






Test Report No:  
2340262R-RFUSV03S-A

## TEST REPORT

### FCC Rules&Regulations

Product Name	Peplink Pepwave Wireless Product
Brand Name	 <b>PEPWAVE</b>
Model No.	MAX BR1 Mini M2M MAX-BR1-MINI-M2M-LTE-US-T-PRM MAX-BR1-MINI-M2M-LTEA-US-T-PRM
FCC ID	U8G-P1MT01DB9
Applicant's Name / Address	PISMO LABS TECHNOLOGY LIMITED A8, 5/F, HK Spinners Industrial Building, Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Hong Kong
Manufacturer's Name / Address	PISMO LABS TECHNOLOGY LIMITED A8, 5/F, HK Spinners Industrial Building, Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Hong Kong
Test Method Requested, Standard	FCC CFR Title 47 Part 15 Subpart E Section 15.407 ANSI C63.10-2013
Verdict Summary	IN COMPLIANCE
Documented By	 Hailey Peng / Senior Engineer
Approved By	 Rueyyan Lin / Supervisor
Date of Receipt	Apr. 12, 2023
Date of Issue	May 23, 2023
Report Version	V1.0

## INDEX

	<b>page</b>
Competences and Guarantees.....	4
General Conditions.....	4
Revision History.....	5
1. General Information.....	6
1.1. EUT Description.....	6
1.2. Test Mode.....	8
1.3. Comments and Remarks.....	9
1.4. Tested System Details.....	10
1.5. Configuration of tested System.....	10
1.6. EUT Operation of during Test.....	11
1.7. Test Facility.....	12
1.8. List of Test Equipment.....	13
1.9. Measurement Uncertainty.....	14
1.10. Duty Cycle.....	15
2. Antenna Requirements.....	16
3. AC Power Line Conducted Emission.....	17
3.1. Test Setup.....	17
3.2. Test Limit.....	17
3.3. Test Procedure.....	18
3.4. Test Specification.....	18
3.5. Test Result of AC Power Line Conducted Emission.....	19
4. Emission Bandwidth.....	27
4.1. Test Setup.....	27
4.2. Test Limit.....	27
4.3. Test Procedure.....	27
4.4. Test Specification.....	27
4.5. Test Result of Emission Bandwidth.....	28
5. Maximum Conducted Output Power.....	34
5.1. Test Setup.....	34
5.2. Test Limit.....	34
5.3. Test Procedure.....	35
5.4. Test Specification.....	35
5.5. Test Result of Maximum Conducted Output Power.....	36
6. Maximum Power Spectral Density.....	37
6.1. Test Setup.....	37
6.2. Test Limit.....	37
6.3. Test Procedure.....	37

6.4.	Test Specification.....	37
6.5.	Test Result of Maximum Power Spectral Density.....	38
7.	Radiated Emission .....	41
7.1.	Test Setup.....	41
7.2.	Test Limit.....	42
7.3.	Test Procedure .....	43
7.4.	Test Specification.....	43
7.5.	Test Result of Radiated Emissions (30 MHz ~ 1 GHz).....	44
7.6.	Test Result of Radiated Emissions (1 GHz ~ 10 <sup>th</sup> Harmonic) .....	46
8.	Radiated Emission Band Edge .....	55
8.1.	Test Setup.....	55
8.2.	Test Limit.....	56
8.3.	Test Procedure .....	57
8.4.	Test Specification.....	57
8.5.	Test Result of Radiated Emission Band Edge.....	58
	Appendix A.....	72
<input type="checkbox"/>	Test Result of Radiated Emissions Co-location.....	72

Test Setup Photograph: Please refer to the file: 2340262R-Test Setup Photograph

## Competences and Guarantees

---

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

**IMPORTANT:** No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

## General Conditions

---

1. The test results relate only to the samples tested.
2. The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
3. This report must not be used to claim product endorsement by TAF or any agency of the government.
4. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
5. Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.


## Revision History

---


Version	Description	Issued Date
V1.0	Initial issue of report	May 23, 2023

## 1. General Information

### 1.1. EUT Description

Product Name	Peplink Pepwave Wireless Product	
Brand Name		
Model No.	MAX BR1 Mini M2M MAX-BR1-MINI-M2M-LTE-US-T-PRM MAX-BR1-MINI-M2M-LTEA-US-T-PRM	
EUT Voltage	Power Port	DC 10~30V AC 120V/60Hz to DC 12V (power by adapter)
	802.3at PoE	DC 50~57V
Frequency Range / Channel Number	IEEE 802.11a / IEEE 802.11n (20 MHz) / IEEE 802.11ac (20 MHz)	5180 ~ 5240 MHz / 4 Channels 5745 ~ 5825 MHz / 5 Channels
	IEEE 802.11n (40 MHz) / IEEE 802.11ac (40 MHz)	5190 ~ 5230 MHz / 2 Channels 5755 ~ 5795 MHz / 2 Channels
	IEEE 802.11ac (80 MHz)	5210 MHz / 1 Channel 5775 MHz / 1 Channel
Type of Modulation	IEEE 802.11a/n/ac	OFDM
Data Rate	IEEE 802.11a	6, 9, 12, 18, 24, 36, 48, 54 Mbps
	IEEE 802.11n	Support a subset of the combination of GI, MCS 0 ~ MCS 15 and bandwidth defined in 802.11n
	IEEE 802.11ac	Support a subset of the combination of GI, MCS 0 ~ MCS 9 and bandwidth defined in 802.11ac
Function	Indoor AP	
	Client	

The brand name/model number in the following table are all refer to the identical product.

Brand Name	EUT	Model No.	Cellular Module	
			Brand Name	Model No.
	-	MAX BR1 Mini M2M	AirPrime	EM7411
	-		Telit	LE910C4-NF
	1	MAX-BR1-MINI-M2M-LTEA-US-T-PRM	AirPrime	EM7411
	2	MAX-BR1-MINI-M2M-LTE-US-T-PRM	Telit	LE910C4-NF
Assemble different cellular module for the marketing purpose.				

Accessories Information				
No.	Equipment Name	Brand Name	Model No.	Rating
1	Adapter	DVE	DSA-24PFS-12 FUS 120200	INPUT: 100~240Vac, 50/60Hz, 0.8A OUTPUT: +12Vdc, 2.0A, 24.0W

Antenna Information							
Ant.	Brand Name	Model No.	Type	Antenna Gain (dBi)		Directional Gain (dBi)	
				5GHz Band 1	5GHz Band 4	5GHz Band 1	5GHz Band 4
0	YUAN CHEN TECH CO., LTD	ACA-0040-6G1 A1-A10	Omni-directional	3.29	4.76	6.30	7.77
1	YUAN CHEN TECH CO., LTD	ACA-0040-6G1 A1-A10	Omni-directional	3.29	4.76		

Directional Gain =  $10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{Ant}]$

**For IEEE 802.11a/n/ac Mode: (2TX, 2RX)**

All of the antenna No. can be used as transmitting/receiving antennas, and them can transmit/receive signal simultaneously.

EUT Operational Condition		
Testing Voltage	Adapter	AC 120V/60Hz to DC 12V
	802.3at PoE	AC 120V/60Hz to DC 56V

**IEEE 802.11a & IEEE 802.11n/ac (20 MHz)**

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz	48	5240 MHz
149	5745 MHz	153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz	-	-	-	-	-	-

**IEEE 802.11n/ac (40 MHz)**

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	151	5755 MHz	159	5795 MHz

**IEEE 802.11ac (80 MHz)**

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	155	5775 MHz	-	-	-	-

**Note:**

1. Regards to the frequency band operation; the lowest, middle and highest frequency of channel were selected to perform the test, and then shown on this report.
2. The above EUT information is declared by the manufacturer.

## 1.2. Test Mode

DEKRA has verified the construction and function in typical operation. The preliminary tests were performed in different data rate, and to find the worst condition, which was shown in this test report. The following table is the final test mode.

Test Mode	Mode 1: Transmit - power by adapter Mode 2: Transmit - power by 802.3at PoE
-----------	--

Test Items	Test Mode	Test EUT	Modulation	Channel	Result
AC Power Line Conducted Emission	Mode 1	EUT 1	11ac (80 MHz)	42	Pass
		EUT 2	11ac (80 MHz)	42	Pass
	Mode 2	EUT 1	11ac (80 MHz)	42	Pass
		EUT 2	11ac (80 MHz)	42	Pass
Emission Bandwidth	Mode 1	EUT 1	11a	36/44/48/149/157/165	Pass
			11ac (20 MHz)	36/44/48/149/157/165	Pass
			11ac (40 MHz)	38/46/151/159	Pass
			11ac (80 MHz)	42/155	Pass
Maximum Conducted Output Power	Mode 1	EUT 1	11a	36/44/48/149/157/165	Pass
			11ac (20 MHz)	36/44/48/149/157/165	Pass
			11ac (40 MHz)	38/46/151/159	Pass
			11ac (80 MHz)	42/155	Pass
Maximum Conducted Output Power Reference Data	Mode 1	EUT 1	11n (20 MHz)	36/44/48/149/157/165	Pass
			11n (40 MHz)	38/46/151/159	Pass
Maximum Power Spectral Density	Mode 1	EUT 1	11a	36/44/48/149/157/165	Pass
			11ac (20 MHz)	36/44/48/149/157/165	Pass
			11ac (40 MHz)	38/46/151/159	Pass
			11ac (80 MHz)	42/155	Pass
Radiated Emission Below 1 GHz	Mode 1	EUT 1	11ac (80 MHz)	42	Pass
	Mode 2	EUT 1	11ac (80 MHz)	42	Pass
Radiated Emission Above 1 GHz	Mode 1	EUT 1	11a	36/44/48/149/157/165	Pass
			11ac (20 MHz)	36/44/48/149/157/165	Pass
			11ac (40 MHz)	38/46/151/159	Pass
			11ac (80 MHz)	42/155	Pass
Radiated Emission Band Edge	Mode 1	EUT 1	11a	36/44/48/149/157/165	Pass
	Mode 1		11ac (20 MHz)	36/44/48/149/157/165	Pass
	Mode 1		11ac (40 MHz)	38/46/151/159	Pass
	Mode 1		11ac (80 MHz)	42/155	Pass



**Note:**

1. Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. The worst case of data rate for 802.11a is 6 Mbps, for 802.11ac (20 MHz)/802.11ac (40 MHz)/802.11ac (80 MHz) are MCS 0, Nss1. (Please refer to the test result of RF output power for detail.)
3. For radiated emission below 1 GHz and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
4. The modulation and bandwidth are similar for 802.11n mode for HT20/HT40 and 802.11ac mode for VHT20/VHT40/VHT80, therefore investigated worst case to representative mode in test report.
5. There are two EUTs, one is EUT 1 contains a WWAN module: AirPrime / EM7411 / FCC ID: N7NEM74B, and the other is EUT 2 contains a WWAN module: Telit / LE910C4-NF / FCC ID: RI7LE910CXNF.
  - (1) For AC power line conducted emission and radiated emission co-location tests: Both EUT 1, and EUT 2 were to test and record in this test report.
  - (2) For other test: EUT 1 generated the worst test result for radiated emission test, thus the measurement for other test will follow this same test configuration.
6. There are two modes of EUT, one is power by adapter, and the other is power by 802.3at PoE.
  - (1) For AC power line conducted emission and radiated emission below 1 GHz tests: Both power by adapter, and power by 802.3at PoE were to test and record in this test report.
  - (2) For other test: The powered does not affect the test result, so only power by adapter was tested and recorded in this report.
7. Since the product supports Client and Indoor AP, the test is evaluated to meet the Client and Indoor AP limit respectively. Radiated emission and radiated emission band edge uses the Indoor AP limit performed test.
8. The EUT could be applied with 1. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: WCDMA function and 2. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: LTE function; therefore Co-location Maximum Permissible Exposure (Please refer to DEKRA Report No.: 2340262R-RFUSV17S-A) and Radiated Emission Co-location (Please refer to Appendix A) tests are added for simultaneously transmit with 1. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: WCDMA function and 2. WiFi 2.4 GHz + WiFi 5 GHz + WWAN module: LTE function.
9. The EUT contains a WWAN module, and assemble of cellular module refer to the section 1.1 for detail.

