

FCC Test Report

Report No.: RF190430E06-1 R1

FCC ID: PY319200444

Test Model: MC321

Series Model: MC321BL, MC321WL, MC321HW, MC321LW

Received Date: Apr. 30, 2019

Test Date: Jun. 1 to Jun. 18, 2019

Issued Date: Jul. 17, 2019

Applicant: NETGEAR, Inc.

Address: 350 East Plumeria Drive, San Jose, CA 95134, USA

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.

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

Test Location (2): E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF190430E06-1	Original release.	Jun. 20, 2019
RF190430E06-1 R1	Addition of Model No. MC321	Jul. 17, 2019

1 Certificate of Conformity

Product: Meural Canvas

Brand: NETGEAR

Test Model: MC321

Series Model: MC321BL, MC321WL, MC321HW, MC321LW

Sample Status: Engineering sample

Applicant: NETGEAR, Inc.

Test Date: Jun. 1 to Jun. 18, 2019

Standard: 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:** Jul. 17, 2019

Jessica Cheng / Senior Specialist

Approved by :



, **Date:** Jul. 17, 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 -8.74dB 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 -0.33dB 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	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OBE test plots were recorded in Annex A.

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	1.8 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.38 dB
	30MHz ~ 1GHz	5.43 dB
Radiated Emissions above 1 GHz	Above 1GHz	5.42 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Meural Canvas
Brand	NETGEAR
Test Model	MC321
Series Model	MC321BL, MC321WL, MC321HW, MC321LW
Model Difference	Refer to note as below
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from Adapter
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only.
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54Mbps 802.11n: up to 150Mbps 802.11ac: up to 433.3Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz 4 for 802.11a, 802.11n (20MHz), 802.11ac (20MHz) 2 for 802.11n (40MHz), 802.11ac (40MHz) 1 for 802.11ac (80MHz) 5745 ~ 5825MHz 5 for 802.11a, 802.11n (20MHz) 802.11ac (20MHz) 2 for 802.11n (40MHz) 802.11ac (40MHz) 1 for 802.11ac (80MHz)
Output Power	5180 ~ 5240MHz: 238.781mW 5745 ~ 5825MHz: 232.809mW
Antenna Type	5180 ~ 5240MHz: Dipole antenna with 3.77dBi gain 5745 ~ 5825MHz: Dipole antenna with 3.81dBi gain
Antenna Connector	I-PEX
Accessory Device	Adapter
Data Cable Supplied	N/A

Note:

1. All models are listed as below. Model: MC321 is the representative for final test.

Brand	Test Model	Series Model	Exterior color differences
NETGEAR	MC321	MC321BL	BL for black
		MC321WL	WL for white
		MC321HW	HW for hardwood color or walnut
		MC321LW	LW for light wood color or birch

2. 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

* 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)

3. The EUT uses following adapter. And the **Adapter 1** was the worst case for final test.

Adapter	1	2
Brand	NETGEAR	NETGEAR
Model	AD2067M20	AD2067F10
Input Power	100-240Vac, 1.0A, 50/60Hz	100-120Vac, 1.0A, 50/60Hz
Output Power	12Vdc, 2.5A	12Vdc, 2.5A
Power Line	Non-shielded DC cable (2.4m)	Non-shielded DC cable (2.4m)

4. 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

FOR 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

FOR 5745 ~ 5825MHz:

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

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

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

Channel	Frequency
155	5775MHz

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

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 **Y-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	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (80MHz)		42	42	OFDM	BPSK	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (80MHz)		155	155	OFDM	BPSK	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	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	149	OFDM	BPSK	6
-	802.11a	5745-5825	149 to 165		OFDM	BPSK	6

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	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	149	OFDM	BPSK	6
-	802.11a	5745-5825	149 to 165		OFDM	BPSK	6

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	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (80MHz)		42	42	OFDM	BPSK	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (80MHz)		155	155	OFDM	BPSK	29.3

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE _≥ 1G	23deg. C, 72%RH	120Vac, 60Hz	Dalen Dai
RE _{<} 1G	23deg. C, 72%RH	120Vac, 60Hz	Dalen Dai
PLC	23deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 76%RH	120Vac, 60Hz	Saxon Lee

3.3 Duty Cycle of Test Signal

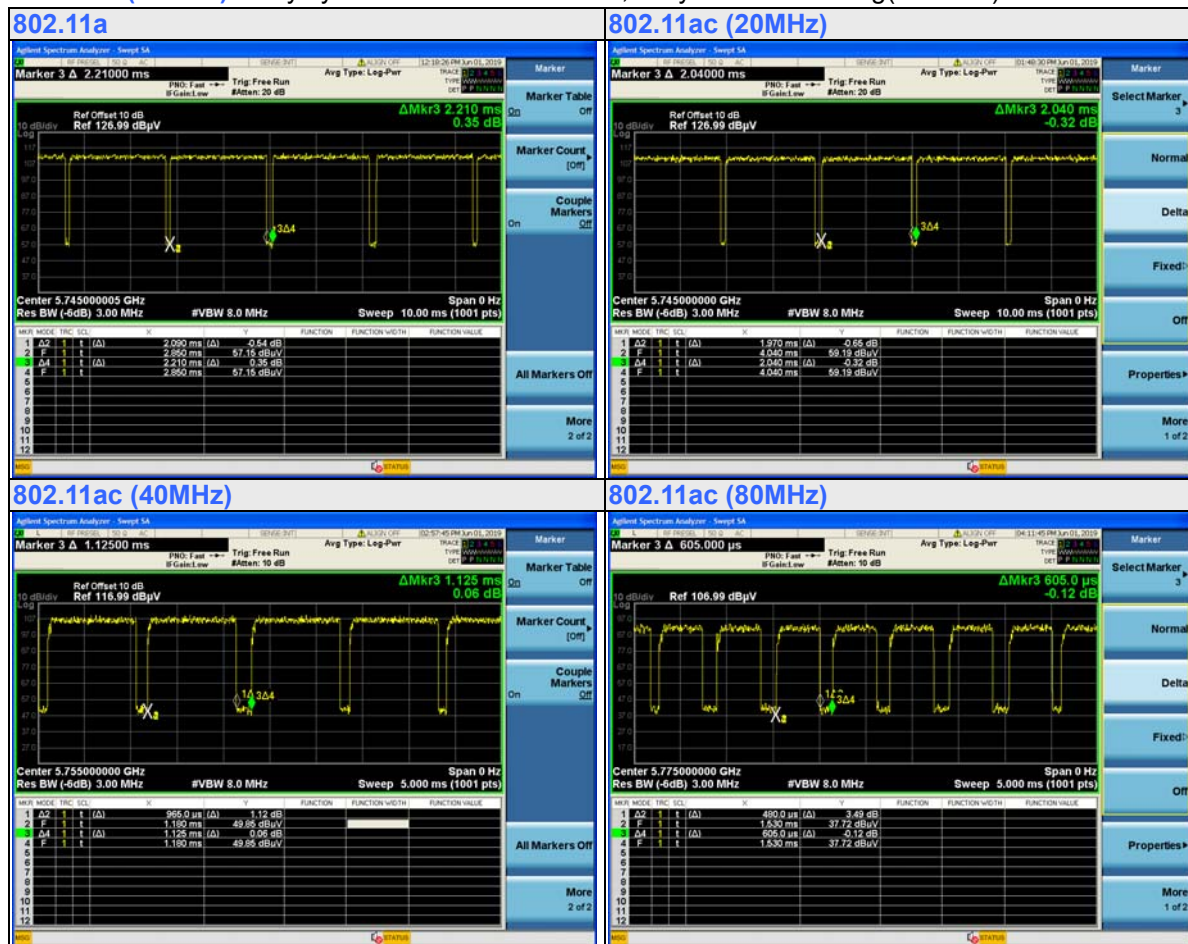
Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = $2.09/2.21 = 0.946$, Duty factor = $10 * \log(1/0.946) = 0.24$

802.11ac (20MHz): Duty cycle = $1.97/2.04 = 0.966$, Duty factor = $10 * \log(1/0.966) = 0.15$

802.11ac (40MHz): Duty cycle = $0.965/1.125 = 0.858$, Duty factor = $10 * \log(1/0.858) = 0.67$

802.11ac (80MHz): Duty cycle = $0.48/0.605 = 0.793$, Duty factor = $10 * \log(1/0.793) = 1.01$



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	DELL	E5410	BW33YM1	N/A	Provided by Lab

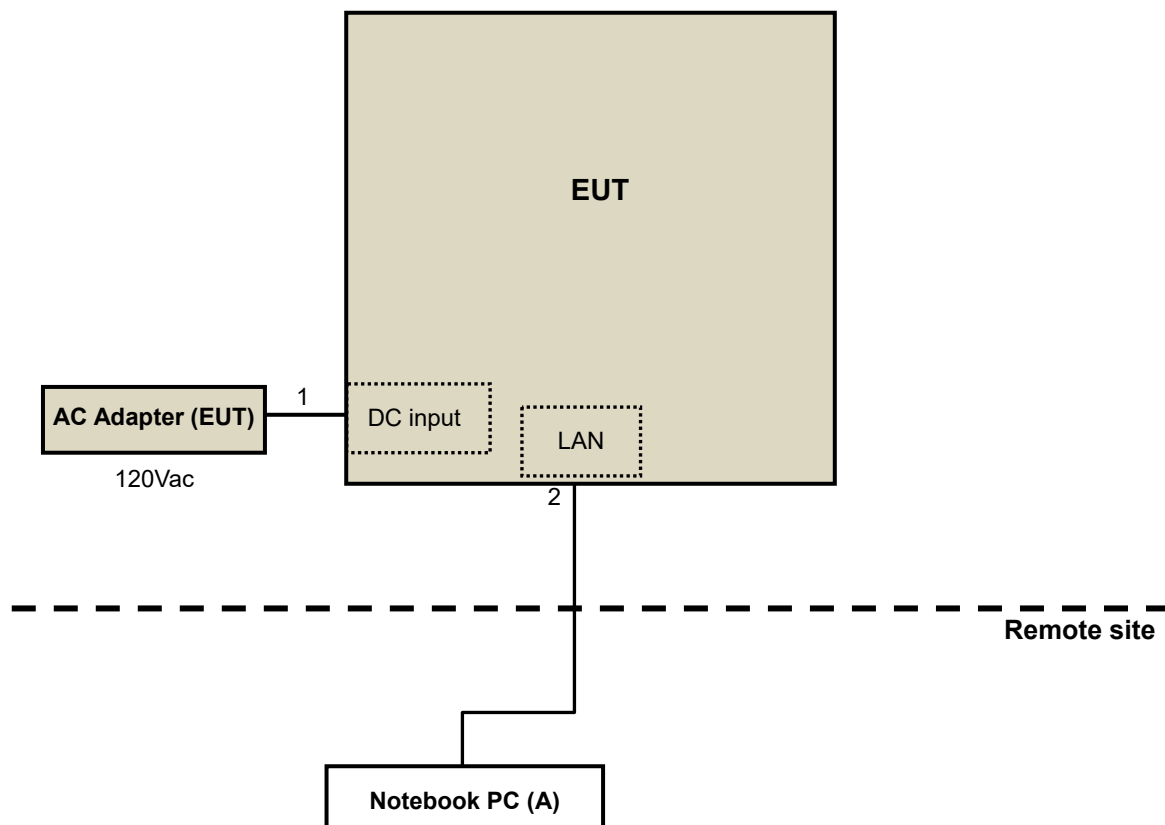
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	2.4	N	0	Supplied by client
2.	LAN cable	1	10	N	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 Standard

