

**FCC 15.407 U-NII
(Permissive Change)
5GHz Test Report**

for

Contec Co., Ltd.

3-9-31, Himesato, Nishiyodogawa-ku, Osaka, 555-0025, Japan

**Product Name : IEEE802.11n/a/b/g Wireless
LAN Access Point Board**
Model Name : FXE3000-US
Brand : CONTEC
FCC ID : PQRFXE3000-US

**Prepared by: : AUDIX Technology Corporation,
EMC Department**



The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.

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TEST REPORT (Permissive Change)

Applicant : Contec Co., Ltd.
Manufacturer : Contec Co., Ltd.
EUT Description
(1) Product : IEEE802.11n/a/b/g Wireless LAN Access Point Board
(2) Model : FXE3000-US
(3) Brand : CONTEC
(4) Power Supply: DC 5-30V

Applicable Standards:

Title 47 FCC CFR Part 15 Subpart E

Audix Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report. **Audix Technology Corp.** does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2023. 10. 04

Reviewed by: Sabrina Wang (Sabrina Wang/Administrator)

Approved by: Johnny Hsueh (Johnny Hsueh/Section Manager)

1. REVISION RECORD OF TEST REPORT

Edition No	Issued Date	Revision Summary	Report Number
0	2023. 10. 04	Original Report	EM-F230491

2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	PASS
15.205/15.209	Undesirable Emissions Limits: Radiated Band Edge and Radiated Spurious Emission	PASS
15.407(a)	Maximum Output Power	PASS
15.407(a)	Power Spectral Density	PASS
15.203	Antenna Requirement	Compliance
Note: 1. Decision rule according to the limit of the test standard chapter, the test value is lower than the limit specified in the test chapter, and it is judged as Pass. 2. The uncertainties value is not used in determining the result. 3. Due to add new Antenna, above test item should be re-tested.		

3. GENERAL INFORMATION

3.1. Description of Application

Applicant	Contec Co., Ltd. 3-9-31, Himesato, Nishiyodogawa-ku, Osaka, 555-0025, Japan
Manufacturer	Contec Co., Ltd. 3-9-31, Himesato, Nishiyodogawa-ku, Osaka, 555-0025, Japan
Product	IEEE802.11n/a/b/g Wireless LAN Access Point Board
Model	FXE3000-US
Brand	CONTEC

3.2. Description of EUT

Test Model	FXE3000-US		
Serial Number	N/A		
Power Rating	DC 5-30V		
RF Features	802.11 a/b/g/n		
Transmit Type	2.4 GHz		
	802.11b	1T1R	
	802.11g	1T1R	
	802.11n-HT20	2T2R	
	802.11n-HT40	2T2R	
	UNII Bands		
	802.11a	1T1R	
	802.11n-HT20	2T2R	
Test Sample	Sample No.	Test Item	Firmware
	01	AC Conduction, RSE, Conducted	N/A
Sample Status	Trial sample		
Date of Receipt	2023. 09. 12		
Date of Test	2023. 09. 18 ~ 25		
Interface Ports of EUT	• None		
Accessories Supplied	• None		

Note: Pursuant ISO 17025:2017 section 7.8.2, Audix Technology Corp. does not assume responsibility for all EUT's information including RF features, transmit type, antenna information...etc are provided by customer.

3.3. Reference Test Guidance

KDB 789033 D02 General UNII Test Procedures New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10:2013

3.4. Information for Permissive Change

- The EUT is an addition version with original FCC ID: PQRFXE3000-US is to add new Dipole Antenna for Model FXE3000-US.
- The differences between this application and original's ID as clarify in following list.

Difference	Original	Permissive Change
Dipole Antenna	SANSEI ELECTRIC CO., LTD ANTDP-048A	Add new Dipole Antenna MOLEX 2158720101

- Due to above different item, there have some test item should be re-tested (see section 2), the test data are recorded in this report.

