TEST REPORT

Application No.:	BTEK230923004AE
Applicant:	Camojojo, INC.
Address of Applicant:	3311 S RAINBOW STE 105, Las Vegas, NV, 89146, USA
Manufacturer:	Camojojo, INC.
Address of Manufacturer:	3311 S RAINBOW STE 105, Las Vegas, NV, 89146, USA
Factory:	SY Electronic Technical Co.,Ltd.
Address of Factory:	5th floor, 4th Bldg, Antongda Industrial Park, 1 Liuxian 3rd Rd, Baoan Dist., Shenzhen, China
Equipment Under Test (EUT):	
EUT Name:	Bird Feeder Camera
Model No.:	hibird
Trade Mark:	camojojo
Standard(s) :	47 CFR Part 15, Subpart E 15.407
Date of Receipt:	2023-10-31
Date of Test:	2023-10-31 to 2023-12-18
Date of Issue:	2023-12-18
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2023-12-18		Original

Authorized for issue by:				
		Elma Yang/ Project Engineer		
		Carl Yang /Reviewer		

2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart E 15.407	N/A	47 CFR Part 15, Subpart C 15.203	Pass
Transmission in the Absence of Data		N/A	47 CFR Part 15, Subpart E 15.407 (c)	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart E 15.407	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207 & Subpart E 15.407 b(9)	Pass
Duty Cycle		KDB 789033 II B 1	KDB 789033 D02 II B 1	Pass
99% Bandwidth		KDB 789033 II D	N/A	Pass
26dB Emission bandwidth		KDB 789033 D02 II C 1	47 CFR Part 15, Subpart E 15.407 (a)	Pass
Minimum 6 dB bandwidth (5.725-5.85 GHz band)		KDB 789033 D02 II C 2	47 CFR Part 15, Subpart E 15.407 (e)	Pass
Maximum Conducted output power		KDB 789033 D02 II E	47 CFR Part 15, Subpart E 15.407 (a)	Pass
Power spectrum density		KDB 789033 D02 II F	47 CFR Part 15, Subpart E 15.407 (a)	Pass
Radiated Emissions (Below 1GHz)		KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)	Pass
Radiated Emissions (Above 1GHz)		KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)	Pass
Radiated Emissions which fall in the restricted bands		KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)	Pass
Frequency Stability		ANSI C63.10 (2013) Section 6.8	47 CFR Part 15, Subpart E 15.407 (g)	Pass
Transmitter Power Control		KDB 789033 D02 II E	47 CFR Part 15, Subpart E 15.407 (h)(1)	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	DC 5V 2A from adapter; DC 3.7V(10000mAh) from Battery
Operation Frequency/Number of channels (20MHz):	U-NII-1:5180-5240MHz (4 Channels) U-NII-2A: 5260-5320MHz (4 Channels) U-NII-2C: 5500-5700MHz (11 Channels) U-NII-3: 5745-5825MHz (5 Channels)
Modulation Type:	802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Channel Spacing:	802.11a/n(HT20)/ac(VHT20): 20MHz
DFS Function:	Slave
TPC Function:	No Support TPC function
Antenna Type:	External Antenna
Antenna Gain:	5dBi
Sample No.:	BTEK230923005AE-01
Remark: The information in this section is provided by the applicant or manufacturer, BANTEK is not liable to the accuracy, suitability, reliability or/and integrity of the information.	

4.2 Description of Support Units

Description	Manufacturer	Model No.
Adapter	FUSHIGANG	AS1201A0502000USU

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	± 3.1dB
Duty Cycle	± 0.37%
99% Bandwidth	± 3%
26dB Emission bandwidth	± 3%
Minimum 6 dB bandwidth (5.725-5.85 GHz band)	± 3%
Maximum Conducted output power	± 0.75dB
Peak Power spectrum density	± 2.84dB
Radiated Emissions (Below 1GHz)	± 6.0dB for 3m; ± 5.0dB for 10m
Radiated Emissions (Above 1GHz)	± 4.6dB (1-18GHz);± 4.8dB (18-40GHz)
Radiated Emissions which fall in the restricted bands	± 6.0dB (below 1GHz); ± 4.6dB (above 1GHz);
Frequency Stability	± 7.25 x 10-8
Transmitter Power Control	± 0.75dB

4.4 Test Location

All tests were performed at:
Shenzhen BANTEK Testing Co., Ltd.,
A5&A6, Building B1&B2, No.45 Gangtou Road, Bogang Community, Shajing Street, Bao'an District, Shenzhen, Guangdong, China 518103
Tel:0755-2334 4200 Fax: 0755-2334 4200
FCC Registration Number: 264293
Designation Number: CN1356
No tests were sub-contracted.

4.5 Deviation from Standards

None

4.6 Abnormalities from Standard Conditions

None

5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Shielding Room	YIHENG ENECTRONIC	9*5*3.3	YH-BT-220304-04	2022-03-03	2025-03-02
EMI Test Receiver	Rohde&Schwarz	ESCI	101021	2023-06-12	2024-06-11
Measurement Software	Fara	EZ_EMC Ver. FA-03A2	N/A	N/A	N/A
LISN	Rohde&Schwarz	ENV216	101472	2023-06-12	2024-06-11
LISN	Schwarzbeck	NSLK 8128	05127	2023-06-12	2024-06-11

RF Conducted					
Equipment	**Manufacturer**	**Model No**	**Serial No**	**Cal Date**	**Cal Due Date**
Shielding Room	YIHENG ENECTRONIC	5.5*3.1*3	YH-BT-220304-03	2022-03-03	2025-03-02
EXA Signal Analyzer	KEYSIGHT	N9020A	MY54230486	2023-06-12	2024-06-11
DC Power Supply	E3632A	E3642A	KR75304416	2023-06-12	2024-06-11
Attenuator	RswTech	SMA-JK-6dB	N/A	2023-06-12	2024-06-11
Attenuator	RswTech	SMA-JK-3dB	N/A	2023-06-12	2024-06-11
RF Control Unit	Techy	TR1029-1	N/A	2023-06-12	2024-06-11
RF Sensor Unit	Techy	TR1029-2	N/A	2023-06-12	2024-06-11
WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	141258	2023-06-12	2024-06-11
MXG Vector Signal Generator	Agilent	N5182A	US46240522	2023-06-12	2024-06-11
Programmable Temperature&Humidity Chamber	GRT	GR-HWX1000	GR22051001	2023-06-12	2024-06-11
Measurement Software	TACHOY	RF TestSoft	N/A	N/A	N/A

RSE					
Equipment	**Manufacturer**	**Model No**	**Serial No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	YIHENG ENECTRONIC	966	YH-BT-220304-01	2022-05-06	2025-05-05
EMI Test Receiver	Rohde&Schwarz	ESCI	100694	2023-06-12	2024-06-11
TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	01324	2022-06-15	2025-06-14
Pre-Amplifier	Schwarzbeck	BBV 9745	#180	2023-06-12	2024-06-11
Measurement Software	Fara	EZ_EMC Ver. FA-03A2	N/A	2023-06-12	2024-06-11
EXA Signal Analyzer	Keysight	N9020A	MY54440290	2023-06-12	2024-06-11
Horn Antenna	Schwarzbeck	BBHA 9120D	02695	2022-06-15	2025-06-14
Pre-Amplifier	Tonscend	TAP0118045	AP20K806109	2023-06-12	2024-06-11
Horn Antenna	SCHWARZBECK	BBHA9170	1157	2022-06-15	2025-06-14

