

FCC Test Report

Report No.: RF190119D06-1

FCC ID: PAN-N93

Test Model: WL-8811CU-V2

Received Date: Jan. 19, 2019

Test Date: Jan. 30 ~ Feb. 12, 2019

Issued Date: Feb. 18, 2019

Applicant: CC&C Technologies, Inc.

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(R.O.C.)

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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**FCC Registration /
Designation Number:** 198487 / TW2021



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Release Control Record

Issue No.	Description	Date Issued
RF190119D06-1	Original release.	Feb. 18, 2019

1 Certificate of Conformity

Product: WLAN USB Adapter

Brand: CC&C

Test Model: WL-8811CU-V2

Sample Status: Engineering sample

Applicant: CC&C Technologies, Inc.

Test Date: Jan. 30 ~ Feb. 12, 2019

Standards: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :



Date: Feb. 18, 2019

Jessica Cheng / Senior Specialist

Approved by :



Date: Feb. 18, 2019

Rex Lai / Associate Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -16.81dB at 0.15000MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -8.86dB at 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	N/A	Not Applicable. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.77 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.38 dB
	30MHz ~ 1000MHz	5.54 dB
Radiated Emissions above 1 GHz	Above 1GHz	5.48 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	WLAN USB Adapter
Brand	CC&C
Test Model	WL-8811CU-V2
Sample Status	Engineering sample
Nominal Voltage	5Vdc from USB interface
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 150Mbps 802.11ac: up to 433.3Mbps
Operating Frequency	5180~5240MHz, 5260~5320MHz
Number of Channel	5180~5240MHz: 802.11a, 802.11n (20MHz), 802.11ac (20MHz): 4 802.11n (40MHz), 802.11ac (40MHz): 2 802.11ac (80MHz): 1 5260~5320MHz: 802.11a, 802.11n (20MHz), 802.11ac (20MHz): 4 802.11n (40MHz), 802.11ac (40MHz): 2 802.11ac (80MHz): 1
Output Power	5180~5240MHz: 21.827mW 5260~5320MHz: 21.528mW
Antenna Type	PIFA antenna with 4.7dBi gain
Antenna Connector	N/A
Accessory Device	N/A
Cable Supplied	N/A

Note:

1. The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	TX Function
802.11a	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX
802.11ac (20MHz)	1TX
802.11ac (40MHz)	1TX
802.11ac (80MHz)	1TX

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

2. 2.4GHz & 5GHz technologies cannot transmit at same time.

3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

5180~5240MHz:

4 channels are provided for 802.11a, 802.11n (20MHz), 802.11ac (20MHz):

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

2 channels are provided for 802.11n (40MHz), 802.11ac (40MHz):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (80MHz):

Channel	Frequency
42	5210MHz

5260~5320MHz:

4 channels are provided for 802.11a, 802.11n (20MHz), 802.11ac (20MHz):

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

2 channels are provided for 802.11n (40MHz), 802.11ac (40MHz):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (80MHz):

Channel	Frequency
58	5290MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement
RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

Radiated Emission Test (Above 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11ac (20MHz)		36 to 48	36, 40, 48	OFDM	6.5
	802.11ac (40MHz)		38 to 46	38, 46	OFDM	13.5
	802.11ac (80MHz)		42	42	OFDM	29.3
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
	802.11ac (20MHz)		52 to 64	52, 60, 64	OFDM	6.5
	802.11ac (40MHz)		54 to 62	54, 62	OFDM	13.5
	802.11ac (80MHz)		58	58	OFDM	29.3

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	52	OFDM	6.0
		5260-5320	52 to 64		OFDM	6.0

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	52	OFDM	6.0
		5260-5320	52 to 64		OFDM	6.0

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11ac (20MHz)		36 to 48	36, 40, 48	OFDM	6.5
	802.11ac (40MHz)		38 to 46	38, 46	OFDM	13.5
	802.11ac (80MHz)		42	42	OFDM	29.3
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
	802.11ac (20MHz)		52 to 64	52, 60, 64	OFDM	6.5
	802.11ac (40MHz)		54 to 62	54, 62	OFDM	13.5
	802.11ac (80MHz)		58	58	OFDM	29.3

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE $\geq$ 1G	20 deg. C, 65% RH	120Vac, 60Hz	Ian Chang
RE<1G	20 deg. C, 66% RH	120Vac, 60Hz	Ian Chang
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Ian Chang
APCM	25 deg. C, 76% RH	120Vac, 60Hz	Saxon Lee

3.3 Duty Cycle of Test Signal

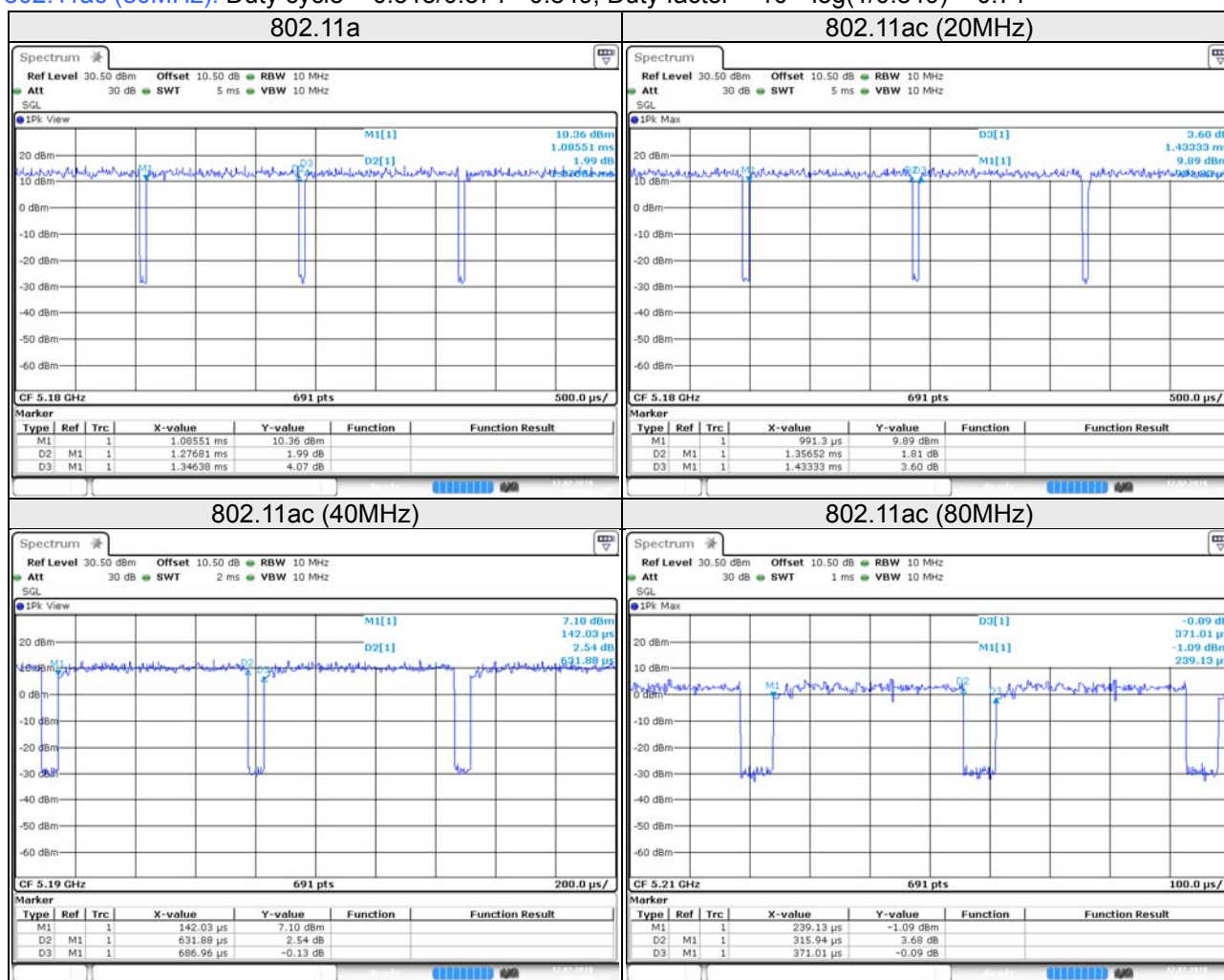
Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = $1.276/1.346 = 0.948$, Duty factor = $10 * \log(1/0.948) = 0.23$