3.5. Antenna Information

2.4G Antenna							
No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)		Directional Gain (dBi)
					Chain 0	Chain 1	
1	MR-1700-W	Azure Solutions, Inc.	Low Profile Vertical	1700 to 2500	4	4	7.01 ^{Note1}
2	ACM3-5036-A1-CC-S (FX-ANT-A8)	INPAQ TECHNOLOGY CO., LTD	Chip (ANT3, ANT4)	2400 to 2500	3.0	3.0	6.01 ^{Note2}
3	ACM3-5036-A1-CC-S (Integrated Antenna)	INPAQ TECHNOLOGY CO., LTD	Chip (ANT1, ANT2)	2400 to 2500	3.0	3.0	6.01 ^{Note2}
4	ANTDP-048A0	SANSEI ELECTRIC CO., LTD	Dipole	2400 to 2500	2.14	2.14	5.15 ^{Note3}
5	2158720101*	MOLEX	Dipole	2400 to 2500	3.80	3.80	6.81 ^{Note4}
Note 1. Directional gain = $10 \log[(10^{4.0/20} + 10^{4.0/20})^2 / 2] = 7.01 \text{dBi}$ Note 2. Directional gain = $10 \log[(10^{3.0/20} + 10^{3.0/20})^2 / 2] = 6.01 \text{dBi}$ Note 3. Directional gain = $10 \log[(10^{2.14/20} + 10^{2.14/20})^2 / 2] = 5.15 \text{dBi}$ Note 4. Directional gain = $10 \log[(10^{3.80/20} + 10^{3.80/20})^2 / 2] = 6.81 \text{dBi}$							
Note: “*” Standing for adding new Antenna.							

5G Antenna							
No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)		Directional Gain (dBi)
					Chain 0	Chain 1	
1	MR-6000	Azure Solutions, Inc.	Low Profile Vertical	4900 to 6000	4	4	7.01 ^{Note1}
2	ACM3-5036-A1-CC-S (FX-ANT-A8)	INPAQ TECHNOLOGY CO., LTD	Chip (ANT3, ANT4)	5000 to 6000	3.3	3.3	6.31 ^{Note.2}
3	ACM3-5036-A1-CC-S (Integrated Antenna)	INPAQ TECHNOLOGY CO., LTD	Chip (ANT1, ANT2)	5000 to 6000	3.3	3.3	6.31 ^{Note2}
4	ANTDP-048A0	SANSEI ELECTRIC CO., LTD	Dipole	5100 to 5825	2.14	2.14	5.15 ^{Note3}
5	2158720101*	MOLEX	Dipole	5000 to 6000	4.60	4.60	7.61 ^{Note4}
Note 1. Directional gain = $10 \log[(10^{4.0/20} + 10^{4.0/20})^2 / 2] = 7.01 \text{dBi}$ Note 2. Directional gain = $10 \log[(10^{3.3/20} + 10^{3.3/20})^2 / 2] = 6.31 \text{dBi}$ Note 3. Directional gain = $10 \log[(10^{2.14/20} + 10^{2.14/20})^2 / 2] = 5.15 \text{dBi}$ Note 4. Directional gain = $10 \log[(10^{4.60/20} + 10^{4.60/20})^2 / 2] = 7.61 \text{dBi}$							
Note: “*” Standing for adding new Antenna.							

3.6.EUT Specifications Assessed in Current Report

Mode	U-NII Band	Fundamental Range (MHz)	Channel Number
802.11a	1	5180-5240	4
	2A	5260-5320	4
	2C	5500-5700	8
	3	5745-5825	5
802.11n-HT20	1	5180-5240	4
	2A	5260-5320	4
	2C	5500-5700	8
	3	5745-5825	5
802.11n-HT40	1	5190-5230	2
	2A	5270-5310	2
	2C	5510-5670	3
	3	5755-5795	2

Remark: U-NII Band 2A and 2C (DFS Function, Slave/no In service monitor, no Ad-Hoc mode)

Mode	Modulation	Data Rate (Mbps)
802.11a	OFDM (BPSK/QPSK/16QAM/64QAM)	Up to 54
802.11n-HT20	OFDM (BPSK/QPSK/16QAM/64QAM)	Up to 144.4
802.11n-HT40	OFDM (BPSK/QPSK/16QAM/64QAM)	Up to 300

Channel List											
802.11a/802.11n-HT20											
U-NII Band	Channel Number	Frequency (MHz)	U-NII Band	Channel Number	Frequency (MHz)	U-NII Band	Channel Number	Frequency (MHz)	U-NII Band	Channel Number	Frequency (MHz)
1	36	5180	2A	52	5260	2C	100	5500	3	149	5745
	40	5200		56	5280		104	5520		153	5765
	44	5220		60	5300		108	5540		157	5785
	48	5240		64	5320		112	5560		161	5805
							116	5580			
							132	5660			
							136	5680			
							140	5700			

Channel List											
802.11n-HT40											
U-NII Band	Channel Number	Frequency (MHz)	U-NII Band	Channel Number	Frequency (MHz)	U-NII Band	Channel Number	Frequency (MHz)	U-NII Band	Channel Number	Frequency (MHz)
1	38	5190	2A	54	5270	2C	62	5310	3	151	5755
	46	5230		62	5310		102	5510		159	5795
							110	5550			
							134	5670			

3.7. Description of Key Components

None

3.8. Test Configuration

Mode	TX _{on} (ms)	TX _{on+off} (ms)	Duty Cycle (x)	Duty Cycle Factor [10log(1/x)] (dB)
802.11a	2.020	2.050	0.985	N/A
802.11n-HT20	1.890	1.920	0.984	N/A
802.11n-HT40	0.920	0.950	0.968	0.141

Note: When duty cycle is less than 98% (0.98) that duty cycle factor 10log(1/x) is needed to add in conducted test items measured in average detector.