Low Noise Pre-amplifier	SKET	LNPA-1840G-50	SK2022032902	2023-06-12	2024-06-11
Signal analyzer	ROHDE&SCHWARZ	FSQ40	100010	2023-06-12	2024-06-11
Loop Antenna	ETS	6502	00201177	2022-06-15	2025-06-14

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Serial No**	**Cal Date**	**Cal Due Date**
Humidity/Temperature/Barometric Pressure Indicator	KUMAR	F132	N/A	2023-06-12	2024-06-11
Humidity/Temperature/Barometric Pressure Indicator	KUMAR	F132	N/A	2023-06-12	2024-06-11

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

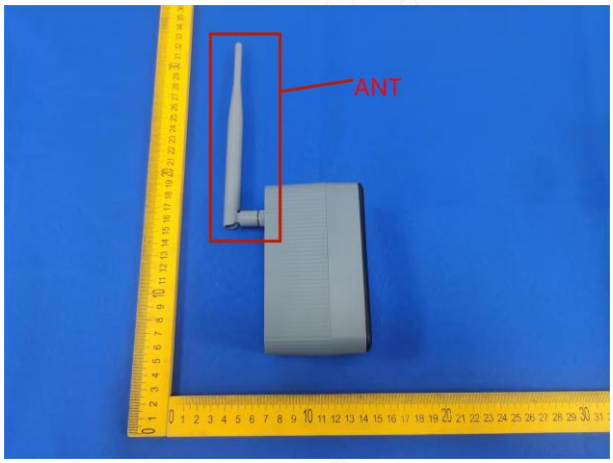
Standard Requirement:

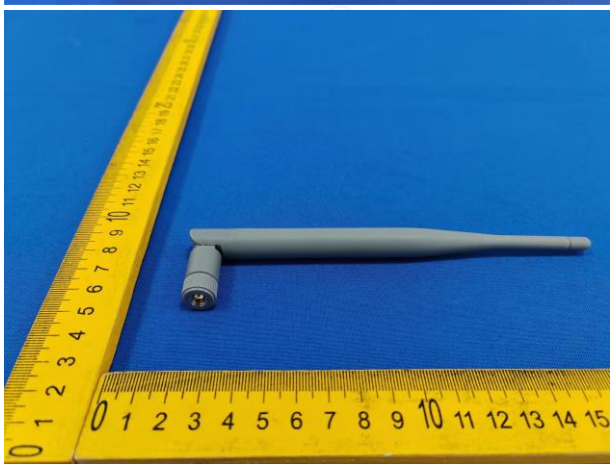
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is A External Antenna. The best case gain of the antenna is 5dBi.

Antenna location: Refer to internal photo.





6.2 Transmission in the Absence of Data

6.2.1 Test Requirement:

47 CFR Part 15, Subpart E 15.407 (c)

6.2.2 Conclusion

Standard Requirement:

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

Applicants shall include in their application for equipment authorization a description of how this requirement is met.

EUT Details:

WIFI chip support automatically discontinue transmission in case of either absence of information to transmit or operational failure, if the chip detects absence of information to transmit or operational failure, it will be automatically shut off.

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207 & Subpart E 15.407 b(9)

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		

7.1.1 E.U.T. Operation

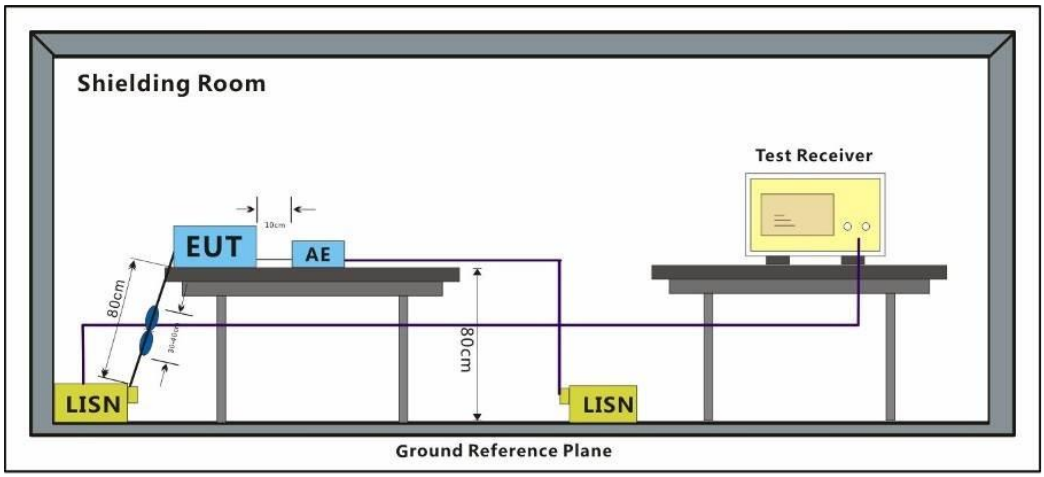
Operating Environment:

Temperature: 22.6 °C Humidity: 50.2 % RH Atmospheric Pressure: 1005 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	03	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Pre-scan	04	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Pre-scan	05	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Pre-scan	06	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

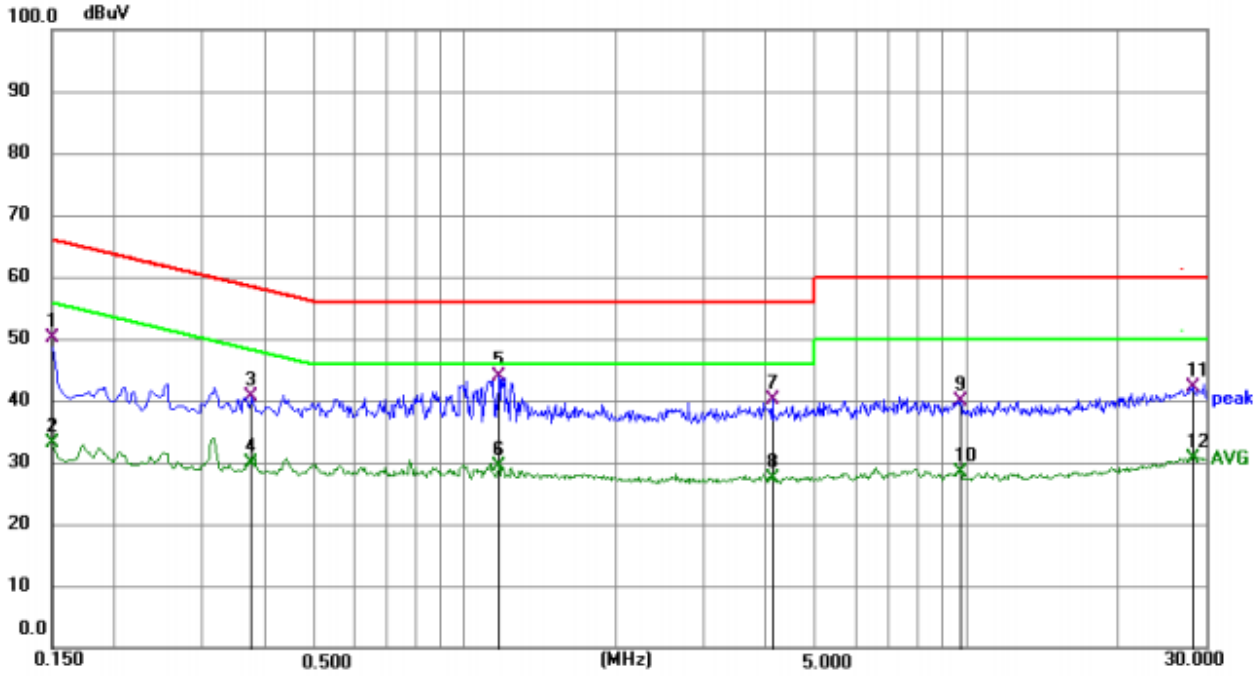
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