802.11ac (20MHz): Duty cycle = $1.356/1.433 = 0.946$, Duty factor = $10 * \log(1/0.946) = 0.24$

802.11ac (40MHz): Duty cycle = $0.631/0.686 = 0.920$, Duty factor = $10 * \log(1/0.920) = 0.36$

802.11ac (80MHz): Duty cycle = $0.315/0.371 = 0.849$, Duty factor = $10 * \log(1/0.849) = 0.71$



3.4 Description of Support Units

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

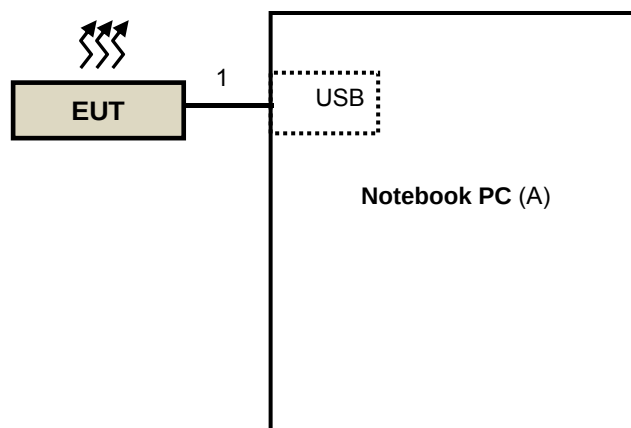
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook PC	Lenovo	81A4	YD02TWDP	FCC DoC Approved	Provided by Lab

Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	1.0	Y	0	Provided by Lab

Note: The core(s) is(are) originally attached to the cable(s)

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart E (15.407)

KDB 789033 D02 General UNII Test Procedure New Rules v02r01

ANSI C63.10:2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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

Limits of unwanted emission out of the restricted bands

Applicable To			Limit	
789033 D02 General UNII Test Procedure New Rules v02r01			Field Strength at 3m	
			PK: 74 (dBµV/m)	AV: 54 (dBµV/m)
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)		PK: -27 (dBm/MHz)	PK: 68.2(dBµV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	☒	15.407(b)(4)(i)	PK: -27 (dBm/MHz) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2(dBµV/m) ^{*1} PK: 105.2 (dBµV/m) ^{*2} PK: 110.8(dBµV/m) ^{*3} PK: 122.2 (dBµV/m) ^{*4}
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*1} beyond 75 MHz or more above of the band edge.			^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.			^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 21, 2018	Feb. 20, 2019
HP Preamplifier	8449B	3008A01201	Feb. 22, 2018	Feb. 21, 2019
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 21, 2018	Feb. 20, 2019
Agilent TEST RECEIVER	N9038A	MY51210137	Jun. 19, 2018	Jun. 18, 2019
Schwarzbeck Antenna	VULB 9168	139	Nov. 26, 2018	Nov. 25, 2019
Schwarzbeck Antenna	VHBA 9123	480	May 19, 2017	May 18, 2019
Schwarzbeck Horn Antenna	BBHA-9170	212	Nov. 25, 2018	Nov. 24, 2019
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Nov. 25, 2018	Nov. 24, 2019
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF102	Cable-CH6-01	Aug. 13, 2018	Aug. 12, 2019
SUHNER RF cable With 3/4dB PAD	SF102	Cable-CH8-3.6m	Aug. 13, 2018	Aug. 12, 2019
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	Jun. 4, 2018	Jun. 3, 2019
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Aug. 3, 2018	Aug. 2, 2019
Loop Antenna EMCI	LPA600	270	Aug. 11, 2017	Aug. 10, 2019
EMCO Horn Antenna	3115	00028257	Nov. 25, 2018	Nov. 24, 2019
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 27, 2018	Sep. 26, 2019
Anritsu Power Sensor	MA2411B	0738404	Apr. 26, 2018	Apr. 25, 2019
Anritsu Power Meter	ML2495A	0842014	Apr. 26, 2018	Apr. 25, 2019
Temperature & Humidity Chamber	MHU-225AU	920409	May 25, 2018	May 24, 2019
DIGITAL POWER METER IDRC	CP-240	240515	Sep. 13, 2018	Sep. 12, 2019
AC Power Source ExTech	CFW-105	E000603	NA	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

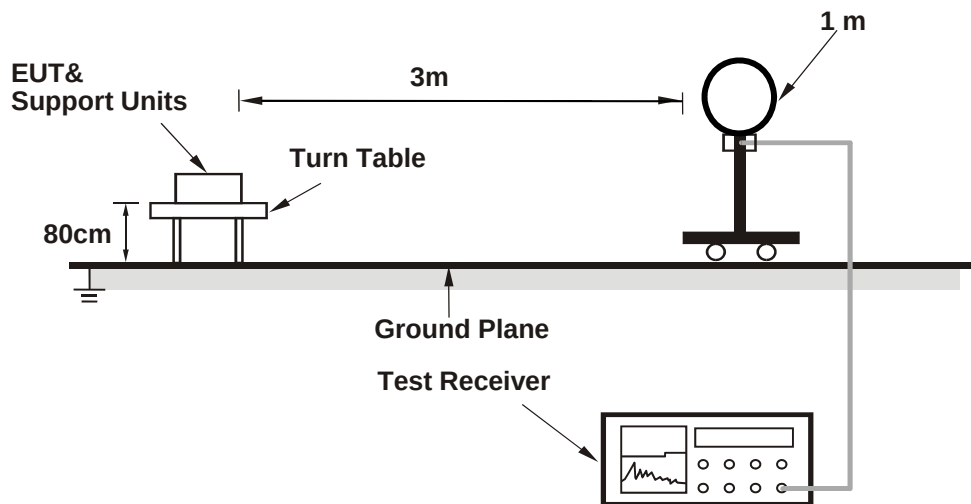
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

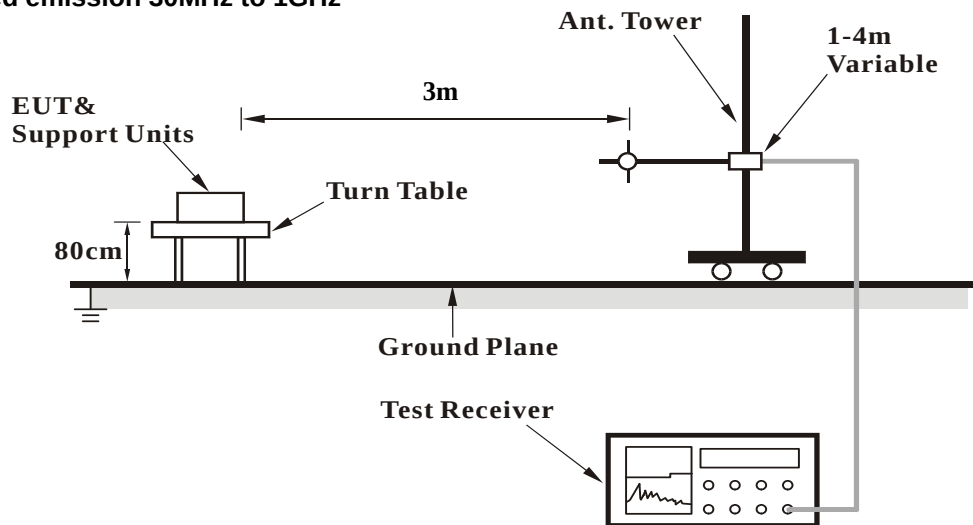
No deviation.