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:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
HP Preamplifier	8447D	2432A03504	Feb. 20, 2019	Feb. 19, 2020
HP Preamplifier	8449B	3008A01201	Feb. 21, 2019	Feb. 20, 2020
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 20, 2019	Feb. 19, 2020
Agilent TEST RECEIVER	N9038A	MY51210129	Mar. 05, 2019	Mar. 04, 2020
Schwarzbeck Antenna	VULB 9168	139	Nov. 26, 2018	Nov. 25, 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 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. 16, 2019	Apr. 15, 2020
Anritsu Power Meter	ML2495A	0842014	Apr. 16, 2019	Apr. 15, 2020
Temperature & Humidity Chamber	MHU-225AU	920409	May 24, 2019	May 23, 2020
DIGITAL POWER METER IDRC	CP-240	240515	Sep. 6, 2018	Sep. 5, 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.

4.1.3 Test Procedure

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 detects 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:

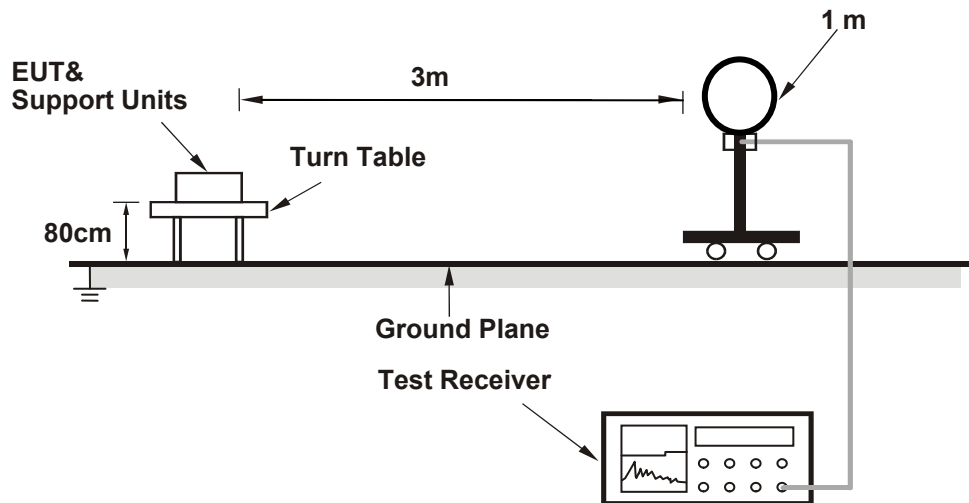
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

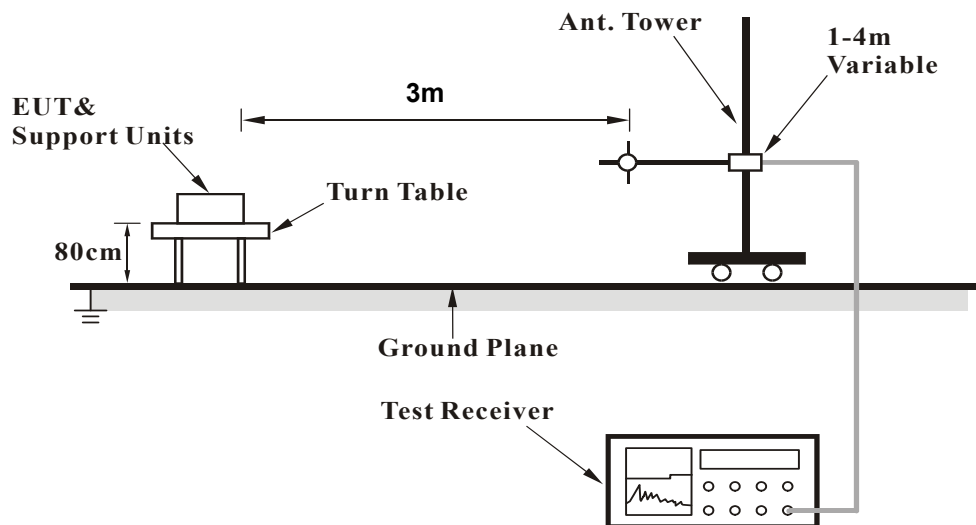
No deviation.

4.1.5 Test Setup

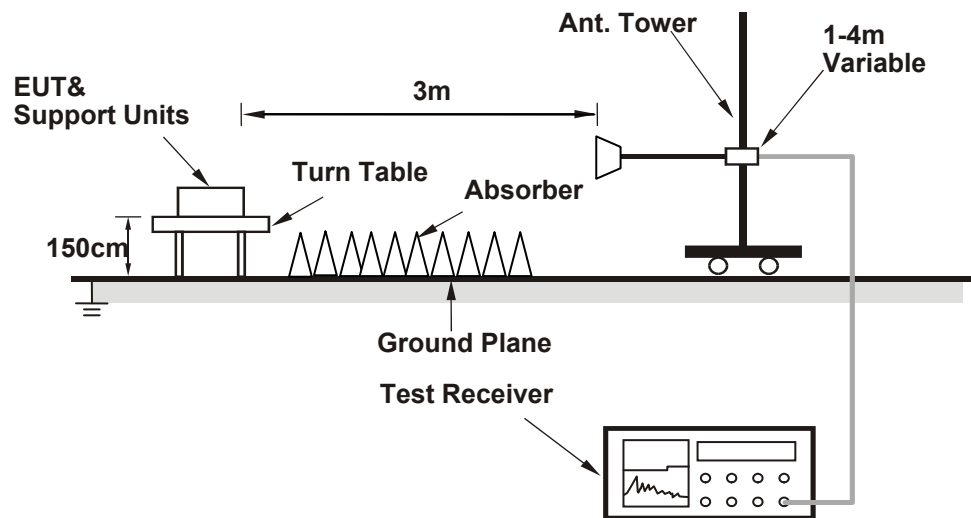
For Radiated emission below 30MHz



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 Condition

- Connected the EUT with AC adapter placed on testing table.
- 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	61.13 PK	74.00	-12.87	1.04 H	185	53.92	7.21
2	5150.00	47.61 AV	54.00	-6.39	1.04 H	185	40.40	7.21
3	*5180.00	102.78 PK			1.04 H	185	95.53	7.25
4	*5180.00	92.89 AV			1.04 H	185	85.64	7.25
5	#10360.00	56.03 PK	68.20	-12.17	2.31 H	28	38.89	17.14
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	69.84 PK	74.00	-4.16	1.15 V	77	62.63	7.21
2	5150.00	53.57 AV	54.00	-0.43	1.15 V	77	46.36	7.21
3	*5180.00	112.49 PK			1.15 V	77	105.24	7.25
4	*5180.00	102.72 AV			1.15 V	58	95.47	7.25
5	#10360.00	56.49 PK	68.20	-11.71	1.99 V	58	39.35	17.14

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	5150.00	58.87 PK	74.00	-15.13	1.05 H	183	51.66	7.21
2	5150.00	47.18 AV	54.00	-6.82	1.05 H	183	39.97	7.21
3	*5200.00	111.28 PK			1.05 H	183	104.02	7.26
4	*5200.00	101.56 AV			1.05 H	183	94.30	7.26
5	#10400.00	56.73 PK	68.20	-11.47	2.33 H	27	39.39	17.34
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	66.13 PK	74.00	-7.87	1.14 V	79	58.92	7.21
2	5150.00	53.39 AV	54.00	-0.61	1.14 V	79	46.18	7.21
3	*5200.00	114.53 PK			1.14 V	79	107.27	7.26
4	*5200.00	104.78 AV			1.14 V	79	97.52	7.26
5	#10400.00	57.45 PK	68.20	-10.75	2.03 V	49	40.11	17.34

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	112.86 PK			1.04 H	182	105.90	6.96
2	*5240.00	102.98 AV			1.04 H	182	96.02	6.96
3	5350.00	57.78 PK	74.00	-16.22	1.04 H	182	50.41	7.37
4	5350.00	43.64 AV	54.00	-10.36	1.04 H	182	36.27	7.37
5	#10480.00	56.95 PK	68.20	-11.25	2.38 H	32	39.25	17.70
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	116.13 PK			1.13 V	80	109.17	6.96
2	*5240.00	106.24 AV			1.13 V	80	99.28	6.96
3	5350.00	60.08 PK	74.00	-13.92	1.13 V	80	52.71	7.37
4	5350.00	45.97 AV	54.00	-8.03	1.13 V	80	38.60	7.37
5	#10480.00	58.61 PK	68.20	-9.59	1.94 V	52	40.91	17.70

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 149	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	#5597.98	59.69 PK	68.20	-8.51	1.53 H	156	52.01	7.68
2	*5745.00	106.53 PK			1.53 H	156	98.94	7.59
3	*5745.00	96.47 AV			1.53 H	156	88.88	7.59
4	#5999.35	60.82 PK	68.20	-7.38	1.53 H	156	52.74	8.08
5	11490.00	59.80 PK	74.00	-14.20	2.49 H	67	41.73	18.07
6	11490.00	46.31 AV	54.00	-7.69	2.49 H	67	28.24	18.07
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	#5599.40	59.72 PK	68.20	-8.48	1.45 V	91	52.05	7.67
2	*5745.00	117.51 PK			1.45 V	91	109.92	7.59
3	*5745.00	107.31 AV			1.45 V	91	99.72	7.59
4	#5932.85	60.37 PK	68.20	-7.83	1.45 V	91	52.21	8.16
5	11490.00	61.69 PK	74.00	-12.31	1.98 V	74	43.62	18.07
6	11490.00	47.61 AV	54.00	-6.39	1.98 V	74	29.54	18.07