AC Conduction	
Normal operation	

Item	Mode	Data Rate	Test Channel	
Radiated Test Case	Radiated Spurious Emission (30MHz~1GHz)	802.11n-HT40	MCS8	159

Item	Mode	Data Rate	Test Channel	
Radiated Test Case	Radiated Band Edge Note1	802.11a	6 Mbps	36/64/100/140/149/165
		802.11n-HT20	MCS8	36/64/100/140/149/165
		802.11n-HT40	MCS8	38/62/102/134/151/159
	Radiated Spurious Emission Note1 & 2	802.11a	6 Mbps	36/60/116/157
		802.11n-HT20	MCS8	36/52/116/157
		802.11n-HT40	MCS8	46/54/110/159

Item	Mode	Data Rate	Test Channel	
Conducted Test Case	Maximum output power	802.11a	6 Mbps	36/64/100/140/149/165
		802.11n-HT20	MCS8	36/64/100/140/149/165
		802.11n-HT40	MCS8	38/62/102/134/151/159
	Power spectral density	802.11a	6 Mbps	36/64/100/140/149/165
		802.11n-HT20	MCS8	36/64/100/140/149/165
		802.11n-HT40	MCS8	38/62/102/134/151/159

Note 1: Mobile Device Portable Device,

and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow: Lie Side Stand

Note 2: Low, mid, and high channels were measured, only the worst channel of each modulation was presented in this report.

Note 3: The data rates were selected based on preliminary testing that identified rate as the worst case for output power.

3.9. Output Power Setting

Mode	Centre Frequency (MHz)	Power Setting
802.11a	5180	19.50
	5200	17.50
	5240	18.00
	5260	24.00
	5300	24.00
	5320	22.00
	5500	22.50
	5580	23.50
	5700	20.50
	5745	16.50
	5785	23.00
	5825	20.50
802.11n-HT20	5180	18.50
	5200	19.00
	5240	19.50
	5260	19.50
	5300	20.00
	5320	18.50
	5500	17.00
	5580	21.00
	5700	15.00
	5745	19.00
	5785	21.00
	5825	21.00
802.11n-HT40	5190	11.00
	5230	20.00
	5270	19.50
	5310	13.00
	5510	11.00
	5550	21.00
	5670	17.00
	5755	19.00
5795	24.00	

3.10. Tested Supporting System List

3.10.1. Support Peripheral Unit

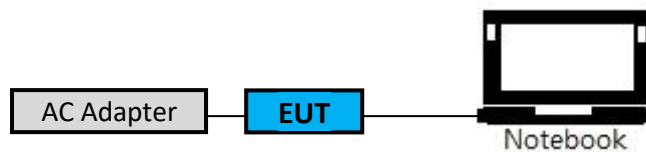
No.	Product	Brand	Model No.	Serial No.	Approval
1.	Notebook PC	acer	N22Q3	NHQGETA002255FD7600	Contains FCC ID: HLZMT7921
2.	AC Adapter	SINO-AMERICAN	SA115B-05U	N/A	N/A

3.10.2. Cable Lists

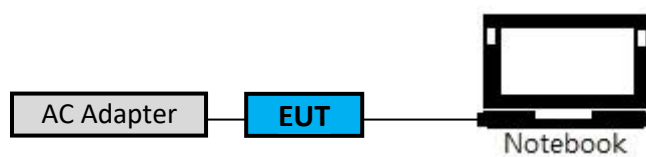
No.	Cable Description Of The Above Support Units
1.	LAN Cable : Unshielded, Detachable, 1.8m Adapter: LITEON, M/N PA-1900-32 DC Power Cable : Shielded, Undetachable, 1.7m, Bonded a ferrite core AC Power Cord : Unshielded, Detachable, 0.9m
2.	DC Power Cable : Shielded, Undetachable, 1.8m AC Power Cord : Unshielded, Detachable, 0.5m (2C)

3.11. Setup Configuration

3.11.1. EUT Configuration for Power Line & Radiated Emission



3.11.2. EUT Configuration for RF Conducted Test Items



3.12. Operating Condition of EUT

Test program “artgui” is used for enabling EUT WLAN function under continues transmitting and choosing data rate/ channel.