4.1.5 Test Set Up

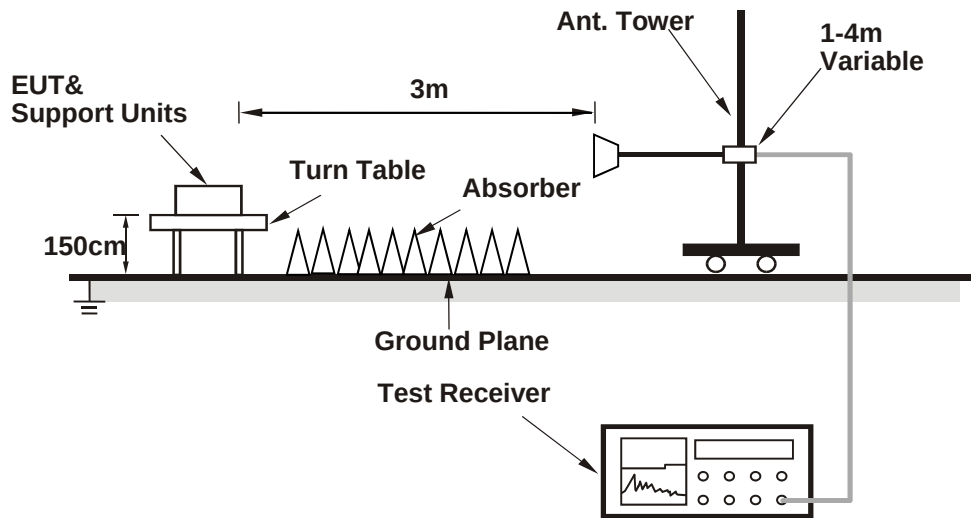
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

ABOVE 1GHz DATA

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.93 PK	74.00	-17.07	1.88 H	92	51.48	5.45
2	5150.00	42.76 AV	54.00	-11.24	1.88 H	92	37.31	5.45
3	*5180.00	97.25 PK			1.88 H	92	91.99	5.26
4	*5180.00	86.09 AV			1.88 H	92	80.83	5.26
5	#10360.00	57.05 PK	68.20	-11.15	1.53 H	17	40.79	16.26
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.31 PK	74.00	-16.69	2.10 V	216	51.86	5.45
2	5150.00	43.89 AV	54.00	-10.11	2.10 V	216	38.44	5.45
3	*5180.00	99.90 PK			2.10 V	216	94.64	5.26
4	*5180.00	89.03 AV			2.10 V	216	83.77	5.26
5	#10360.00	58.14 PK	68.20	-10.06	1.69 V	138	41.88	16.26

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	96.99 PK			1.88 H	96	91.86	5.13
2	*5200.00	85.89 AV			1.88 H	96	80.76	5.13
3	#10400.00	57.22 PK	68.20	-10.98	1.62 H	23	40.66	16.56
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	99.46 PK			2.10 V	216	94.33	5.13
2	*5200.00	88.87 AV			2.10 V	216	83.74	5.13
3	#10400.00	57.64 PK	68.20	-10.56	1.77 V	201	41.08	16.56

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	96.68 PK			1.85 H	96	91.94	4.74
2	*5240.00	85.67 AV			1.85 H	96	80.93	4.74
3	5350.00	54.73 PK	74.00	-19.27	1.85 H	96	49.87	4.86
4	5350.00	40.74 AV	54.00	-13.26	1.85 H	96	35.88	4.86
5	#10480.00	57.14 PK	68.20	-11.06	1.88 H	139	40.23	16.91
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	98.99 PK			2.08 V	218	94.25	4.74
2	*5240.00	88.33 AV			2.08 V	218	83.59	4.74
3	5350.00	55.00 PK	74.00	-19.00	2.08 V	218	50.14	4.86
4	5350.00	41.31 AV	54.00	-12.69	2.08 V	218	36.45	4.86
5	#10480.00	57.98 PK	68.20	-10.22	1.44 V	18	41.07	16.91

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 52	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.31 PK	74.00	-17.69	1.95 H	96	50.86	5.45
2	5150.00	44.11 AV	54.00	-9.89	1.95 H	96	38.66	5.45
3	*5260.00	98.33 PK			1.95 H	96	93.68	4.65
4	*5260.00	87.24 AV			1.95 H	96	82.59	4.65
5	#10520.00	56.76 PK	68.20	-11.44	1.52 H	139	39.67	17.09
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.71 PK	74.00	-17.29	2.28 V	222	51.26	5.45
2	5150.00	45.08 AV	54.00	-8.92	2.28 V	222	39.63	5.45
3	*5260.00	100.69 PK			2.28 V	222	96.04	4.65
4	*5260.00	89.94 AV			2.28 V	222	85.29	4.65
5	#10520.00	57.65 PK	68.20	-10.55	1.45 V	29	40.56	17.09

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	96.99 PK			1.96 H	97	92.26	4.73
2	*5300.00	85.75 AV			1.96 H	97	81.02	4.73
3	10600.00	56.98 PK	74.00	-17.02	1.58 H	125	39.52	17.46
4	10600.00	42.74 AV	54.00	-11.26	1.58 H	125	25.28	17.46
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	100.40 PK			2.17 V	221	95.67	4.73
2	*5300.00	89.69 AV			2.17 V	221	84.96	4.73
3	10600.00	58.12 PK	74.00	-15.88	1.56 V	85	40.66	17.46
4	10600.00	44.42 AV	54.00	-9.58	1.56 V	85	26.96	17.46

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 64	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	96.97 PK			1.99 H	100	92.20	4.77
2	*5320.00	85.86 AV			1.99 H	100	81.09	4.77
3	5350.00	55.90 PK	74.00	-18.10	1.99 H	100	51.04	4.86
4	5350.00	43.41 AV	54.00	-10.59	1.99 H	100	38.55	4.86
5	10640.00	56.87 PK	74.00	-17.13	1.84 H	141	39.84	17.03
6	10640.00	42.16 AV	54.00	-11.84	1.84 H	141	25.13	17.03
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	100.06 PK			2.23 V	226	95.29	4.77
2	*5320.00	88.94 AV			2.23 V	226	84.17	4.77
3	5350.00	56.42 PK	74.00	-17.58	2.23 V	226	51.56	4.86
4	5350.00	44.11 AV	54.00	-9.89	2.23 V	226	39.25	4.86
5	10640.00	57.87 PK	74.00	-16.13	1.67 V	100	40.84	17.03
6	10640.00	43.75 AV	54.00	-10.25	1.67 V	100	26.72	17.03

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11ac (20MHz)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.23 PK	74.00	-16.77	1.94 H	102	51.78	5.45
2	5150.00	43.41 AV	54.00	-10.59	1.94 H	102	37.96	5.45
3	*5180.00	98.11 PK			1.94 H	102	92.85	5.26
4	*5180.00	97.94 AV			1.94 H	102	92.68	5.26
5	#10360.00	56.13 PK	68.20	-12.07	1.58 H	124	39.87	16.26

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.63 PK	74.00	-16.37	2.21 V	224	52.18	5.45
2	5150.00	43.63 AV	54.00	-10.37	2.21 V	224	38.18	5.45
3	*5180.00	100.64 PK			2.21 V	224	95.38	5.26
4	*5180.00	90.84 AV			2.21 V	224	85.58	5.26
5	#10360.00	56.84 PK	68.20	-11.36	1.66 V	39	40.58	16.26

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	96.82 PK			1.87 H	89	91.69	5.13
2	*5200.00	86.71 AV			1.87 H	89	81.58	5.13
3	#10400.00	56.08 PK	68.20	-12.12	1.44 H	158	39.52	16.56
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	99.66 PK			2.19 V	221	94.53	5.13
2	*5200.00	89.88 AV			2.19 V	221	84.75	5.13
3	#10400.00	57.40 PK	68.20	-10.80	1.69 V	28	40.84	16.56

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	96.21 PK			1.91 H	94	91.47	4.74
2	*5240.00	86.02 AV			1.91 H	94	81.28	4.74
3	5350.00	56.40 PK	74.00	-17.60	1.91 H	94	51.54	4.86
4	5350.00	42.98 AV	54.00	-11.02	1.91 H	94	38.12	4.86
5	#10480.00	56.37 PK	68.20	-11.83	1.49 H	162	39.46	16.91
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	99.61 PK			2.23 V	218	94.87	4.74
2	*5240.00	89.47 AV			2.23 V	218	84.73	4.74
3	5350.00	57.30 PK	74.00	-16.70	2.23 V	218	52.44	4.86
4	5350.00	44.55 AV	54.00	-9.45	2.23 V	218	39.69	4.86
5	#10480.00	57.09 PK	68.20	-11.11	1.77 V	42	40.18	16.91

