

FCC Test Report

Report No.: RF200309D01

FCC ID: 2AATB-WAP-7531

Test Model: WAP-7531

Received Date: Mar. 9, 2020

Test Date: Mar. 17 to 20, 2020

Issued Date: Mar. 24, 2020

Applicant: Tatung Technology Inc.

Address: 10F, No.288, Sec.6, Civic Blvd, Xinyi District, Taipei City 110, Taiwan

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

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

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Release Control Record

Issue No.	Description	Date Issued
RF200309D01	Original release.	Mar. 24, 2020

1 Certificate of Conformity

Product: Wi-Fi Dual Band Video Bridge

Brand: TTI

Test Model: WAP-7531

Sample Status: Engineering sample

Applicant: Tatung Technology Inc.

Test Date: Mar. 17 to 20, 2020

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 : Celia Chen , **Date:** Mar. 24, 2020
Celia Chen / Supervisor

Approved by : Rex Lai , **Date:** Mar. 24, 2020
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 -11.63dB at 0.26719MHz.
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 -1.06dB 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 IPEX not a standard connector.

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.
3. For U-NII-1 band compliance with rule 15.407(b) of band-edge items, the test plots were recorded in Annex B. Test Procedures refer to report 4.1.3.

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	3.00 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.61 dB
	30MHz ~ 1GHz	5.43 dB
Radiated Emissions above 1 GHz	Above 1GHz	5.14 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wi-Fi Dual Band Video Bridge
Brand	TTI
Test Model	WAP-7531
Status of EUT	Engineering sample
Power Supply Rating	DC 12V from Adapter
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54Mbps 802.11n: up to 800Mbps 802.11ac: up to 1733Mbps
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: 120.942mW 5745 ~ 5825MHz: 113.952mW
Antenna Type	Refer to note as below
Antenna Connector	Refer to note as below
Accessory Device	Adapter
Data Cable Supplied	N/A

Note:

1. The EUT provides 4 completed transmitters and 4 receivers.

Modulation Mode	TX FUNCTION
802.11a	4TX
802.11n (20MHz)	4TX
802.11n (40MHz)	4TX
802.11ac (20MHz)	4TX
802.11ac (40MHz)	4TX
802.11ac (80MHz)	4TX

* 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. The following antennas were applied to the EUT:

Antenna No.	Antenna Type	Brand	Model	Gain (dBi)	Antenna Connector
5G1	PIFA	Ethertronics	5003326	4.7	IPEX
5G2	PIFA	Ethertronics	5003329	4.5	IPEX
5G3	PIFA	Ethertronics	5003332	4.9*	IPEX
5G4	PIFA	Ethertronics	5003335	4.2	IPEX

*The 4.9dBi gain is chosen for final tests since it has the maximum gain among.

3. The EUT uses following adapter.

	Adapter 1	Adapter 2
Brand:	APD	MOSO
Model:	WB-18D12FU	MSA-C1500IC12.0-18P-US
Input:	100-240Vac, 50-60Hz, 0.5A Max.	100-240Vac, 50-60Hz, 0.7A max.
Output:	12Vdc, 1.5A	12.0Vdc, 1.5A
Power Cord:	AC 2-Pin Non-shielded DC cable (1.8m)	AC 2-Pin Non-shielded DC cable (1.5m)

After pre-tested above two adapters, the Adapter 1 was the worst case, therefore, only its test data was recorded in this report.

4. The EUT was contain FCC ID: TX2RTL8192EEBT of 2.4GHz module.

5. 2.4GHz and 5GHz modes cannot transmit simultaneously.

6. The above EUT information is declared by manufacturer and for more detailed features description, please refer 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≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	EUT with adapter 1

Where **RE≥1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

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
-	802.11ac (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11ac (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
-	802.11ac (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11ac (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	157	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	157	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
-	802.11ac (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11ac (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
-	802.11ac (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11ac (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 $\geq$ 1G	23deg. C, 67%RH	120Vac, 60Hz	Ian Chang
RE<1G	23deg. C, 67%RH	120Vac, 60Hz	Ian Chang
PLC	20deg. C, 80%RH	120Vac, 60Hz	Dalen Dai
APCM	25deg. C, 76%RH	120Vac, 60Hz	Saxon Lee

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is > 98%, duty factor is not required.

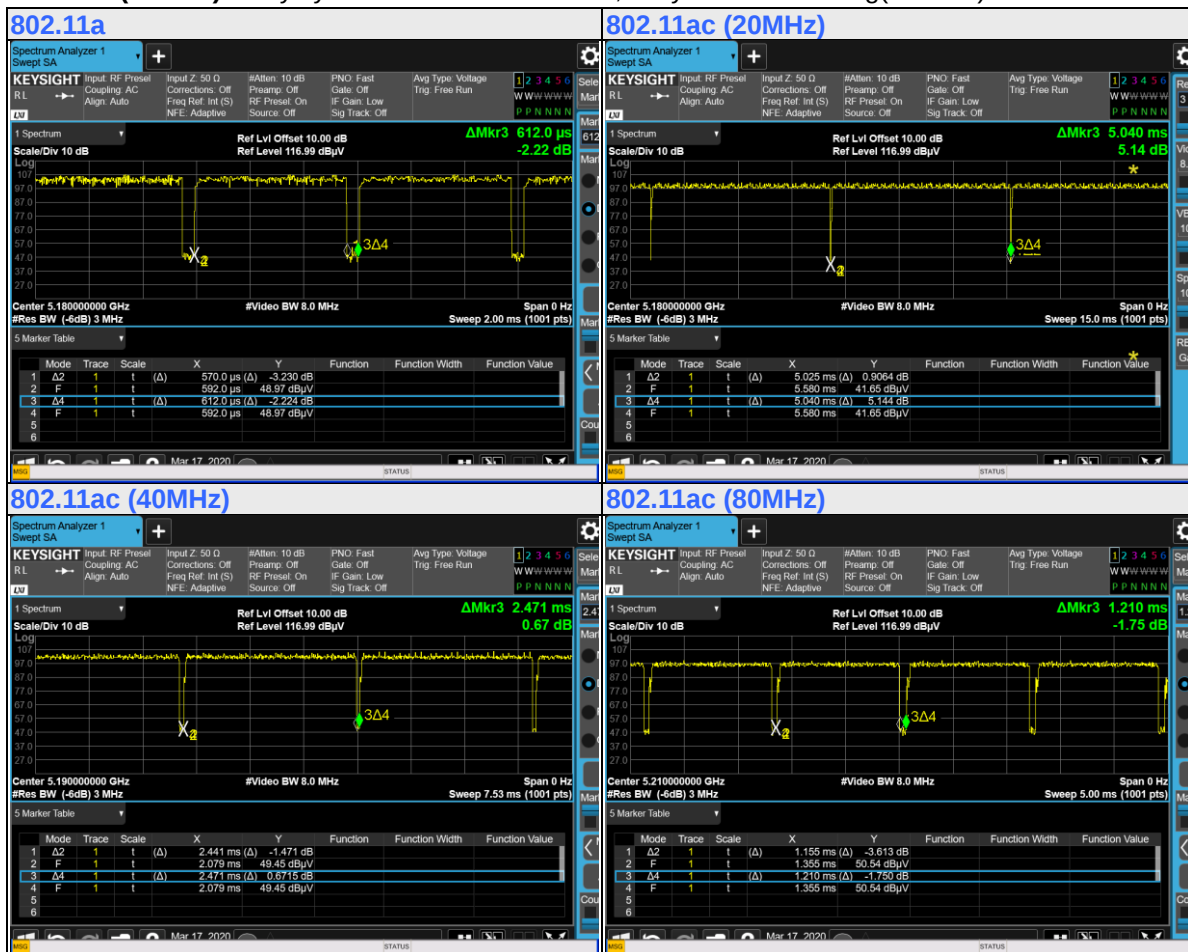
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = $0.57/0.612 = 0.931$, Duty factor = $10 * \log(1/0.931) = 0.31$

802.11ac (20MHz): Duty cycle = $5.025/5.04 = 0.997$.