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	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	#5624.57	59.28 PK	68.20	-8.92	1.51 H	160	51.73	7.55
2	*5785.00	106.41 PK			1.51 H	160	98.67	7.74
3	*5785.00	96.25 AV			1.51 H	160	88.51	7.74
4	#5986.52	60.44 PK	68.20	-7.76	1.51 H	160	52.35	8.09
5	11570.00	59.74 PK	74.00	-14.26	2.52 H	60	41.76	17.98
6	11570.00	46.37 AV	54.00	-7.63	2.52 H	60	28.39	17.98
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	#5606.52	60.18 PK	68.20	-8.02	1.43 V	89	52.54	7.64
2	*5785.00	117.39 PK			1.43 V	89	109.65	7.74
3	*5785.00	107.21 AV			1.43 V	89	99.47	7.74
4	#5984.62	60.92 PK	68.20	-7.28	1.43 V	89	52.83	8.09
5	11570.00	61.69 PK	74.00	-12.31	1.93 V	70	43.71	17.98
6	11570.00	47.50 AV	54.00	-6.50	1.93 V	70	29.52	17.98

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 165	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	#5631.23	59.76 PK	68.20	-8.44	1.52 H	158	52.24	7.52
2	*5825.00	106.35 PK			1.52 H	158	98.43	7.92
3	*5825.00	96.21 AV			1.52 H	158	88.29	7.92
4	#5987.95	60.63 PK	68.20	-7.57	1.52 H	158	52.55	8.08
5	11650.00	59.49 PK	74.00	-14.51	2.50 H	61	41.77	17.72
6	11650.00	46.06 AV	54.00	-7.94	2.50 H	61	28.34	17.72
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	#5554.75	60.17 PK	68.20	-8.03	1.40 V	90	52.45	7.72
2	*5825.00	116.93 PK			1.40 V	90	109.01	7.92
3	*5825.00	106.74 AV			1.40 V	90	98.82	7.92
4	#6025.00	61.16 PK	68.20	-7.04	1.40 V	90	52.95	8.21
5	11650.00	61.32 PK	74.00	-12.68	1.96 V	72	43.60	17.72
6	11650.00	47.17 AV	54.00	-6.83	1.96 V	72	29.45	17.72

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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	61.49 PK	74.00	-12.51	1.07 H	189	54.28	7.21
2	5150.00	47.38 AV	54.00	-6.62	1.07 H	189	40.17	7.21
3	*5180.00	102.86 PK			1.07 H	189	95.61	7.25
4	*5180.00	92.97 AV			1.07 H	189	85.72	7.25
5	#10360.00	56.10 PK	68.20	-12.10	2.27 H	23	38.96	17.14
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	69.84 PK	74.00	-4.16	1.15 V	78	62.63	7.21
2	5150.00	53.67 AV	54.00	-0.33	1.15 V	78	46.46	7.21
3	*5180.00	112.85 PK			1.15 V	78	105.60	7.25
4	*5180.00	102.94 AV			1.15 V	78	95.69	7.25
5	#10360.00	56.33 PK	68.20	-11.87	1.96 V	50	39.19	17.14

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	5150.00	58.87 PK	74.00	-15.13	1.02 H	185	51.66	7.21
2	5150.00	47.49 AV	54.00	-6.51	1.02 H	185	40.28	7.21
3	*5200.00	111.63 PK			1.02 H	185	104.37	7.26
4	*5200.00	101.71 AV			1.02 H	185	94.45	7.26
5	#10400.00	56.80 PK	68.20	-11.40	2.34 H	24	39.46	17.34
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	67.07 PK	74.00	-6.93	1.13 V	77	59.86	7.21
2	5150.00	53.67 AV	54.00	-0.33	1.13 V	77	46.46	7.21
3	*5200.00	115.01 PK			1.13 V	77	107.75	7.26
4	*5200.00	105.14 AV			1.13 V	77	97.88	7.26
5	#10400.00	57.53 PK	68.20	-10.67	2.01 V	54	40.19	17.34

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	112.72 PK			1.06 H	188	105.76	6.96
2	*5240.00	102.89 AV			1.06 H	188	95.93	6.96
3	5350.00	57.85 PK	74.00	-16.15	1.06 H	188	50.48	7.37
4	5350.00	43.76 AV	54.00	-10.24	1.06 H	188	36.39	7.37
5	#10480.00	57.25 PK	68.20	-10.95	2.29 H	33	39.55	17.70
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	116.32 PK			1.16 V	73	109.36	6.96
2	*5240.00	106.24 AV			1.16 V	73	99.28	6.96
3	5350.00	59.64 PK	74.00	-14.36	1.16 V	73	52.27	7.37
4	5350.00	45.78 AV	54.00	-8.22	1.16 V	73	38.41	7.37
5	#10480.00	58.54 PK	68.20	-9.66	1.98 V	48	40.84	17.70

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 149	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	#5610.80	58.73 PK	68.20	-9.47	1.55 H	161	51.11	7.62
2	*5745.00	106.33 PK			1.55 H	161	98.74	7.59
3	*5745.00	96.18 AV			1.55 H	161	88.59	7.59
4	#6000.77	60.32 PK	68.20	-7.88	1.55 H	161	52.24	8.08
5	11490.00	59.62 PK	74.00	-14.38	2.37 H	64	41.55	18.07
6	11490.00	46.23 AV	54.00	-7.77	2.37 H	64	28.16	18.07
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	#5625.05	60.18 PK	68.20	-8.02	1.45 V	90	52.63	7.55
2	*5745.00	117.45 PK			1.45 V	90	109.86	7.59
3	*5745.00	107.29 AV			1.45 V	90	99.70	7.59
4	#5964.20	60.70 PK	68.20	-7.50	1.45 V	90	52.61	8.09
5	11490.00	60.99 PK	74.00	-13.01	1.94 V	73	42.92	18.07
6	11490.00	47.50 AV	54.00	-6.50	1.94 V	73	29.43	18.07

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	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	#5626.48	59.56 PK	68.20	-8.64	1.52 H	156	52.01	7.55
2	*5785.00	106.03 PK			1.52 H	156	98.29	7.74
3	*5785.00	95.84 AV			1.52 H	156	88.10	7.74
4	#6024.05	60.40 PK	68.20	-7.80	1.52 H	156	52.21	8.19
5	11570.00	59.61 PK	74.00	-14.39	2.54 H	63	41.63	17.98
6	11570.00	46.29 AV	54.00	-7.71	2.54 H	63	28.31	17.98
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	#5616.50	60.40 PK	68.20	-7.80	1.43 V	92	52.80	7.60
2	*5785.00	117.27 PK			1.43 V	92	109.53	7.74
3	*5785.00	107.04 AV			1.43 V	92	99.30	7.74
4	#6002.68	60.98 PK	68.20	-7.22	1.43 V	92	52.89	8.09
5	11570.00	61.09 PK	74.00	-12.91	2.00 V	71	43.11	17.98
6	11570.00	47.46 AV	54.00	-6.54	2.00 V	71	29.48	17.98

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 165	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	#5620.30	59.66 PK	68.20	-8.54	1.54 H	159	52.08	7.58
2	*5825.00	106.11 PK			1.54 H	159	98.19	7.92
3	*5825.00	95.94 AV			1.54 H	159	88.02	7.92
4	#5987.00	60.50 PK	68.20	-7.70	1.54 H	159	52.41	8.09
5	11650.00	59.21 PK	74.00	-14.79	2.45 H	66	41.49	17.72
6	11650.00	45.96 AV	54.00	-8.04	2.45 H	66	28.24	17.72
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	#5613.18	59.40 PK	68.20	-8.80	1.47 V	94	51.79	7.61
2	*5825.00	117.42 PK			1.47 V	94	109.50	7.92
3	*5825.00	107.25 AV			1.47 V	94	99.33	7.92
4	#5968.48	61.24 PK	68.20	-6.96	1.47 V	94	53.15	8.09
5	11650.00	60.92 PK	74.00	-13.08	1.98 V	76	43.20	17.72
6	11650.00	47.17 AV	54.00	-6.83	1.98 V	76	29.45	17.72

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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	61.33 PK	74.00	-12.67	1.02 H	208	54.12	7.21
2	5150.00	47.26 AV	54.00	-6.74	1.02 H	208	40.05	7.21
3	*5190.00	98.73 PK			1.02 H	208	91.48	7.25
4	*5190.00	88.64 AV			1.02 H	208	81.39	7.25
5	#10380.00	54.93 PK	68.20	-13.27	2.76 H	37	37.69	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	5150.00	69.59 PK	74.00	-4.41	1.07 V	154	62.38	7.21
2	5150.00	53.57 AV	54.00	-0.43	1.07 V	154	46.36	7.21
3	*5190.00	106.82 PK			1.07 V	154	99.57	7.25
4	*5190.00	96.69 AV			1.07 V	154	89.44	7.25
5	#10380.00	56.28 PK	68.20	-11.92	2.17 V	92	39.04	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	5150.00	61.45 PK	74.00	-12.55	1.03 H	204	54.24	7.21
2	5150.00	47.38 AV	54.00	-6.62	1.03 H	204	40.17	7.21
3	*5230.00	101.84 PK			1.03 H	204	94.80	7.04
4	*5230.00	91.69 AV			1.03 H	204	84.65	7.04
5	5350.00	57.62 PK	74.00	-16.38	1.03 H	204	50.25	7.37
6	5350.00	44.08 AV	54.00	-9.92	1.03 H	204	36.71	7.37
7	#10460.00	55.27 PK	68.20	-12.93	2.71 H	39	37.66	17.61
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	67.73 PK	74.00	-6.27	1.05 V	158	60.52	7.21
2	5150.00	53.63 AV	54.00	-0.37	1.05 V	158	46.42	7.21
3	*5230.00	110.55 PK			1.05 V	158	103.51	7.04
4	*5230.00	100.37 AV			1.05 V	158	93.33	7.04
5	5350.00	61.19 PK	74.00	-12.81	1.05 V	158	53.82	7.37
6	5350.00	47.08 AV	54.00	-6.92	1.05 V	158	39.71	7.37
7	#10460.00	57.75 PK	68.20	-10.45	2.11 V	99	40.14	17.61