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 52	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.93 PK	74.00	-18.07	1.98 H	100	50.48	5.45
2	5150.00	44.04 AV	54.00	-9.96	1.98 H	100	38.59	5.45
3	*5260.00	97.07 PK			1.98 H	100	92.42	4.65
4	*5260.00	87.01 AV			1.98 H	100	82.36	4.65
5	#10520.00	56.73 PK	68.20	-11.47	1.88 H	129	39.64	17.09
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.03 PK	74.00	-16.97	2.17 V	221	51.58	5.45
2	5150.00	44.81 AV	54.00	-9.19	2.17 V	221	39.36	5.45
3	*5260.00	100.39 PK			2.16 V	221	95.74	4.65
4	*5260.00	90.46 AV			2.16 V	221	85.81	4.65
5	#10520.00	57.93 PK	68.20	-10.27	1.68 V	56	40.84	17.09

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	97.57 PK			1.91 H	88	92.84	4.73
2	*5300.00	87.32 AV			1.91 H	88	82.59	4.73
3	10600.00	57.11 PK	74.00	-16.89	1.74 H	127	39.65	17.46
4	10600.00	42.77 AV	54.00	-11.23	1.74 H	127	25.31	17.46
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	100.16 PK			2.20 V	229	95.43	4.73
2	*5300.00	90.02 AV			2.20 V	229	85.29	4.73
3	10600.00	58.27 PK	74.00	-15.73	1.87 V	64	40.81	17.46
4	10600.00	44.14 AV	54.00	-9.86	1.87 V	64	26.68	17.46

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 64	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	97.03 PK			1.96 H	94	92.26	4.77
2	*5320.00	86.85 AV			1.96 H	94	82.08	4.77
3	5350.00	55.10 PK	74.00	-18.90	1.96 H	94	50.24	4.86
4	5350.00	43.28 AV	54.00	-10.72	1.96 H	94	38.42	4.86
5	10640.00	56.51 PK	74.00	-17.49	1.55 H	123	39.48	17.03
6	10640.00	42.84 AV	54.00	-11.16	1.55 H	123	25.81	17.03
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	100.13 PK			2.18 V	222	95.36	4.77
2	*5320.00	86.97 AV			2.18 V	222	82.20	4.77
3	5350.00	56.34 PK	74.00	-17.66	2.18 V	222	51.48	4.86
4	5350.00	44.16 AV	54.00	-9.84	2.18 V	222	39.30	4.86
5	10640.00	57.53 PK	74.00	-16.47	1.75 V	55	40.50	17.03
6	10640.00	43.34 AV	54.00	-10.66	1.75 V	55	26.31	17.03

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11ac (40MHz)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.87 PK	74.00	-17.13	1.93 H	101	51.42	5.45
2	5150.00	43.33 AV	54.00	-10.67	1.93 H	101	37.88	5.45
3	*5190.00	94.95 PK			1.93 H	101	89.75	5.20
4	*5190.00	84.89 AV			1.93 H	101	79.69	5.20
5	#10380.00	56.07 PK	68.20	-12.13	1.84 H	128	39.66	16.41

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.68 PK	74.00	-16.32	2.10 V	221	52.23	5.45
2	5150.00	43.66 AV	54.00	-10.34	2.10 V	221	38.21	5.45
3	*5190.00	97.55 PK			2.10 V	221	92.35	5.20
4	*5190.00	87.54 AV			2.10 V	221	82.34	5.20
5	#10380.00	57.25 PK	68.20	-10.95	1.62 V	28	40.84	16.41

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	94.61 PK			1.92 H	89	89.77	4.84
2	*5230.00	84.53 AV			1.92 H	89	79.69	4.84
3	5350.00	56.32 PK	74.00	-17.68	1.92 H	89	51.46	4.86
4	5350.00	41.85 AV	54.00	-12.15	1.92 H	89	36.99	4.86
5	#10460.00	56.67 PK	68.20	-11.53	1.88 H	166	39.84	16.83
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	97.10 PK			2.10 V	222	92.26	4.84
2	*5230.00	87.18 AV			2.10 V	222	82.34	4.84
3	5350.00	56.70 PK	74.00	-17.30	2.10 V	222	51.84	4.86
4	5350.00	42.61 AV	54.00	-11.39	2.10 V	222	37.75	4.86
5	#10460.00	57.37 PK	68.20	-10.83	1.55 V	24	40.54	16.83

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 54	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.70 PK	74.00	-18.30	1.92 H	93	50.25	5.45
2	5150.00	44.09 AV	54.00	-9.91	1.92 H	93	38.64	5.45
3	*5270.00	95.21 PK			1.92 H	93	90.54	4.67
4	*5270.00	84.93 AV			1.92 H	93	80.26	4.67
5	#10540.00	57.02 PK	68.20	-11.18	1.77 H	128	39.84	17.18
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.90 PK	74.00	-17.10	2.17 V	221	51.45	5.45
2	5150.00	45.08 AV	54.00	-8.92	2.17 V	221	39.63	5.45
3	*5270.00	98.21 PK			2.17 V	221	93.54	4.67
4	*5270.00	88.03 AV			2.17 V	221	83.36	4.67
5	#10540.00	58.02 PK	68.20	-10.18	1.65 V	25	40.84	17.18

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 62	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	94.92 PK			1.90 H	99	90.16	4.76
2	*5310.00	84.96 AV			1.90 H	99	80.20	4.76
3	5350.00	55.08 PK	74.00	-18.92	1.90 H	99	50.22	4.86
4	5350.00	43.02 AV	54.00	-10.98	1.90 H	99	38.16	4.86
5	10620.00	56.85 PK	74.00	-17.15	1.88 H	151	39.61	17.24
6	10620.00	42.48 AV	54.00	-11.52	1.88 H	151	25.24	17.24
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	98.02 PK			2.23 V	219	93.26	4.76
2	*5310.00	87.95 AV			2.23 V	219	83.19	4.76
3	5350.00	56.28 PK	74.00	-17.72	2.23 V	219	51.42	4.86
4	5350.00	43.95 AV	54.00	-10.05	2.23 V	219	39.09	4.86
5	10620.00	57.53 PK	74.00	-16.47	1.63 V	69	40.29	17.24
6	10620.00	43.55 AV	54.00	-10.45	1.63 V	69	26.31	17.24

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11ac (80MHz)

CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.14 PK	74.00	-17.86	1.93 H	98	50.69	5.45
2	5150.00	44.31 AV	54.00	-9.69	1.93 H	98	38.86	5.45
3	*5210.00	89.62 PK			1.93 H	98	84.59	5.03
4	*5210.00	80.72 AV			1.93 H	98	75.69	5.03
5	5350.00	55.34 PK	74.00	-18.66	1.93 H	98	50.48	4.86
6	5350.00	43.61 AV	54.00	-10.39	1.93 H	98	38.75	4.86
7	#10420.00	56.03 PK	68.20	-12.17	1.68 H	122	39.38	16.65
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.01 PK	74.00	-16.99	2.09 V	222	51.56	5.45
2	5150.00	45.14 AV	54.00	-8.86	2.09 V	222	39.69	5.45
3	*5210.00	92.30 PK			2.09 V	222	87.27	5.03
4	*5210.00	83.40 AV			2.09 V	222	78.37	5.03
5	5350.00	56.41 PK	74.00	-17.59	2.09 V	222	51.55	4.86
6	5350.00	44.73 AV	54.00	-9.27	2.09 V	222	39.87	4.86
7	#10420.00	57.22 PK	68.20	-10.98	1.58 V	23	40.57	16.65