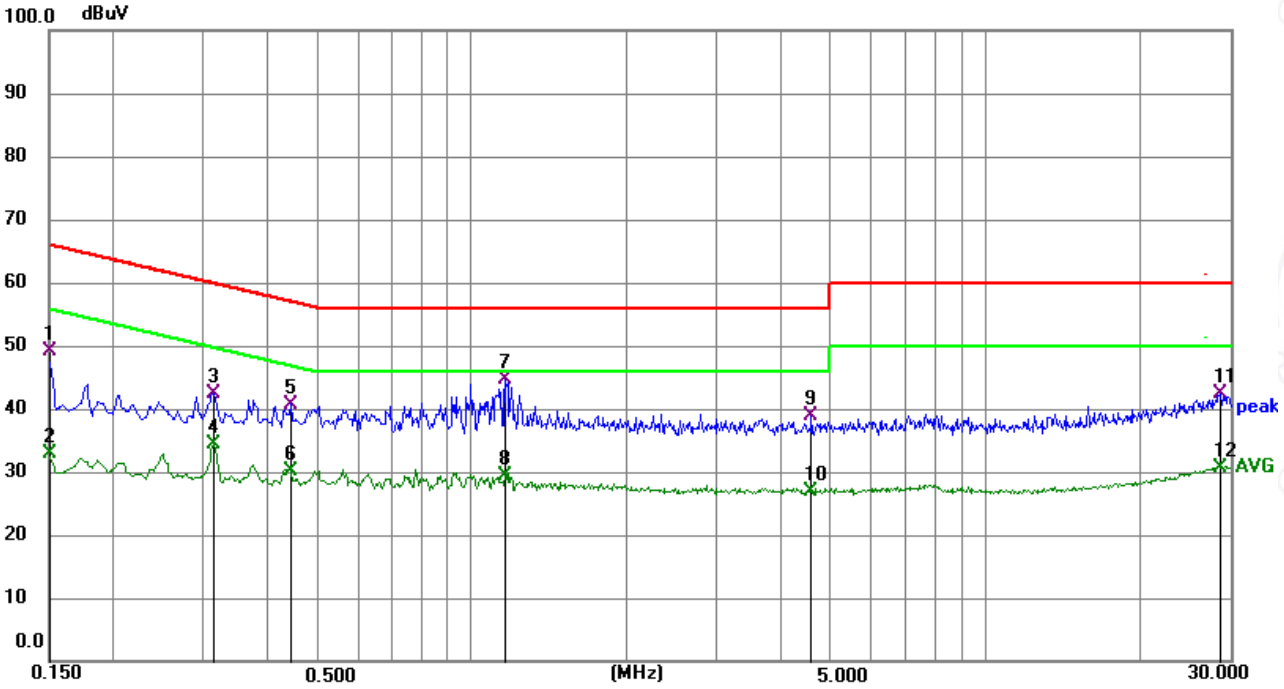
Remark: Level=Read Level+ Cable Loss+ LISN Factor

Test Mode: 03; Line: Live line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	30.29	19.74	50.03	66.00	-15.97	QP	P	
2	0.1500	13.40	19.74	33.14	56.00	-22.86	AVG	P	
3	0.3750	20.93	19.82	40.75	58.39	-17.64	QP	P	
4	0.3750	10.11	19.82	29.93	48.39	-18.46	AVG	P	
5 *	1.1713	23.94	20.02	43.96	56.00	-12.04	QP	P	
6	1.1713	9.28	20.02	29.30	46.00	-16.70	AVG	P	
7	4.1100	19.88	20.22	40.10	56.00	-15.90	QP	P	
8	4.1100	7.12	20.22	27.34	46.00	-18.66	AVG	P	
9	9.7170	19.20	20.80	40.00	60.00	-20.00	QP	P	
10	9.7170	7.52	20.80	28.32	50.00	-21.68	AVG	P	
11	28.2794	19.21	22.97	42.18	60.00	-17.82	QP	P	
12	28.2794	7.78	22.97	30.75	50.00	-19.25	AVG	P	

Test Mode: 03; Line: Neutral Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	29.26	19.76	49.02	66.00	-16.98	QP	P	
2	0.1500	13.21	19.76	32.97	56.00	-23.03	AVG	P	
3	0.3120	22.66	19.83	42.49	59.92	-17.43	QP	P	
4	0.3120	14.47	19.83	34.30	49.92	-15.62	AVG	P	
5	0.4420	20.80	19.84	40.64	57.02	-16.38	QP	P	
6	0.4420	10.33	19.84	30.17	47.02	-16.85	AVG	P	
7 *	1.1625	24.62	20.03	44.65	56.00	-11.35	QP	P	
8	1.1625	9.23	20.03	29.26	46.00	-16.74	AVG	P	
9	4.5870	18.59	20.18	38.77	56.00	-17.23	QP	P	
10	4.5870	6.58	20.18	26.76	46.00	-19.24	AVG	P	
11	28.7340	19.32	23.05	42.37	60.00	-17.63	QP	P	
12	28.7340	7.67	23.05	30.72	50.00	-19.28	AVG	P	

7.2 Duty Cycle

Test Requirement KDB 789033 D02 II B 1
Test Method: KDB 789033 II B 1

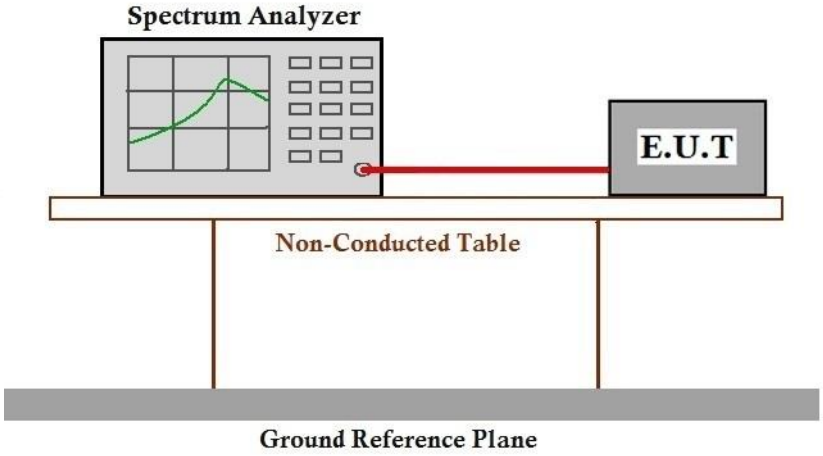
7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 25.5 °C Humidity: 49.1 % RH Atmospheric Pressure: 1005 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	03	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	05	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	06	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.3 99% Bandwidth