3.13. Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 491, Zhongfu Rd., Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2017 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724
Test Facilities	FCC OET Designation Number under APEC MRA by NCC is : TW1724 ISED CAB Identifier Number under APEC TEL MRA by NCC is TW1724 (1) No.8 Shielded Room (2) No.1 3m Semi Anechoic Chamber

3.14. Measurement Uncertainty

The measurement uncertainty levels have been estimated as specified in ETSI TR 100 028-2001

Test Items/Facilities		Frequency Range	Uncertainty
Conduction Test	<input type="checkbox"/> No. 7 Shielded Room	9kHz-150kHz	±3.7dB
		150kHz-30MHz	±3.4dB
	<input checked="" type="checkbox"/> No. 8 Shielded Room	9kHz-150kHz	±3.7dB
		150kHz-30MHz	±3.5dB
Radiation Test	<input checked="" type="checkbox"/> No.1 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±3.6dB
		200MHz-1000MHz, 3m, Horizontal	±4.3dB
		30MHz-200MHz, 3m, Vertical	±4.4dB
		200MHz-1000MHz, 3m, Vertical	±4.8dB
		1GHz-6GHz, 3m	±4.8dB
		6GHz-18GHz, 3m	±4.5dB
	<input type="checkbox"/> No.3 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.0dB
		200MHz-1000MHz, 3m, Horizontal	±4.4dB
		30MHz-200MHz, 3m, Vertical	±4.7dB
		200MHz-1000MHz, 3m, Vertical	±4.5dB
		1GHz-6GHz, 3m	±4.8dB
		6GHz-18GHz, 3m	±4.5dB
	<input type="checkbox"/> No.4 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.3dB
		200MHz-1000MHz, 3m, Horizontal	±4.2dB
		30MHz-200MHz, 3m, Vertical	±4.8dB
		200MHz-1000MHz, 3m, Vertical	±4.7dB
		1GHz-6GHz, 3m	±4.6dB
		6GHz-18GHz, 3m	±4.4dB
	<input type="checkbox"/> No.5 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.6dB
		200MHz-1000MHz, 3m, Horizontal	±4.4dB
		30MHz-200MHz, 3m, Vertical	±4.5dB
		200MHz-1000MHz, 3m, Vertical	±4.9dB
		1GHz-6GHz, 3m	±4.9dB
		6GHz-18GHz, 3m	±4.6dB
Radiated emissions (18GHz-40GHz)		18GHz-40GHz, 3m	±3.4dB

Remark : Uncertainty = $ku_c(y)$

Test Items	Uncertainty
Maximum output power	± 0.33dB
Power spectral density	± 0.13dB

4. MEASUREMENT EQUIPMENT LIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESR3	101774	2023.01.11	1 Year
2.	A.M.N.	R&S	ENV432	101567	2023.06.02	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-855-9	2022.12.19	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	100354	2022.12.14	1 Year
5.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.8 S/R	2023.04.13	1 Year
6.	Coaxial Cable	Yeida	RG/58AU	CE-08	2023.09.06	1 Year
7.	Test Software	Audix	e3	V9 18621a	N.C.R.	N.C.R.

4.2. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2023.08.16	1 Year
2.	Test Receiver	R&S	ESCS30	100338	2023.06.20	1 Year
3.	Amplifier	HP	8447D	2944A06305	2022.12.29	1 Year
4.	Microwave Amplifier	Keysight	83051A	MY56480113	2023.09.11	1 Year
5.	Microwave Amplifier	HP	8449B	3008A01284	2023.06.06	1 Year
6.	Loop Antenna	TESEQ	HLA 6121	60478	2023.02.21	1 Year
7.	Bilog Antenna	TESEQ	CBL6112D	33821	2023.06.30	1 Year
8.	Horn Antenna	EMCO	3115	9609-4927	2023.07.21	1 Year
9.	Horn Antenna	COM-POWER	AH-840	101092	2022.12.30	1 Year
10.	5G Notch Filter	Microwave Circuits	N0452502	459775	2023.05.03	1 Year
11.	5G Notch Filter	Microwave Circuits	N0555983	504921	2023.08.02	1 Year
12.	5G Notch Filter	Microwave Circuits	N0257881	459776	2023.08.01	1 Year
13.	Coaxial Cable	MIYAZAKI	5D2W	RE-11	2023.01.07	1 Year
14.	Coaxial Cable	HUBER+SUHNER	RG223/U	RE-33	2023.03.02	1 Year
15.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 106	RE-14	2023.01.07	1 Year
16.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	RE-30	2023.08.21	1 Year
17.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 3m A/C	2023.04.13	1 Year
18.	Test Software	Audix	e3	V9 18621a	N.C.R.	N.C.R.