### 1.3. Comments and Remarks

The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

### 1.4. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system.

Mode 1: Transmit - power by adapter

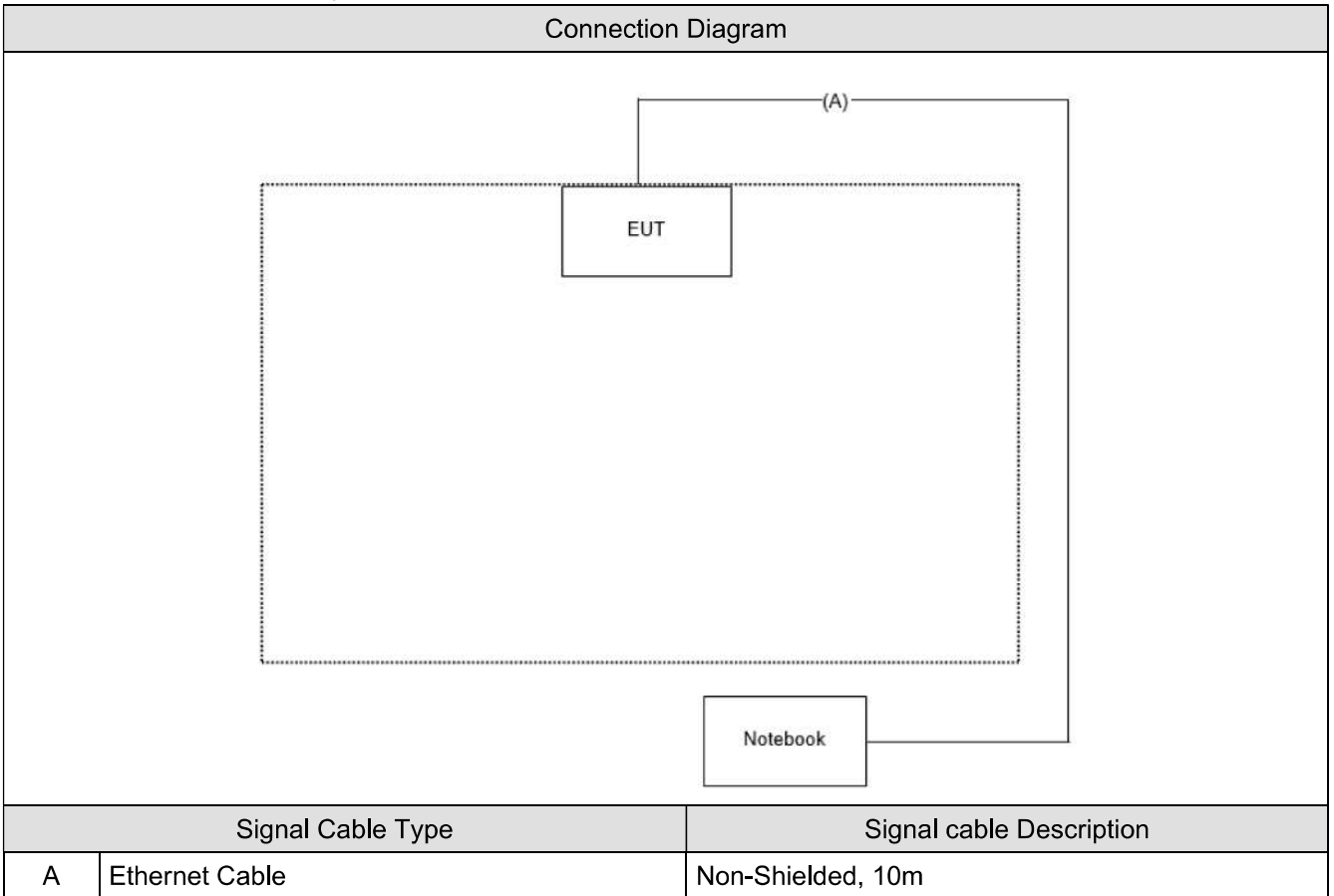
	Product	Manufacturer	Model No.	Serial No.
1	Notebook	DELL	Latitude E6320	8611271467

Mode 2: Transmit - power by 802.3at PoE

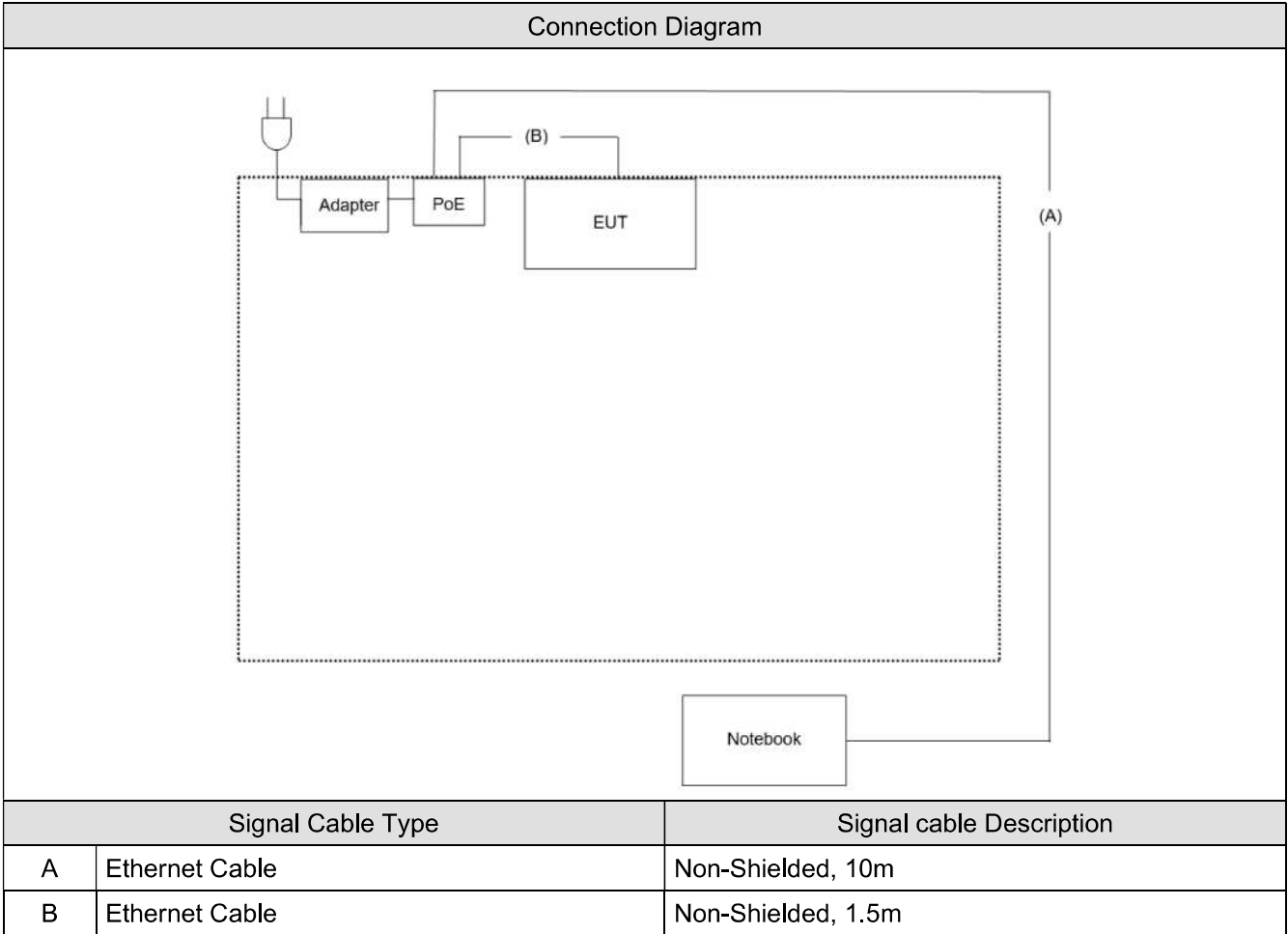
	Product	Manufacturer	Model No.	Serial No.
1	Notebook	DELL	Latitude E6320	8611271467
2	PoE	BulletPOE	BPW541-65W	N/A
3	Adapter	DVE	DSA-24PFS-12 FUS 120200	N/A

### 1.5. Configuration of tested System

Mode 1: Transmit - power by adapter



Mode 2: Transmit - power by 802.3at PoE



**1.6. EUT Operation of during Test**

1	Execute control command by software "MT7615 QA v0.0.2.0".
2	Configure the test mode, the test channel, and the data rate.
3	Press "Start TX" to start the continuous transmitting.
4	Verify that the EUT works properly.

## 1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Actually	Tested by	Test Date	Test Site
Temperature (°C)	AC Power Line Conducted Emission	21.5 ~ 22	Scott Chang Cyril Chen	2023/04/28 ~ 2023/05/09	HC-SR02
Humidity (%RH)		58 ~ 61			
Temperature (°C)	99% & 26dB & DTS Bandwidth	21	Clemens Fang	2023/04/26	HC-SR12
Humidity (%RH)		65			
Temperature (°C)	Maximum Conducted Output Power	21	Clemens Fang	2023/04/25	HC-SR12
Humidity (%RH)		66			
Temperature (°C)	Maximum Power Spectral Density	21	Clemens Fang	2023/04/26	HC-SR12
Humidity (%RH)		65			
Temperature (°C)	Radiated Emission	21 ~ 23.1	Cyril Chen Scott Chang	2023/04/24 ~ 2023/05/08	HC-CB04
Humidity (%RH)		60 ~ 63			
Temperature (°C)	Radiated Emission Band Edge	23	Cyril Chen	2023/04/21	HC-CB04
Humidity (%RH)		61			

Note: Test site information refers to Laboratory Information.

**USA : FCC Registration Number: TW3024**

**Canada CAB identifier : TW3024**

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our

Web site: <http://www.dekra.com.tw>

If you have any comments, please don't hesitate to contact us. Our test sites as below:

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
Address	1. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 2. No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
Phone number	1. +886-3-582-8001 2. +886-3-582-8001
Fax number	1. +886-3-582-8958 2. +886-3-582-8958
E mail address	<a href="mailto:info.tw@dekra.com">info.tw@dekra.com</a>
Website	<a href="http://www.dekra.com.tw">http://www.dekra.com.tw</a>
Note: Test site number for address 1 includes HC-SR02. Test site number for address 2 includes HC-CB02, HC-CB03, HC-CB04, HC-SR10 and HC-SR12.	

## 1.8. List of Test Equipment

### HC-SR02

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2022/12/19	2023/12/18
EMI Test Receiver	R&S	ESR3	102608	2022/09/28	2023/09/27
Two-Line V-Network	R&S	ENV216	100096	2022/05/17	2023/05/16
Coaxial Cable(9 m)	Harbour	RG-400	HC-SR02	2022/08/15	2023/08/14
EMI Testing System	AUDIX	e3 210616 dekra V9	HC-SR02	N/A	N/A

### HC-SR12

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2022/11/02	2023/11/01
Pulse Power Sensor	Anritsu	MA2411B	1531043	2022/11/02	2023/11/01
Pulse Power Sensor	Anritsu	MA2411B	1531044	2022/11/02	2023/11/01
Power Meter	Keysight	8990B	MY51000248	2022/05/06	2023/05/05
Power Sensor	Keysight	N1923A	MY57240005	2022/05/06	2023/05/05
Signal and Spectrum Analyzer	R&S	FSVA40	101435	2022/05/30	2023/05/29

### HC-CB04

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2022/09/29	2023/09/28
Trilog Broadband Antenna	Schwarzbeck	VULB 9168	1209	2022/06/14	2023/06/13
Double Ridged Horn Antenna	RF SPIN	DRH18-E	211212A18E N	2022/11/15	2023/11/14
Horn Antenna	Schwarzbeck	BBHA 9170	203	2023/02/13	2024/02/12
Pre-Amplifier	EMCI	EMC01820I	980364	2022/06/10	2023/06/09
Pre-Amplifier	EMEC	EM01G18GA	060835	2022/07/04	2023/07/03
Pre-Amplifier	DEKRA	AP-400C	201801231	2022/09/27	2023/09/26
EMI Test Receiver	R&S	ESR7	102260	2022/12/01	2023/11/30
Magnetic Loop Antenna	Teseq	HLA 6121	44287	2022/10/21	2023/10/20
Coaxial Cable(10m)	Suhner	SF102_SF104	HC-CB04	2022/08/08	2023/08/07
Coaxial Cable(3m)	Suhner,Rosnol	SF102_UP0264	HC-CB04_1	2022/08/14	2023/08/13
Radiated Software	AUDIX	e3 V9	HC-CB04_1	N/A	N/A

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

## 1.9. Measurement Uncertainty

Uncertainties have been calculated according to the DEKRA internal document with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Test Item	Uncertainty
AC Power Line Conducted Emission	$\pm 2.34$ dB
99% & 26dB & DTS Bandwidth	$\pm 636.54$ Hz
Maximum Conducted Output Power	$\pm 1.16$ dB
Maximum Power Spectral Density	$\pm 2.47$ dB
Radiated Emission	$\pm 3.52$ dB below 1 GHz $\pm 3.56$ dB above 1 GHz
Radiated Emission Band Edge	$\pm 3.56$ dB

### 1.10. Duty Cycle

Modulation	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	1.380	1.450	95.17	0.215	0.725
802.11ac (20 MHz)	1.310	1.370	95.62	0.194	0.763
802.11ac (40 MHz)	0.650	0.710	91.55	0.383	1.538
802.11ac (80 MHz)	0.320	0.380	84.21	0.746	3.125



---

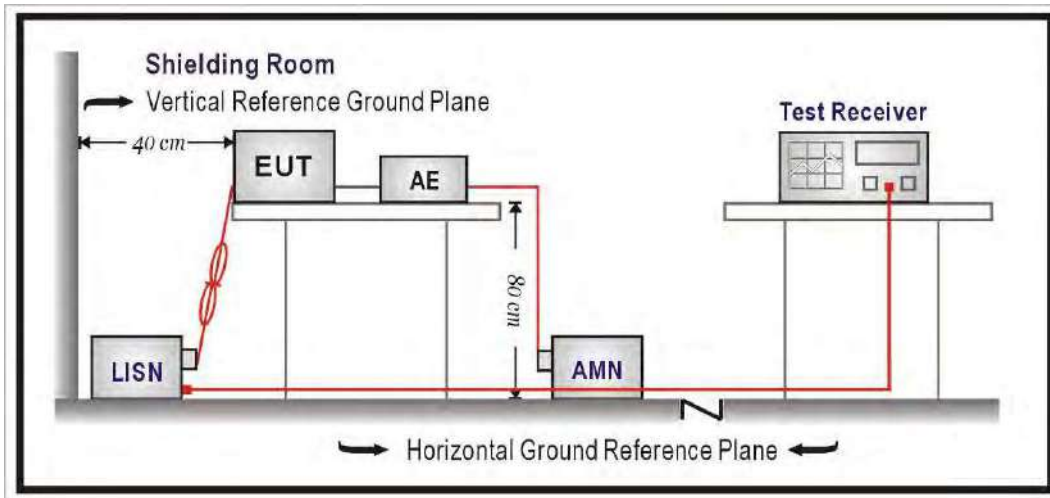
## 2. Antenna Requirements

According to FCC 47CFR 15.203, 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 permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.