802.11ac (40MHz): Duty cycle = $2.441/2.471 = 0.988$.

802.11ac (80MHz): Duty cycle = $1.155/1.21 = 0.955$, Duty factor = $10 * \log(1/0.955) = 0.20$



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	SONY	SVS151A12P	275548477000760	N/A	Provided by Lab
B.	LAN load	N/A	N/A	N/A	N/A	Provided by Lab

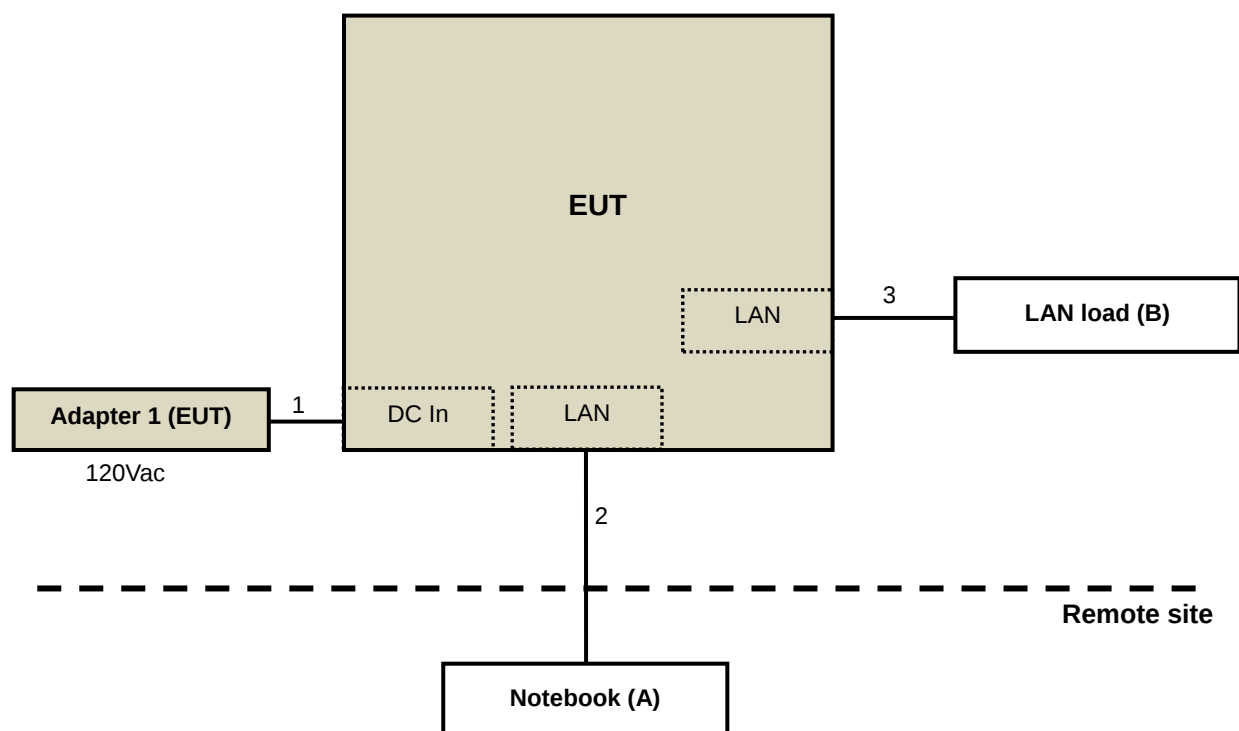
Note:

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	1.8	N	0	Supplied by client
2.	LAN cable	1	10	N	0	Provided by Lab (RJ45, Cat.5e)
3.	LAN cable	1	1.5	N	0	Provided by Lab (RJ45, Cat.5e)

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 and References

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

Test standard:

FCC Part 15, Subpart E (15.407)

ANSI C63.10-2013

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

References Test Guidance:

KDB 789033 D02 General UNII Test Procedure New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

All test items have been performed as a reference to the above KDB test guidance.

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:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 19, 2020	Feb. 18, 2021
HP Preamplifier	8449B	3008A01201	Feb. 20, 2020	Feb. 19, 2021
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 19, 2020	Feb. 18, 2021
Agilent TEST RECEIVER	N9038A	MY51210137	Jun. 6, 2019	Jun. 5, 2020
Schwarzbeck Antenna	VULB 9168	139	Nov. 7, 2019	Nov. 6, 2020
Schwarzbeck Antenna	VHBA 9123	480	Jun. 3, 2019	Jun. 2, 2021
Schwarzbeck Horn Antenna	BBHA-9170	212	Nov. 24, 2019	Nov. 23, 2020
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Nov. 24, 2019	Nov. 23, 2020
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	Jul. 10, 2019	Jul. 9, 2020
SUHNER RF cable With 3/4dB PAD	SF102	Cable-CH8-3.6m	Jul. 10, 2019	Jul. 9, 2020
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	Jun. 11, 2019	Jun. 10, 2020
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 30, 2019	Jul. 29, 2020
Loop Antenna EMCI	LPA600	270	Aug. 23, 2019	Aug. 22, 2021
EMCO Horn Antenna	3115	00028257	Nov. 24, 2019	Nov. 23, 2020
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 23, 2019	Sep. 22, 2020
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. 11, 2019	Sep. 10, 2020
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:

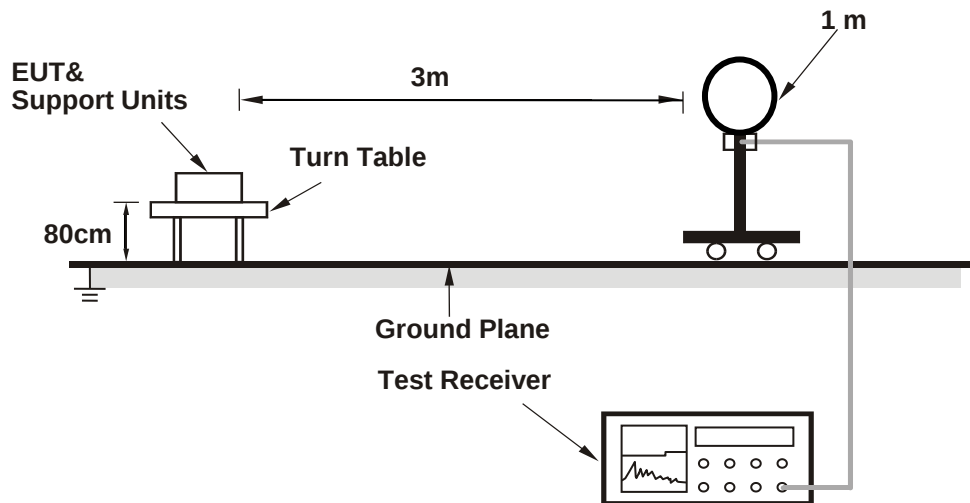
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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.
(5G traffic radio: 802.11a: RBW = 1MHz, VBW = 1.8kHz; 802.11ac (80MHz): RBW = 1MHz, VBW = 1kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

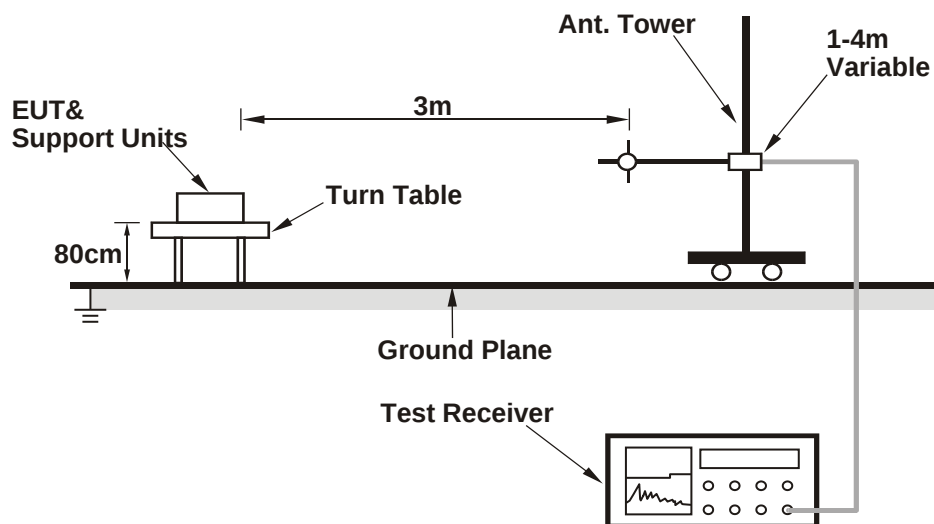
No deviation.