4.3. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9020B-544	MY57120357	2023.02.22	1 Year
2.	Power Meter	Anritsu	ML2495A	2127005	2022.12.01	1 Year
3.	Power Sensor	Anritsu	MA2411B	1911360	2022.12.07	1 Year
4.	Digital Thermo-Hygro Meter	iMax	HTC-1	RF-03	2023.04.13	1 Year

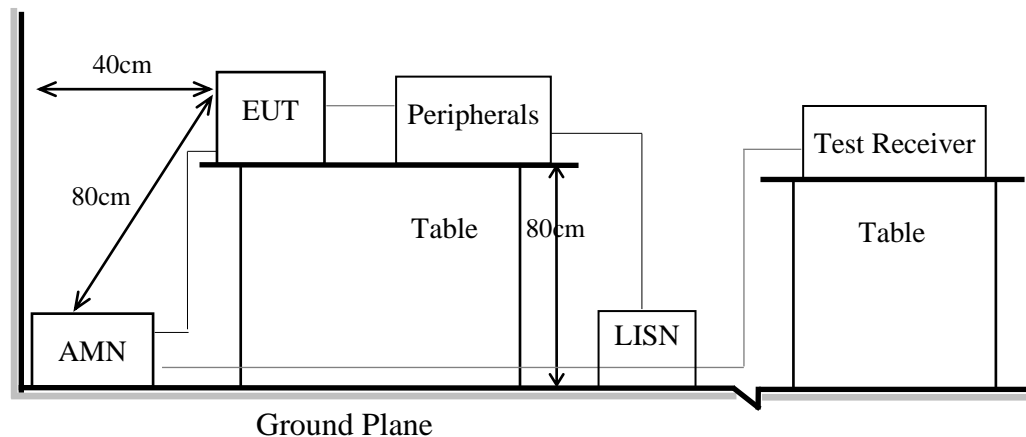
5. CONDUCTED EMISSION

5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT

Indicated as section 3.11

5.1.2. Shielded Room Setup Diagram



5.2. Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ V

Remark1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.

2.: The lower limit applies to the band edges.

5.3. Test Procedure

- 5.3.1. To set up the EUT as indicated in ANSI C63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.
- 5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).
- 5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.)
- 5.3.4. Checking frequency range from 150kHz to 30 MHz and record the emission which does not have 20 dB below limit.

5.4. Test Results

Please refer to Appendix A.