### 3. AC Power Line Conducted Emission

#### 3.1. Test Setup



#### 3.2. Test Limit

Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Remark: In the above table, the tighter limit applies at the band edges.

### 3.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz.

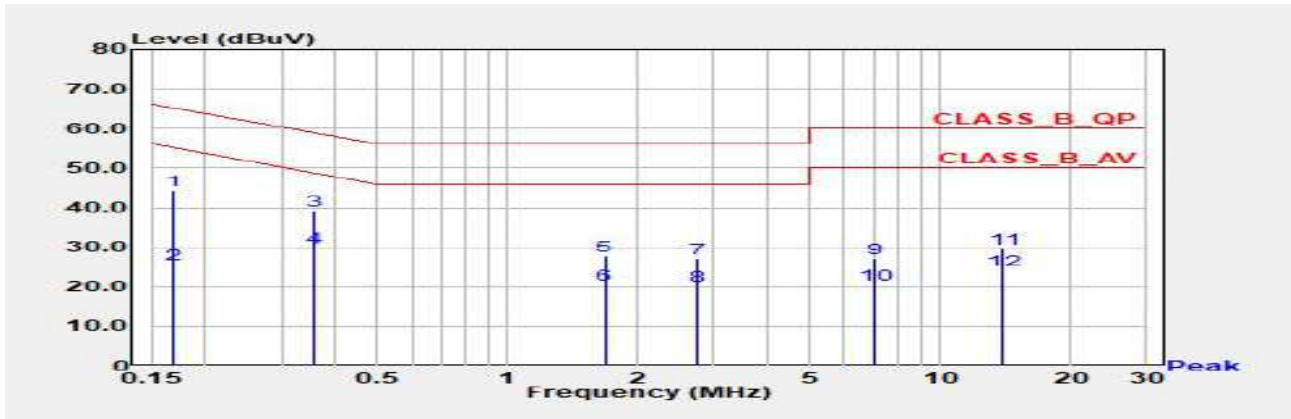
### 3.4. Test Specification

According to FCC CFR Title 47 Part 15 Subpart E.

### 3.5. Test Result of AC Power Line Conducted Emission

<For EUT 1>

Test Mode	Mode 1: Transmit - power by adapter	Phase	Line
Test Condition	802.11ac (80 MHz) / Ant. 0 + Ant. 1 / 5210 MHz		

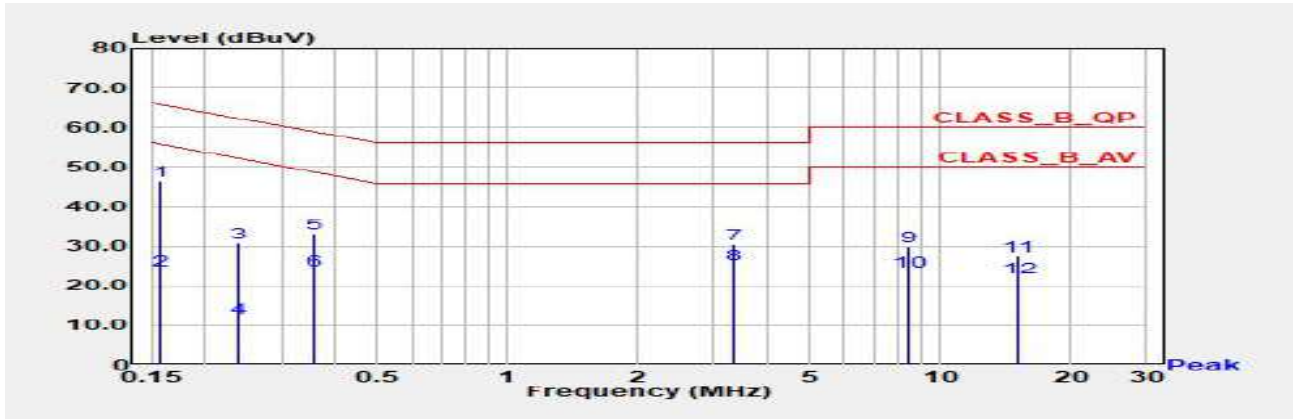


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.168	44.40	65.06	-20.65	34.79	9.62	QP
2	0.168	25.57	55.06	-29.48	15.96	9.62	AV
3	0.357	39.34	58.80	-19.45	29.71	9.64	QP
*4	0.357	29.75	48.80	-19.05	20.11	9.64	AV
5	1.675	27.63	56.00	-28.37	17.89	9.73	QP
6	1.675	20.65	46.00	-25.35	10.92	9.73	AV
7	2.728	27.12	56.00	-28.88	17.34	9.78	QP
8	2.728	20.33	46.00	-25.67	10.55	9.78	AV
9	7.064	27.21	60.00	-32.79	17.23	9.97	QP
10	7.064	20.61	50.00	-29.39	10.64	9.97	AV
11	13.989	29.53	60.00	-30.47	19.33	10.20	QP
12	13.989	24.09	50.00	-25.91	13.89	10.20	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Test Mode	Mode 1: Transmit - power by adapter	Phase	Neutral
Test Condition	802.11ac (80 MHz) / Ant. 0 + Ant. 1 / 5210 MHz		

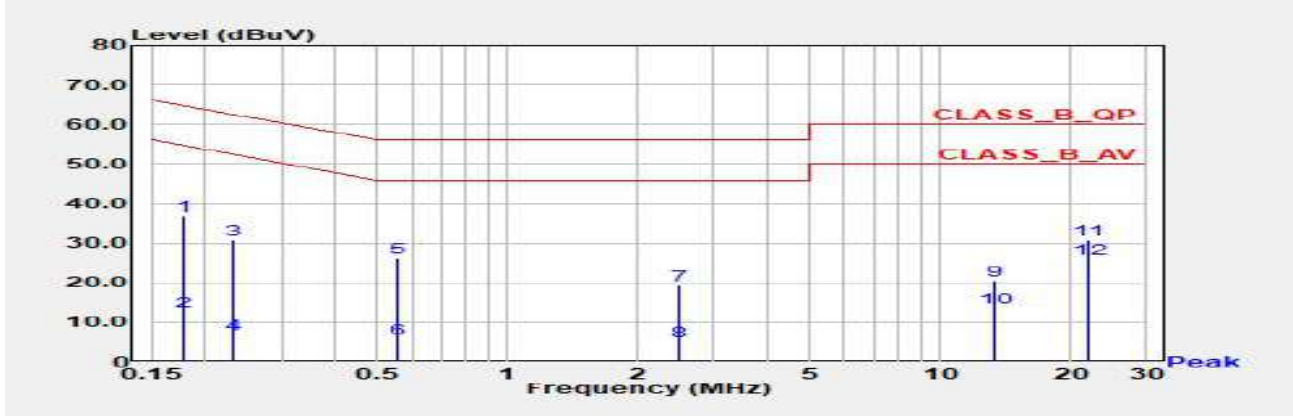


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.157	46.41	65.63	-19.22	36.79	9.62	QP
2	0.157	24.00	55.63	-31.64	14.38	9.62	AV
3	0.240	30.65	62.10	-31.45	21.03	9.62	QP
4	0.240	11.65	52.10	-40.45	2.03	9.62	AV
5	0.357	33.35	58.80	-25.45	23.72	9.63	QP
6	0.357	23.87	48.80	-24.93	14.24	9.63	AV
7	3.352	30.57	56.00	-25.43	20.75	9.82	QP
8	3.352	25.32	46.00	-20.68	15.50	9.82	AV
9	8.428	29.77	60.00	-30.23	19.72	10.05	QP
10	8.428	23.46	50.00	-26.54	13.40	10.05	AV
11	15.054	27.33	60.00	-32.67	17.00	10.34	QP
12	15.054	22.08	50.00	-27.92	11.74	10.34	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Test Mode	Mode 2: Transmit - power by 802.3at PoE	Phase	Line
Test Condition	802.11ac (80 MHz) / Ant. 0 + Ant. 1 / 5210 MHz		

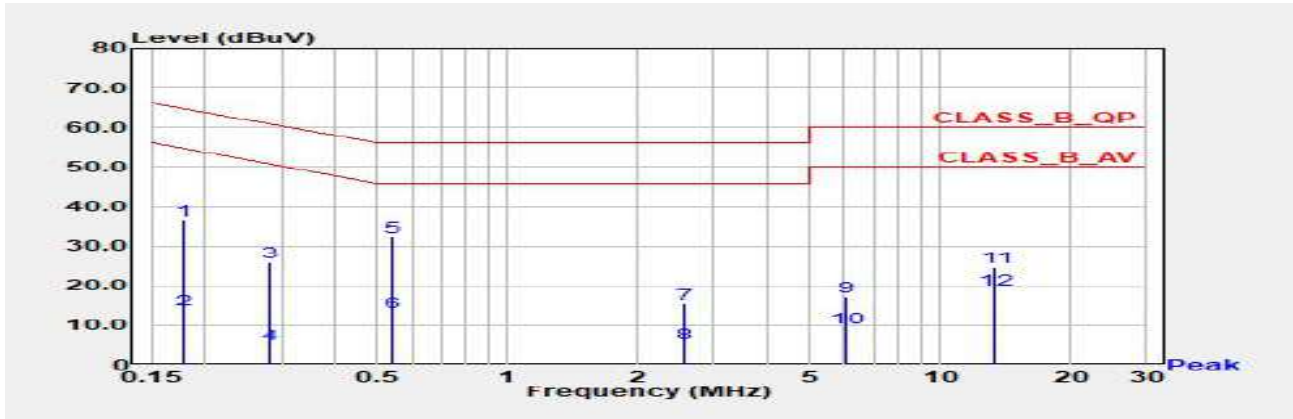


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.179	36.91	64.52	-27.61	27.29	9.62	QP
2	0.179	12.63	54.52	-41.89	3.01	9.62	AV
3	0.231	30.79	62.41	-31.63	21.17	9.62	QP
4	0.231	6.82	52.41	-45.59	-2.79	9.62	AV
5	0.555	26.16	56.00	-29.84	16.50	9.66	QP
6	0.555	5.72	46.00	-40.28	-3.94	9.66	AV
7	2.490	19.31	56.00	-36.69	9.54	9.77	QP
8	2.490	5.09	46.00	-40.91	-4.69	9.77	AV
9	13.373	20.50	60.00	-39.50	10.32	10.18	QP
10	13.373	13.67	50.00	-36.33	3.48	10.18	AV
11	21.983	30.81	60.00	-29.19	20.41	10.40	QP
*12	21.983	26.02	50.00	-23.98	15.62	10.40	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Test Mode	Mode 2: Transmit - power by 802.3at PoE	Phase	Neutral
Test Condition	802.11ac (80 MHz) / Ant. 0 + Ant. 1 / 5210 MHz		



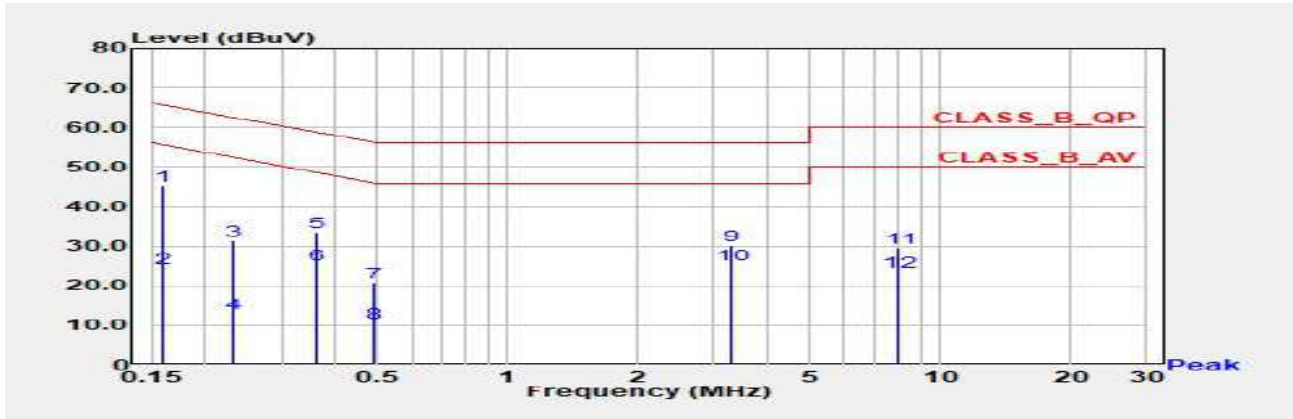
No	Frequency (MHz)	Emission Level (dBUV)	Limit (dBUV)	Margin (dB)	Reading Level (dBUV)	Correct Factor (dB)	Detector Type
1	0.179	36.58	64.52	-27.94	26.96	9.62	QP
2	0.179	13.85	54.52	-40.67	4.24	9.62	AV
3	0.283	25.97	60.73	-34.77	16.35	9.62	QP
4	0.283	5.14	50.73	-45.60	-4.49	9.62	AV
*5	0.539	32.29	56.00	-23.71	22.64	9.65	QP
6	0.539	13.35	46.00	-32.65	3.70	9.65	AV
7	2.548	15.35	56.00	-40.65	5.57	9.78	QP
8	2.548	5.49	46.00	-40.51	-4.29	9.78	AV
9	6.054	17.24	60.00	-42.76	7.29	9.95	QP
10	6.054	9.43	50.00	-40.57	-0.52	9.95	AV
11	13.380	24.84	60.00	-35.16	14.58	10.27	QP
12	13.380	19.02	50.00	-30.98	8.75	10.27	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