4.1.5 Test Setup

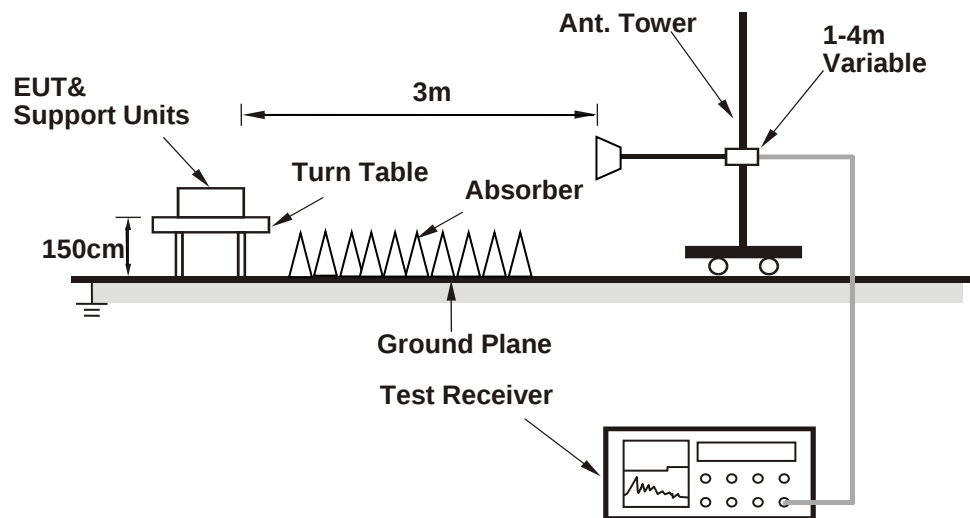
For Radiated emission below 30MHz



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 the Notebook Computer which is placed on remote site.
- Set the EUT under transmission condition continuously at specific channel frequency continuously.

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	62.11 PK	74.00	-11.89	1.92 H	308	52.57	9.54
2	5150.00	50.14 AV	54.00	-3.86	1.92 H	308	40.60	9.54
3	*5180.00	113.27 PK			1.92 H	308	103.67	9.60
4	*5180.00	104.24 AV			1.92 H	308	94.64	9.60
5	#10360.00	60.59 PK	68.20	-7.61	1.78 H	189	44.52	16.07
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	5150.00	62.65 PK	74.00	-11.35	1.33 V	217	53.11	9.54
2	5150.00	50.87 AV	54.00	-3.13	1.33 V	217	41.33	9.54
3	*5180.00	114.95 PK			1.33 V	217	105.35	9.60
4	*5180.00	106.39 AV			1.33 V	217	96.79	9.60
5	#10360.00	61.41 PK	68.20	-6.79	2.14 V	206	45.34	16.07

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 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	112.47 PK			1.99 H	310	102.84	9.63
2	*5200.00	103.26 AV			1.99 H	310	93.63	9.63
3	#10400.00	60.39 PK	68.20	-7.81	1.69 H	188	44.31	16.08
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	113.94 PK			1.39 V	223	104.31	9.63
2	*5200.00	105.61 AV			1.39 V	223	95.98	9.63
3	#10400.00	61.51 PK	68.20	-6.69	2.31 V	202	45.43	16.08

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	112.01 PK			1.98 H	313	102.18	9.83
2	*5240.00	103.09 AV			1.98 H	313	93.26	9.83
3	5350.00	60.48 PK	74.00	-13.52	1.98 H	313	50.23	10.25
4	5350.00	50.14 AV	54.00	-3.86	1.98 H	313	39.89	10.25
5	#10480.00	60.35 PK	68.20	-7.85	1.58 H	228	44.13	16.22
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	113.85 PK			1.39 V	223	104.02	9.83
2	*5240.00	105.31 AV			1.39 V	223	95.48	9.83
3	5350.00	61.35 PK	74.00	-12.65	1.39 V	223	51.10	10.25
4	5350.00	50.71 AV	54.00	-3.29	1.39 V	223	40.46	10.25
5	#10480.00	61.34 PK	68.20	-6.86	1.63 V	230	45.12	16.22

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	#5645.70	61.12 PK	68.20	-7.08	1.87 H	298	50.56	10.56
2	*5745.00	114.67 PK			1.87 H	298	104.56	10.11
3	*5745.00	106.00 AV			1.87 H	298	95.89	10.11
4	#5950.69	62.67 PK	68.20	-5.53	1.87 H	298	52.36	10.31
5	11490.00	60.68 PK	74.00	-13.32	1.93 H	29	42.51	18.17
6	11490.00	48.33 AV	54.00	-5.67	1.93 H	29	30.16	18.17
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	61.98 PK	68.20	-6.22	1.76 V	76	51.42	10.56
2	*5745.00	116.32 PK			1.76 V	76	106.21	10.11
3	*5745.00	108.00 AV			1.76 V	76	97.89	10.11
4	#5939.71	62.00 PK	68.20	-6.20	1.76 V	76	51.70	10.30
5	11490.00	61.82 PK	74.00	-12.18	1.58 V	241	43.65	18.17
6	11490.00	49.81 AV	54.00	-4.19	1.58 V	241	31.64	18.17

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	#5635.54	62.10 PK	68.20	-6.10	1.91 H	299	51.51	10.59
2	*5785.00	114.17 PK			1.91 H	299	104.21	9.96
3	*5785.00	105.51 AV			1.91 H	299	95.55	9.96
4	#5938.75	61.51 PK	68.20	-6.69	1.91 H	299	51.21	10.30
5	11570.00	60.72 PK	74.00	-13.28	1.62 H	36	42.52	18.20
6	11570.00	48.25 AV	54.00	-5.75	1.62 H	36	30.05	18.20
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	#5631.84	61.38 PK	68.20	-6.82	1.78 V	82	50.78	10.60
2	*5785.00	116.39 PK			1.78 V	82	106.43	9.96
3	*5785.00	107.92 AV			1.78 V	82	97.96	9.96
4	#5949.46	62.27 PK	68.20	-5.93	1.78 V	82	51.95	10.32
5	11570.00	61.36 PK	74.00	-12.64	1.48 V	274	43.16	18.20
6	11570.00	49.36 AV	54.00	-4.64	1.48 V	274	31.16	18.20

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	#5636.89	61.94 PK	68.20	-6.26	1.91 H	288	51.35	10.59
2	*5825.00	115.26 PK			1.91 H	288	105.26	10.00
3	*5825.00	106.66 AV			1.91 H	288	96.66	10.00
4	#5943.29	62.14 PK	68.20	-6.06	1.91 H	288	51.83	10.31
5	11650.00	60.57 PK	74.00	-13.43	1.42 H	210	42.52	18.05
6	11650.00	48.48 AV	54.00	-5.52	1.42 H	210	30.43	18.05
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	#5638.54	61.87 PK	68.20	-6.33	1.65 V	72	51.29	10.58
2	*5825.00	116.38 PK			1.65 V	72	106.38	10.00
3	*5825.00	107.68 AV			1.65 V	72	97.68	10.00
4	#5944.40	61.43 PK	68.20	-6.77	1.65 V	72	51.12	10.31
5	11650.00	61.21 PK	74.00	-12.79	1.82 V	25	43.16	18.05
6	11650.00	49.21 AV	54.00	-4.79	1.82 V	25	31.16	18.05