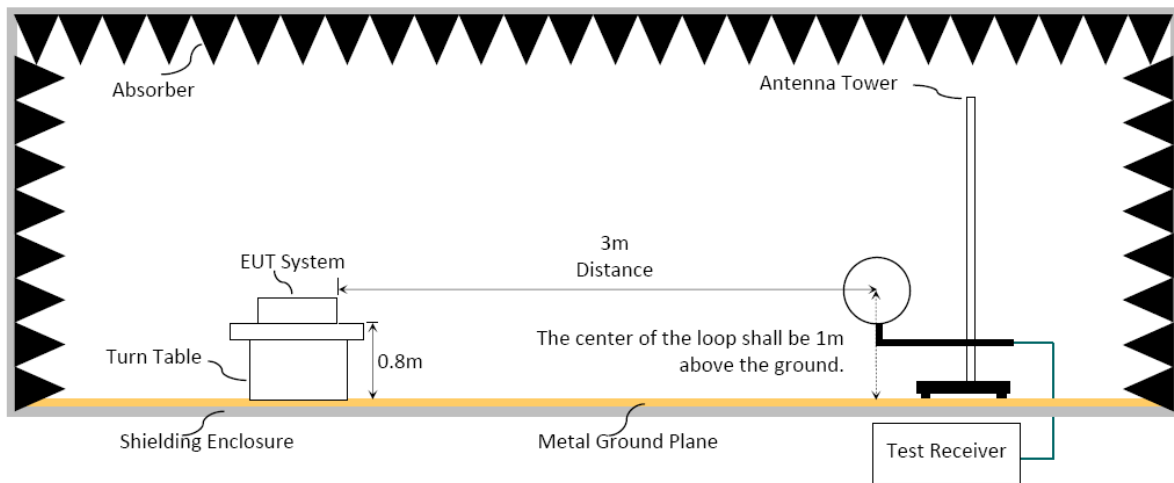
6. RADIATED EMISSION

6.1. Block Diagram of Test Setup

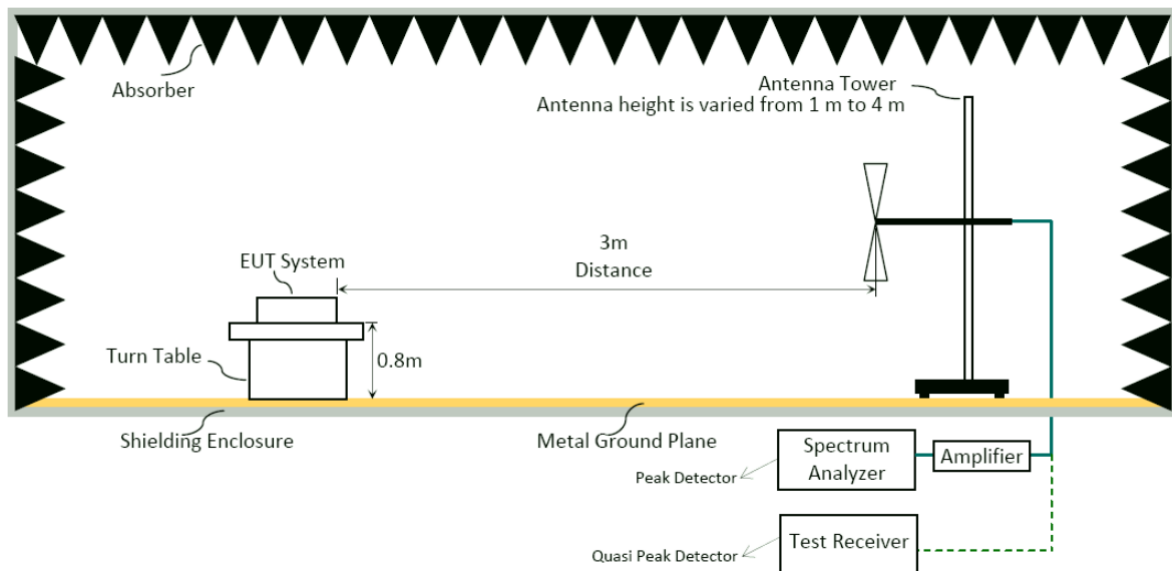
6.1.1. Block Diagram of EUT

Indicated as section 3.11

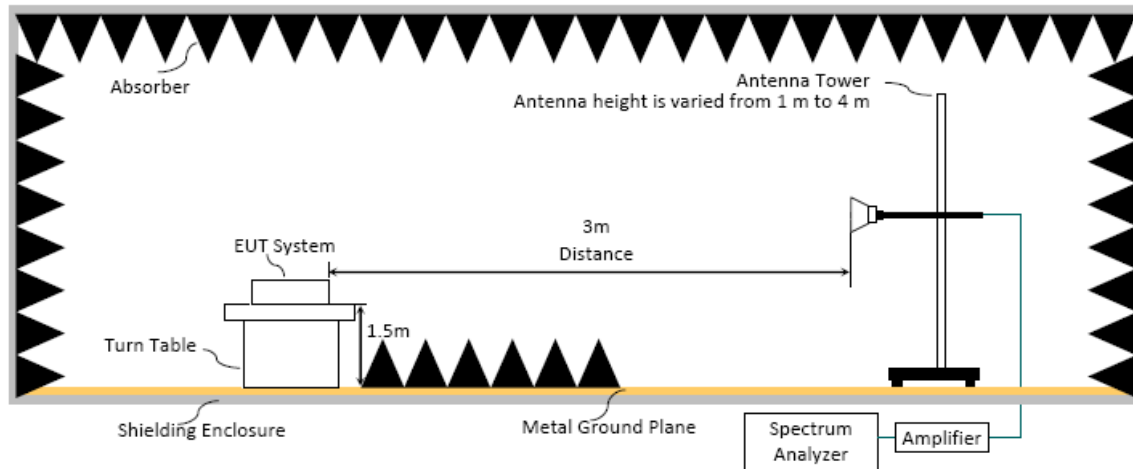
6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30-1000MHz



6.1.4. Setup Diagram for above 1GHz



6.2. Radiated Emission Limits

Radiated emissions fall in restricted bands, as defined in Section 15.205 must be in compliance with the radiated emission limits specified in 15.209 as below.

6.2.1. General Limit

Frequency (MHz)	Distance(m)	Limits	
		dB μ V/m	μ V/m
0.009 - 0.490	300	67.6-20 log f(kHz)	2400/f kHz
0.490 - 1.705	30	87.6-20 log f(kHz)	24000/f kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dB μ V/m (Peak) 54.0 dB μ V/m (Average)	

Remark : (1) dB μ V/m = 20 log (μ V/m)