<For EUT 2>

Test Mode	Mode 1: Transmit - power by adapter	Phase	Line
Test Condition	802.11ac (80 MHz) / Ant. 0 + Ant. 1 / 5210 MHz		

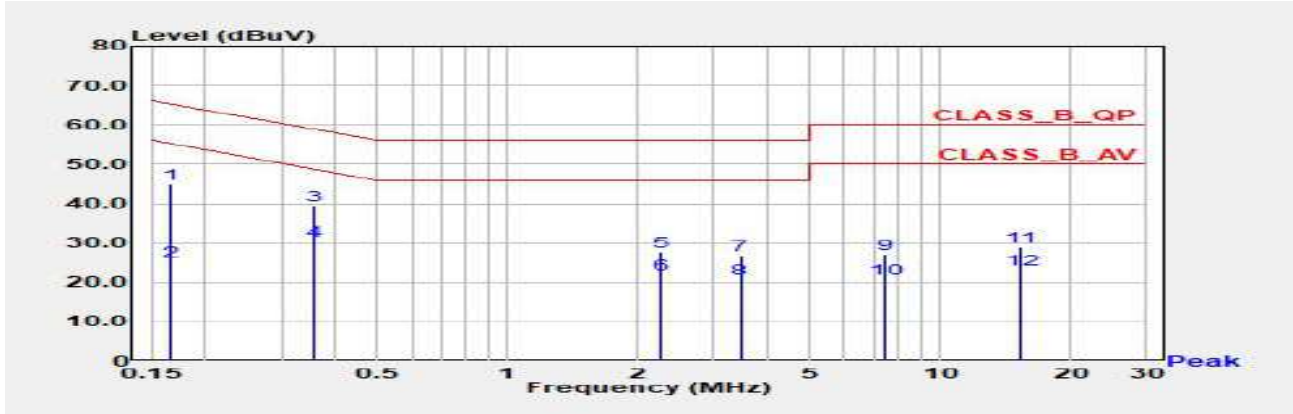


No	Frequency (MHz)	Emission Level (dBUV)	Limit (dBUV)	Margin (dB)	Reading Level (dBUV)	Correct Factor (dB)	Detector Type
*1	0.159	45.30	65.52	-20.22	35.68	9.62	QP
2	0.159	24.42	55.52	-31.09	14.80	9.62	AV
3	0.233	31.41	62.33	-30.93	21.79	9.62	QP
4	0.233	12.95	52.33	-39.38	3.33	9.62	AV
5	0.359	33.46	58.75	-25.29	23.82	9.64	QP
6	0.359	25.37	48.75	-23.38	15.73	9.64	AV
7	0.487	20.85	56.21	-35.36	11.20	9.65	QP
8	0.487	10.66	46.21	-35.56	1.00	9.65	AV
9	3.289	30.31	56.00	-25.69	20.50	9.81	QP
10	3.289	25.31	46.00	-20.69	15.50	9.81	AV
11	8.027	29.64	60.00	-30.36	19.62	10.01	QP
12	8.027	23.69	50.00	-26.31	13.68	10.01	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Test Mode	Mode 1: Transmit - power by adapter	Phase	Neutral
Test Condition	802.11ac (80 MHz) / Ant. 0 + Ant. 1 / 5210 MHz		



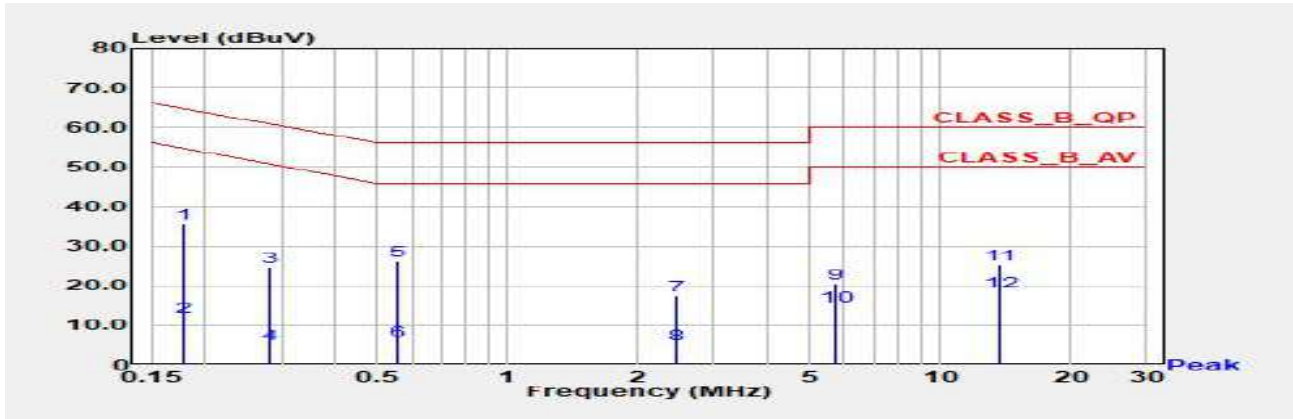
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.166	44.92	65.17	-20.25	35.30	9.62	QP
2	0.166	25.36	55.17	-29.81	15.74	9.62	AV
3	0.357	39.50	58.80	-19.30	29.87	9.63	QP
*4	0.357	30.54	48.80	-18.26	20.91	9.63	AV
5	2.267	27.77	56.00	-28.23	18.00	9.76	QP
6	2.267	21.91	46.00	-24.09	12.15	9.76	AV
7	3.448	26.87	56.00	-29.13	17.05	9.82	QP
8	3.448	20.92	46.00	-25.08	11.10	9.82	AV
9	7.480	27.24	60.00	-32.76	17.23	10.01	QP
10	7.480	20.93	50.00	-29.07	10.91	10.01	AV
11	15.360	28.86	60.00	-31.14	18.51	10.35	QP
12	15.360	23.30	50.00	-26.70	12.95	10.35	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.



Test Mode	Mode 2: Transmit - power by 802.3at PoE	Phase	Line
Test Condition	802.11ac (80 MHz) / Ant. 0 + Ant. 1 / 5210 MHz		

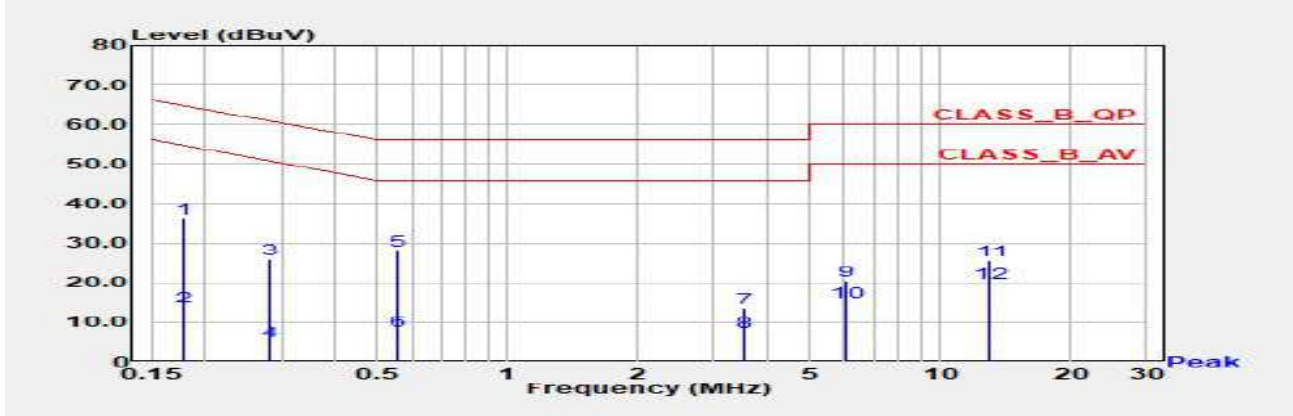


No	Frequency (MHz)	Emission Level (dBUV)	Limit (dBUV)	Margin (dB)	Reading Level (dBUV)	Correct Factor (dB)	Detector Type
*1	0.179	35.68	64.52	-28.84	26.06	9.62	QP
2	0.179	12.21	54.52	-42.31	2.59	9.62	AV
3	0.283	24.64	60.73	-36.09	15.02	9.63	QP
4	0.283	5.12	50.73	-45.62	-4.51	9.63	AV
5	0.555	26.15	56.00	-29.85	16.50	9.66	QP
6	0.555	6.08	46.00	-39.92	-3.57	9.66	AV
7	2.465	17.61	56.00	-38.39	7.84	9.77	QP
8	2.465	4.99	46.00	-41.01	-4.78	9.77	AV
9	5.732	20.67	60.00	-39.33	10.75	9.92	QP
10	5.732	14.74	50.00	-35.26	4.82	9.92	AV
11	13.697	25.29	60.00	-34.71	15.09	10.19	QP
12	13.697	18.35	50.00	-31.65	8.16	10.19	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Test Mode	Mode 2: Transmit - power by 802.3at PoE	Phase	Neutral
Test Condition	802.11ac (80 MHz) / Ant. 0 + Ant. 1 / 5210 MHz		



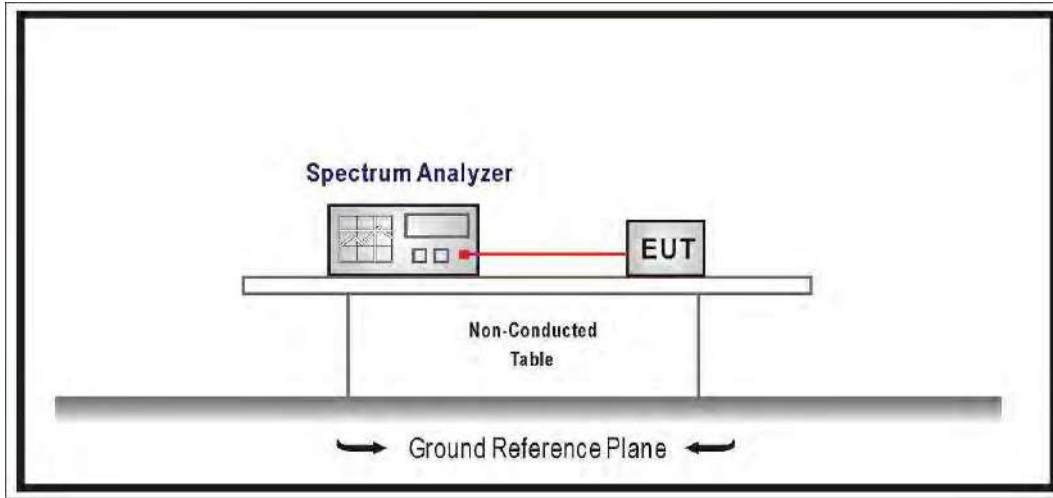
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.179	36.09	64.52	-28.43	26.47	9.62	QP
2	0.179	13.92	54.52	-40.60	4.30	9.62	AV
3	0.283	26.00	60.73	-34.73	16.38	9.62	QP
4	0.283	5.00	50.73	-45.74	-4.62	9.62	AV
*5	0.555	28.03	56.00	-27.97	18.39	9.65	QP
6	0.555	7.88	46.00	-38.12	-1.77	9.65	AV
7	3.502	13.62	56.00	-42.38	3.79	9.83	QP
8	3.502	7.52	46.00	-38.48	-2.31	9.83	AV
9	6.052	20.47	60.00	-39.53	10.52	9.95	QP
10	6.052	15.11	50.00	-34.89	5.15	9.95	AV
11	13.058	25.75	60.00	-34.25	15.50	10.25	QP
12	13.058	20.06	50.00	-29.94	9.81	10.25	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

## 4. Emission Bandwidth

### 4.1. Test Setup



### 4.2. Test Limit

99% & 26dB Bandwidth : No Required

6dB Bandwidth  $\geq$  500kHz

### 4.3. Test Procedure

99% & 26dB Bandwidth :

The EUT was tested according to U-NII test procedure of KDB 789033.D02 V02r01

Set RBW 1% of the emission bandwidth, VBW equal to 3 times the RBW.

DTS Bandwidth :

Set RBW = 100kHz, VBW  $\geq$  3xRBW, Sweep time=Auto, Set Peak detector.

### 4.4. Test Specification

According to FCC CFR Title 47 Part 15 Subpart E.