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	61.38 PK	74.00	-12.62	1.84 H	296	51.84	9.54
2	5150.00	49.48 AV	54.00	-4.52	1.84 H	296	39.94	9.54
3	*5180.00	112.23 PK			1.84 H	296	102.63	9.60
4	*5180.00	103.13 AV			1.84 H	296	93.53	9.60
5	#10360.00	59.33 PK	68.20	-8.87	1.69 H	326	43.26	16.07

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	5150.00	62.50 PK	74.00	-11.50	1.81 V	89	52.96	9.54
2	5150.00	50.20 AV	54.00	-3.80	1.81 V	89	40.66	9.54
3	*5180.00	114.26 PK			1.81 V	89	104.66	9.60
4	*5180.00	105.20 AV			1.81 V	89	95.60	9.60
5	#10360.00	60.30 PK	68.20	-7.90	1.58 V	234	44.23	16.07

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 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	110.71 PK			1.87 H	267	101.08	9.63
2	*5200.00	101.86 AV			1.87 H	267	92.23	9.63
3	#10400.00	59.31 PK	68.20	-8.89	1.99 H	64	43.23	16.08
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	113.16 PK			1.80 V	96	103.53	9.63
2	*5200.00	103.89 AV			1.80 V	96	94.26	9.63
3	#10400.00	60.23 PK	68.20	-7.97	1.52 V	258	44.15	16.08

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	111.81 PK			1.82 H	278	101.98	9.83
2	*5240.00	102.86 AV			1.82 H	278	93.03	9.83
3	5350.00	61.27 PK	74.00	-12.73	1.82 H	278	51.02	10.25
4	5350.00	48.38 AV	54.00	-5.62	1.82 H	278	38.13	10.25
5	#10480.00	59.45 PK	68.20	-8.75	1.52 H	203	43.23	16.22
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	113.56 PK			1.86 V	88	103.73	9.83
2	*5240.00	104.72 AV			1.86 V	88	94.89	9.83
3	5350.00	61.79 PK	74.00	-12.21	1.86 V	88	51.54	10.25
4	5350.00	49.12 AV	54.00	-4.88	1.86 V	88	38.87	10.25
5	#10480.00	60.30 PK	68.20	-7.90	1.82 V	114	44.08	16.22

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	#5647.28	62.03 PK	68.20	-6.17	1.96 H	303	51.48	10.55
2	*5745.00	112.26 PK			1.96 H	303	102.15	10.11
3	*5745.00	101.53 AV			1.96 H	303	91.42	10.11
4	#5947.78	62.49 PK	68.20	-5.71	1.96 H	303	52.17	10.32
5	11490.00	60.22 PK	74.00	-13.78	2.31 H	236	42.05	18.17
6	11490.00	48.26 AV	54.00	-5.74	2.31 H	236	30.09	18.17
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	#5627.44	62.12 PK	68.20	-6.08	1.75 V	98	51.51	10.61
2	*5745.00	115.03 PK			1.75 V	98	104.92	10.11
3	*5745.00	103.33 AV			1.75 V	98	93.22	10.11
4	#5952.80	63.03 PK	68.20	-5.17	1.75 V	98	52.72	10.31
5	11490.00	61.19 PK	74.00	-12.81	1.63 V	239	43.02	18.17
6	11490.00	49.29 AV	54.00	-4.71	1.63 V	239	31.12	18.17

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	#5636.64	61.43 PK	68.20	-6.77	1.87 H	298	50.84	10.59
2	*5785.00	111.77 PK			1.87 H	298	101.81	9.96
3	*5785.00	100.82 AV			1.87 H	298	90.86	9.96
4	#5948.23	62.94 PK	68.20	-5.26	1.87 H	298	52.62	10.32
5	11570.00	60.31 PK	74.00	-13.69	1.64 H	231	42.11	18.20
6	11570.00	48.22 AV	54.00	-5.78	1.64 H	231	30.02	18.20
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	#5637.27	62.23 PK	68.20	-5.97	1.78 V	84	51.64	10.59
2	*5785.00	114.19 PK			1.78 V	84	104.23	9.96
3	*5785.00	103.07 AV			1.78 V	84	93.11	9.96
4	#5936.08	63.48 PK	68.20	-4.72	1.78 V	84	53.19	10.29
5	11570.00	61.16 PK	74.00	-12.84	1.82 V	264	42.96	18.20
6	11570.00	49.07 AV	54.00	-4.93	1.82 V	264	30.87	18.20

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	#5623.59	62.71 PK	68.20	-5.49	1.96 H	295	52.08	10.63
2	*5825.00	111.66 PK			1.96 H	295	101.66	10.00
3	*5825.00	100.84 AV			1.96 H	295	90.84	10.00
4	#5933.68	62.69 PK	68.20	-5.51	1.96 H	295	52.41	10.28
5	11650.00	60.16 PK	74.00	-13.84	1.86 H	332	42.11	18.05
6	11650.00	48.18 AV	54.00	-5.82	1.86 H	332	30.13	18.05
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	#5627.27	62.19 PK	68.20	-6.01	1.66 V	107	51.58	10.61
2	*5825.00	114.25 PK			1.66 V	107	104.25	10.00
3	*5825.00	103.20 AV			1.66 V	107	93.20	10.00
4	#5946.38	62.58 PK	68.20	-5.62	1.66 V	107	52.27	10.31
5	11650.00	60.89 PK	74.00	-13.11	1.85 V	241	42.84	18.05
6	11650.00	48.79 AV	54.00	-5.21	1.85 V	241	30.74	18.05

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	63.00 PK	74.00	-11.00	1.88 H	297	53.46	9.54
2	5150.00	50.32 AV	54.00	-3.68	1.88 H	297	40.78	9.54
3	*5190.00	109.50 PK			1.88 H	297	99.89	9.61
4	*5190.00	100.38 AV			1.88 H	297	90.77	9.61
5	#10380.00	59.33 PK	68.20	-8.87	1.28 H	264	43.26	16.07

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	5150.00	63.57 PK	74.00	-10.43	1.81 V	90	54.03	9.54
2	5150.00	51.11 AV	54.00	-2.89	1.81 V	90	41.57	9.54
3	*5190.00	111.05 PK			1.81 V	90	101.44	9.61
4	*5190.00	102.12 AV			1.81 V	90	92.51	9.61
5	#10380.00	60.23 PK	68.20	-7.97	1.85 V	239	44.16	16.07

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 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	108.57 PK			1.89 H	286	98.79	9.78
2	*5230.00	99.47 AV			1.89 H	286	89.69	9.78
3	5350.00	61.03 PK	74.00	-12.97	1.89 H	286	50.78	10.25
4	5350.00	48.21 AV	54.00	-5.79	1.89 H	286	37.96	10.25
5	#10460.00	59.79 PK	68.20	-8.41	1.52 H	201	43.61	16.18
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	*5230.00	110.47 PK			1.64 V	86	100.69	9.78
2	*5230.00	101.24 AV			1.64 V	86	91.46	9.78
3	5350.00	61.54 PK	74.00	-12.46	1.64 V	86	51.29	10.25
4	5350.00	49.08 AV	54.00	-4.92	1.64 V	86	38.83	10.25
5	#10460.00	60.36 PK	68.20	-7.84	1.96 V	230	44.18	16.18