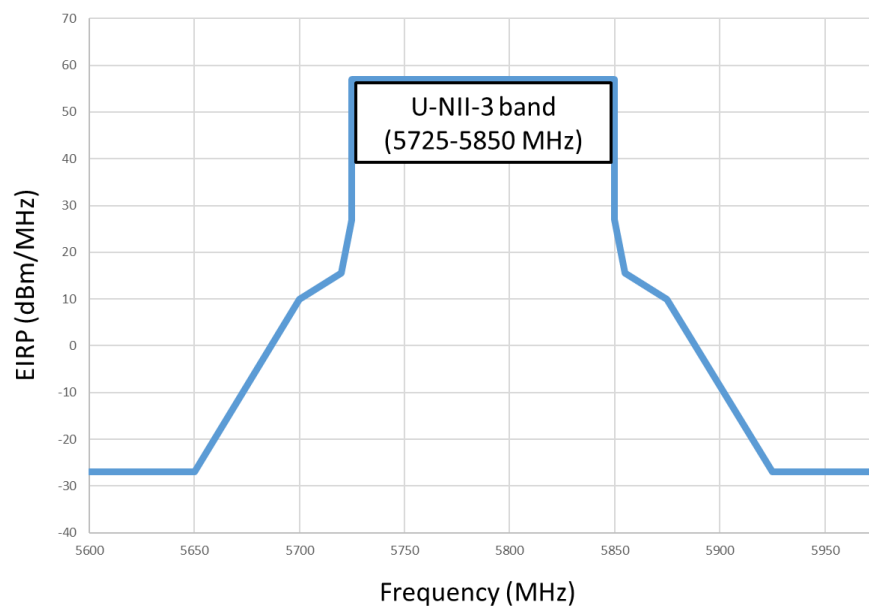
- (2) The tighter limit applies to the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) Fundamental and emission fall within operation band are exempted from this section.
- (5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

6.2.2. Limit for non-restricted frequency above 1 GHz

Frequency Band (MHz)	E.I.R.P. Limit	Field Strength Limit at 3 m
5150 to 5250	-27 dBm	68.2 dB μ V/m
5250 to 5350		68.2 dB μ V/m
5470 to 5725		68.2 dB μ V/m

Note: Field Strength at 3 m = E.I.R.P. + 95.2 dB

Frequency Band (MHz)	Field Strength Limit at 3 m	
5725 to 5850	<input checked="" type="checkbox"/>	15.407(b)(4)(i) All emissions shall be limited to a level of 68.2 dB μ V/m at 75 MHz or more above or below the band edge increasing linearly to 105.2 dB μ V/m at 25 MHz above or below the band edge increasing linearly to a level of 110.8 dB μ V/m at 5 MHz above or below the band edge increasing linearly to a level of 122.2 dB μ V/m at the band edge.
	<input type="checkbox"/>	15.407(b)(4)(ii), compliance with the emission limits in § 15.247(d) shall be at least 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c))



6.3. Test Procedure

Frequency Range 9kHz~30MHz:

The EUT setup on the turntable which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

- (1) RBW = 9kHz with peak and average detector.
- (2) Detector: average and peak (9kHz-490kHz)
Q.P. (490kHz-30MHz)

Frequency Range 30MHz ~ 40GHz:

The EUT setup on the turn table which has 80cm (for 30-1000MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

Frequency below 1GHz:

Spectrum Analyzer is used for pre-testing with following setting:

- (1)RBW = 120kHz
- (2)VBW $\geq 3 \times$ RBW.
- (3)Detector = Peak.
- (4)Sweep time = auto.
- (5)Trace mode = max hold.
- (6)Allow sweeps to continue until the trace stabilizes.

Note 1: When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required, otherwise using Q.P. for final measurement.

Note 2: When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

Frequency above 1GHz to 10th harmonic(up to 40 GHz):

Peak Detector:

- (1)RBW = 1MHz
- (2)VBW $\geq 3 \times$ RBW.
- (3)Detector = Peak.
- (4)Sweep time = auto.
- (5)Trace mode = max hold.
- (6)Allow sweeps to continue until the trace stabilizes.

Note: When peak-detected value is lower than limit that the measurement using the average detector is not required, otherwise using average detector for final measurement.

Average Detector:

Option 1:

(1) RBW = 1MHz

(2) VBW $\geq 1/T$. (Duty Cycle < 98%, when duty cycle presented in section 3.8)

Modulation Type	VBW Setting
802.11n-HT40	1.1kHz

(3) VBW = set VBW \leq RBW / 100, but not less than 10Hz (Duty Cycle \geq 98%, when duty cycle presented in section 3.7)

Modulation Type	VBW Setting
802.11a	10Hz
802.11n-HT20	10Hz

(4) Detector = Peak.

(5) Sweep time = auto.

(6) Trace mode = max hold.

(7) Allow sweeps to continue until the trace stabilizes.

Option 2:

Average Emission Level(dB μ V/m) = Peak Emission Level(dB μ V/m) + DCCF(dB).