#### 4.5. Test Result of Emission Bandwidth

Modulation	Channel	Frequency (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)		Limit (MHz)	
			Ant. 0	Ant. 1	Ant. 0	Ant. 1	99% & 26dB Bandwidth	
802.11a	36	5180	16.943	16.903	20.419	22.857	-	
	44	5220	17.182	16.743	20.379	22.617	-	
	48	5240	16.943	16.743	20.579	22.377	-	
Modulation	Channel	Frequency (MHz)	99% Bandwidth (MHz)		DTS Bandwidth (MHz)		Limit (MHz)	
			Ant. 0	Ant. 1	Ant. 0	Ant. 1	99% Bandwidth	DTS Bandwidth
802.11a	149	5745	17.062	16.703	15.104	15.104	-	≥ 0.50
	157	5785	17.142	16.823	15.104	15.104	-	≥ 0.50
	165	5825	17.062	16.783	15.104	15.104	-	≥ 0.50

Modulation	Channel	Frequency (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)		Limit (MHz)	
			Ant. 0	Ant. 1	Ant. 0	Ant. 1	99% & 26dB Bandwidth	
802.11ac (20 MHz)	36	5180	17.982	17.782	20.939	24.815	-	
	44	5220	18.141	17.742	20.859	20.419	-	
	48	5240	17.942	17.702	20.859	20.539	-	
Modulation	Channel	Frequency (MHz)	99% Bandwidth (MHz)		DTS Bandwidth (MHz)		Limit (MHz)	
			Ant. 0	Ant. 1	Ant. 0	Ant. 1	99% Bandwidth	DTS Bandwidth
802.11ac (20 MHz)	149	5745	17.982	17.622	15.104	16.303	-	≥ 0.50
	157	5785	18.021	17.662	15.104	16.503	-	≥ 0.50
	165	5825	17.902	17.662	15.104	15.904	-	≥ 0.50

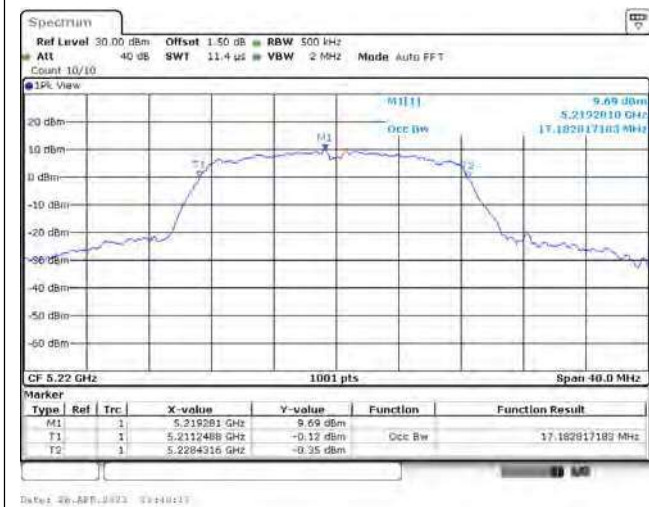
Modulation	Channel	Frequency (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)		Limit (MHz)	
			Ant. 0	Ant. 1	Ant. 0	Ant. 1	99% & 26dB Bandwidth	
802.11ac (40 MHz)	38	5190	36.123	36.043	40.599	40.119	-	
	46	5230	36.123	36.123	40.759	40.119	-	
Modulation	Channel	Frequency (MHz)	99% Bandwidth (MHz)		DTS Bandwidth (MHz)		Limit (MHz)	
			Ant. 0	Ant. 1	Ant. 0	Ant. 1	99% Bandwidth	DTS Bandwidth
802.11ac (40 MHz)	151	5755	36.043	36.123	35.084	35.084	-	≥ 0.50
	159	5795	36.123	36.203	35.084	35.005	-	≥ 0.50

Modulation	Channel	Frequency (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)		Limit (MHz)	
			Ant. 0	Ant. 1	Ant. 0	Ant. 1	99% & 26dB Bandwidth	
802.11ac (80 MHz)	42	5210	75.124	74.805	80.719	78.961	-	
Modulation	Channel	Frequency (MHz)	99% Bandwidth (MHz)		DTS Bandwidth (MHz)		Limit (MHz)	
			Ant. 0	Ant. 1	Ant. 0	Ant. 1	99% Bandwidth	DTS Bandwidth
802.11ac (80 MHz)	155	5755	75.124	74.965	74.965	74.965	-	$\geq 0.50$

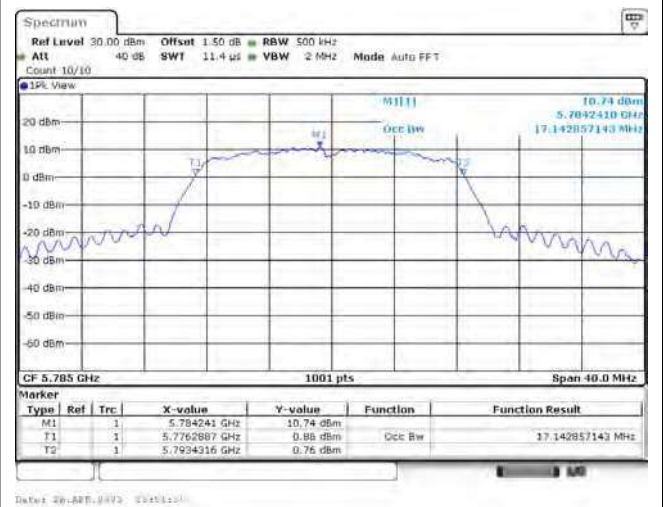
**For 99% Bandwidth:**

**Spectrum plot of worst value**

802.11a / Ant. 0 / 5220 MHz (U-NII-1)



802.11a / Ant. 0 / 5785 MHz (U-NII-3)



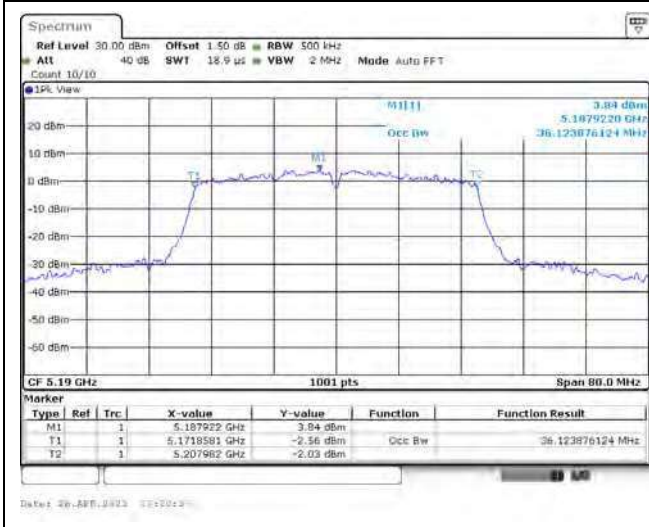
802.11ac (20 MHz) / Ant. 0 / 5220 MHz (U-NII-1)



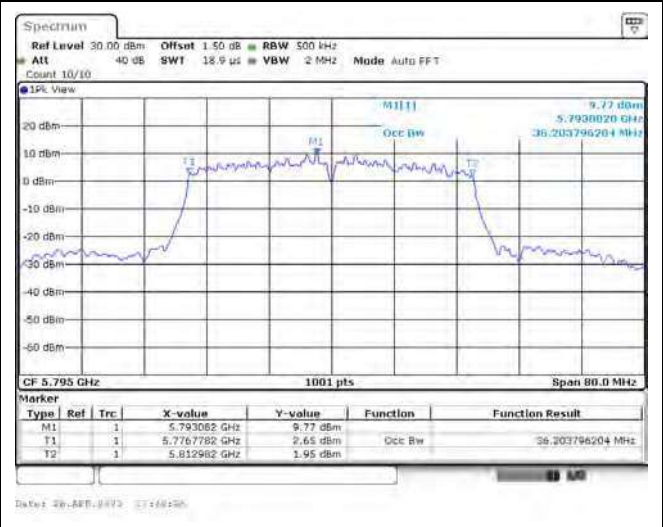
802.11ac (20 MHz) / Ant. 0 / 5785 MHz (U-NII-3)



802.11ac (40 MHz) / Ant. 0 / 5190 MHz (U-NII-1)



802.11ac (40 MHz) / Ant. 1 / 5795 MHz (U-NII-3)

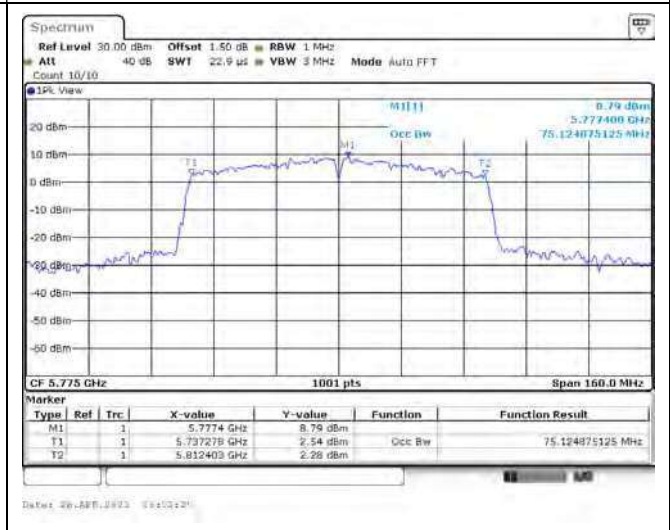
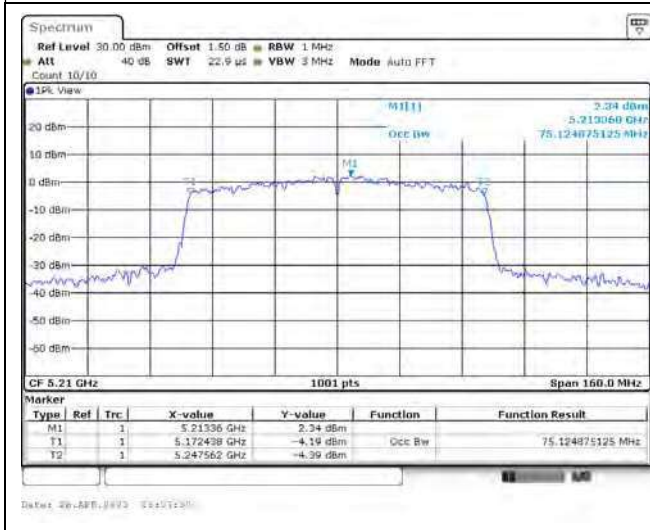




**Spectrum plot of worst value**

802.11ac (80 MHz) / Ant. 0 / 5210 MHz (U-NII-1)

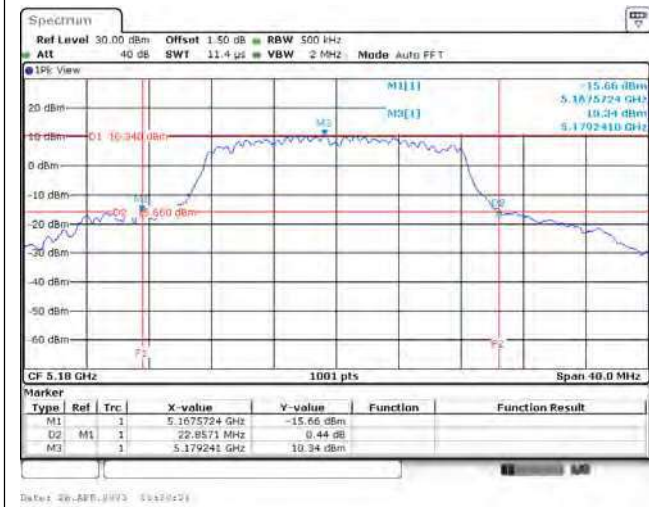
802.11ac (80 MHz) / Ant. 0 / 5775 MHz (U-NII-3)



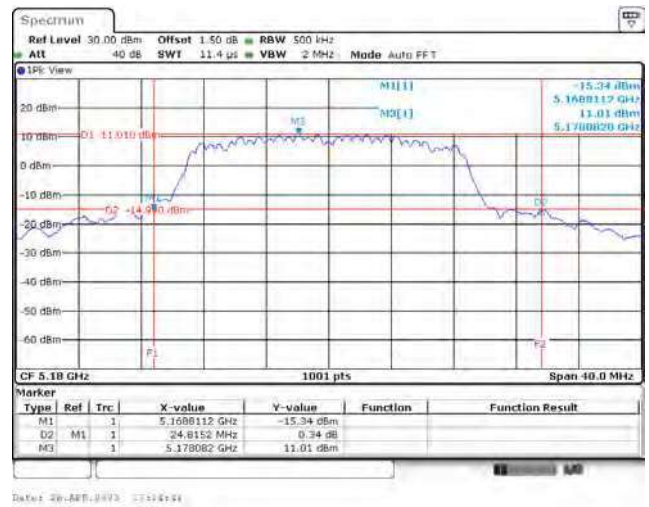
**For 26dB Bandwidth:**

**Spectrum plot of worst value**

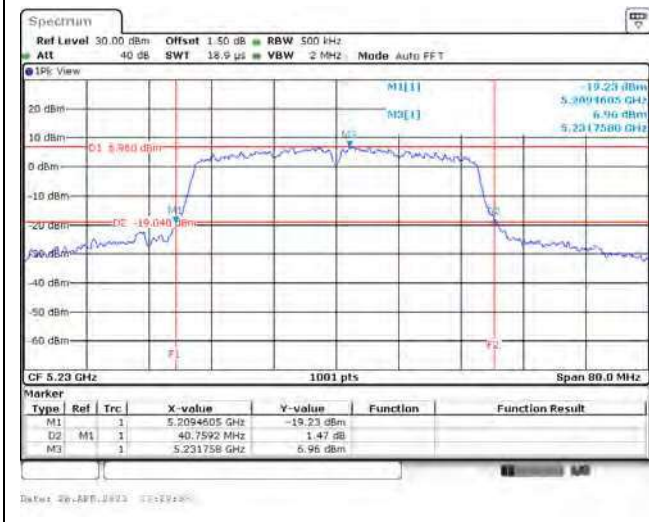
802.11a / Ant. 1 / 5180 MHz (U-NII-1)