Test Requirement N/A
Test Method: KDB 789033 II D

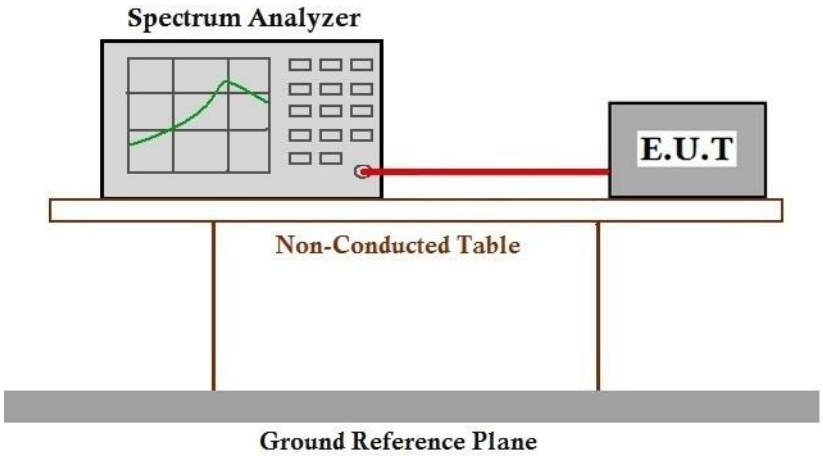
7.3.1 E.U.T. Operation

Operating Environment:
Temperature: 25.5 °C Humidity: 49.1 % RH Atmospheric Pressure: 1005 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	03	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	05	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	06	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.4 26dB Emission bandwidth

Test Requirement 47 CFR Part 15, Subpart E 15.407 (a)
Test Method: KDB 789033 D02 II C 1

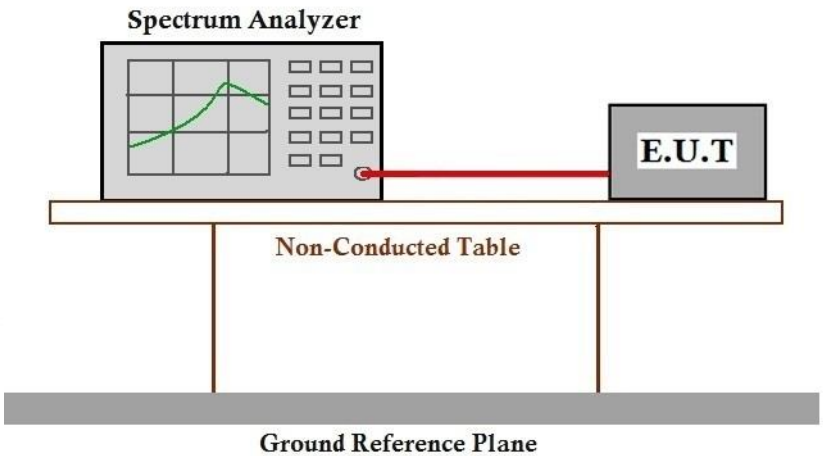
7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 25.5 °C Humidity: 49.1 % RH Atmospheric Pressure: 1005 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	03	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	05	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.5 Minimum 6 dB bandwidth (5.725-5.85 GHz band)

Test Requirement 47 CFR Part 15, Subpart E 15.407 (e)

Test Method: KDB 789033 D02 II C 2

Limit:

Frequency band(MHz)	Limit
5725-5850	⩾500 kHz

7.5.1 E.U.T. Operation

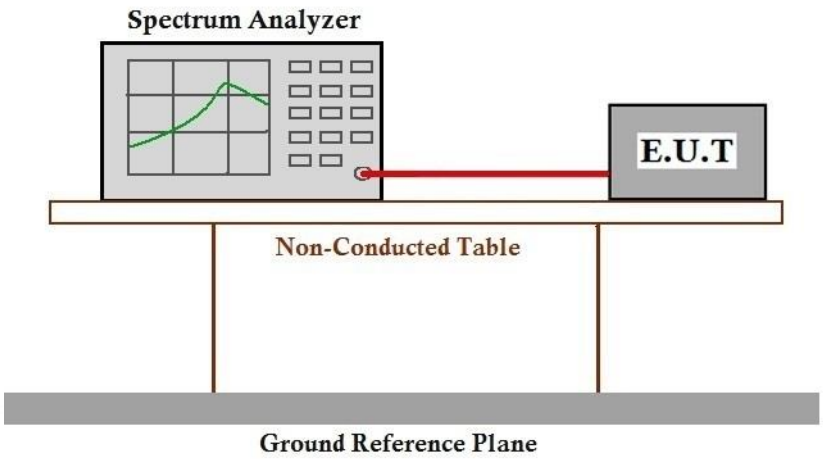
Operating Environment:

Temperature: 25.5 °C Humidity: 49.1 % RH Atmospheric Pressure: 1005 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.6 Maximum Conducted output power

Test Requirement 47 CFR Part 15, Subpart E 15.407 (a)

Test Method: KDB 789033 D02 II E

Limit:

Frequency band(MHz)	Limit
5150-5250	≤1W(30dBm) for master device
	≤250mW(24dBm) for client device
5250-5350	≤250mW(24dBm) or 11dBm+10logB*
5470-5725	≤250mW(24dBm) or 11dBm+10logB*
5725-5850	≤1W(30dBm)
Remark:	* Where B is the 26dB emission bandwidth in MHz. The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

7.6.1 E.U.T. Operation

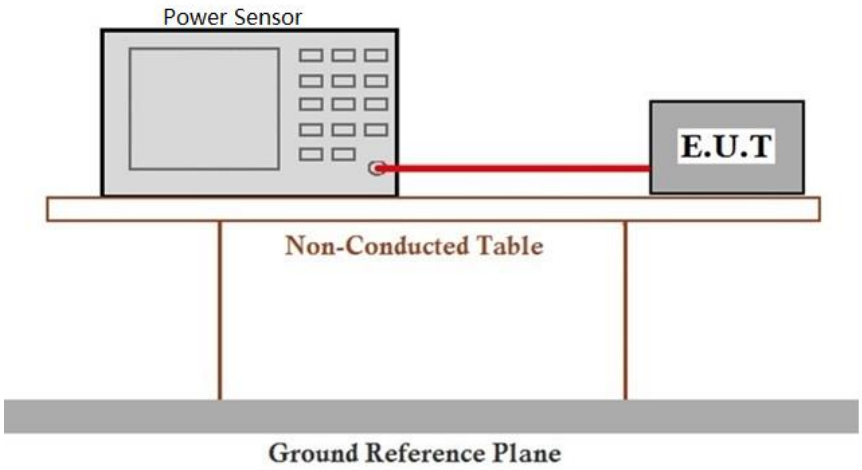
Operating Environment:

Temperature: 25.5 °C Humidity: 49.1 % RH Atmospheric Pressure: 1005 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	03	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	05	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	06	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.7 Power spectrum density

Test Requirement 47 CFR Part 15, Subpart E 15.407 (a)

Test Method: KDB 789033 D02 II F

Limit:

Frequency band(MHz)	Limit
5150-5250	≤17dBm in 1MHz for master device
	≤11dBm in 1MHz for client device
5250-5350	≤11dBm in 1MHz for client device
5470-5725	≤11dBm in 1MHz for client device
5725-5850	≤30dBm in 500 kHz
Remark:	The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test.