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. 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	#5632.96	62.10 PK	68.20	-6.10	1.98 H	305	51.50	10.60
2	*5755.00	111.60 PK			1.98 H	305	101.54	10.06
3	*5755.00	100.72 AV			1.98 H	305	90.66	10.06
4	#5936.08	62.29 PK	68.20	-5.91	1.98 H	305	52.00	10.29
5	11510.00	59.29 PK	74.00	-14.71	2.02 H	254	41.13	18.16
6	11510.00	47.85 AV	54.00	-6.15	2.02 H	254	29.69	18.16
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	#5632.97	62.18 PK	68.20	-6.02	1.73 V	107	51.58	10.60
2	*5755.00	113.75 PK			1.73 V	107	103.69	10.06
3	*5755.00	102.71 AV			1.73 V	107	92.65	10.06
4	#5967.50	63.65 PK	68.20	-4.55	1.73 V	107	53.30	10.35
5	11510.00	60.81 PK	74.00	-13.19	1.52 V	142	42.65	18.16
6	11510.00	48.79 AV	54.00	-5.21	1.52 V	142	30.63	18.16

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	#5625.83	62.78 PK	68.20	-5.42	1.99 H	294	52.16	10.62
2	*5795.00	111.01 PK			1.99 H	294	101.08	9.93
3	*5795.00	100.15 AV			1.99 H	294	90.22	9.93
4	#5935.97	62.46 PK	68.20	-5.74	1.99 H	294	52.17	10.29
5	11590.00	59.34 PK	74.00	-14.66	1.97 H	54	41.13	18.21
6	11590.00	47.85 AV	54.00	-6.15	1.97 H	54	29.64	18.21
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	#5623.10	63.14 PK	68.20	-5.06	1.74 V	97	52.51	10.63
2	*5795.00	113.80 PK			1.74 V	97	103.87	9.93
3	*5795.00	102.59 AV			1.74 V	97	92.66	9.93
4	#5951.62	63.01 PK	68.20	-5.19	1.74 V	97	52.70	10.31
5	11590.00	60.72 PK	74.00	-13.28	2.36 V	210	42.51	18.21
6	11590.00	48.52 AV	54.00	-5.48	2.36 V	210	30.31	18.21

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	64.97 PK	74.00	-9.03	1.82 H	279	55.43	9.54
2	5150.00	50.83 AV	54.00	-3.17	1.82 H	279	41.29	9.54
3	*5210.00	106.56 PK			1.82 H	279	96.89	9.67
4	*5210.00	97.51 AV			1.82 H	279	87.84	9.67
5	5350.00	60.71 PK	74.00	-13.29	1.82 H	279	50.46	10.25
6	5350.00	46.69 AV	54.00	-7.31	1.82 H	279	36.44	10.25
7	#10420.00	59.29 PK	68.20	-8.91	1.33 H	258	43.18	16.11
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	66.95 PK	74.00	-7.05	1.64 V	88	57.41	9.54
2	5150.00	52.94 AV	54.00	-1.06	1.64 V	88	43.40	9.54
3	*5210.00	108.33 PK			1.64 V	88	98.66	9.67
4	*5210.00	99.12 AV			1.64 V	88	89.45	9.67
5	5350.00	62.15 PK	74.00	-11.85	1.64 V	88	51.90	10.25
6	5350.00	48.24 AV	54.00	-5.76	1.64 V	88	37.99	10.25
7	#10420.00	60.19 PK	68.20	-8.01	1.74 V	162	44.08	16.11

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	#5622.90	62.21 PK	68.20	-5.99	1.96 H	300	51.58	10.63
2	*5775.00	108.77 PK			1.96 H	300	98.76	10.01
3	*5775.00	99.67 AV			1.96 H	300	89.66	10.01
4	#5935.46	61.97 PK	68.20	-6.23	1.96 H	300	51.68	10.29
5	11550.00	59.34 PK	74.00	-14.66	1.87 H	45	41.16	18.18
6	11550.00	47.83 AV	54.00	-6.17	1.87 H	45	29.65	18.18
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	#5615.15	62.18 PK	68.20	-6.02	1.81 V	90	51.53	10.65
2	*5775.00	110.27 PK			1.81 V	90	100.26	10.01
3	*5775.00	101.14 AV			1.81 V	90	91.13	10.01
4	#5931.85	62.26 PK	68.20	-5.94	1.81 V	90	51.98	10.28
5	11550.00	60.61 PK	74.00	-13.39	1.42 V	163	42.43	18.18
6	11550.00	48.81 AV	54.00	-5.19	1.42 V	163	30.63	18.18

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. 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:

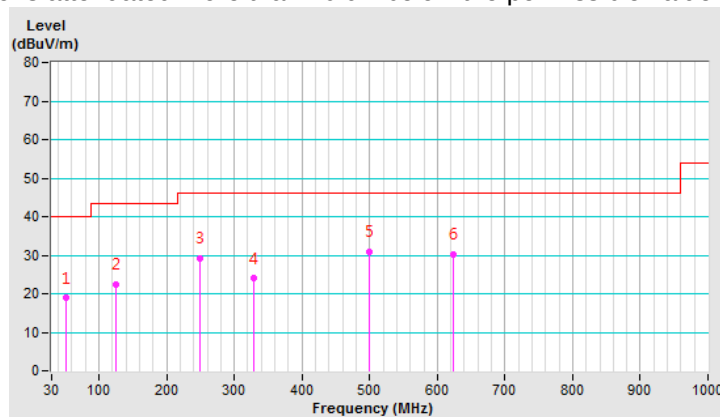
802.11a

CHANNEL	TX Channel 157	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	52.16	18.87 QP	40.00	-21.13	2.31 H	326	25.92	-7.05
2	125.01	22.35 QP	43.50	-21.15	1.64 H	248	30.92	-8.57
3	250.00	29.22 QP	46.00	-16.78	1.99 H	212	36.07	-6.85
4	328.03	23.90 QP	46.00	-22.10	2.20 H	207	27.88	-3.98
5	500.01	30.94 QP	46.00	-15.06	1.27 H	120	31.40	-0.46
6	623.74	30.22 QP	46.00	-15.78	1.82 H	117	27.53	2.69

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.

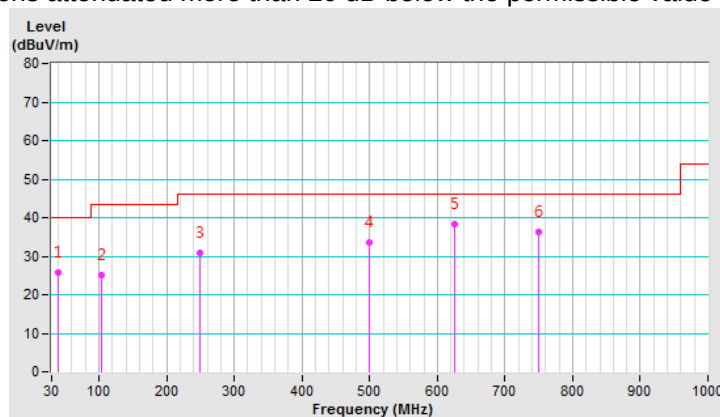


CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	40.28	25.77 QP	40.00	-14.23	1.34 V	208	33.32	-7.55
2	104.40	25.15 QP	43.50	-18.35	1.58 V	324	35.77	-10.62
3	250.00	30.98 QP	46.00	-15.02	1.61 V	41	37.83	-6.85
4	500.01	33.50 QP	46.00	-12.50	1.12 V	112	33.96	-0.46
5	625.00	38.29 QP	46.00	-7.71	1.08 V	123	35.56	2.73
6	749.98	36.38 QP	46.00	-9.62	1.48 V	126	31.59	4.79

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
ROHDE & SCHWARZ TEST RECEIVER	ESCS30	100276	Apr. 8, 2019	Apr. 7, 2020
SCHWARZBECK Artificial Mains Network (for EUT)	NSLK 8128	8128-244	Nov. 11, 2019	Nov. 10, 2020
LISN With Adapter (for EUT)	AD10	C05Ada-001	Nov. 11, 2019	Nov. 10, 2020
ROHDE & SCHWARZ Artificial Mains Network (for peripheral)	ESH3-Z5	100220	Nov. 18, 2019	Nov. 17, 2020
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C05.01	Jan. 30, 2020	Jan. 29, 2021
LYNICS Terminator (For R&S LISN)	0900510	E1-01-305	Feb. 17, 2020	Feb. 16, 2021

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 Shielded Room No. 5.