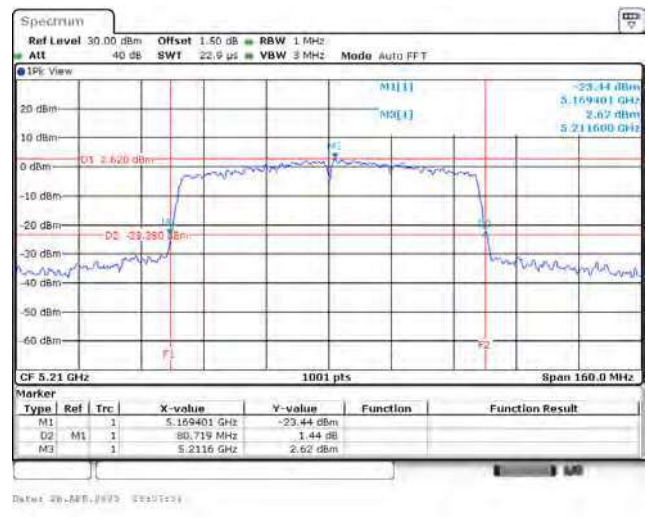
802.11ac (20 MHz) / Ant. 1 / 5180 MHz (U-NII-1)



802.11ac (40 MHz) / Ant. 0 / 5230 MHz (U-NII-1)



802.11ac (80 MHz) / Ant. 0 / 5210 MHz (U-NII-1)

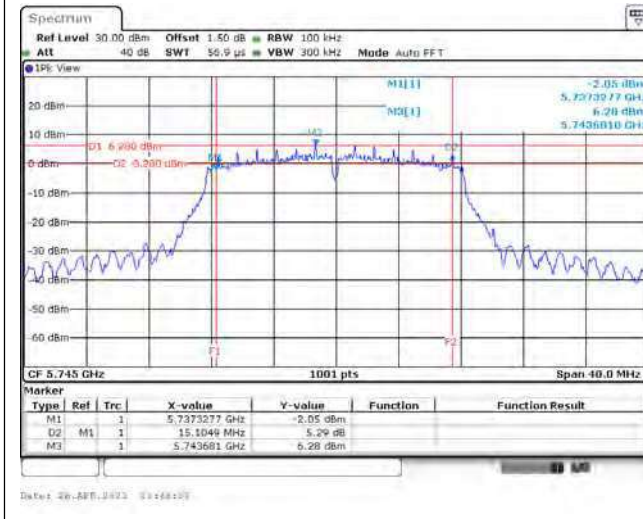




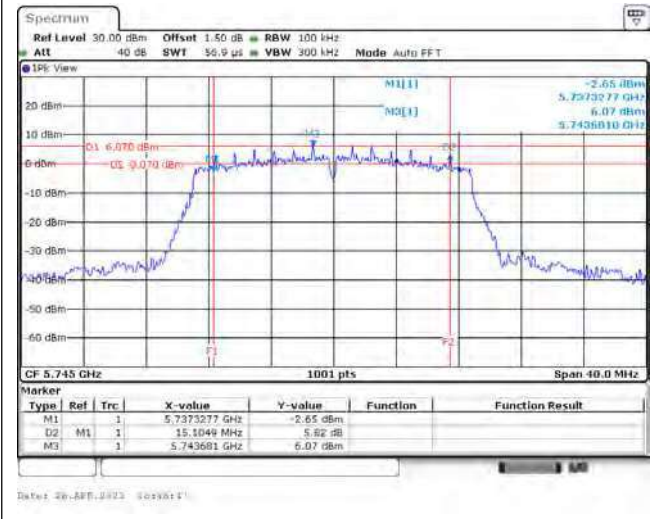
**For DTS Bandwidth:**

**Spectrum plot of worst value**

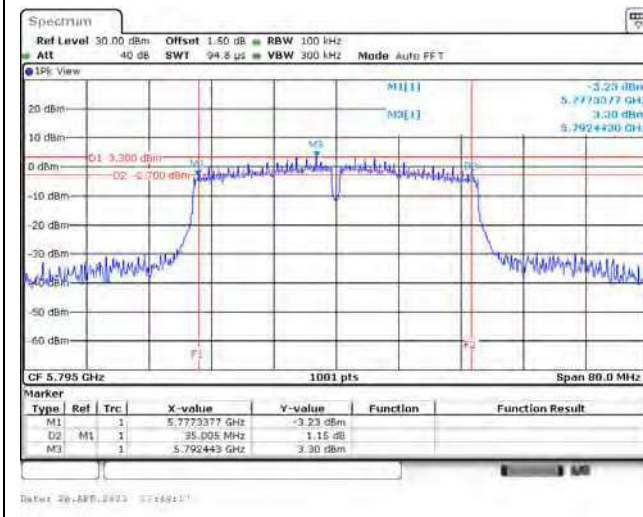
802.11a / Ant. 0 / 5745 MHz



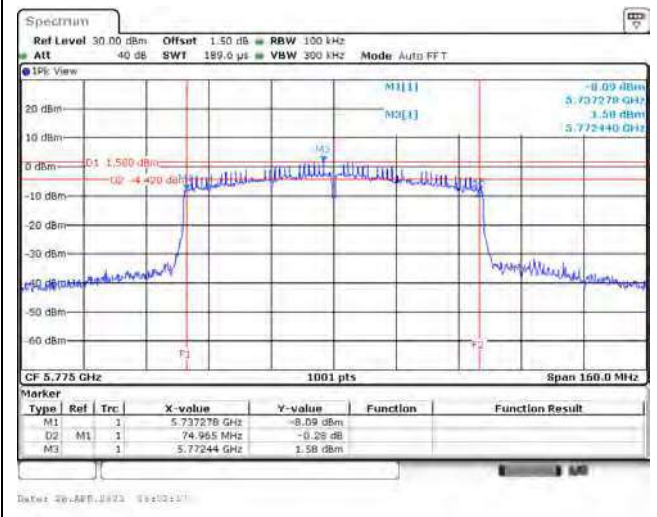
802.11ac (20 MHz) / Ant. 0 / 5745 MHz



802.11ac (40 MHz) / Ant. 1 / 5795 MHz

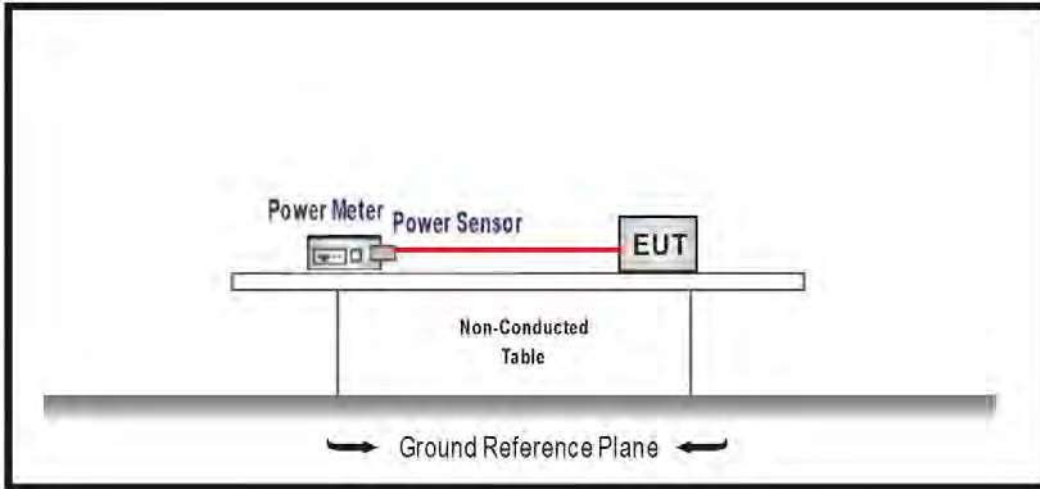


802.11ac (80 MHz) / Ant. 0 / 5775 MHz



## 5. Maximum Conducted Output Power

### 5.1. Test Setup



### 5.2. Test Limit

1. For an outdoor access point and an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
3. For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **5.3. Test Procedure**

The EUT was setup to ANSI C63.10: 2013; tested to U-NII test procedure of 789033 D02 V02r01 for compliance to FCC CFR Title 47 Part 15 Subpart E.

### **5.4. Test Specification**

According to FCC CFR Title 47 Part 15 Subpart E.

### 5.5. Test Result of Maximum Conducted Output Power

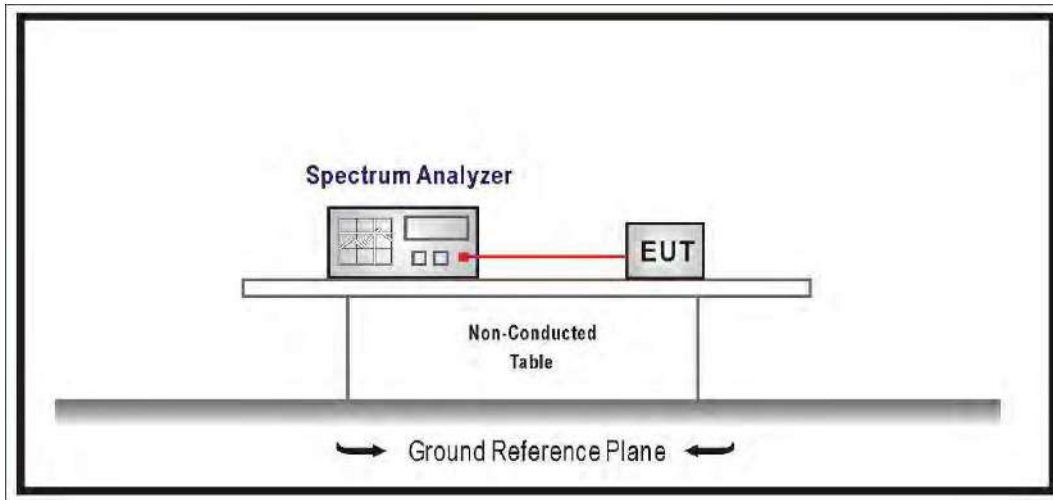
Modulation	Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)			Limit (dBm)		Result
			Ant. 0	Ant. 1	Total	Indoor AP	Client	
802.11a	36	5180	18.07	16.52	20.37	≤30.00	≤24.00	Pass
	44	5220	18.02	16.31	20.26	≤30.00	≤24.00	Pass
	48	5240	18.26	16.28	20.39	≤30.00	≤24.00	Pass
	149	5745	18.37	17.22	20.84	≤30.00	≤30.00	Pass
	157	5785	18.52	17.29	20.96	≤30.00	≤30.00	Pass
	165	5825	18.54	17.20	20.93	≤30.00	≤30.00	Pass
802.11ac (20 MHz)	36	5180	18.12	16.54	20.41	≤30.00	≤24.00	Pass
	44	5220	18.03	16.27	20.25	≤30.00	≤24.00	Pass
	48	5240	18.09	16.31	20.30	≤30.00	≤24.00	Pass
	149	5745	18.34	17.32	20.87	≤30.00	≤30.00	Pass
	157	5785	18.56	17.29	20.98	≤30.00	≤30.00	Pass
	165	5825	18.44	17.16	20.86	≤30.00	≤30.00	Pass
802.11ac (40 MHz)	38	5190	15.52	13.94	17.81	≤30.00	≤24.00	Pass
	46	5230	17.78	15.43	19.77	≤30.00	≤24.00	Pass
	151	5755	18.13	17.18	20.69	≤30.00	≤30.00	Pass
	159	5795	18.41	17.06	20.80	≤30.00	≤30.00	Pass
802.11ac (80 MHz)	42	5210	12.37	11.21	14.84	≤30.00	≤24.00	Pass
	155	5775	18.69	17.32	21.07	≤30.00	≤30.00	Pass

#### <Reference Data>

Modulation	Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)		
			Ant. 0	Ant. 1	Total
802.11n (20 MHz)	36	5180	17.95	16.38	20.25
	44	5220	17.91	16.14	20.12
	48	5240	17.95	16.16	20.16
	149	5745	18.18	17.14	20.70
	157	5785	18.43	17.17	20.86
	165	5825	18.29	17.03	20.72
802.11n (40 MHz)	38	5190	15.34	13.80	17.65
	46	5230	17.66	15.27	19.64
	151	5755	18.00	17.03	20.55
	159	5795	18.24	16.93	20.64

## 6. Maximum Power Spectral Density

### 6.1. Test Setup



### 6.2. Test Limit

1. For the band 5.15 ~ 5.25 GHz, the peak power spectral density shall not exceed 17 dBm in any 1 MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
2. For client devices in the 5.15 ~ 5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi
3. For the 5.25 ~ 5.35 GHz ,5470 ~ 5600 MHz and 5650 ~ 5725 MHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
4. For the band 5.725 ~ 5.850 GHz, the peak power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

### 6.3. Test Procedure

The EUT was setup to ANSI C63.10: 2013; tested to U-NII test procedure of KDB 789033.D02 V02r01 for compliance to FCC CFR Title 47 Part 15 Subpart E requirements.

### 6.4. Test Specification

According to FCC CFR Title 47 Part 15 Subpart E.