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 58	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.71 PK	74.00	-18.29	1.99 H	98	50.26	5.45
2	5150.00	44.09 AV	54.00	-9.91	1.99 H	98	38.64	5.45
3	*5290.00	90.57 PK			1.99 H	98	85.86	4.71
4	*5290.00	80.67 AV			1.99 H	98	75.96	4.71
5	5350.00	55.08 PK	74.00	-18.92	1.98 H	98	50.22	4.86
6	5350.00	43.03 AV	54.00	-10.97	1.98 H	98	38.17	4.86
7	#10580.00	56.90 PK	68.20	-11.30	1.45 H	122	39.53	17.37
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.74 PK	74.00	-17.26	2.27 V	221	51.29	5.45
2	5150.00	45.11 AV	54.00	-8.89	2.27 V	221	39.66	5.45
3	*5290.00	92.72 PK			2.27 V	221	88.01	4.71
4	*5290.00	83.43 AV			2.27 V	221	78.72	4.71
5	5350.00	56.49 PK	74.00	-17.51	2.27 V	221	51.63	4.86
6	5350.00	44.70 AV	54.00	-9.30	2.27 V	221	39.84	4.86
7	#10580.00	57.92 PK	68.20	-10.28	1.84 V	64	40.55	17.37

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

BELOW 1GHz WORST-CASE DATA

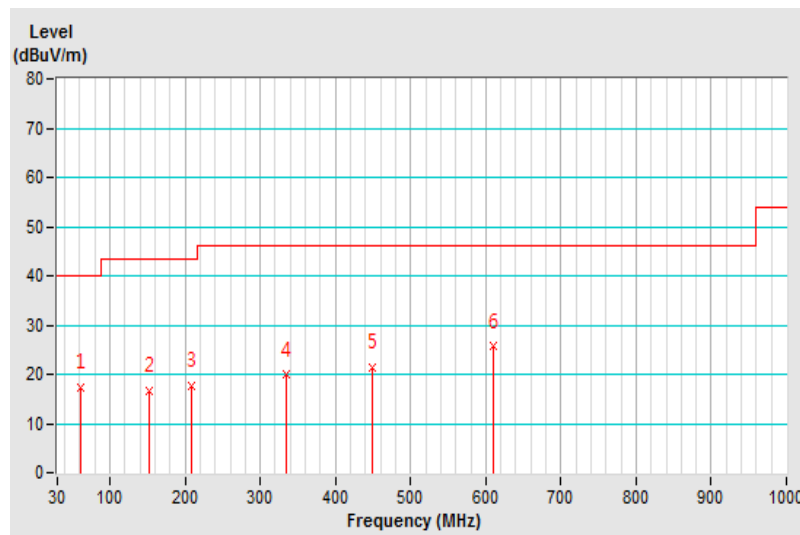
802.11a

CHANNEL	TX Channel 52	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	61.82	17.26 QP	40.00	-22.74	1.59 H	108	25.57	-8.31
2	153.14	16.54 QP	43.50	-26.96	2.64 H	358	23.53	-6.99
3	208.19	17.74 QP	43.50	-25.76	2.18 H	168	26.82	-9.08
4	334.43	19.89 QP	46.00	-26.11	2.41 H	38	24.53	-4.64
5	448.60	21.41 QP	46.00	-24.59	1.63 H	148	23.58	-2.17
6	610.01	25.66 QP	46.00	-20.34	1.55 H	331	24.72	0.94

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz :the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

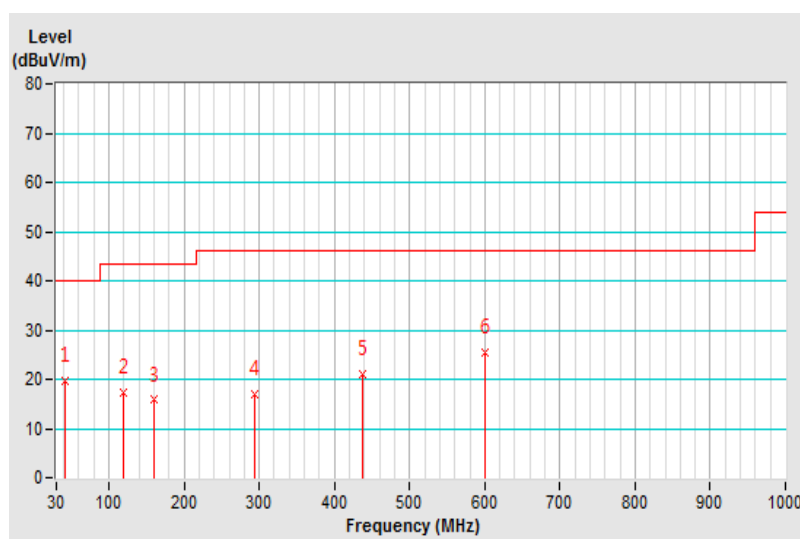


CHANNEL	TX Channel 52	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	41.54	19.75 QP	40.00	-20.25	1.12 V	300	27.49	-7.74
2	119.43	17.22 QP	43.50	-26.28	1.63 V	254	26.59	-9.37
3	160.08	15.78 QP	43.50	-27.72	1.84 V	294	22.79	-7.01
4	293.99	17.03 QP	46.00	-28.97	1.08 V	113	22.47	-5.44
5	437.45	21.12 QP	46.00	-24.88	1.07 V	169	23.47	-2.35
6	599.87	25.39 QP	46.00	-20.61	1.24 V	170	24.66	0.73

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz :the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	838251/021	Nov. 1, 2018	Oct. 31, 2019
ROHDE & SCHWARZ Artificial Mains Network (For EUT)	ENV216	101195	May 2, 2018	May 1, 2019
LISN With Adapter (for EUT)	AD10	C03Ada-002	May 2, 2018	May 1, 2019
EMCO L.I.S.N. (For peripherals)	3825/2	9504-2359	Jul. 26, 2018	Jul. 25, 2019
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 3, 2018	May 2, 2019
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With10dB PAD	5D-FB	Cable-C03.01	Sep. 18, 2018	Sep. 17, 2019
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-300	Jan. 25, 2019	Jan. 24, 2020
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-301	Jan. 25, 2019	Jan. 24, 2020
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 21, 2018	Nov. 20, 2019
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 21, 2018	Nov. 20, 2019

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in Shielded Room No. 3.

4.2.3 Test Procedures

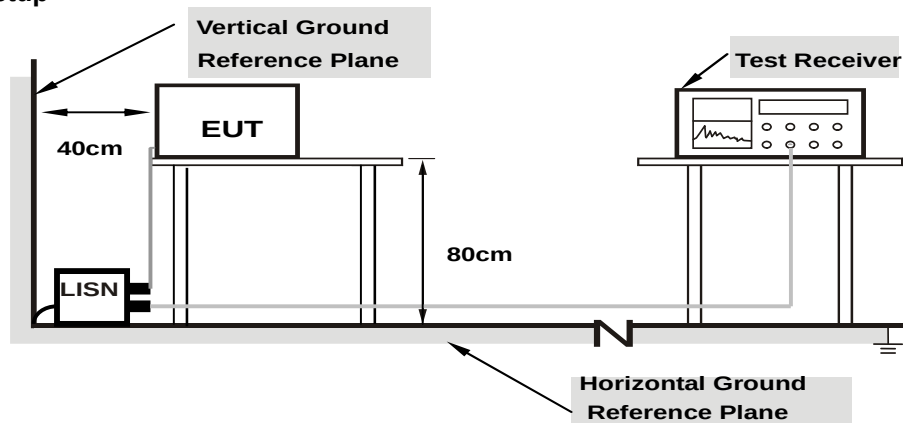
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

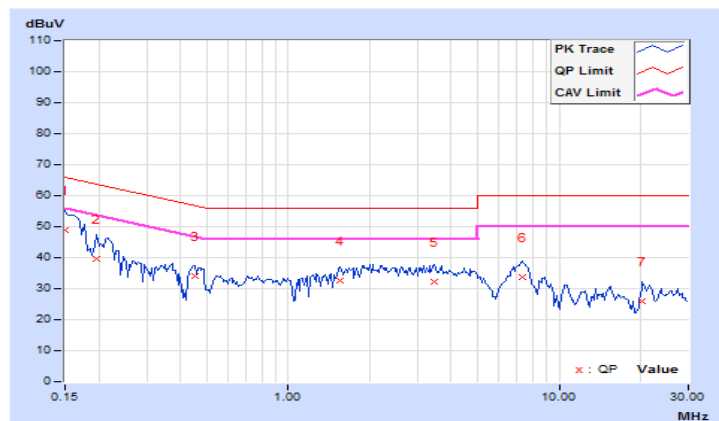
802.11a CH52

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.68	39.14	13.54	48.82	23.22	66.00	56.00	-17.18	-32.78
2	0.19687	9.67	29.94	5.15	39.61	14.82	63.74	53.74	-24.13	-38.92
3	0.45469	9.69	24.46	15.45	34.15	25.14	56.79	46.79	-22.64	-21.65
4	1.56250	9.75	23.00	14.99	32.75	24.74	56.00	46.00	-23.25	-21.26
5	3.47656	9.81	22.58	16.65	32.39	26.46	56.00	46.00	-23.61	-19.54
6	7.30859	9.89	23.88	17.82	33.77	27.71	60.00	50.00	-26.23	-22.29
7	20.32813	9.98	16.05	10.80	26.03	20.78	60.00	50.00	-33.97	-29.22