4.2.3 Test Procedure

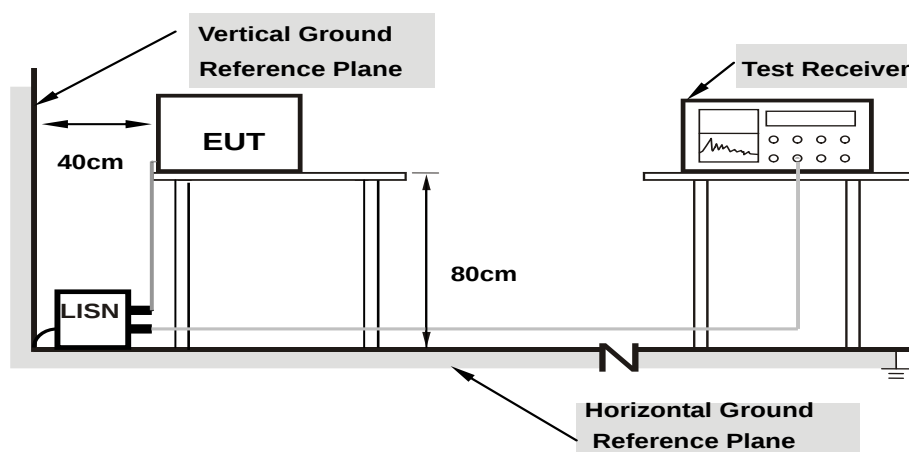
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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.

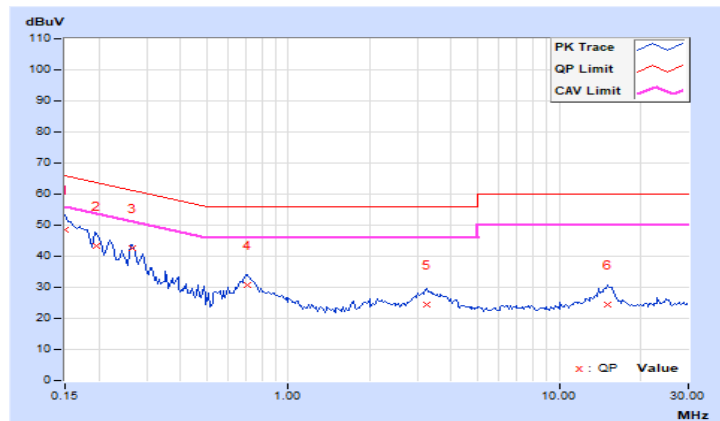
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	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	9.90	38.62	27.56	48.52	37.46	66.00	56.00	-17.48	-18.54
2	0.19679	9.90	33.54	24.92	43.44	34.82	63.74	53.74	-20.30	-18.92
3	0.26719	9.90	32.82	29.67	42.72	39.57	61.20	51.20	-18.48	-11.63
4	0.70859	9.94	20.84	15.09	30.78	25.03	56.00	46.00	-25.22	-20.97
5	3.23047	10.11	14.46	4.63	24.57	14.74	56.00	46.00	-31.43	-31.26
6	15.19531	10.83	13.55	7.99	24.38	18.82	60.00	50.00	-35.62	-31.18

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.

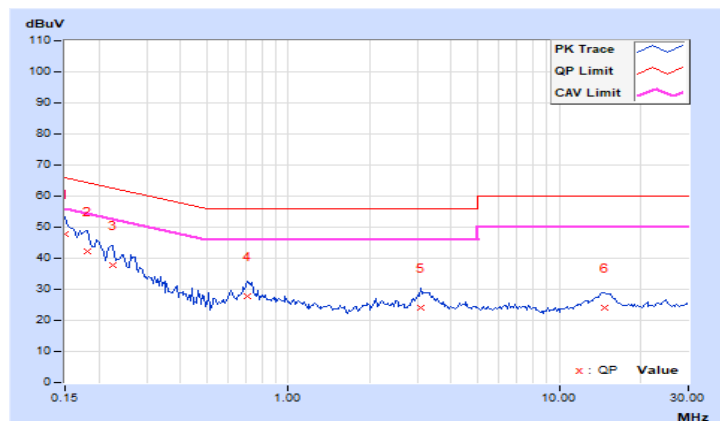


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

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	9.92	38.04	26.65	47.96	36.57	66.00	56.00	-18.04	-19.43
2	0.18125	9.92	32.13	17.41	42.05	27.33	64.43	54.43	-22.38	-27.10
3	0.22422	9.92	27.98	18.10	37.90	28.02	62.66	52.66	-24.76	-24.64
4	0.70859	9.97	17.90	12.16	27.87	22.13	56.00	46.00	-28.13	-23.87
5	3.10547	10.12	14.03	4.91	24.15	15.03	56.00	46.00	-31.85	-30.97
6	14.66016	10.85	13.17	7.61	24.02	18.46	60.00	50.00	-35.98	-31.54

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)
	√	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

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

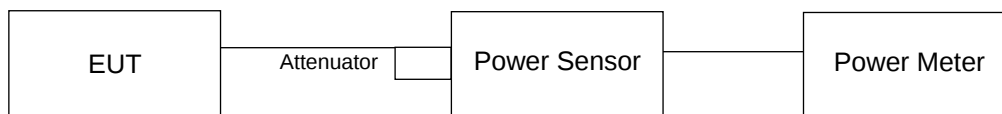
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

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

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.

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.	CHAN. FREQ. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	12.81	14.63	15.76	14.62	114.782	20.60	24	Pass
40	5200	12.72	14.63	15.89	14.63	115.602	20.63	24	Pass
48	5240	12.74	14.76	15.59	14.87	115.63	20.63	24	Pass
149	5745	13.56	14.85	14.39	14.53	109.106	20.38	30	Pass
157	5785	13.80	14.82	14.39	14.52	110.12	20.42	30	Pass
165	5825	13.72	14.49	14.33	14.41	106.377	20.27	30	Pass

802.11ac (20MHz)

CHAN.	CHAN. FREQ. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	13.28	13.10	17.09	12.69	111.444	20.47	24	Pass
40	5200	13.31	13.16	16.69	12.95	108.52	20.36	24	Pass
48	5240	12.68	14.25	15.87	14.62	112.752	20.52	24	Pass
149	5745	13.69	14.80	14.23	14.33	107.175	20.30	30	Pass
157	5785	13.81	14.66	14.21	14.32	106.689	20.28	30	Pass
165	5825	13.66	14.74	14.26	14.55	108.191	20.34	30	Pass

802.11ac (40MHz)

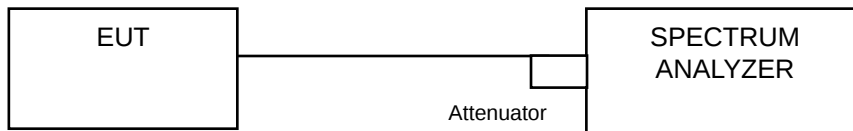
CHAN.	CHAN. FREQ. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	13.21	13.70	17.23	13.75	120.942	20.83	24	Pass
46	5230	12.50	13.37	16.27	14.58	110.582	20.44	24	Pass
151	5755	14.13	14.92	14.50	14.60	113.952	20.57	30	Pass
159	5795	13.76	14.98	14.40	14.47	110.777	20.44	30	Pass

802.11ac (80MHz)

CHAN.	CHAN. FREQ. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	12.89	13.77	16.85	13.61	114.655	20.59	24	Pass
155	5775	13.97	14.60	14.18	14.43	107.701	20.32	30	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)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	17.04	17.04	17.04	16.92
40	5200	17.04	16.92	17.04	17.04
48	5240	16.80	16.92	16.92	16.92
149	5745	16.87	16.90	16.90	16.90
157	5785	16.90	16.90	16.90	16.90
165	5825	16.90	16.90	16.90	16.90