## 6.5. Test Result of Maximum Power Spectral Density

Modulation	Channel	Frequency (MHz)	Power Spectral Density (dBm)			Limit (dBm)		Result
			Ant. 0	Ant. 1	Total	Indoor AP	Client	
802.11a	36	5180	6.220	5.250	8.987	≤ 16.70	≤ 10.70	Pass
	44	5220	6.240	5.110	8.937	≤ 16.70	≤ 10.70	Pass
	48	5240	6.360	4.980	8.950	≤ 16.70	≤ 10.70	Pass
	149	5745	3.820	3.800	7.035	≤ 28.23	≤ 28.23	Pass
	157	5785	4.040	3.770	7.132	≤ 28.23	≤ 28.23	Pass
	165	5825	4.090	3.520	7.040	≤ 28.23	≤ 28.23	Pass
802.11ac (20 MHz)	36	5180	6.000	5.330	8.883	≤ 16.70	≤ 10.70	Pass
	44	5220	5.890	4.980	8.664	≤ 16.70	≤ 10.70	Pass
	48	5240	6.080	4.910	8.739	≤ 16.70	≤ 10.70	Pass
	149	5745	3.620	3.330	6.682	≤ 28.23	≤ 28.23	Pass
	157	5785	3.830	3.510	6.878	≤ 28.23	≤ 28.23	Pass
	165	5825	3.750	3.270	6.721	≤ 28.23	≤ 28.23	Pass
802.11ac (40 MHz)	38	5190	0.120	-0.890	3.038	≤ 16.70	≤ 10.70	Pass
	46	5230	2.590	0.710	5.145	≤ 16.70	≤ 10.70	Pass
	151	5755	0.400	-0.100	3.551	≤ 28.23	≤ 28.23	Pass
	159	5795	0.790	-0.110	3.757	≤ 28.23	≤ 28.23	Pass
802.11ac (80 MHz)	42	5210	-5.330	-6.180	-1.978	≤ 16.70	≤ 10.70	Pass
	155	5775	-1.790	-2.440	1.654	≤ 28.23	≤ 28.23	Pass

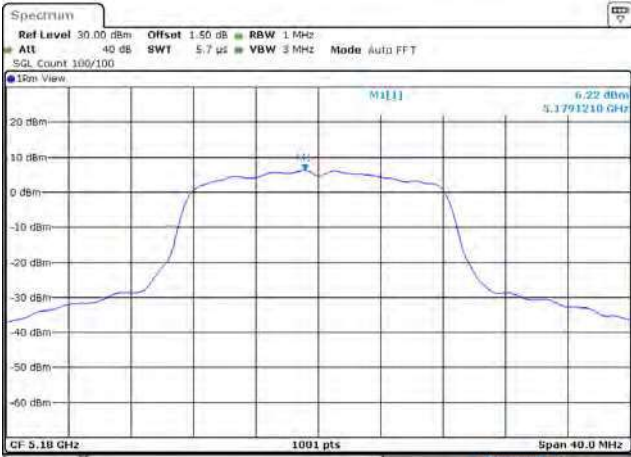
Note:

- Total power spectral density = power spectral density + duty factor, and the duty factor refer to section 1.10.
- Directional Gain =  $10 \log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{Ant}]$  for U-NII-1: 6.30dBi & U-NII-3: 7.77dBi >6dBi;
  - U-NII-1 limit of Indoor AP =  $17 - (6.30 - 6) = 16.70\text{dBm}$ .
  - U-NII-1 limit of Client =  $11 - (6.30 - 6) = 10.70\text{dBm}$ .
  - U-NII-3 limit =  $30 - (7.77 - 6) = 28.23\text{dBm}$ .



**Spectrum plot of worst value**

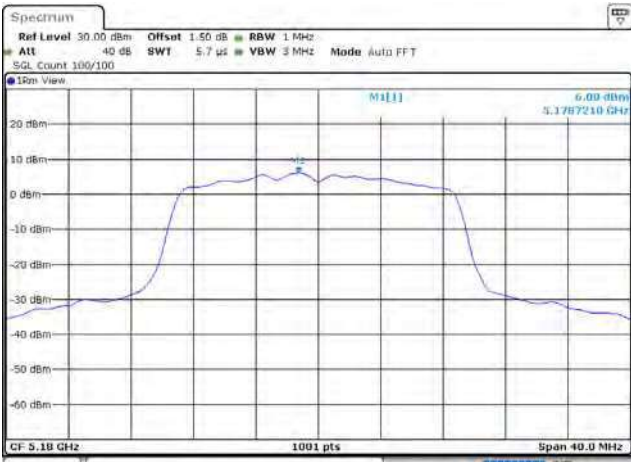
802.11a / Ant. 0 / 5180 MHz (U-NII-1)



802.11a / Ant. 0 / 5785 MHz (U-NII-3)



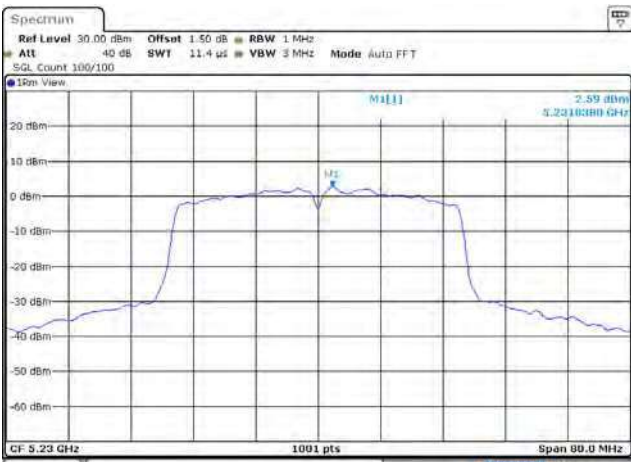
802.11ac (20 MHz) / Ant. 0 / 5180 MHz (U-NII-1)



802.11ac (20 MHz) / Ant. 0 / 5785 MHz (U-NII-3)



802.11ac (40 MHz) / Ant. 0 / 5230 MHz (U-NII-1)



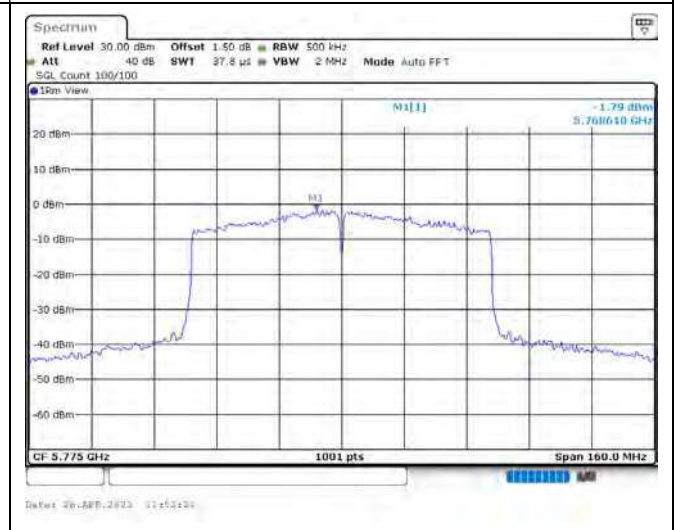
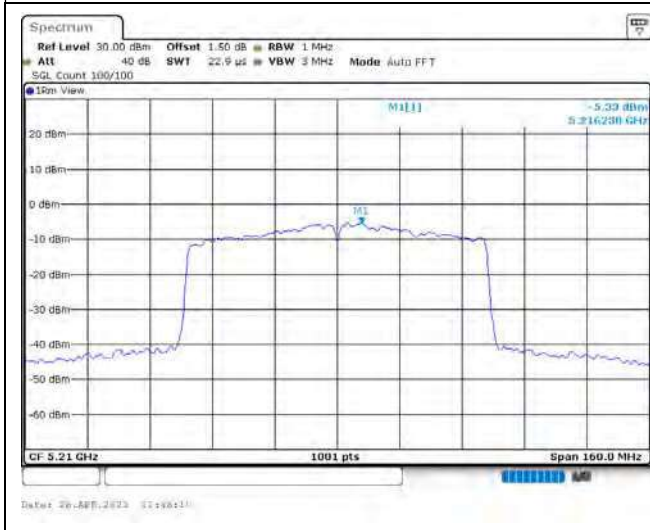
802.11ac (40 MHz) / Ant. 0 / 5795 MHz (U-NII-3)



**Spectrum plot of worst value**

802.11ac (80 MHz) / Ant. 0 / 5210 MHz (U-NII-1)

802.11ac (80 MHz) / Ant. 0 / 5775 MHz (U-NII-3)

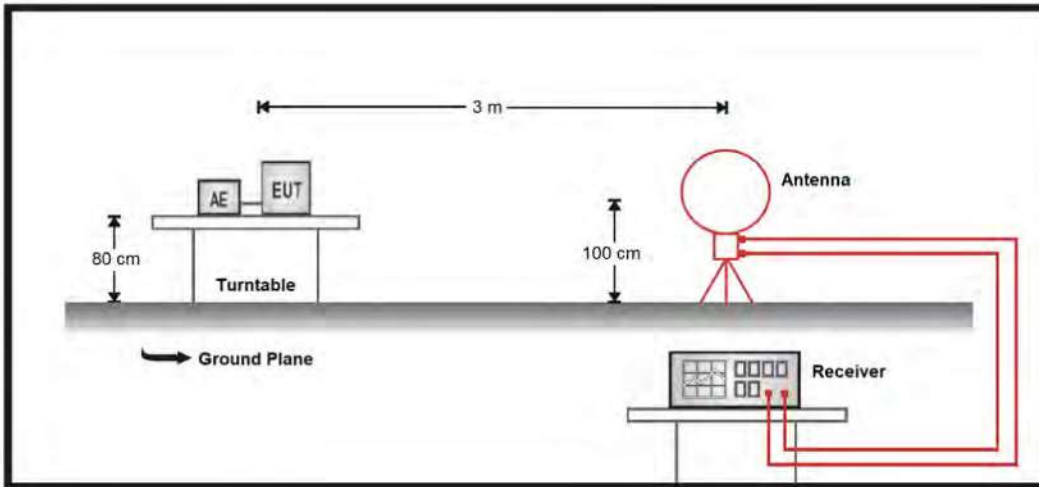




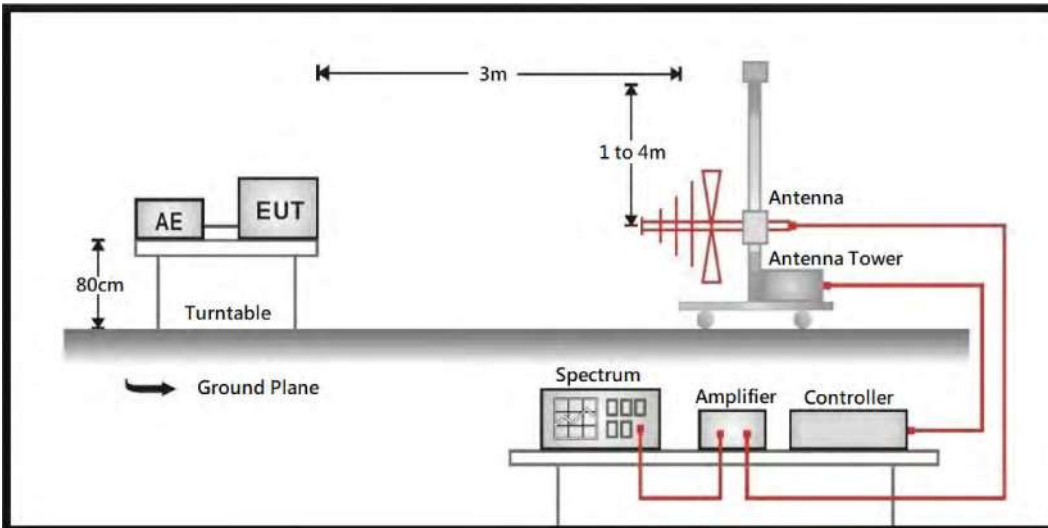
## 7. Radiated Emission

### 7.1. Test Setup

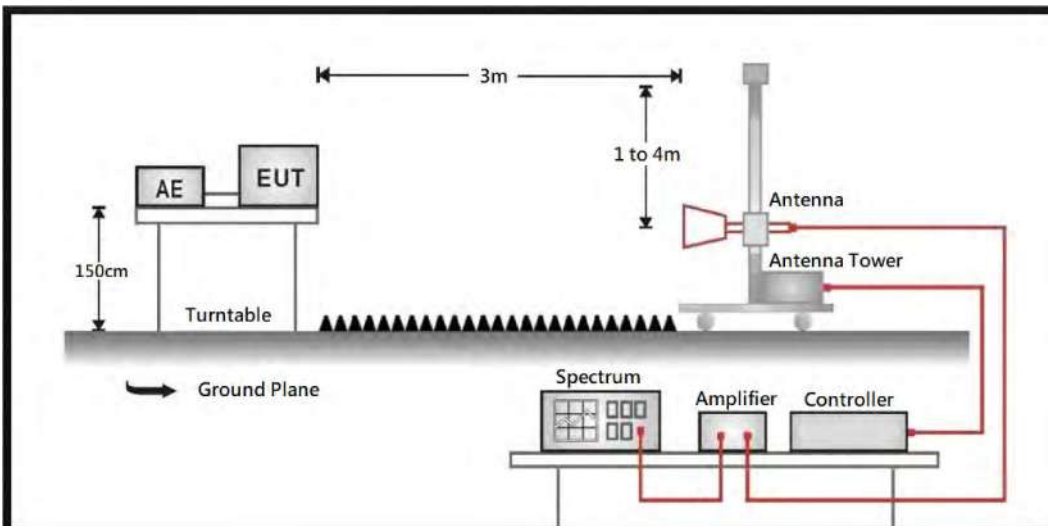
9 kHz ~ 30 MHz



30 MHz ~ 1 GHz



Above 1 GHz



## 7.2. Test Limit

### General Radiated Emission Test Limit

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 30 dB below the level of the fundamental or to the general radiated emission limit in paragraph 15.209, whichever is the lesser attenuation.