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

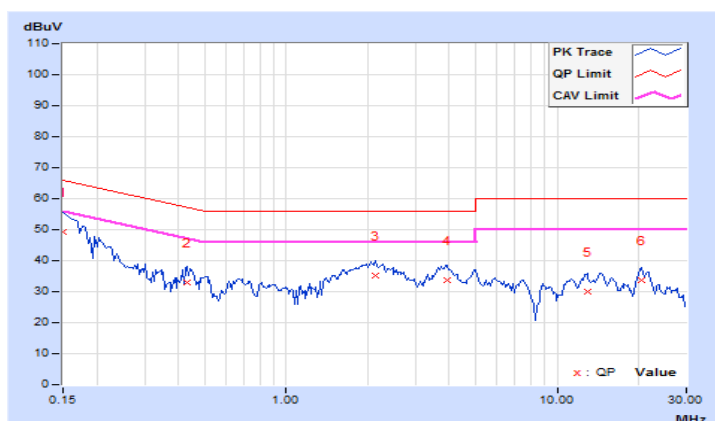


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.68	39.51	14.24	49.19	23.92	66.00	56.00	-16.81	-32.08
2	0.43125	9.69	23.22	12.65	32.91	22.34	57.23	47.23	-24.32	-24.89
3	2.12891	9.77	25.36	18.78	35.13	28.55	56.00	46.00	-20.87	-17.45
4	3.91406	9.84	23.82	17.69	33.66	27.53	56.00	46.00	-22.34	-18.47
5	12.96094	9.97	20.17	15.60	30.14	25.57	60.00	50.00	-29.86	-24.43
6	20.39453	10.03	23.60	18.74	33.63	28.77	60.00	50.00	-26.37	-21.23

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



4.3 Transmit Power Measurement

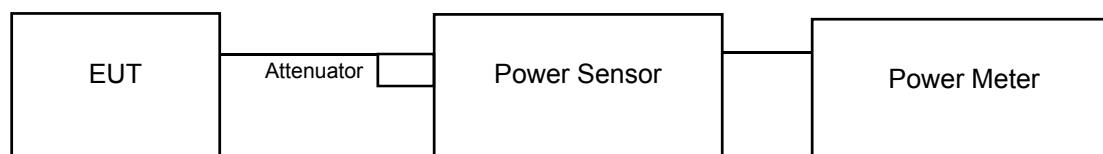
4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Mobile and Portable client device	250mW (24 dBm)
U-NII-2A	√		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3			1 Watt (30 dBm)

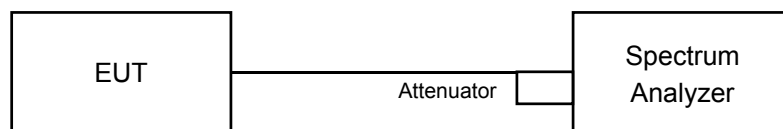
*B is the 26 dB emission bandwidth in megahertz

4.3.2 Test Setup

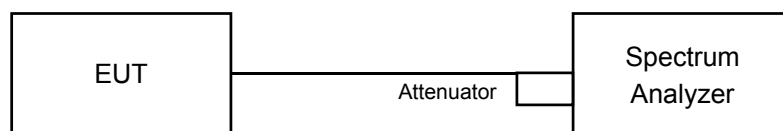
For Power Output
802.11a, 802.11ac (20MHz), 802.11ac (40MHz)



802.11ac (80MHz)



For 26dB and Occupied Bandwidth



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

For 802.11a, 802.11ac (20MHz), 802.11ac (40MHz)

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst and set the detector to AVERAGE. Duty factor is not added to measured value.

For 802.11ac (80MHz)

- Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- Set sweep trigger to "free run".
- Set RBW = 1 MHz
- Set VBW $\geq$ 3 MHz
- Number of points in sweep $\geq$ 2 Span / RBW
- Sweep time $\leq$ (number of points in sweep) * T
- Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
- Detector = RMS
- Trace mode = max hold
- Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
- Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

For 26dB Bandwidth

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

For Occupied Bandwidth

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to Sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Result

Power Output:

802.11a

Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	20.989	13.22	24.00	Pass
40	5200	20.654	13.15	24.00	Pass
48	5240	20.749	13.17	24.00	Pass
52	5260	20.606	13.14	24.00	Pass
60	5300	20.464	13.11	24.00	Pass
64	5320	20.324	13.08	24.00	Pass

Note:

For U-NII-2A Band:

1. $11\text{dBm} + 10\log(21.37) = 24.30\text{dBm} > 24\text{dBm}$
2. $11\text{dBm} + 10\log(21.32) = 24.29\text{dBm} > 24\text{dBm}$
3. $11\text{dBm} + 10\log(21.29) = 24.28\text{dBm} > 24\text{dBm}$

802.11ac (20MHz)

Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	21.232	13.27	24.00	Pass
40	5200	20.654	13.15	24.00	Pass
48	5240	20.23	13.06	24.00	Pass
52	5260	20.989	13.22	24.00	Pass
60	5300	20.893	13.20	24.00	Pass
64	5320	20.941	13.21	24.00	Pass

Note:

For U-NII-2A Band:

1. $11\text{dBm} + 10\log(21.55) = 24.33\text{ dBm} > 24\text{dBm}$
2. $11\text{dBm} + 10\log(21.46) = 24.32\text{ dBm} > 24\text{dBm}$
3. $11\text{dBm} + 10\log(21.43) = 24.31\text{ dBm} > 24\text{dBm}$

802.11ac (40MHz)

Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
38	5190	21.827	13.39	24.00	Pass
46	5230	21.577	13.34	24.00	Pass
54	5270	21.528	13.33	24.00	Pass
62	5310	21.33	13.29	24.00	Pass

Note:

For U-NII-2A Band:

1. $11\text{dBm} + 10\log(44.73) = 27.51\text{ dBm} > 24\text{dBm}$
2. $11\text{dBm} + 10\log(43.24) = 27.36\text{ dBm} > 24\text{dBm}$

802.11ac (80MHz)

Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
42	5210	12.794	11.07	24.00	Pass
58	5290	12.706	11.04	24.00	Pass

Note:

For U-NII-2A Band:

1. $11\text{dBm} + 10\log(82.70) = 30.18\text{ dBm} > 24\text{dBm}$

26dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)
36	5180	21.65
40	5200	21.55
48	5240	21.57
52	5260	21.37
60	5300	21.32
64	5320	21.29

802.11ac (20MHz)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)
36	5180	21.63
40	5200	21.59
48	5240	21.65
52	5260	21.55
60	5300	21.46
64	5320	21.43

802.11ac (40MHz)

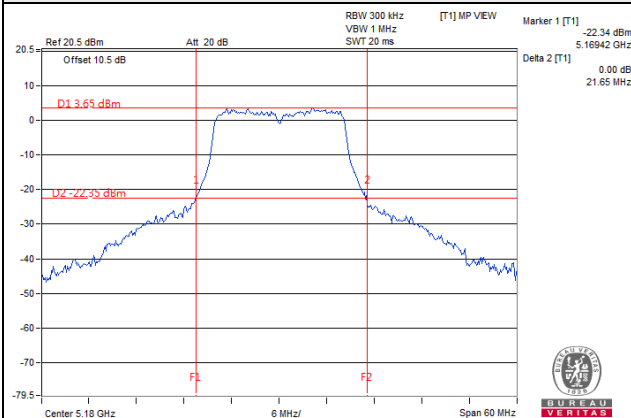
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)
38	5190	44.41
46	5230	44.50
54	5270	44.73
62	5310	43.24