7.7.1 E.U.T. Operation

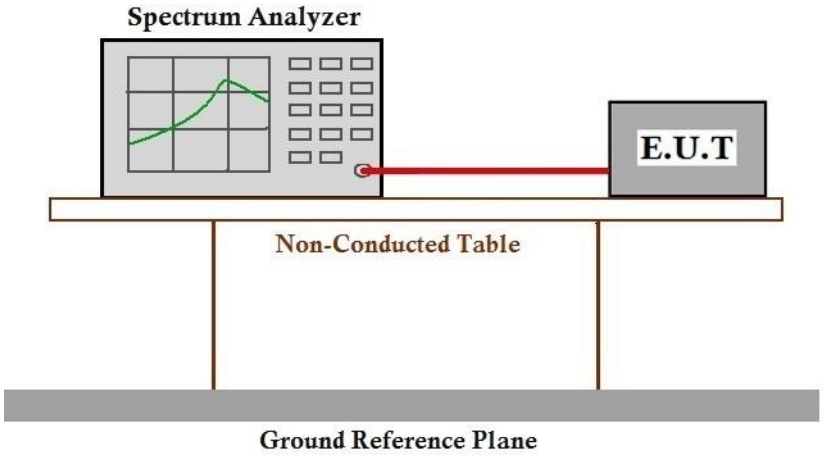
Operating Environment:

Temperature: 25.5 °C Humidity: 49.1 % RH Atmospheric Pressure: 1005 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	03	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	05	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	06	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.8 Radiated Emissions (Below 1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)
Test Method: KDB 789033 D02 II G
Measurement Distance: 3m

Limit:

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
960-1000	500	3

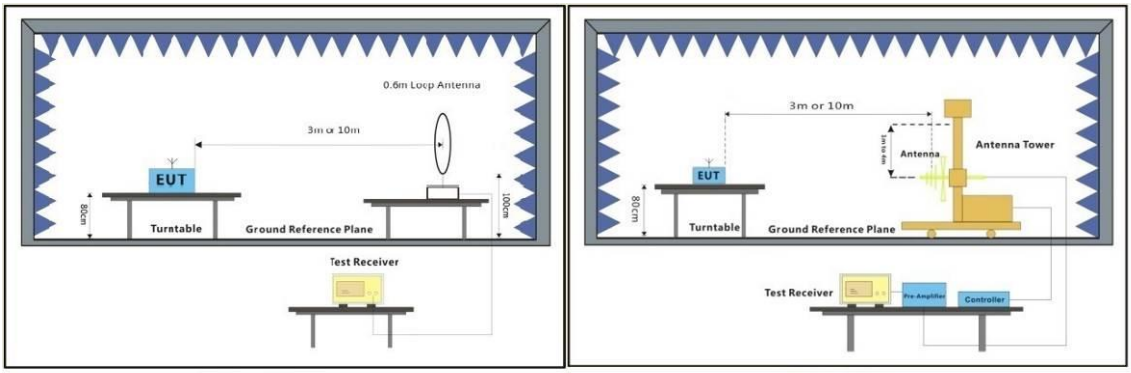
7.8.1 E.U.T. Operation

Operating Environment:
Temperature: 22.1 °C Humidity: 41.2 % RH Atmospheric Pressure: 1005 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	03	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	05	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	06	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



Below 30MHz　　30MHz-1GHz

7.8.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

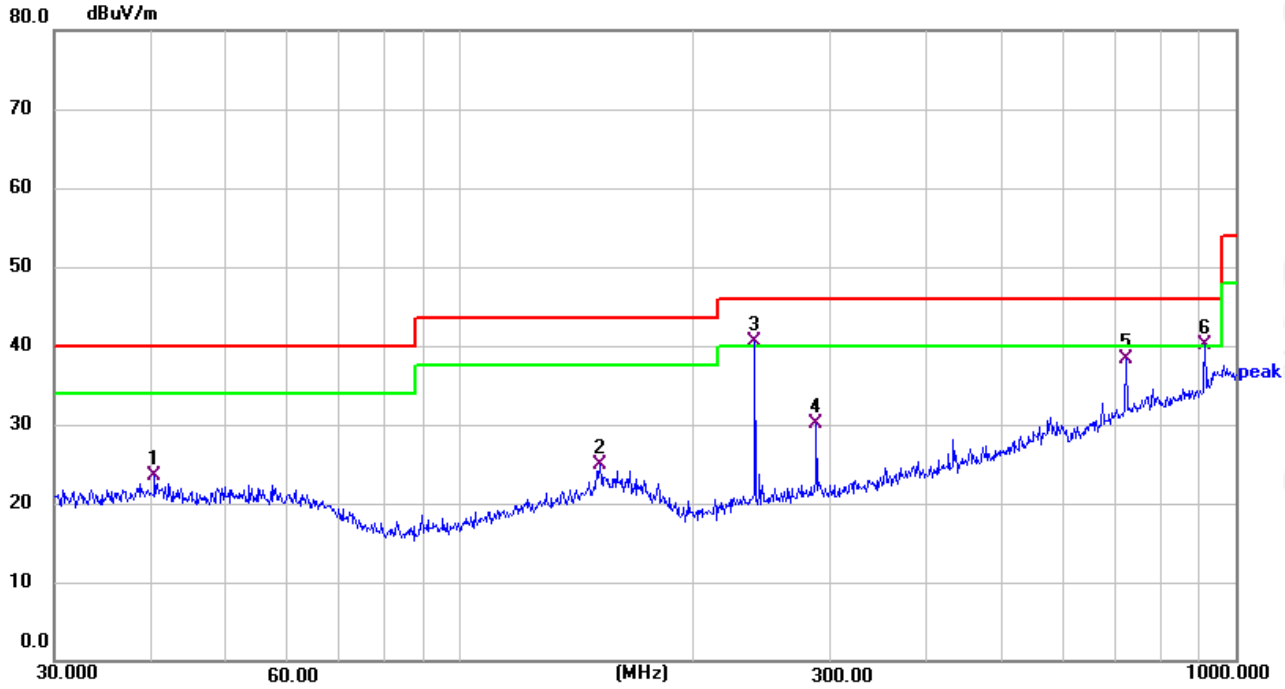
Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. For emission below 1GHz, through the pre-scan found the worst case is the lowest channel of 802.11a. Only the worst case is recorded in the report.

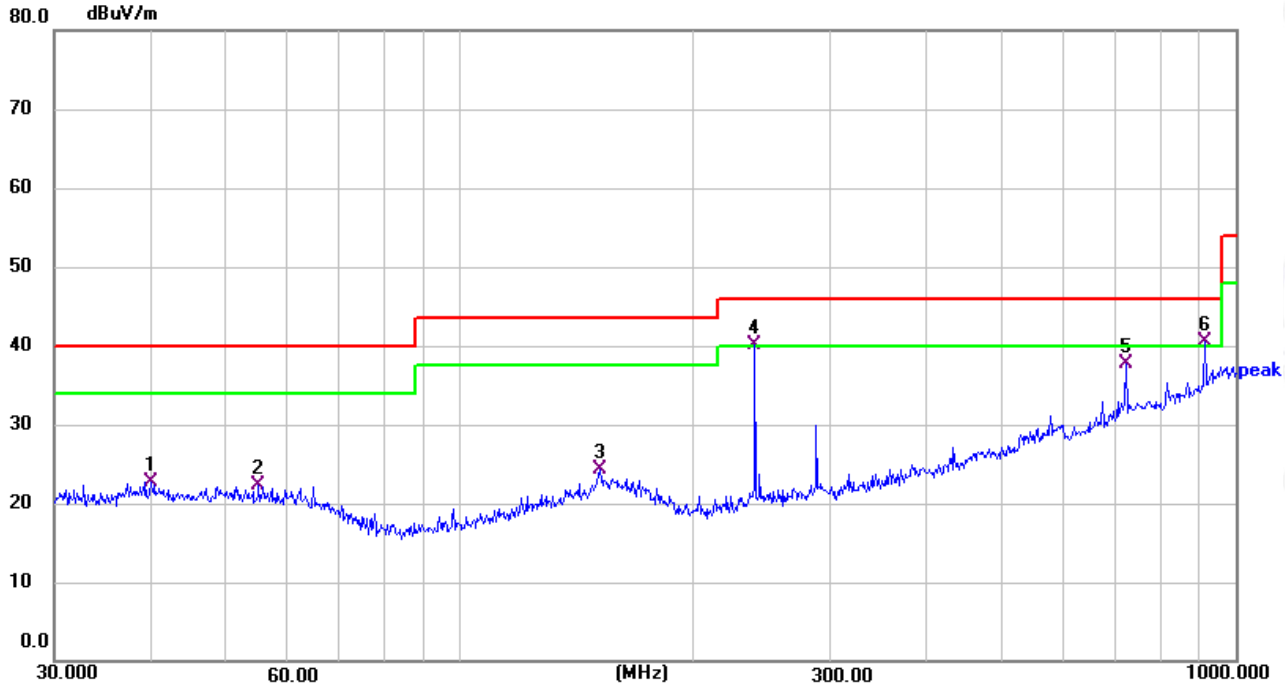
3. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