802.11ac (20MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	18.24	18.24	18.24	18.24
40	5200	18.36	18.24	18.12	18.24
48	5240	18.24	18.24	18.24	18.24
149	5745	18.26	18.20	18.20	18.20
157	5785	18.20	18.20	18.20	18.30
165	5825	18.20	18.20	18.20	18.20

802.11ac (40MHz)

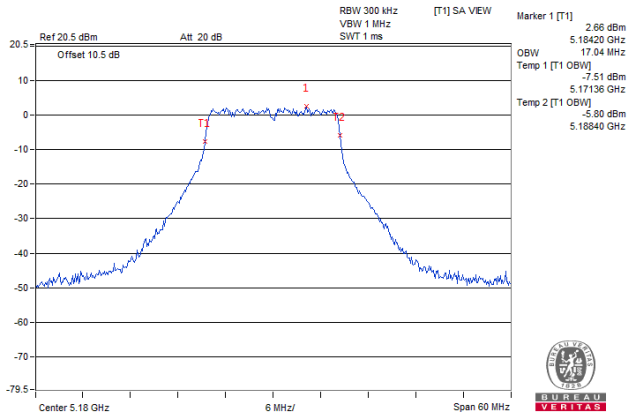
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	36.60	36.40	36.60	36.60
46	5230	36.60	36.60	36.60	36.60
151	5755	36.67	36.66	36.66	36.66
159	5795	36.66	36.66	36.66	36.66

802.11ac (80MHz)

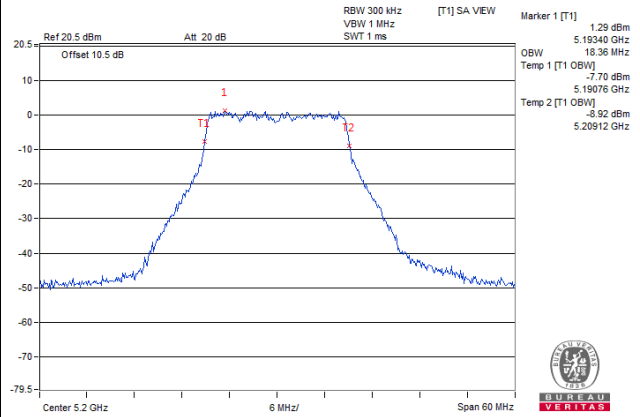
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.60	75.60	75.60	75.60
155	5775	75.48	75.60	75.32	75.60

Spectrum Plot of Worst Value

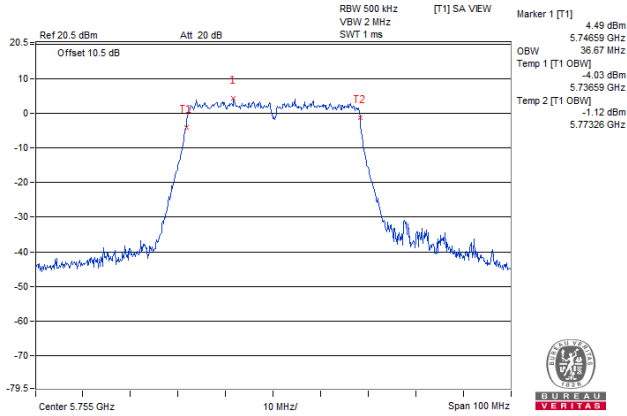
802.11a_Chain0 / CH36



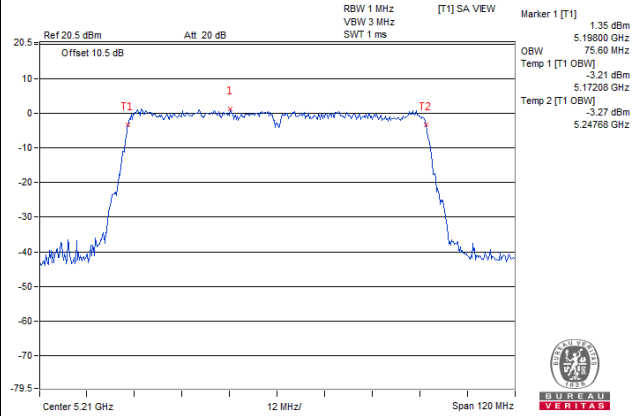
802.11ac (20MHz)_Chain0 / CH40



802.11ac (40MHz)_Chain0 / CH151



802.11ac (80MHz)_Chain0 / CH42

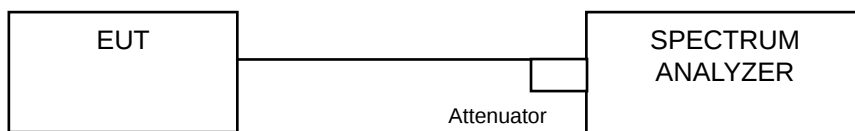


4.5 Peak Power Spectral Density Measurement

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-1

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 30 kHz, Set VBW $\geq$ 1 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

Using method SA-2

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 30 kHz, Set VBW $\geq$ 1 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/duty cycle)

For U-NII-3 band:

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 500 kHz, Set VBW $\geq$ 3 RBW, 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)

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

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	-2.04	-1.45	-1.41	-1.45	0.31	4.75	6.08	Pass
40	5200	-1.71	-1.76	-1.82	-1.78	0.31	4.56	6.08	Pass
48	5240	-1.59	-1.61	-1.58	-1.59	0.31	4.74	6.08	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $4.9\text{dBi} + 10\log(4) = 10.92\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11-(10.92-6) = 6.08\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (20MHz)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	-2.10	-2.07	-2.02	-2.00	3.97	6.08	Pass
40	5200	-2.27	-2.28	-2.34	-2.37	3.71	6.08	Pass
48	5240	-3.11	-3.09	-3.07	-3.01	2.95	6.08	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $4.9\text{dBi} + 10\log(4) = 10.92\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11-(10.92-6) = 6.08\text{dBm}$.

802.11ac (40MHz)