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 151	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	#5618.87	59.84 PK	68.20	-8.36	1.56 H	161	52.26	7.58
2	*5755.00	103.54 PK			1.56 H	161	95.93	7.61
3	*5755.00	94.27 AV			1.56 H	161	86.66	7.61
4	#6016.45	60.35 PK	68.20	-7.85	1.56 H	161	52.19	8.16
5	11510.00	57.94 PK	74.00	-16.06	2.50 H	63	39.85	18.09
6	11510.00	44.22 AV	54.00	-9.78	2.50 H	63	26.13	18.09
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	#5644.52	63.11 PK	68.20	-5.09	1.44 V	90	55.65	7.46
2	*5755.00	113.97 PK			1.44 V	90	106.36	7.61
3	*5755.00	104.42 AV			1.44 V	90	96.81	7.61
4	#6014.07	60.90 PK	68.20	-7.30	1.44 V	90	52.75	8.15
5	11510.00	59.42 PK	74.00	-14.58	1.99 V	73	41.33	18.09
6	11510.00	45.61 AV	54.00	-8.39	1.99 V	73	27.52	18.09

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 159	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	#5596.07	59.91 PK	68.20	-8.29	1.50 H	157	52.24	7.67
2	*5795.00	103.29 PK			1.50 H	157	95.50	7.79
3	*5795.00	93.81 AV			1.50 H	157	86.02	7.79
4	#5931.90	61.06 PK	68.20	-7.14	1.50 H	157	52.90	8.16
5	11590.00	57.70 PK	74.00	-16.30	2.52 H	64	39.76	17.94
6	11590.00	44.05 AV	54.00	-9.95	2.52 H	64	26.11	17.94
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	#5584.68	61.62 PK	68.20	-6.58	1.42 V	93	53.93	7.69
2	*5795.00	113.59 PK			1.42 V	93	105.80	7.79
3	*5795.00	103.94 AV			1.42 V	93	96.15	7.79
4	#5932.85	62.86 PK	68.20	-5.34	1.42 V	93	54.70	8.16
5	11590.00	59.20 PK	74.00	-14.80	1.96 V	70	41.26	17.94
6	11590.00	45.57 AV	54.00	-8.43	1.96 V	70	27.63	17.94

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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	60.12 PK	74.00	-13.88	1.05 H	206	52.91	7.21
2	5150.00	46.53 AV	54.00	-7.47	1.05 H	206	39.32	7.21
3	*5210.00	94.87 PK			1.05 H	206	87.69	7.18
4	*5210.00	84.49 AV			1.05 H	206	77.31	7.18
5	5350.00	56.80 PK	74.00	-17.20	1.05 H	206	49.43	7.37
6	5350.00	43.87 AV	54.00	-10.13	1.05 H	206	36.50	7.37
7	#10420.00	56.49 PK	68.20	-11.71	2.65 H	34	39.06	17.43
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	66.14 PK	74.00	-7.86	1.08 V	153	58.93	7.21
2	5150.00	53.64 AV	54.00	-0.36	1.08 V	153	46.43	7.21
3	*5210.00	103.18 PK			1.08 V	153	96.00	7.18
4	*5210.00	92.84 AV			1.08 V	153	85.66	7.18
5	5350.00	59.62 PK	74.00	-14.38	1.08 V	153	52.25	7.37
6	5350.00	45.38 AV	54.00	-8.62	1.08 V	153	38.01	7.37
7	#10420.00	57.37 PK	68.20	-10.83	2.15 V	91	39.94	17.43

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 155	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	#5647.85	62.72 PK	68.20	-5.48	1.54 H	156	55.28	7.44
2	*5775.00	99.81 PK			1.54 H	156	92.11	7.70
3	*5775.00	89.34 AV			1.54 H	156	81.64	7.70
4	#6013.60	60.72 PK	68.20	-7.48	1.54 H	156	52.57	8.15
5	11550.00	57.30 PK	74.00	-16.70	2.49 H	58	39.28	18.02
6	11550.00	44.09 AV	54.00	-9.91	2.49 H	58	26.07	18.02
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	#5647.85	67.83 PK	68.20	-0.37	1.41 V	92	60.39	7.44
2	*5775.00	109.98 PK			1.41 V	92	102.28	7.70
3	*5775.00	99.41 AV			1.41 V	92	91.71	7.70
4	#5928.10	63.60 PK	68.20	-4.60	1.41 V	92	55.44	8.16
5	11550.00	58.69 PK	74.00	-15.31	1.88 V	77	40.67	18.02
6	11550.00	45.21 AV	54.00	-8.79	1.88 V	77	27.19	18.02

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

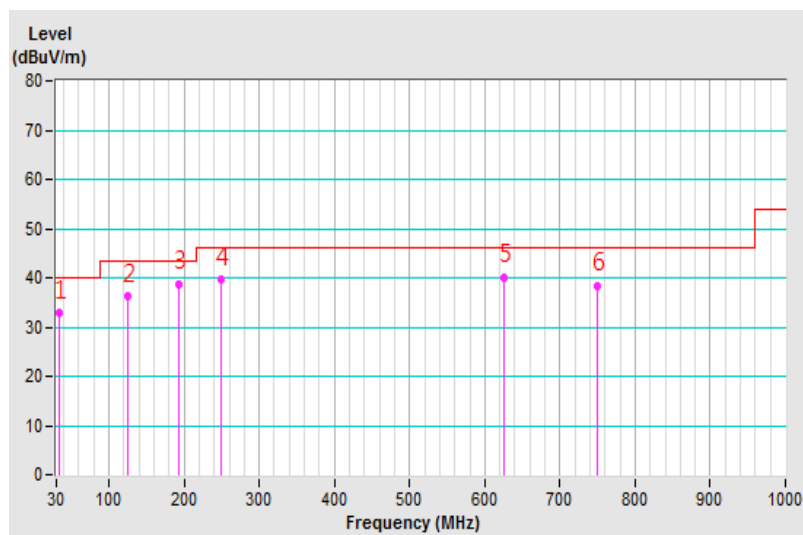
802.11a

CHANNEL	TX Channel 149	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	33.49	32.75 QP	40.00	-7.25	1.53 H	109	41.29	-8.54
2	125.01	36.15 QP	43.50	-7.35	1.38 H	267	44.71	-8.56
3	193.64	38.78 QP	43.50	-4.72	1.69 H	159	47.86	-9.08
4	250.00	39.50 QP	46.00	-6.50	1.42 H	150	46.45	-6.95
5	625.00	40.13 QP	46.00	-5.87	2.17 H	229	38.57	1.56
6	750.03	38.35 QP	46.00	-7.65	1.96 H	152	34.52	3.83

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
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.

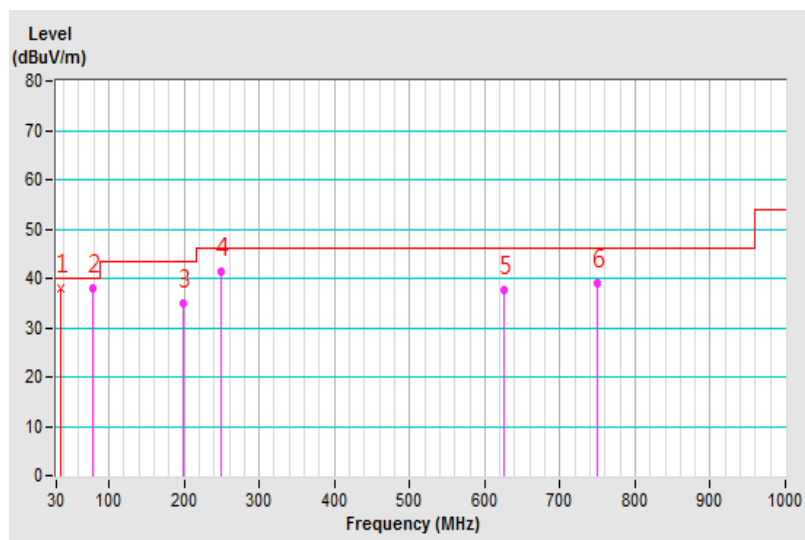


CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	36.06	38.10 QP	40.00	-1.90	1.93 V	38	46.33	-8.23
2	77.87	38.00 QP	40.00	-2.00	1.42 V	308	49.13	-11.13
3	199.51	34.84 QP	43.50	-8.66	1.56 V	136	43.92	-9.08
4	250.00	41.42 QP	46.00	-4.58	2.08 V	31	48.37	-6.95
5	625.00	37.60 QP	46.00	-8.40	1.67 V	142	36.04	1.56
6	750.03	38.92 QP	46.00	-7.08	1.39 V	290	35.09	3.83

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
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
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 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 Conduction 1. (TAF no.: 2022)

4.2.3 Test Procedure

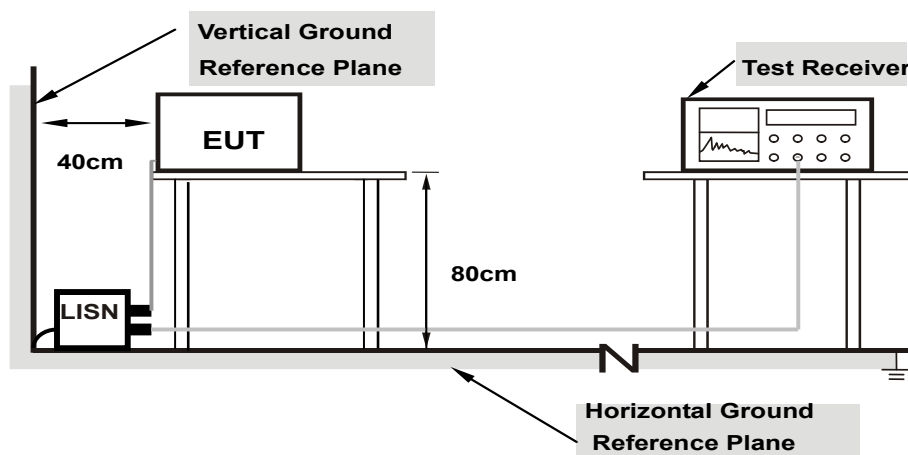
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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: All modes of operation were investigated and the worst-case emissions are reported.