802.11ac (80MHz)

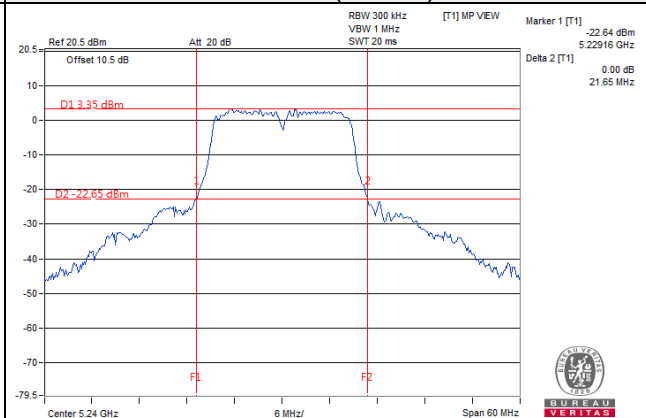
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)
42	5210	83.00
58	5290	82.70

Spectrum Plot of Worst Value

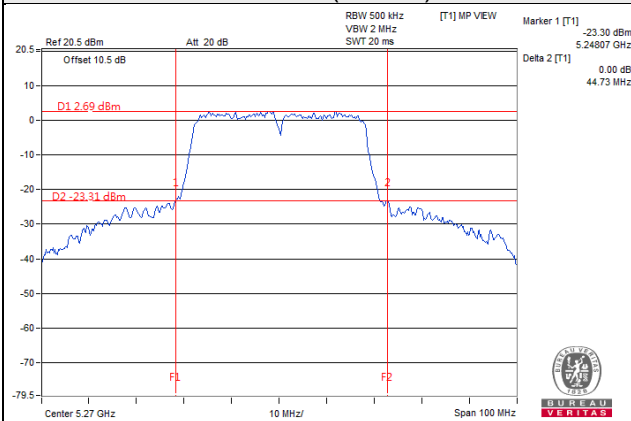
802.11a



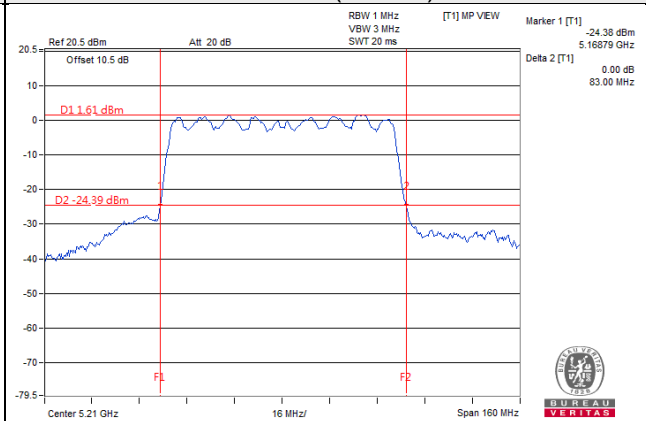
802.11ac (20MHz)



802.11ac (40MHz)

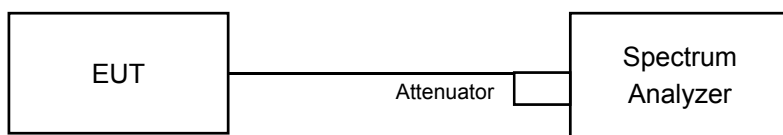


802.11ac (80MHz)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

4.4.4 Test Result

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	16.80
40	5200	16.80
48	5240	16.80
52	5260	16.80
60	5300	16.80
64	5320	16.80

802.11ac (20MHz)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	17.76
40	5200	17.76
48	5240	17.76
52	5260	17.76
60	5300	17.76
64	5320	17.76

802.11ac (40MHz)

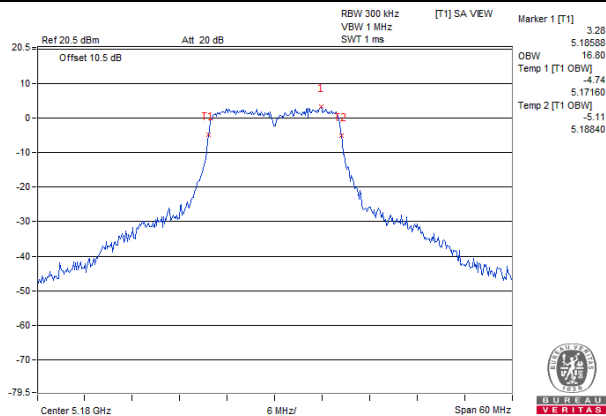
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
38	5190	36.40
46	5230	36.40
54	5270	36.40
62	5310	36.40

802.11ac (80MHz)

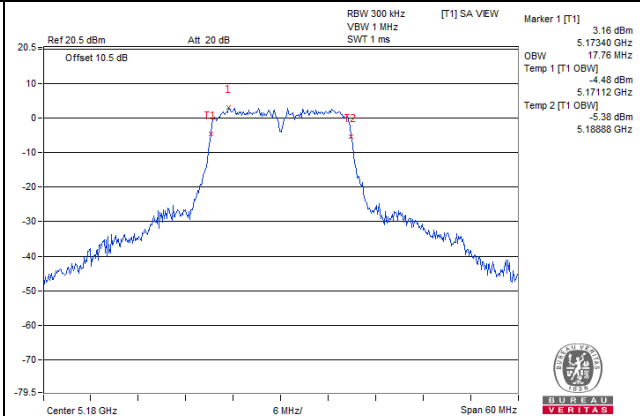
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
42	5210	75.60
58	5290	75.60

Spectrum Plot of Worst Value

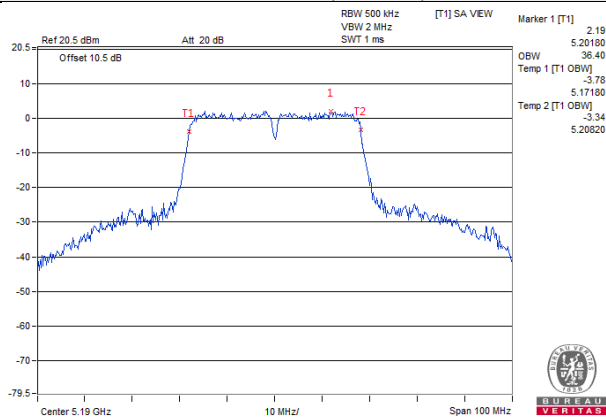
802.11a



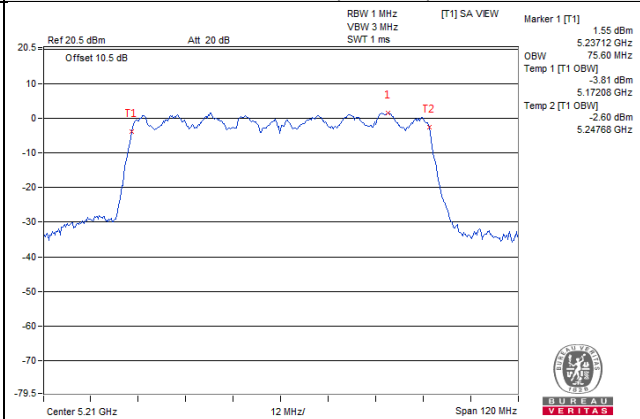
802.11ac (20MHz)



802.11ac (40MHz)



802.11ac (80MHz)

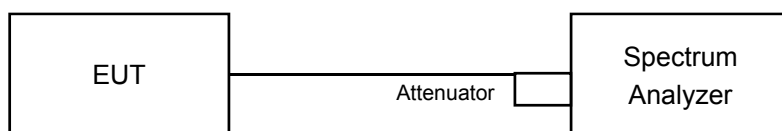


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Mobile and Portable client device	11dBm/ MHz
U-NII-2A	√		11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3			30dBm/ 500kHz

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1, U-NII-2A band:

Duty cycle of test signal is < 98%

Using method SA-2

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 1MHz, Set VBW $\geq$ 3 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to "free run".
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value and add $10 \log (1/\text{duty cycle})$