Test Mode: 03; Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	40.4170	40.43	-16.97	23.46	40.00	-16.54	QP	200	122	P	
2	151.5971	41.75	-16.85	24.90	43.50	-18.60	QP	100	167	P	
3 *	239.9873	59.67	-19.11	40.56	46.00	-5.44	QP	100	307	P	
4	287.9904	48.14	-18.06	30.08	46.00	-15.92	QP	100	223	P	
5	721.7258	47.39	-9.13	38.26	46.00	-7.74	QP	200	205	P	
6 !	912.8620	47.78	-7.77	40.01	46.00	-5.99	QP	100	159	P	

Test Mode: 03; Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	39.9941	39.64	-16.89	22.75	40.00	-17.25	QP	100	207	P	
2	55.0274	40.17	-17.85	22.32	40.00	-17.68	QP	100	159	P	
3	151.5971	41.06	-16.85	24.21	43.50	-19.29	QP	200	159	P	
4 !	239.9873	59.16	-19.11	40.05	46.00	-5.95	QP	100	159	P	
5	721.7258	46.91	-9.13	37.78	46.00	-8.22	QP	200	223	P	
6 *	912.8620	48.24	-7.77	40.47	46.00	-5.53	QP	100	100	P	

7.9 Radiated Emissions (Above 1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)
Test Method: KDB 789033 D02 II G
Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1GHz	500	3

*(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

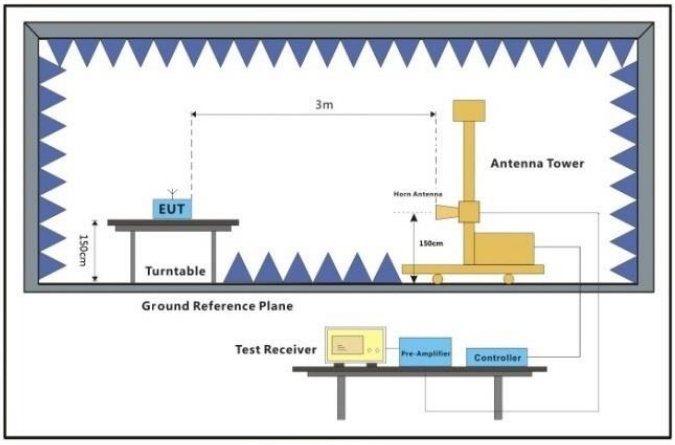
7.9.1 E.U.T. Operation

Operating Environment:
Temperature: 22.1 °C Humidity: 60.1 % RH Atmospheric Pressure: 1005 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	03	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	05	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	06	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.9.3 Test Setup Diagram



Above 1GHz

7.9.4 Measurement Procedure and Data

a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. 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 antenna height 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

5. For devices with multiple operating modes, measurements on the middle channel is used to determine the worst-case mode(s). Only the worst case mode with the highest output power and the mode with the highest output power spectral density for each modulation family (e.g., OFDM and direct sequence spread spectrum) is recorded in the test report.

Note: Level = Reading level + Factor
All mode had been tested, only the worst mode 802.11a are in the report.
1G~40G:

UNII-1_20M_5180MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2913.743	70.56	-29.10	41.46	68.20	-26.74	peak	P
2	4277.179	69.05	-28.32	40.73	68.20	-27.47	peak	P
3	6086.413	65.13	-26.08	39.05	68.20	-29.15	peak	P
4	8646.062	69.10	-24.53	44.58	68.20	-23.62	peak	P
5	11047.421	68.94	-23.29	45.65	68.20	-22.55	peak	P
6	14217.875	71.01	-20.77	50.24	68.20	-17.96	peak	P

UNII-1_20M_5180MHz_Vertical

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2972.925	66.21	-29.61	36.61	68.20	-31.59	peak	P
2	4313.629	69.80	-29.87	39.93	68.20	-28.27	peak	P
3	6353.289	66.94	-25.91	41.02	68.20	-27.18	peak	P
4	8576.310	69.10	-25.39	43.71	68.20	-24.49	peak	P
5	11285.237	67.05	-23.24	43.81	68.20	-24.39	peak	P
6	14956.165	70.48	-21.24	49.25	68.20	-18.95	peak	P

UNII-1_20M_5240MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2913.861	69.64	-30.33	39.31	68.20	-28.89	peak	P
2	4276.352	68.79	-28.33	40.46	68.20	-27.74	peak	P
3	6086.064	65.37	-25.62	39.75	68.20	-28.45	peak	P
4	8645.259	70.10	-24.17	45.94	68.20	-22.26	peak	P
5	11046.623	68.78	-23.53	45.26	68.20	-22.94	peak	P
6	14218.244	70.30	-21.00	49.31	68.20	-18.89	peak	P

UNII-1_20M_5240MHz_Vertical

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.507	67.07	-29.61	37.46	68.20	-30.74	peak	P
2	4312.209	69.72	-29.58	40.14	68.20	-28.06	peak	P
3	6353.567	68.20	-24.45	43.75	68.20	-24.45	peak	P
4	8575.770	70.39	-24.58	45.82	68.20	-22.38	peak	P
5	11285.724	68.14	-23.97	44.17	68.20	-24.03	peak	P
6	14955.950	71.25	-20.92	50.33	68.20	-17.87	peak	P

UNII-2A_20M_5320MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2915.558	69.10	-30.36	38.74	68.20	-29.46	peak	P
2	4277.719	67.59	-28.18	39.40	68.20	-28.80	peak	P
3	6084.764	64.60	-24.90	39.70	68.20	-28.50	peak	P
4	8646.448	68.93	-24.30	44.63	68.20	-23.57	peak	P
5	11046.897	67.69	-23.37	44.33	68.20	-23.87	peak	P
6	14219.038	70.36	-20.77	49.59	68.20	-18.61	peak	P

UNII-2A_20M_5320MHz_Vertical

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.010	67.76	-29.70	38.05	68.20	-30.15	peak	P
2	4312.347	69.74	-28.49	41.25	68.20	-26.95	peak	P
3	6353.038	67.15	-25.94	41.20	68.20	-27.00	peak	P
4	8576.707	69.13	-24.31	44.82	68.20	-23.38	peak	P
5	11286.165	68.21	-24.30	43.91	68.20	-24.29	peak	P
6	14956.594	71.36	-20.79	50.56	68.20	-17.64	peak	P