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 Condition

Same as 4.1.6.

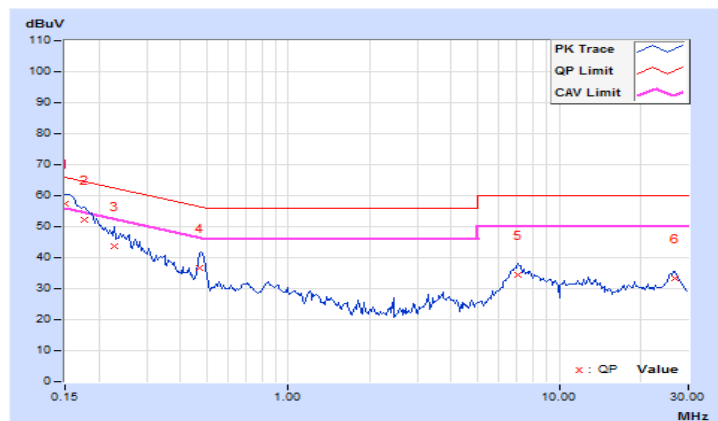
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	47.23	33.75	57.26	43.78	66.00	56.00	-8.74	-12.22
2	0.17734	10.04	42.26	29.89	52.30	39.93	64.61	54.61	-12.31	-14.68
3	0.22812	10.05	33.78	22.44	43.83	32.49	62.52	52.52	-18.69	-20.03
4	0.47031	10.09	26.66	20.84	36.75	30.93	56.51	46.51	-19.76	-15.58
5	7.04688	10.51	24.03	19.39	34.54	29.90	60.00	50.00	-25.46	-20.10
6	26.65625	11.52	21.81	19.44	33.33	30.96	60.00	50.00	-26.67	-19.04

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.

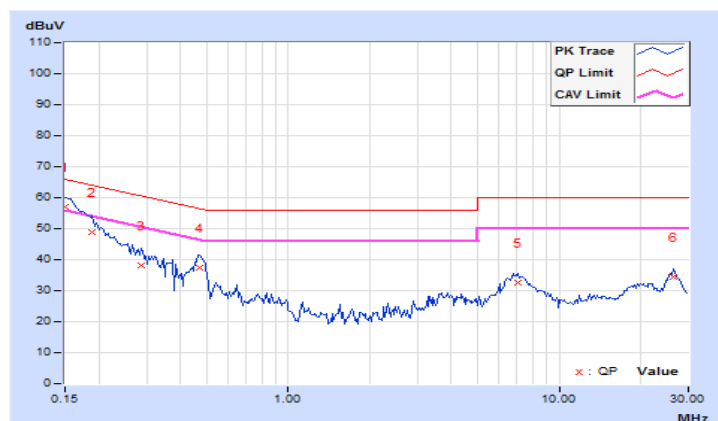


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.94	46.98	33.17	56.92	43.11	66.00	56.00	-9.08	-12.89
2	0.18906	9.95	38.87	25.15	48.82	35.10	64.08	54.08	-15.26	-18.98
3	0.28672	9.96	28.05	16.63	38.01	26.59	60.62	50.62	-22.61	-24.03
4	0.47031	9.98	27.61	21.61	37.59	31.59	56.51	46.51	-18.92	-14.92
5	7.02734	10.35	22.42	17.70	32.77	28.05	60.00	50.00	-27.23	-21.95
6	26.51563	11.25	23.24	19.98	34.49	31.23	60.00	50.00	-25.51	-18.77

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.



Note: The test, calibration and test results are compliance with the TAF (Certificate # 2022)

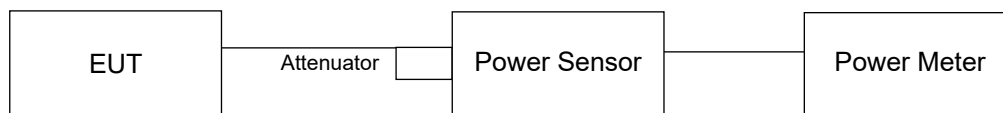
4.3 Transmit Power Measurement

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)
	√	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



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)

- 1) Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- 2) Set sweep trigger to "free run".
- 3) Set RBW = 1 MHz.
- 4) Set VBW $\geq$ 3 MHz
- 5) Number of points in sweep $\geq$ 2 Span / RBW.
- 6) Sweep time $\leq$ (number of points in sweep) * T
- 7) Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
- 8) Detector = RMS.
- 9) Trace mode = max hold.
- 10) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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	144.212	21.59	24.00	Pass
40	5200	234.423	23.70	24.00	Pass
48	5240	238.781	23.78	24.00	Pass
149	5745	232.809	23.67	30.00	Pass
157	5785	221.309	23.45	30.00	Pass
165	5825	214.289	23.31	30.00	Pass

802.11ac (20MHz)

Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	110.917	20.45	24.00	Pass
40	5200	225.424	23.53	24.00	Pass
48	5240	232.274	23.66	24.00	Pass
149	5745	218.273	23.39	30.00	Pass
157	5785	216.272	23.35	30.00	Pass
165	5825	209.411	23.21	30.00	Pass

802.11ac (40MHz)

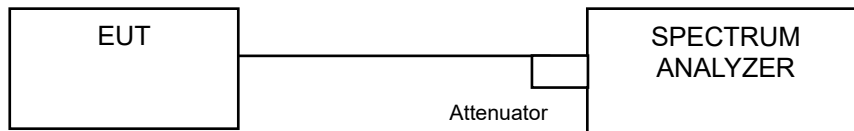
Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
38	5190	79.616	19.01	24.00	Pass
46	5230	174.582	22.42	24.00	Pass
151	5755	229.615	23.61	30.00	Pass
159	5795	215.278	23.33	30.00	Pass

802.11ac (80MHz)

Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
42	5210	86.696	19.38	24.00	Pass
155	5775	212.324	23.27	30.00	Pass

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 SAMPLE. 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 Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	16.68
40	5200	19.56
48	5240	18.24
149	5745	23.40
157	5785	21.30
165	5825	18.80

802.11ac (20MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	17.64
40	5200	19.08
48	5240	18.24
149	5745	22.35
157	5785	20.60
165	5825	18.50

802.11ac (40MHz)

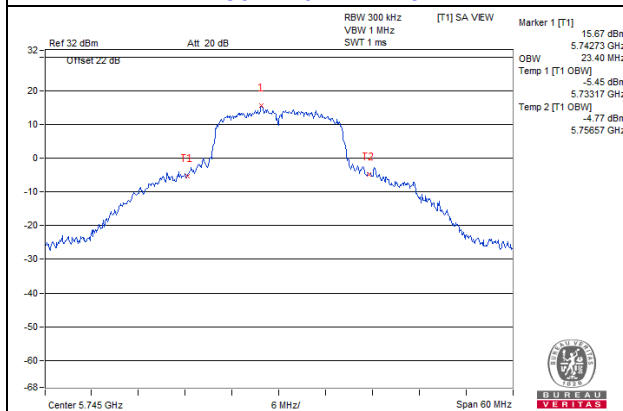
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
38	5190	35.94
46	5230	36.40
151	5755	48.41
159	5795	44.84

802.11ac (80MHz)

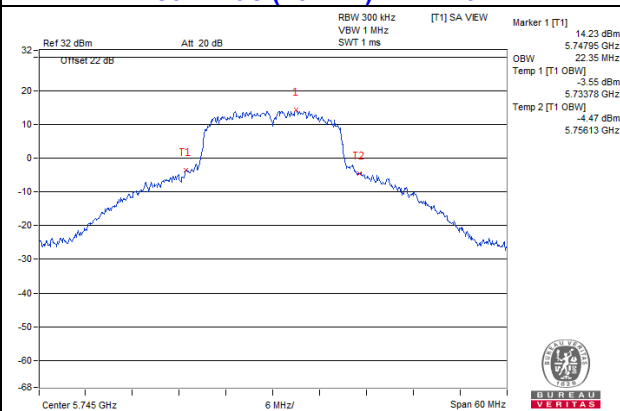
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
42	5210	75.14
155	5775	85.01

Spectrum Plot of Worst Value

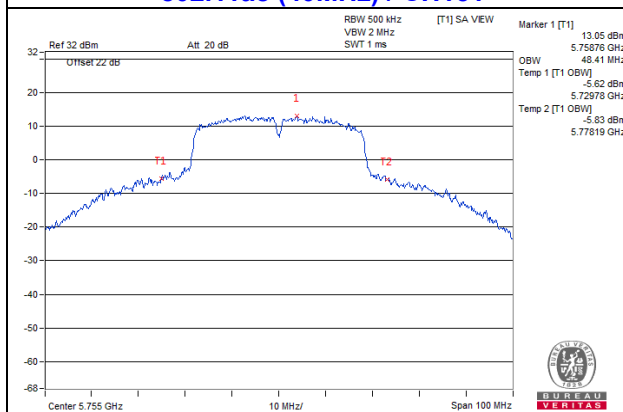
802.11a / CH149



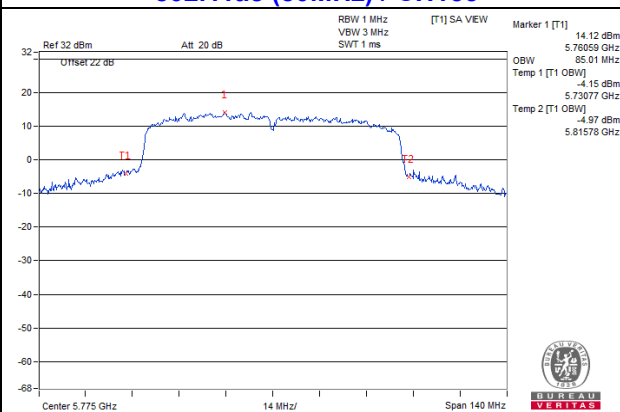
802.11ac (20MHz) / CH149



802.11ac (40MHz) / CH151



802.11ac (80MHz) / CH155

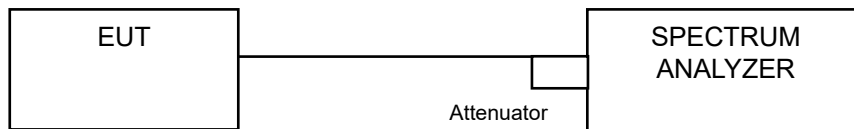


4.5 Peak Power Spectral Density Measurement

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	
	√	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 Procedure