Frequency (MHz)	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	20 log (2400/F(kHz))	300
0.490 – 1.705	24000/F(kHz)	20 log (24000/F(kHz))	30
1.705 - 30	30	29.5	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

Remarks:

1. Field strength (dBuV/m) = 20 log Field strength (uV/m)
2. In the Above Table, the tighter limit applies at the band edges.
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

### Unwanted Emission out of the restricted bands Test Limit

Frequency (MHz)	EIRP Limit (dBm/MHz)	Equivalent Field Strength (dBuV/m@3m)
5150 - 5250	-27	68.2
5250 - 5350	-27	68.2
5470 - 5725	-27	68.2
5725 - 5850	-27 <sup>*1</sup>	68.2 <sup>*1</sup>
	10 <sup>*2</sup>	105.2 <sup>*2</sup>
	15.6 <sup>*3</sup>	110.8 <sup>*3</sup>
	27 <sup>*4</sup>	122.2 <sup>*4</sup>

<sup>\*1</sup> beyond 75 MHz or more above of the band edge.

<sup>\*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

<sup>\*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

<sup>\*4</sup> from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Remark:

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

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

### 7.3. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The additional latch filter below 1 GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement.

The bandwidth below 1 GHz setting on the field strength meter is 120 kHz, above 1 GHz are 1 MHz.

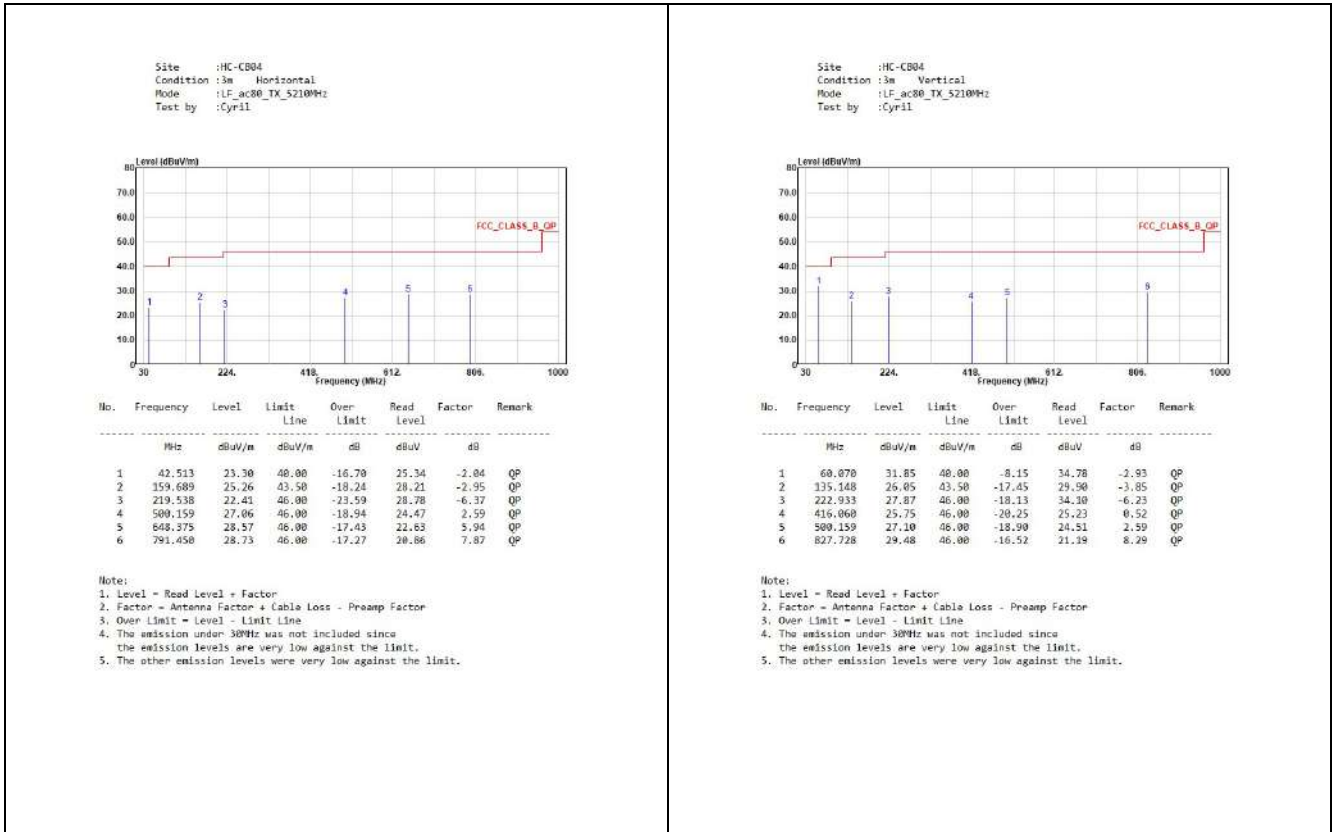
The frequency range from 9 kHz to 10th harmonics and included The frequency range from the lowest oscillator frequency generated within the device up to the 10th harmonic was checked is checked.

### 7.4. Test Specification

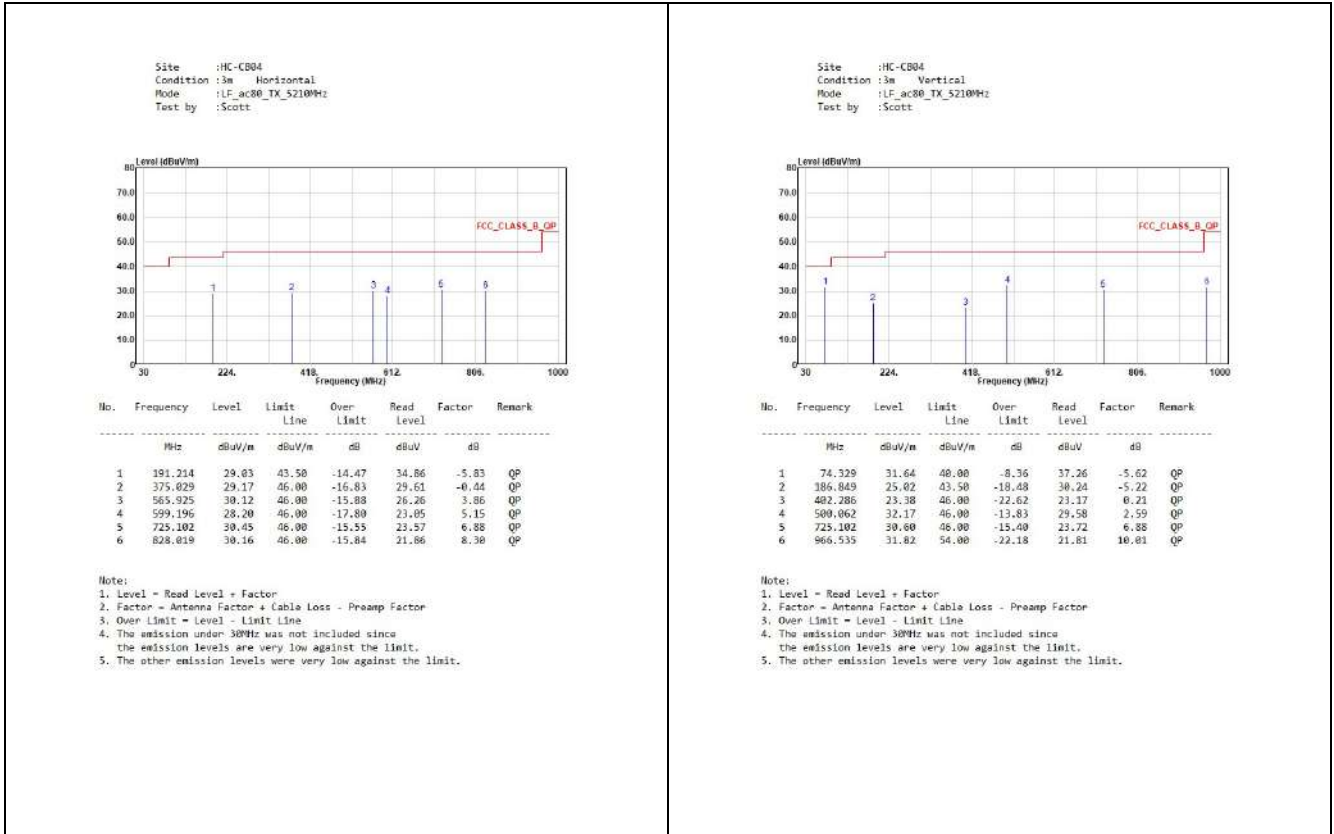
According to FCC CFR Title 47 Part 15 Subpart E.

### 7.5. Test Result of Radiated Emissions (30 MHz ~ 1 GHz)

Mode 1: Transmit - power by adapter



Mode 2: Transmit - power by 802.3at PoE



### 7.6. Test Result of Radiated Emissions (1 GHz ~ 10<sup>th</sup> Harmonic)

<p>Site :HC-CB04 Condition :3m ,Horizontal Mode :a_TX_5180MHz Test by :Cyril</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>10360.000</td> <td>47.70</td> <td>68.20</td> <td>-20.50</td> <td>53.06</td> <td>-5.36</td> <td>Peak</td> </tr> <tr> <td>2</td> <td>15540.000</td> <td>53.07</td> <td>74.00</td> <td>-20.93</td> <td>52.24</td> <td>0.83</td> <td>Peak</td> </tr> </tbody> </table> <p>Notes: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit. 5. The other emission levels were very low against the limit.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	10360.000	47.70	68.20	-20.50	53.06	-5.36	Peak	2	15540.000	53.07	74.00	-20.93	52.24	0.83	Peak	<p>Site :HC-CB04 Condition :3m ,Vertical Mode :a_TX_5180MHz Test by :Cyril</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>10360.000</td> <td>48.07</td> <td>68.20</td> <td>-20.13</td> <td>53.43</td> <td>-5.36</td> <td>Peak</td> </tr> <tr> <td>2</td> <td>15540.000</td> <td>53.48</td> <td>74.00</td> <td>-20.52</td> <td>52.65</td> <td>0.83</td> <td>Peak</td> </tr> </tbody> </table> <p>Notes: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit. 5. The other emission levels were very low against the limit.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	10360.000	48.07	68.20	-20.13	53.43	-5.36	Peak	2	15540.000	53.48	74.00	-20.52	52.65	0.83	Peak
No.	Frequency	Level	Limit	Over	Read	Factor	Remark																																																										
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB																																																											
1	10360.000	47.70	68.20	-20.50	53.06	-5.36	Peak																																																										
2	15540.000	53.07	74.00	-20.93	52.24	0.83	Peak																																																										
No.	Frequency	Level	Limit	Over	Read	Factor	Remark																																																										
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB																																																											
1	10360.000	48.07	68.20	-20.13	53.43	-5.36	Peak																																																										
2	15540.000	53.48	74.00	-20.52	52.65	0.83	Peak																																																										
<p>Site :HC-CB04 Condition :3m ,Horizontal Mode :a_TX_5220MHz Test by :Cyril</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>10440.000</td> <td>46.66</td> <td>68.20</td> <td>-21.54</td> <td>51.89</td> <td>-5.23</td> <td>Peak</td> </tr> <tr> <td>2</td> <td>15660.000</td> <td>51.72</td> <td>74.00</td> <td>-22.28</td> <td>50.89</td> <td>0.83</td> <td>Peak</td> </tr> </tbody> </table> <p>Notes: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit. 5. The other emission levels were very low against the limit.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	10440.000	46.66	68.20	-21.54	51.89	-5.23	Peak	2	15660.000	51.72	74.00	-22.28	50.89	0.83	Peak	<p>Site :HC-CB04 Condition :3m ,Vertical Mode :a_TX_5220MHz Test by :Cyril</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>10440.000</td> <td>48.16</td> <td>68.20</td> <td>-20.04</td> <td>53.39</td> <td>-5.23</td> <td>Peak</td> </tr> <tr> <td>2</td> <td>15660.000</td> <td>52.79</td> <td>74.00</td> <td>-21.21</td> <td>51.96</td> <td>0.83</td> <td>Peak</td> </tr> </tbody> </table> <p>Notes: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit. 5. The other emission levels were very low against the limit.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	10440.000	48.16	68.20	-20.04	53.39	-5.23	Peak	2	15660.000	52.79	74.00	-21.21	51.96	0.83	Peak
No.	Frequency	Level	Limit	Over	Read	Factor	Remark																																																										
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB																																																											
1	10440.000	46.66	68.20	-21.54	51.89	-5.23	Peak																																																										
2	15660.000	51.72	74.00	-22.28	50.89	0.83	Peak																																																										
No.	Frequency	Level	Limit	Over	Read	Factor	Remark																																																										
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB																																																											
1	10440.000	48.16	68.20	-20.04	53.39	-5.23	Peak																																																										
2	15660.000	52.79	74.00	-21.21	51.96	0.83	Peak																																																										