UNII-2C_20M_5500MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.324	70.43	-29.42	41.02	68.20	-27.18	peak	P
2	4278.011	68.74	-29.07	39.66	68.20	-28.54	peak	P
3	6086.428	65.58	-25.41	40.17	68.20	-28.03	peak	P
4	8645.144	69.89	-25.38	44.52	68.20	-23.68	peak	P
5	11048.225	67.01	-23.93	43.08	68.20	-25.12	peak	P
6	14217.638	71.72	-20.78	50.94	68.20	-17.26	peak	P

UNII-2C_20M_5500MHz_Vertical

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2972.669	67.74	-30.39	37.35	68.20	-30.85	peak	P
2	4312.764	68.30	-28.36	39.94	68.20	-28.26	peak	P
3	6353.661	67.59	-24.41	43.19	68.20	-25.01	peak	P
4	8577.008	70.21	-25.24	44.97	68.20	-23.23	peak	P
5	11286.351	67.12	-22.57	44.55	68.20	-23.65	peak	P
6	14956.791	71.23	-19.58	51.65	68.20	-16.55	peak	P

UNII-2C_20M_5600MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.017	69.94	-29.64	40.30	68.20	-27.90	peak	P
2	4277.557	68.26	-28.52	39.74	68.20	-28.46	peak	P
3	6086.216	65.04	-25.26	39.78	68.20	-28.42	peak	P
4	8646.354	69.56	-25.49	44.07	68.20	-24.13	peak	P
5	11047.265	68.11	-23.00	45.10	68.20	-23.10	peak	P
6	14217.524	70.66	-20.42	50.24	68.20	-17.96	peak	P

UNII-2C_20M_5600MHz_Vertical

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2974.200	67.68	-29.17	38.51	68.20	-29.69	peak	P
2	4313.770	68.99	-28.36	40.63	68.20	-27.57	peak	P
3	6354.207	66.69	-24.65	42.04	68.20	-26.16	peak	P
4	8576.543	69.96	-26.08	43.88	68.20	-24.32	peak	P
5	11286.205	67.02	-23.45	43.57	68.20	-24.63	peak	P
6	14956.147	71.14	-20.21	50.93	68.20	-17.27	peak	P

UNII-2C_20M_5700MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2913.593	69.82	-30.32	39.50	68.20	-28.70	peak	P
2	4277.843	67.54	-29.80	37.74	68.20	-30.46	peak	P
3	6084.518	64.24	-24.83	39.42	68.20	-28.78	peak	P
4	8645.123	68.96	-24.69	44.27	68.20	-23.93	peak	P
5	11046.505	68.83	-24.34	44.48	68.20	-23.72	peak	P
6	14218.966	70.64	-21.73	48.90	68.20	-19.30	peak	P

UNII-2C_20M_5700MHz_Vertical

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.585	66.85	-30.54	36.31	68.20	-31.89	peak	P
2	4312.325	69.63	-27.92	41.71	68.20	-26.49	peak	P
3	6354.089	67.03	-24.55	42.48	68.20	-25.72	peak	P
4	8576.732	69.55	-26.16	43.39	68.20	-24.81	peak	P
5	11286.708	68.62	-22.43	46.18	68.20	-22.02	peak	P
6	14956.319	70.40	-21.24	49.15	68.20	-19.05	peak	P

UNII-3_20M_5745MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2913.665	69.01	-30.17	38.84	68.20	-29.36	peak	P
2	4276.791	67.27	-28.54	38.73	68.20	-29.47	peak	P
3	6084.656	64.70	-25.83	38.86	68.20	-29.34	peak	P
4	8645.843	70.70	-24.46	46.23	68.20	-21.97	peak	P
5	11046.780	67.08	-24.25	42.83	68.20	-25.37	peak	P
6	14218.166	70.27	-20.76	49.51	68.20	-18.69	peak	P

UNII-3_20M_5745MHz_Vertical

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2972.417	66.41	-28.63	37.78	68.20	-30.42	peak	P
2	4312.151	68.31	-29.63	38.69	68.20	-29.51	peak	P
3	6353.583	66.74	-26.23	40.51	68.20	-27.69	peak	P
4	8575.507	70.15	-25.63	44.52	68.20	-23.68	peak	P
5	11286.619	67.26	-23.37	43.89	68.20	-24.31	peak	P
6	14955.332	71.49	-19.72	51.77	68.20	-16.43	peak	P

UNII-3_20M_5785MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2913.885	70.66	-29.53	41.14	68.20	-27.06	peak	P
2	4277.312	67.51	-29.52	38.00	68.20	-30.20	peak	P
3	6085.790	65.45	-24.79	40.66	68.20	-27.54	peak	P
4	8646.612	70.13	-25.10	45.04	68.20	-23.16	peak	P
5	11047.028	67.10	-23.12	43.97	68.20	-24.23	peak	P
6	14217.619	71.24	-21.78	49.45	68.20	-18.75	peak	P

UNII-3_20M_5785MHz_Vertical

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.107	66.63	-29.59	37.04	68.20	-31.16	peak	P
2	4313.055	69.22	-28.13	41.09	68.20	-27.11	peak	P
3	6352.614	67.96	-25.99	41.97	68.20	-26.23	peak	P
4	8576.685	70.55	-24.68	45.86	68.20	-22.34	peak	P
5	11287.051	67.82	-23.52	44.30	68.20	-23.90	peak	P
6	14955.545	70.55	-20.97	49.58	68.20	-18.62	peak	P

UNII-3_20M_5825MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.698	69.97	-30.02	39.95	68.20	-28.25	peak	P
2	4277.176	67.69	-28.54	39.15	68.20	-29.05	peak	P
3	6084.676	65.03	-24.55	40.48	68.20	-27.72	peak	P
4	8644.950	68.86	-25.46	43.40	68.20	-24.80	peak	P
5	11046.391	68.73	-22.83	45.90	68.20	-22.30	peak	P
6	14218.184	71.20	-22.01	49.19	68.20	-19.01	peak	P

UNII-3_20M_5825MHz_Vertical

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.462	67.75	-29.22	38.53	68.20	-29.67	peak	P
2	4313.830	68.82	-29.29	39.53	68.20	-28.67	peak	P
3	6354.158	67.78	-26.00	41.78	68.20	-26.42	peak	P
4	8577.199	70.25	-24.37	45.88	68.20	-22.32	peak	P
5	11286.113	67.78	-24.13	43.65	68.20	-24.55	peak	P
6	14954.921	71.73	-20.39	51.35	68.20	-16.85	peak	P

7.10 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)
Test Method: KDB 789033 D02 II G
Measurement Distance: 3m

Limit:

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

*(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

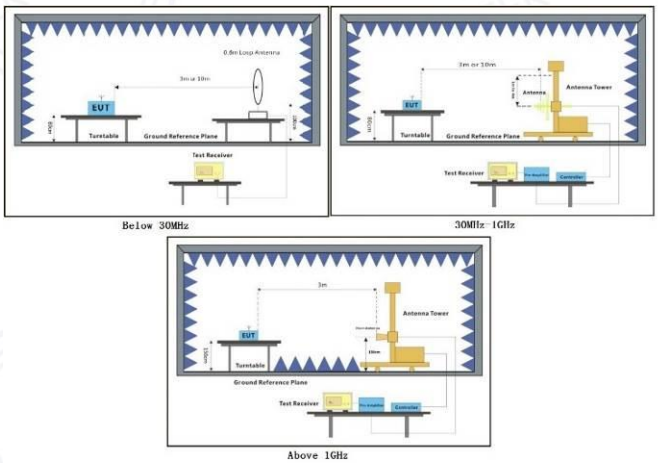
7.9.5 E.U.T. Operation

Operating Environment:
Temperature: 22.0 °C Humidity: 61.5 % RH Atmospheric Pressure: 1005 mbar

7.9.6 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	03	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	05	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	06	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.9.7 Test Setup Diagram



7.9.8 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height 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.

e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Note: Level = Reading level + Factor

Note: All mode had been tested, only the worst mode 802.11a are in the report.