For U-NII-1 band:

Using method SA-2

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

For U-NII-3 band:

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
- 3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- 4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$
- 5) Sweep time = auto, trigger set to "free run".
- 6) Trace average at least 100 traces in power averaging mode.
- 7) Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

802.11a

Chan.	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	5.43	0.24	5.67	11	Pass
40	5200	7.11	0.24	7.35	11	Pass
48	5240	7.70	0.24	7.94	11	Pass

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

802.11ac (20MHz)

Chan.	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	5.03	0.15	5.18	11	Pass
40	5200	7.53	0.15	7.68	11	Pass
48	5240	6.24	0.15	6.39	11	Pass

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

802.11ac (40MHz)

Chan.	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	-1.59	0.67	-0.92	11	Pass
46	5230	2.32	0.67	2.99	11	Pass

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

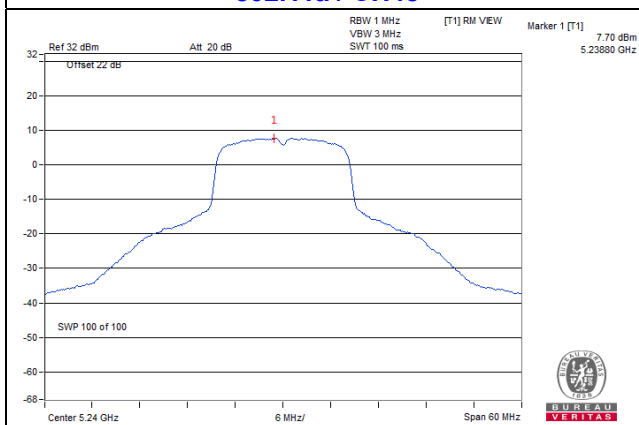
802.11ac (80MHz)

Chan.	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	-6.00	1.01	-4.99	11	Pass

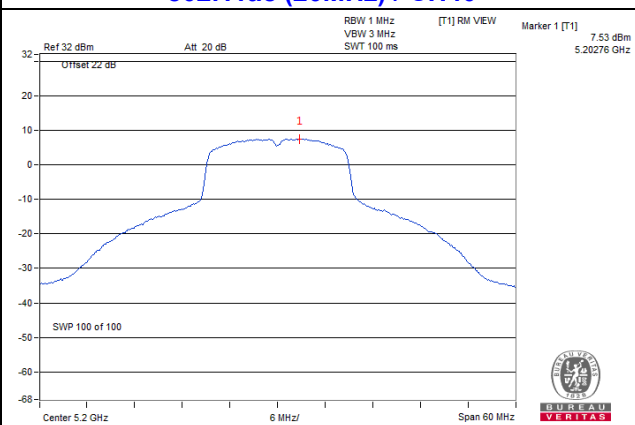
Note: Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

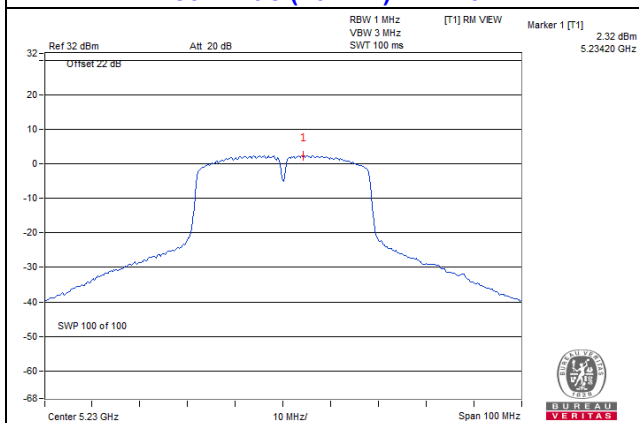
802.11a / CH48



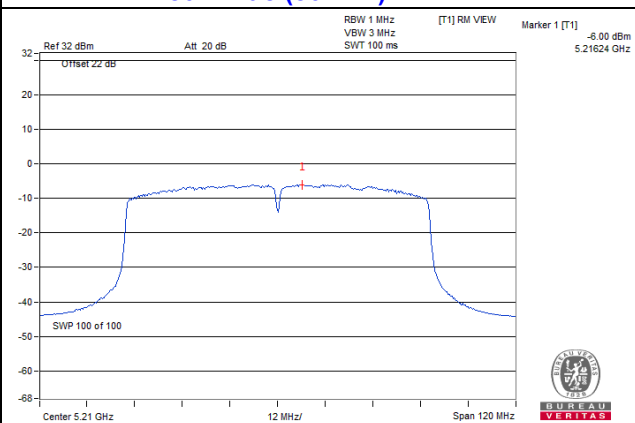
802.11ac (20MHz) / CH40



802.11ac (40MHz) / CH46



802.11ac (80MHz) / CH42



For U-NII-3:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/500kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
149	5745	1.54	0.24	1.78	30	Pass
157	5785	0.79	0.24	1.03	30	Pass
165	5825	0.45	0.24	0.69	30	Pass

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

802.11ac (20MHz)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/500kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
149	5745	1.09	0.15	1.24	30	Pass
157	5785	0.33	0.15	0.48	30	Pass
165	5825	0.00	0.15	0.15	30	Pass

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

802.11ac (40MHz)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/500kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
151	5755	-2.85	0.67	-2.18	30	Pass
159	5795	-3.70	0.67	-3.03	30	Pass

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

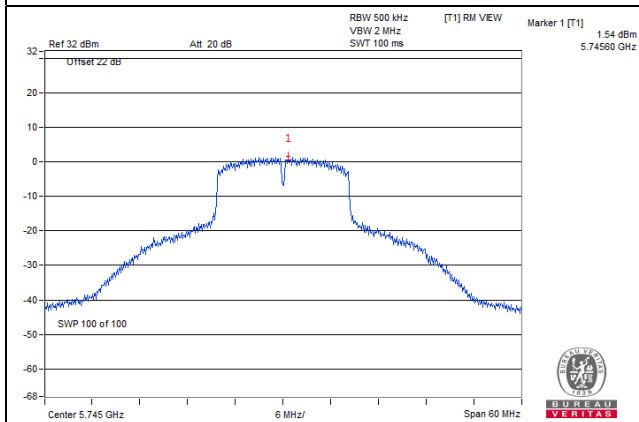
802.11ac (80MHz)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/500kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
155	5775	-6.66	1.01	-5.65	30	Pass

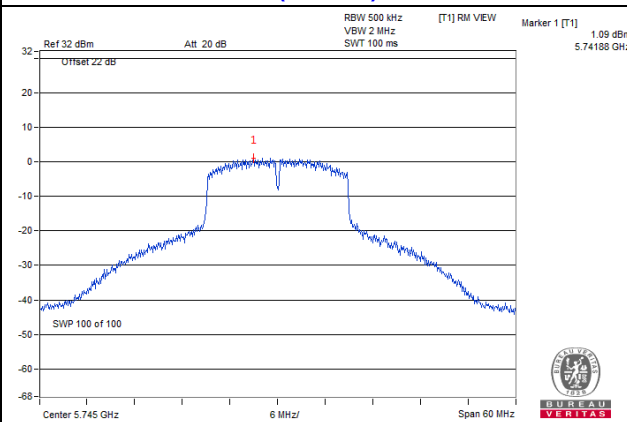
Note: Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

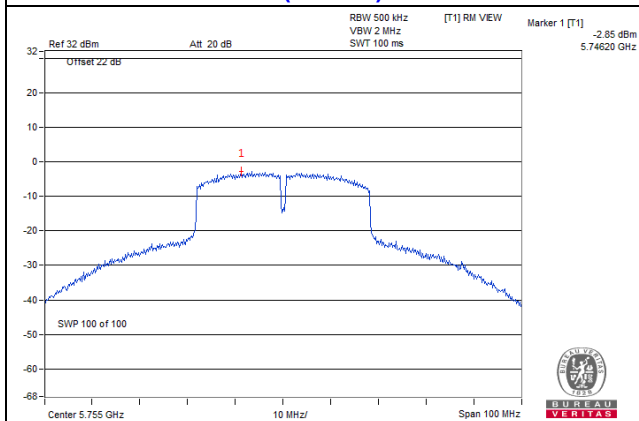
802.11a / CH149



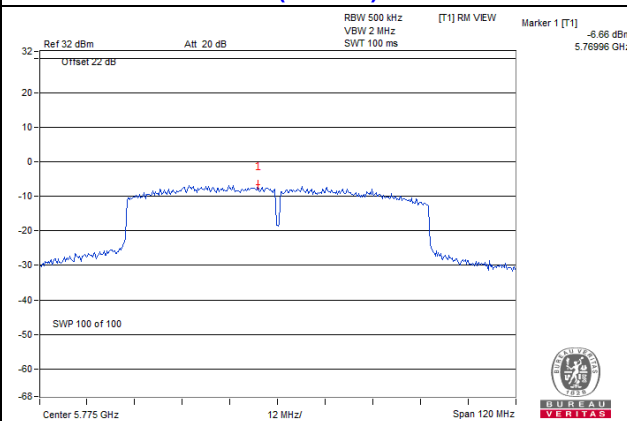
802.11ac (20MHz) / CH149



802.11ac (40MHz) / CH151



802.11ac (80MHz) / CH155

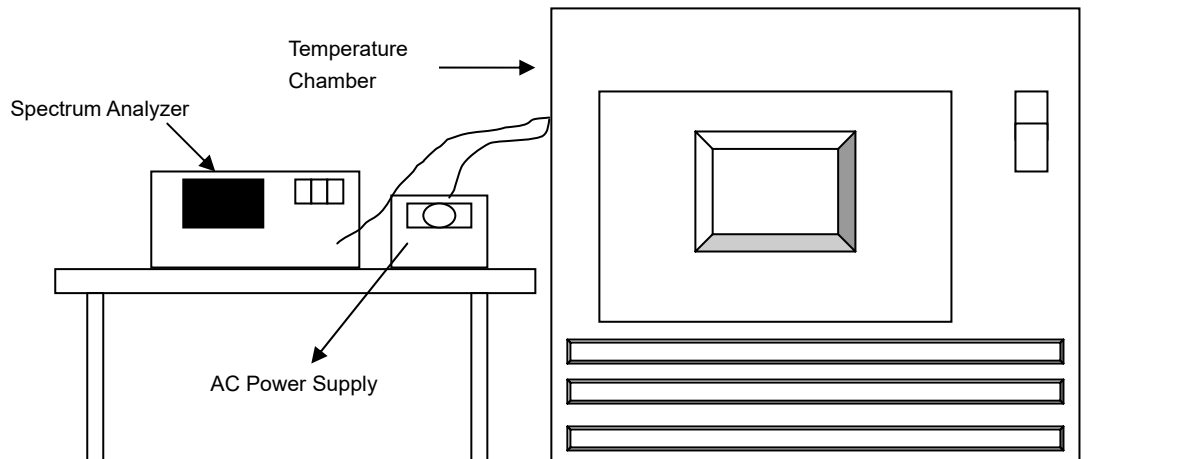


4.6 Frequency Stability Measurement

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

Refer to section 4.1.2 to get information of above instrument.