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1, U-NII-2A band

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
36	5180	-0.57	0.23	-0.34	11	Pass
40	5200	-0.33	0.23	-0.10	11	Pass
48	5240	-0.51	0.23	-0.28	11	Pass
52	5260	-0.71	0.23	-0.48	11	Pass
60	5300	-0.93	0.23	-0.70	11	Pass
64	5320	-1.06	0.23	-0.83	11	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (20MHz)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
36	5180	-0.93	0.24	-0.69	11	Pass
40	5200	-0.75	0.24	-0.51	11	Pass
48	5240	-0.89	0.24	-0.65	11	Pass
52	5260	-0.58	0.24	-0.34	11	Pass
60	5300	-0.98	0.24	-0.74	11	Pass
64	5320	-1.34	0.24	-1.10	11	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (40MHz)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
38	5190	-3.83	0.36	-3.47	11	Pass
46	5230	-3.91	0.36	-3.55	11	Pass
54	5270	-3.74	0.36	-3.38	11	Pass
62	5310	-4.09	0.36	-3.73	11	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

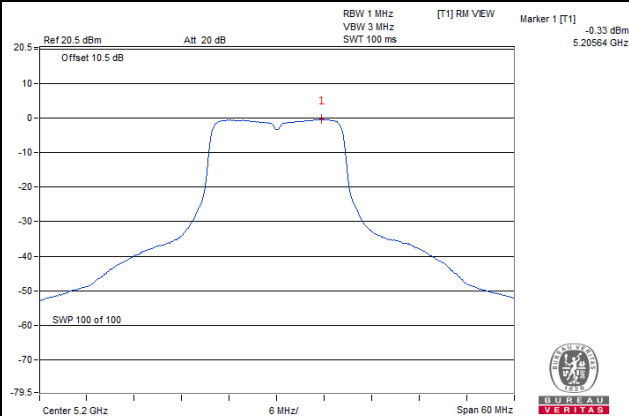
802.11ac (80MHz)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
42	5210	-8.47	0.71	-7.76	11	Pass
58	5290	-8.32	0.71	-7.61	11	Pass

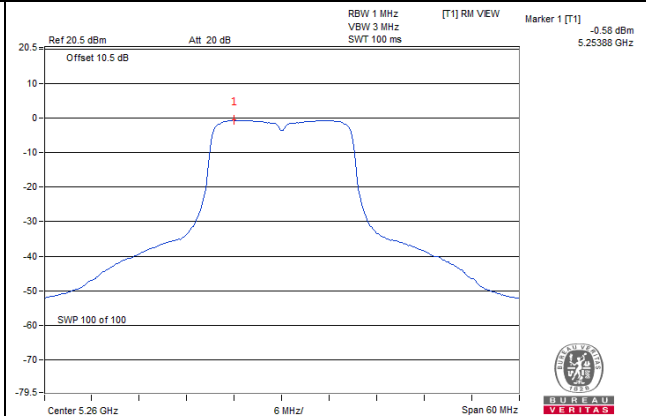
Note: Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

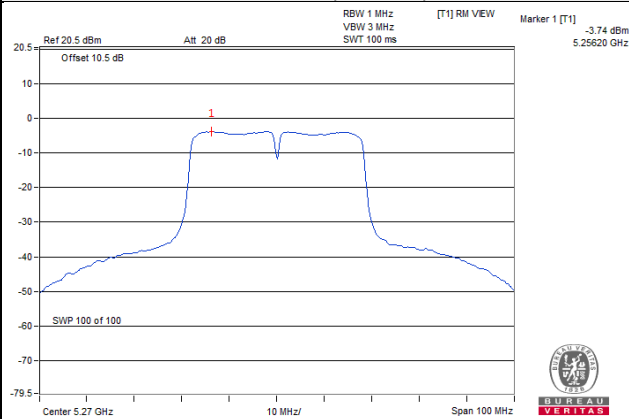
802.11a



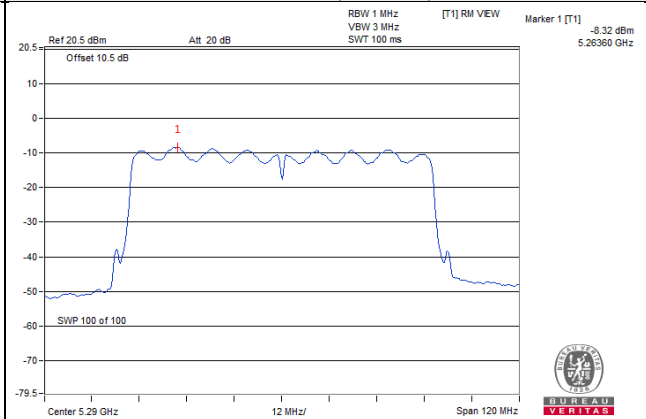
802.11ac (20MHz)



802.11ac (40MHz)



802.11ac (80MHz)

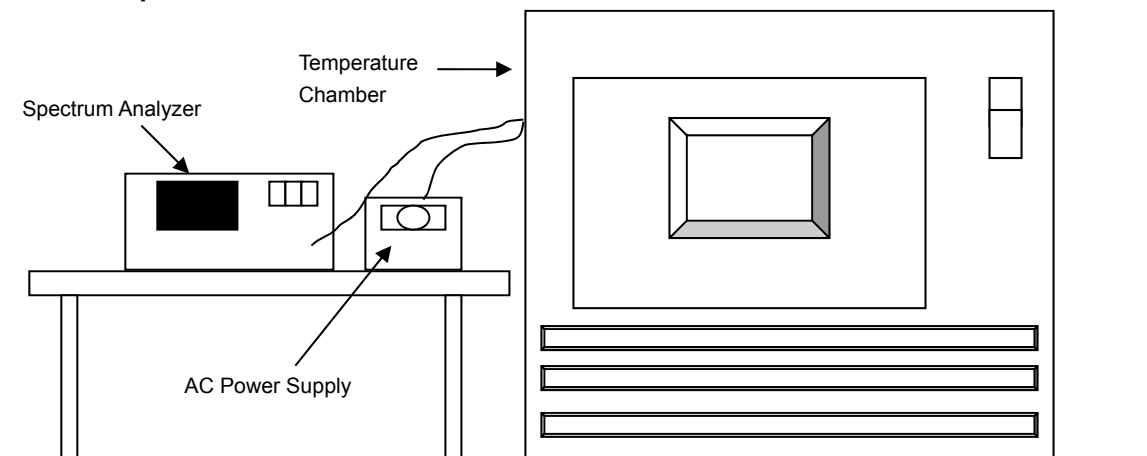


4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

4.6.2 Test Setup



4.6.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 11, 2018	Jun. 10, 2019
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 04, 2018	Jun. 03, 2019
Digital Multimeter Fluke	87-III	70360742	Jun. 29, 2018	Jun. 28, 2019
AC Power Supply Exttech	CFW-105	E000603	NA	NA

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- Repeat step d with the temperature chamber set to the next desire temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
50	120	5179.9898	PASS	5179.993	PASS	5179.9918	PASS	5179.9899	PASS
40	120	5180.0062	PASS	5180.0021	PASS	5180.0043	PASS	5180.0019	PASS
30	120	5179.9883	PASS	5179.9844	PASS	5179.9858	PASS	5179.9873	PASS
20	120	5180.0239	PASS	5180.0247	PASS	5180.0232	PASS	5180.0219	PASS
10	120	5179.9862	PASS	5179.9881	PASS	5179.9883	PASS	5179.9889	PASS
0	120	5179.9988	PASS	5179.9995	PASS	5179.9996	PASS	5179.9972	PASS
-10	120	5180.0183	PASS	5180.0133	PASS	5180.0149	PASS	5180.0147	PASS
-20	120	5179.9856	PASS	5179.9831	PASS	5179.9848	PASS	5179.984	PASS
-30	120	5180.0181	PASS	5180.0179	PASS	5180.0192	PASS	5180.017	PASS

Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5180.0234	PASS	5180.0244	PASS	5180.0223	PASS	5180.0221	PASS
	120	5180.0239	PASS	5180.0247	PASS	5180.0232	PASS	5180.0219	PASS
	102	5180.0248	PASS	5180.0246	PASS	5180.0234	PASS	5180.0218	PASS

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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

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Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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