UNII-1_20M_5180MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5135.247	83.32	-31.27	52.05	68.20	-16.15	peak	P
2	5150.000	82.24	-30.68	51.56	68.20	-16.64	peak	P

UNII-1_20M_5180MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5124.712	82.14	-30.57	51.57	68.20	-16.63	peak	P
2	5150.000	83.54	-31.88	51.66	68.20	-16.54	peak	P

UNII-2A_20M_5320MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5350.000	80.14	-32.05	48.09	68.20	-20.11	peak	P
2	5460.000	82.66	-32.01	50.65	68.20	-17.55	peak	P

UNII-2A_20M_5320MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5350.000	81.88	-32.05	49.83	68.20	-18.37	peak	P
2	5460.000	83.23	-32.01	51.22	68.20	-16.98	peak	P

UNII-2C_20M_5500MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5460.000	83.12	-30.51	52.61	68.20	-15.59	peak	P
2	5470.000	80.54	-31.88	48.66	68.20	-19.54	peak	P

UNII-2C_20M_5500MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5460.000	81.47	-30.55	50.92	68.20	-17.28	peak	P
2	5470.000	80.87	-30.57	50.30	68.20	-17.90	peak	P

UNII-2C_20M_5700MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5725.000	83.23	-31.88	51.35	68.20	-16.85	peak	P

UNII-2C_20M_5700MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5725.000	84.79	-32.07	52.72	68.20	-15.48	peak	P

UNII-3_20M_5745MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5650.000	87.24	-31.24	56.00	68.20	-12.20	peak	P
2	5700.000	93.15	-30.54	62.61	105.60	-42.99	peak	P
3	5720.000	92.16	-31.66	60.50	110.80	-50.30	peak	P

UNII-3_20M_5745MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5650.000	85.88	-30.23	55.65	68.20	-12.55	peak	P
2	5700.000	93.24	-30.85	62.39	105.60	-43.21	peak	P
3	5720.000	95.16	-37.95	57.21	110.80	-53.59	peak	P

UNII-3_20M_5825MHz_Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5850.000	88.73	-30.78	57.95	122.20	-64.25	peak	P
2	5875.000	94.21	-31.25	62.96	110.80	-47.84	peak	P
3	5925.000	85.12	-30.22	54.90	68.20	-13.30	peak	P

UNII-3_20M_5825MHz_Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	5850.000	91.24	-31.78	59.46	122.20	-62.74	peak	P
2	5875.000	95.58	-31.89	63.69	110.80	-47.11	peak	P
3	5925.000	96.27	-31.95	64.32	68.20	-3.88	peak	P

7.10 Frequency Stability

Test Requirement 47 CFR Part 15, Subpart E 15.407 (g)
Test Method: ANSI C63.10 (2013) Section 6.8

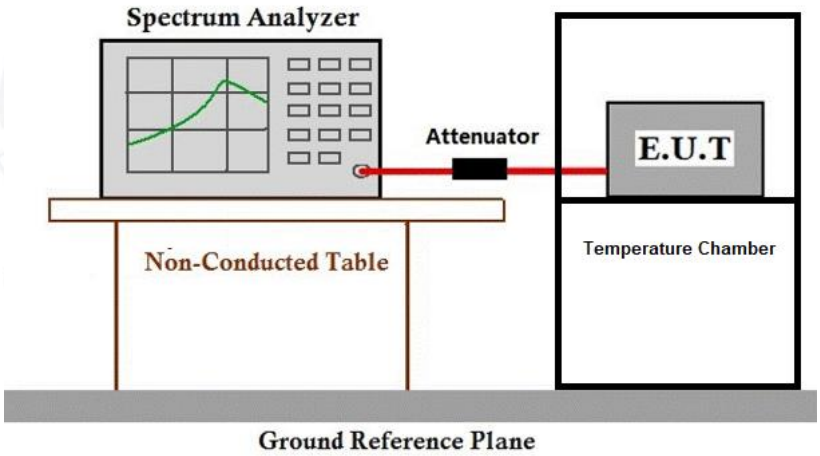
7.10.1 E.U.T. Operation

Operating Environment:
Temperature: 25.5 °C Humidity: 49.1 % RH Atmospheric Pressure: 1005 mbar

7.10.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	03	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	05	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.
Final test	06	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.10.3 Test Setup Diagram



7.10.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.11 Transmitter Power Control

Test Requirement 47 CFR Part 15, Subpart E 15.407 (h)(1)
Test Method: KDB 789033 D02 II E

Limit:
Able to lower EIRP below 24dBm when Max_EIRP ≥ 500 mW (27 dBm).

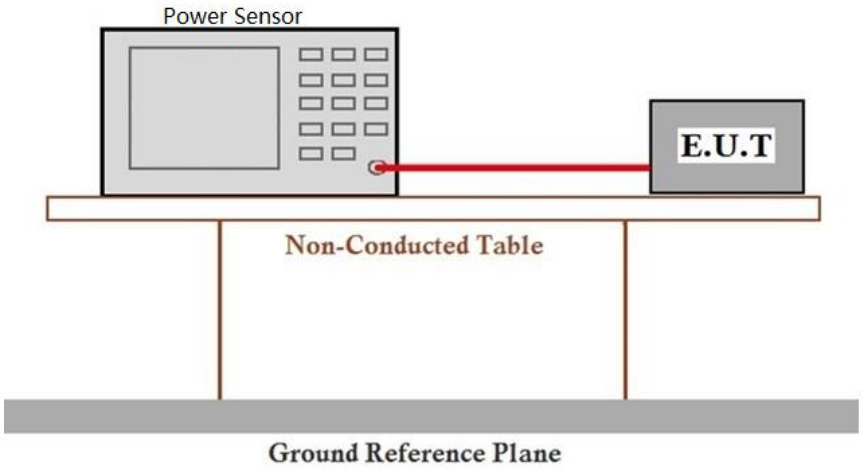
7.11.1 E.U.T. Operation

Operating Environment:
Temperature: 25.5 °C Humidity: 49.1 % RH Atmospheric Pressure: 1005 mbar

7.11.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	05	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac 20, Only the data of worst case is recorded in the report.

7.11.3 Test Setup Diagram



7.11.4 Measurement Procedure and Data

Please Refer to Appendix for Details

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for BTEK230923004AE

9 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for BTEK230923004AE

10 Appendix

Please refer to the Appendix UNII_1 WiFi 5G Test Data, UNII_2A WiFi 5G Test Data, UNII_2C WiFi 5G Test Data and UNII_3 WiFi 5G Test Data

- End of the Report -