6.4. Measurement Result Explanation

Peak Emission Level(dB μ V/m) = Antenna Factor(dB/m) + Cable Loss (dB) – Preamp Gain (dB) + Reading(dB μ V).

Average Emission Level(dB μ V/m) = Antenna Factor(dB/m) + Cable Loss (dB) – Preamp Gain (dB) + Reading(dB μ V).

Average Emission Level(dB μ V/m) = Peak Emission Level(dB μ V/m) + DCCF(dB)
Duty Cycle Correction Factor (DCCF)(dB) = $20\log(TX_{on}/TX_{on+off})$ presented in section 3.8.

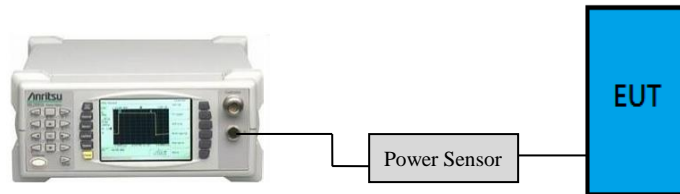
ERP(dBm) = Peak Emission Level(dB μ V/m) - 95.2dB - 2.14dB

6.5. Test Results

Please refer to Appendix A.

7. MAXIMUM OUTPUT POWER

7.1. Block Diagram of Test Setup



7.2. Specification Limits

Frequency Band (MHz)	Category	Limit
5150 to 5250	Outdoor Access Point	1 W(30 dBm)/ Max e.i.r.p. ≤ 125 mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon
	Fixed point-to-point Access Point	1 W(30 dBm)
	Indoor Access Point	1 W(30 dBm)
	Mobile and Portable client device	250 mW(24 dBm)
5250 to 5350	N/A	250 mW or $11 \text{ dBm} + 10 \log B^{\text{Note1}}$
5470 to 5725		250 mW or $11 \text{ dBm} + 10 \log B^{\text{Note1}}$
5725 to 5850		1 W(30 dBm)

Note 1: B is the 26 dB emission bandwidth, which presented in section 7 and appendix A.1.

7.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v02r01:

■ **Method AVGPM (Measurement using an RF average power meter):**

EUT is connected to power sensor and record the maximum average output power and duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

■ **Method AVGSA-2 (Spectrum channel power) for 802.11ac-VHT80/160, 802.11ax-HE80/160 modes only**

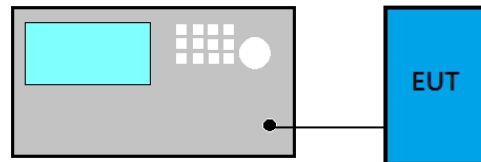
- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 MHz
- (3) Set the video bandwidth (VBW) \geq 3 MHz.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
- (8) Duty cycle factor is added when duty cycle presented in section 3.8 is < 98%.

7.4. Test Results

Please refer to Appendix A

8. POWER SPECTRAL DENSITY

8.1. Block Diagram of Test Setup



8.2. Specification Limits

Frequency Band (MHz)	Category	Limit
5150 to 5250	Outdoor Access Point	17dBm/MHz
	Fixed point-to-point Access Point	
	Indoor Access Point	
	Mobile and Portable client device	11 dBm/MHz
5250 to 5350	N/A	11 dBm/MHz
5470 to 5725		11 dBm/MHz
5725 to 5850		30dBm/500 kHz

8.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v02r01:

■ Method AVGSA-2

- (1) Set span to encompass the EBW (or 99% OBW) of the signal.
- (2) Set RBW = 1 MHz (Applicable to all bands except to 5725 MHz- 5850 MHz)/
Set RBW=100 KHz(when EUT operate at 5725 MHz- 5850 MHz)
- (3) Set the video bandwidth (VBW) ≥ 3 RBW.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Use peak search function to find out the maximum power density.
- (8) Duty cycle factor is added when duty cycle presented in section 3.8 is $< 98\%$.
- (9) Offset BWCF (7dB) when EUT operate at 5725 MHz – 5850 MHz.

8.4. Test Results

Please refer to Appendix A

9. DEVIATIO DEVIATION TO TEST SPECIFICATIONS

【NONE】



*Audix Technology Corp.
No. 491, Zhongfu Rd., Linkou Dist.,
New Taipei City 244, Taiwan*

*Tel: +886 2 26099301
Fax: +886 2 26099303*

APPENDIX A

TEST DATA AND PLOTS

(Model: FXE3000-US)



*Audix Technology Corp.
No. 491, Zhongfu Rd., Linkou Dist.,
New Taipei City 244, Taiwan*

*Tel: +886 2 26099301
Fax: +886 2 26099303*

APPENDIX B

TEST PHOTOGRAPHS

(Model: FXE3000-US)