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 desired temperature until measurements down to the lowest specified temperature have been completed..
- 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: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5180.0034	Pass	5180.0027	Pass	5180.0033	Pass	5180.0057	Pass
40	120	5179.9823	Pass	5179.9805	Pass	5179.9838	Pass	5179.9809	Pass
30	120	5179.9845	Pass	5179.9865	Pass	5179.9842	Pass	5179.9867	Pass
20	120	5179.9867	Pass	5179.9881	Pass	5179.9865	Pass	5179.9869	Pass
10	120	5179.9919	Pass	5179.9918	Pass	5179.993	Pass	5179.9916	Pass
0	120	5180.0228	Pass	5180.0274	Pass	5180.023	Pass	5180.0244	Pass
-10	120	5180.023	Pass	5180.0239	Pass	5180.0212	Pass	5180.0212	Pass
-20	120	5180.0095	Pass	5180.0109	Pass	5180.0109	Pass	5180.0073	Pass
-30	120	5179.9845	Pass	5179.9815	Pass	5179.9805	Pass	5179.9814	Pass

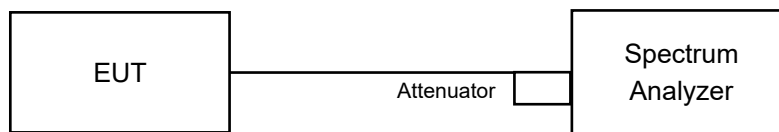
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9857	Pass	5179.9889	Pass	5179.9864	Pass	5179.9867	Pass
	120	5179.9867	Pass	5179.9881	Pass	5179.9865	Pass	5179.9869	Pass
	102	5179.9874	Pass	5179.9874	Pass	5179.9868	Pass	5179.9864	Pass

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.19	0.5	PASS
157	5785	15.17	0.5	PASS
165	5825	15.19	0.5	PASS

802.11ac (20MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.95	0.5	PASS
157	5785	15.19	0.5	PASS
165	5825	15.19	0.5	PASS

802.11ac (40MHz)

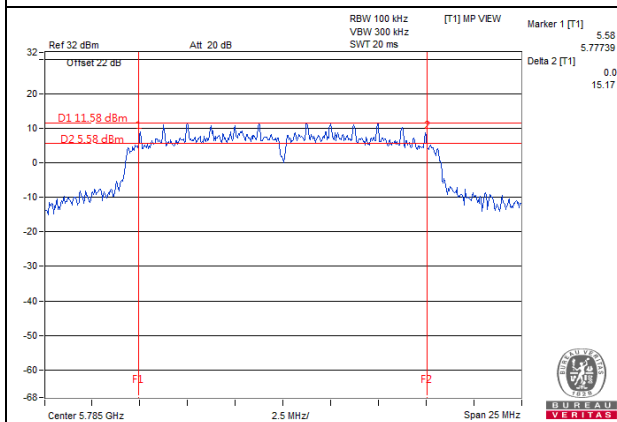
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	35.17	0.5	PASS
159	5795	35.13	0.5	PASS

802.11ac (80MHz)

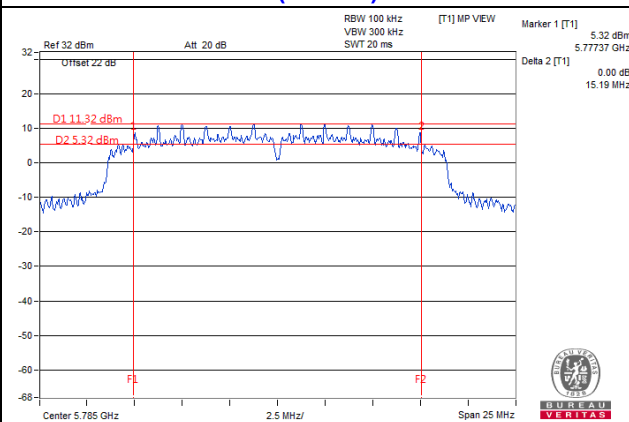
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
155	5775	72.71	0.5	PASS

Spectrum Plot of Worst Value

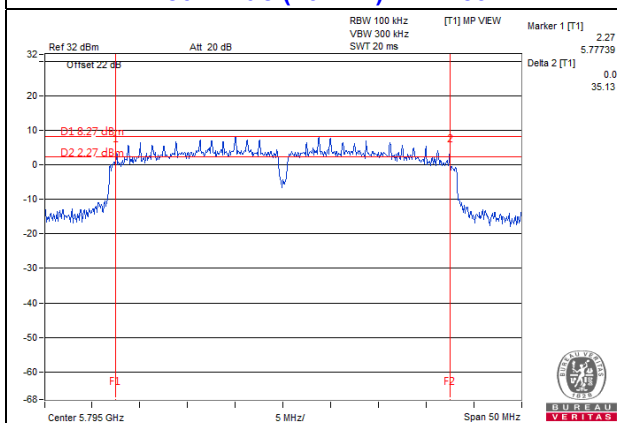
802.11a / CH157



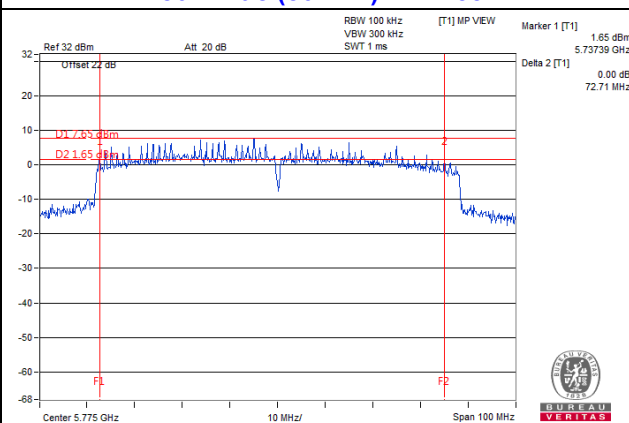
802.11ac (20MHz) / CH157



802.11ac (40MHz) / CH159



802.11ac (80MHz) / CH155



5 Pictures of Test Arrangements

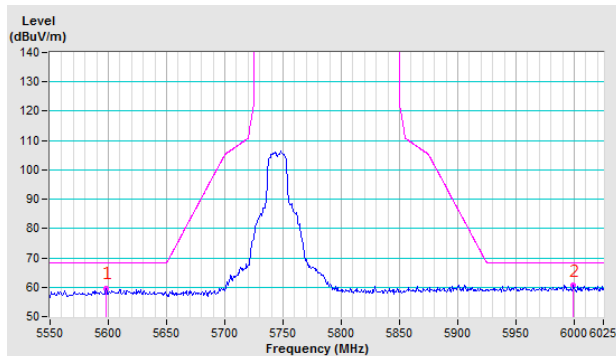
Please refer to the attached file (Test Setup Photo).

Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

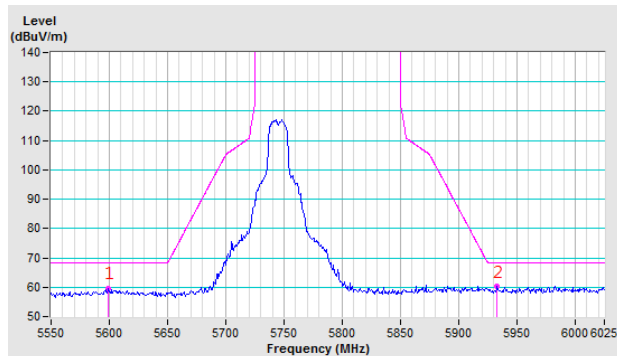
802.11a

CH 149 5745 MHz

Horizontal

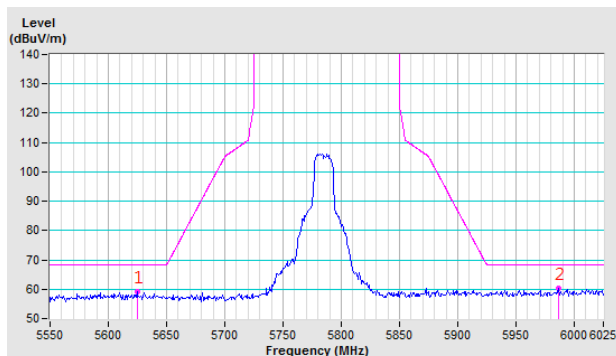


Vertical

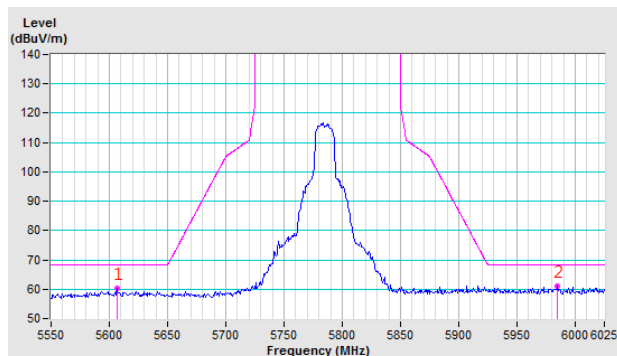


CH 157 5785 MHz

Horizontal

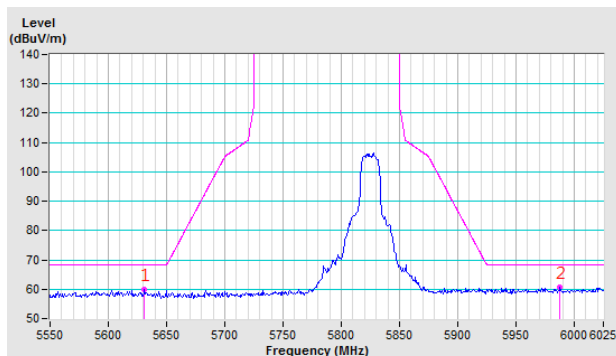


Vertical

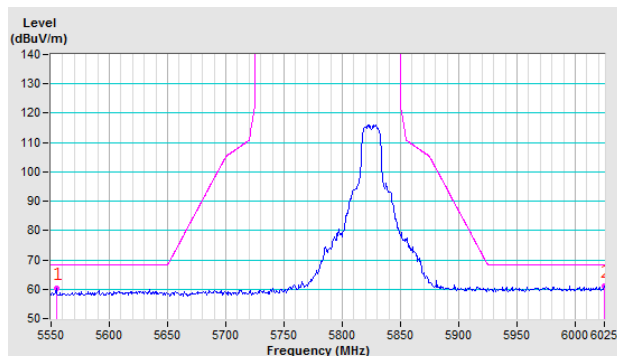


CH 165 5825 MHz

Horizontal



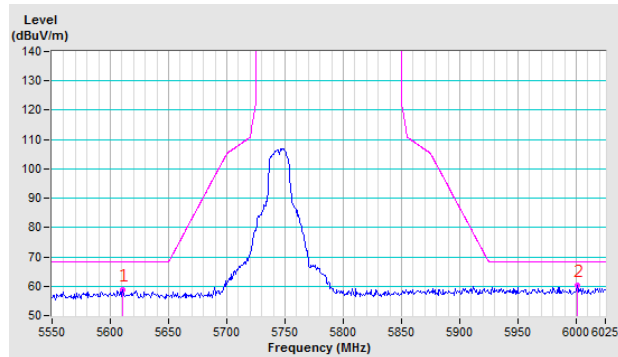
Vertical



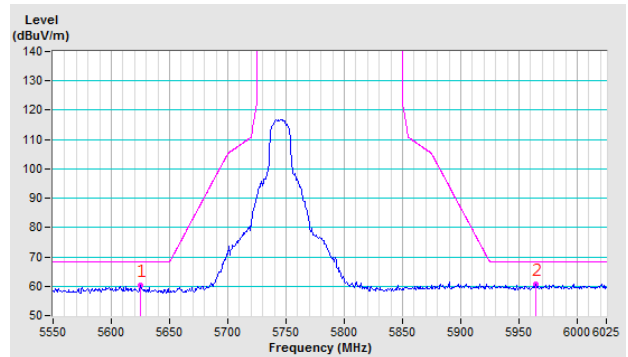
802.11ac (20MHz)

CH 149 5745 MHz

Horizontal

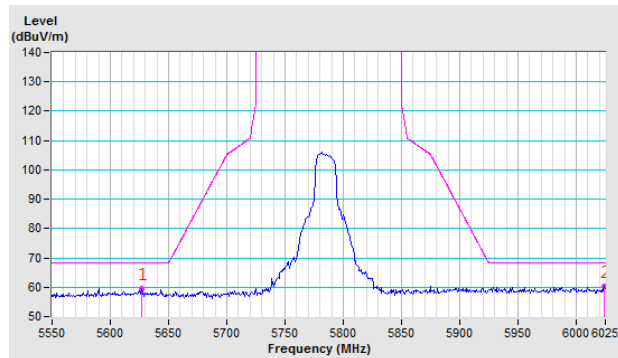


Vertical

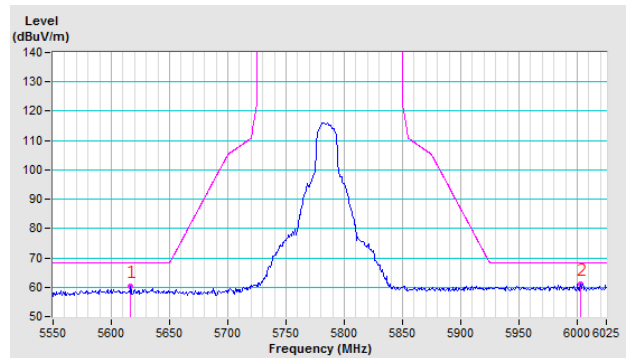


CH 157 5785 MHz

Horizontal

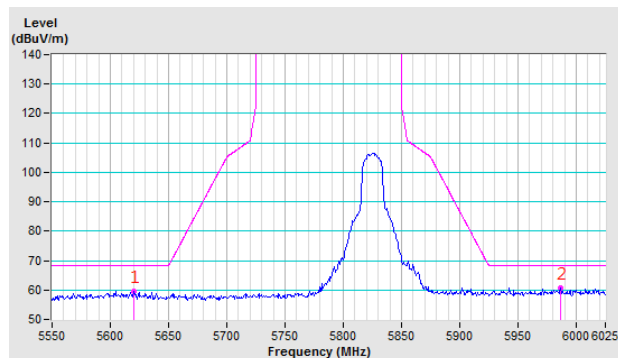


Vertical

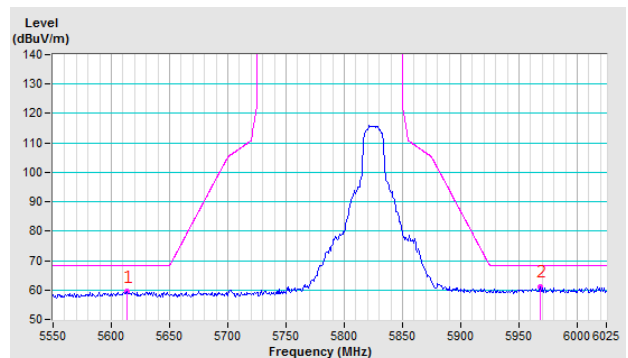


CH 165 5825 MHz

Horizontal



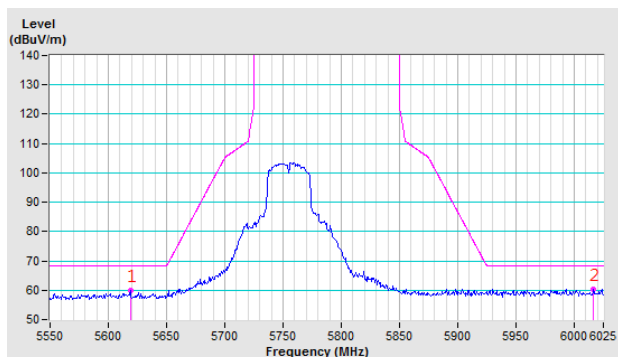
Vertical



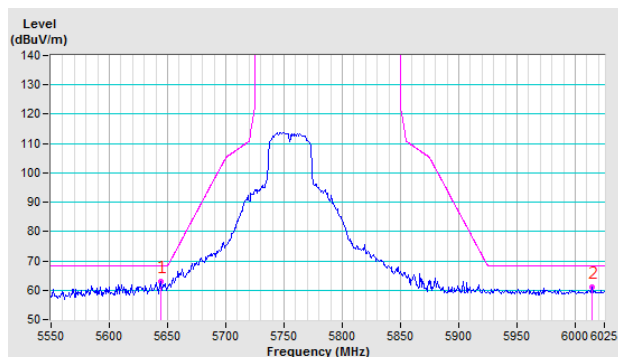
802.11ac (40MHz)

CH 151 5755 MHz

Horizontal

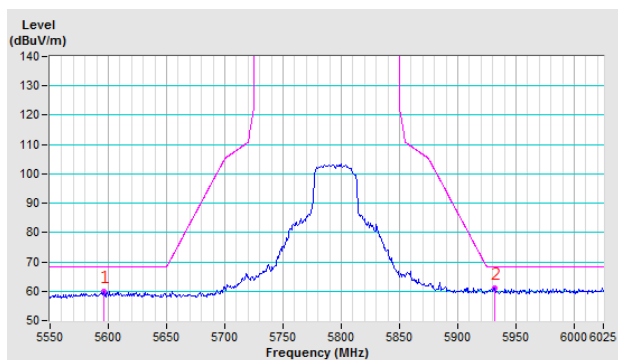


Vertical

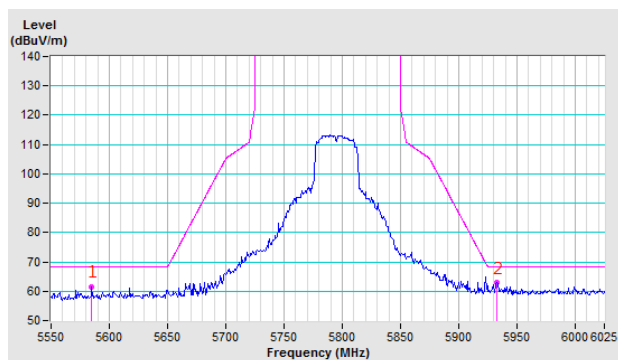


CH 159 5795 MHz

Horizontal



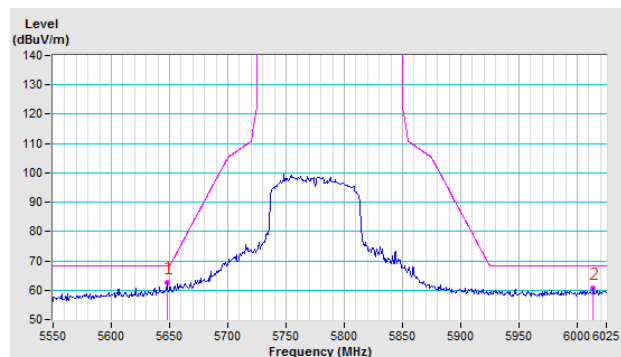
Vertical



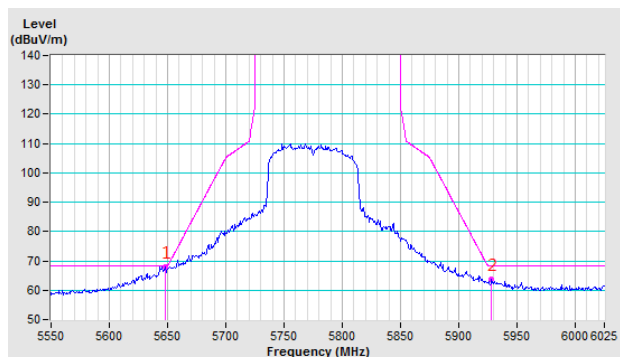
802.11ac (80MHz)

CH 155 5775 MHz

Horizontal



Vertical



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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