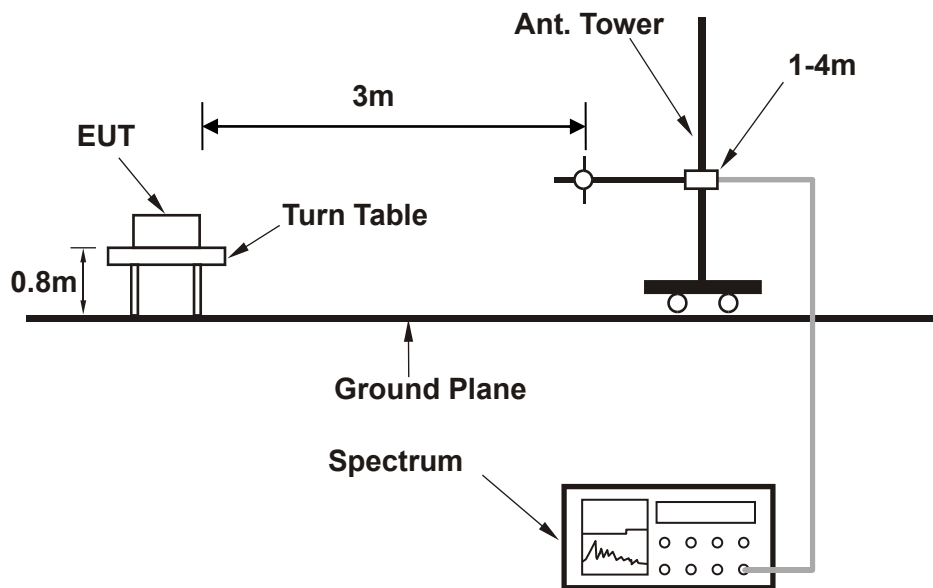
No deviation

### 3.6.4 TEST SETUP

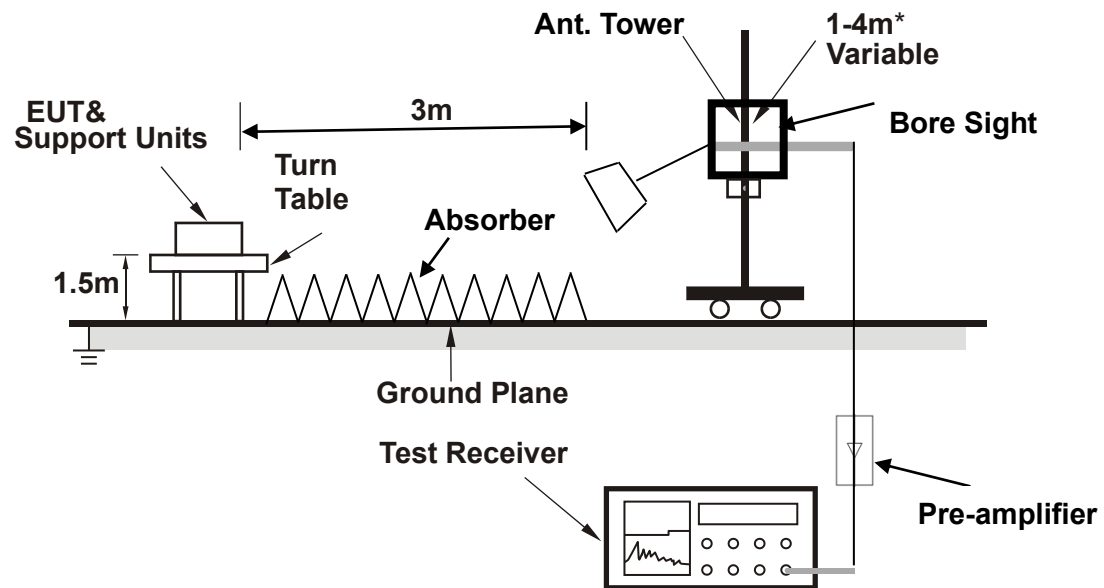
#### < Frequency Range below 30MHz >



#### < Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



**Note:** Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 3.6.5 TEST RESULTS

NOTE1 : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

NOTE2 : The measurement range is 30M to the tenth harmonic of the highest fundamental frequency, For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report

#### LTE band 2

Test result:

ANT1 Channel : 18900

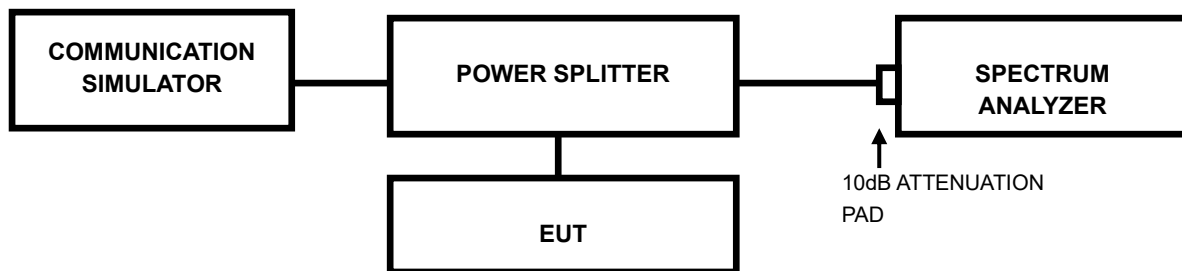
Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1152.60	-80.36	-13.00	Vertical
1435.40	-78.20	-13.00	Vertical
2411.11	-76.28	-13.00	Vertical
3123.00	-82.82	-13.00	Vertical
3555.00	-80.83	-13.00	Vertical
4701.00	-87.48	-13.00	Vertical

### 3.7 PEAK TO AVERAGE RATIO

#### 3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

#### 3.7.2 TEST SETUP



#### 3.7.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

#### 3.7.4 TEST RESULTS

Please Refer to module EC25-AFXD; EC25-AFXD MINIPCIE report.

( Report No.: R2203A0238-R2 FCC ID : XMR202008EC25AFXD )

## 4 INFORMATION ON THE TESTING LABORATORIES

We, Huarui 7layers High Technology (Suzhou) Co., Ltd. ,were founded in 2020 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

Lab Address:

Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province

Accredited Test Lab Cert 6613.01

If you have any comments, please feel free to contact us at the following:

**Suzhou EMC/RF Lab:**

Tel: +86 (0557) 368 1008

## 5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

## 6 APPENDIX

Please Refer to module EC25-AFXD; EC25-AFXD MINIPCIE report.

---END---