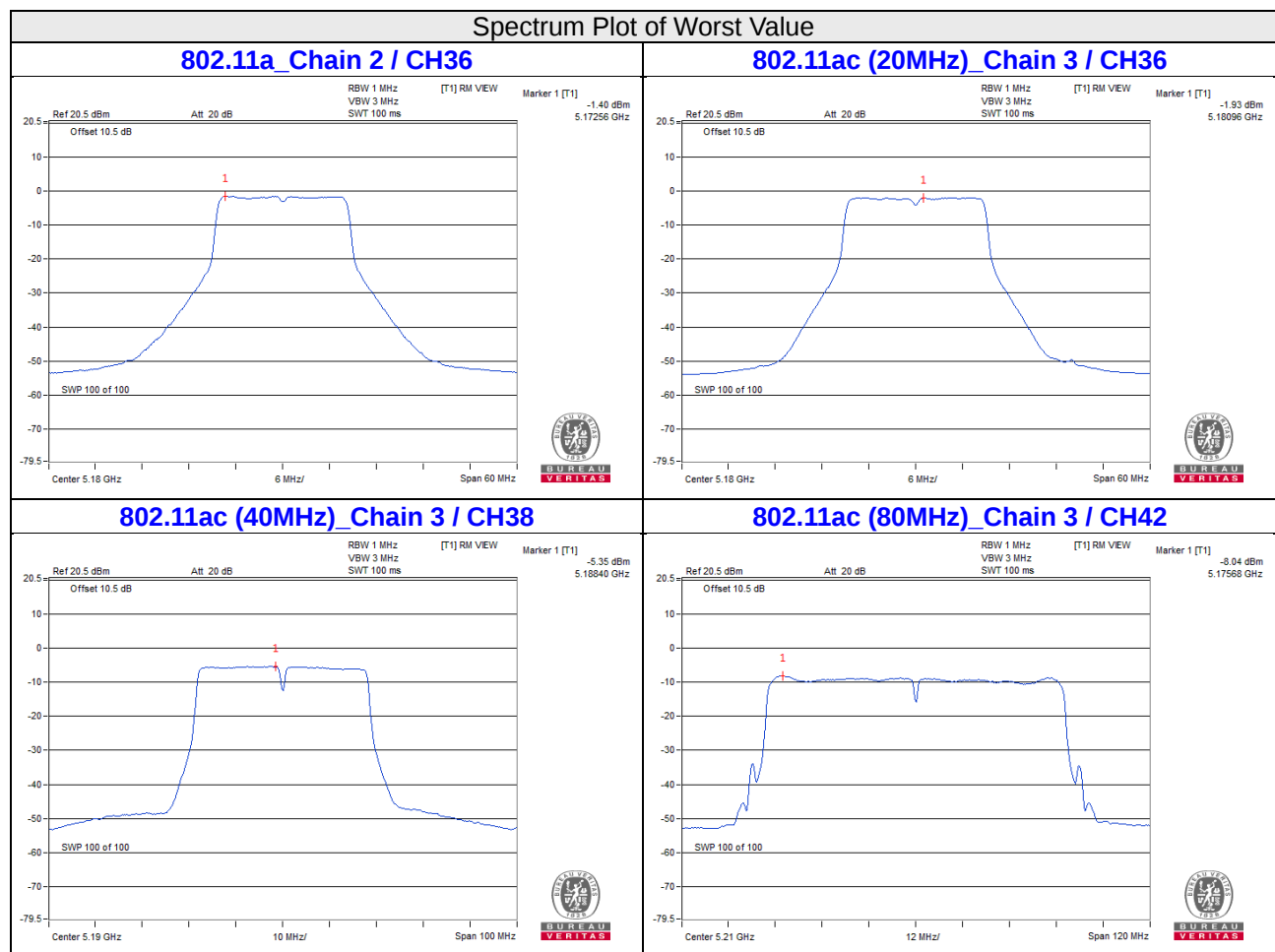
Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
38	5190	-5.45	-5.39	-5.49	-5.37	0.60	6.08	Pass
46	5230	-5.57	-5.59	-5.62	-5.66	0.41	6.08	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $4.9\text{dBi} + 10\log(4) = 10.92\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11-(10.92-6) = 6.08\text{dBm}$.

802.11ac (80MHz)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-8.11	-8.12	-8.15	-8.06	0.20	-1.89	6.08	Pass

- Note:**
- Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
 - Directional gain = $4.9\text{dBi} + 10\log(4) = 10.92\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11 - (10.92 - 6) = 6.08\text{dBm}$.
 - Refer to section 3.3 for duty cycle spectrum plot.



For U-NII-3:

802.11a

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/500kHz)	10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	-8.58	6.02	0.31	-2.25	25.08	Pass
	157	5785	-8.42	6.02	0.31	-2.09	25.08	Pass
	165	5825	-8.95	6.02	0.31	-2.62	25.08	Pass
1	149	5745	-8.42	6.02	0.31	-2.09	25.08	Pass
	157	5785	-8.49	6.02	0.31	-2.16	25.08	Pass
	165	5825	-8.50	6.02	0.31	-2.17	25.08	Pass
2	149	5745	-8.56	6.02	0.31	-2.23	25.08	Pass
	157	5785	-8.41	6.02	0.31	-2.08	25.08	Pass
	165	5825	-8.52	6.02	0.31	-2.19	25.08	Pass
3	149	5745	-8.55	6.02	0.31	-2.22	25.08	Pass
	157	5785	-8.78	6.02	0.31	-2.45	25.08	Pass
	165	5825	-8.51	6.02	0.31	-2.18	25.08	Pass

Note: 1. Directional gain = $4.9\text{dBi} + 10\log(4) = 10.92\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30-(10.92-6) = 25.08\text{dBm}$.

2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (20MHz)

TX chain	Chan.	Chan. Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	-8.57	6.02	-2.55	25.08	Pass
	157	5785	-8.60	6.02	-2.58	25.08	Pass
	165	5825	-8.70	6.02	-2.68	25.08	Pass
1	149	5745	-8.18	6.02	-2.16	25.08	Pass
	157	5785	-8.83	6.02	-2.81	25.08	Pass
	165	5825	-8.54	6.02	-2.52	25.08	Pass
2	149	5745	-8.33	6.02	-2.31	25.08	Pass
	157	5785	-8.49	6.02	-2.47	25.08	Pass
	165	5825	-8.72	6.02	-2.70	25.08	Pass
3	149	5745	-8.47	6.02	-2.45	25.08	Pass
	157	5785	-8.41	6.02	-2.39	25.08	Pass
	165	5825	-8.80	6.02	-2.78	25.08	Pass

Note: Directional gain = $4.9\text{dBi} + 10\log(4) = 10.92\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30-(10.92-6) = 25.08\text{dBm}$.

802.11ac (40MHz)

TX chain	Chan.	Chan. Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	151	5755	-11.73	6.02	-5.71	25.08	Pass
	159	5795	-11.71	6.02	-5.69	25.08	Pass
1	151	5755	-11.73	6.02	-5.71	25.08	Pass
	159	5795	-11.69	6.02	-5.67	25.08	Pass
2	151	5755	-11.99	6.02	-5.97	25.08	Pass
	159	5795	-11.92	6.02	-5.90	25.08	Pass
3	151	5755	-11.86	6.02	-5.84	25.08	Pass
	159	5795	-12.01	6.02	-5.99	25.08	Pass

Note: Directional gain = 4.9dBi + 10log(4) = 10.92dBi > 6dBi , so the power density limit shall be reduced to 30-(10.92-6) = 25.08dBm.

802.11ac (80MHz)

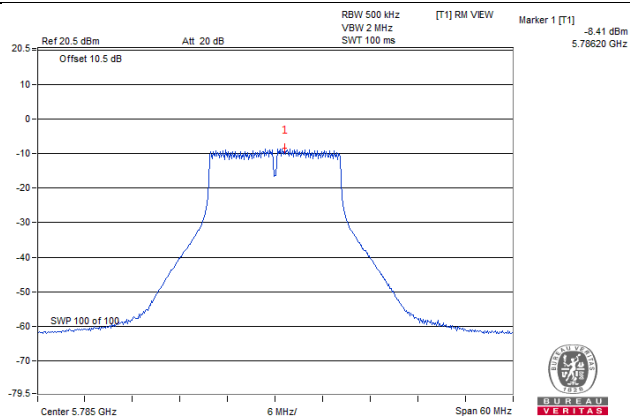
TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/500kHz)	10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	155	5775	-14.41	6.02	0.20	-8.19	25.08	Pass
1	155	5775	-14.27	6.02	0.20	-8.05	25.08	Pass
2	155	5775	-14.26	6.02	0.20	-8.04	25.08	Pass
3	155	5775	-14.29	6.02	0.20	-8.07	25.08	Pass

Note: 1. Directional gain = 4.9dBi + 10log(4) = 10.92dBi > 6dBi , so the power density limit shall be reduced to 30-(10.92-6) = 25.08dBm.

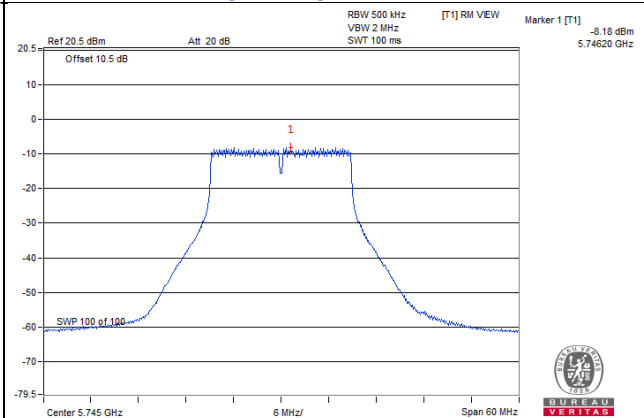
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

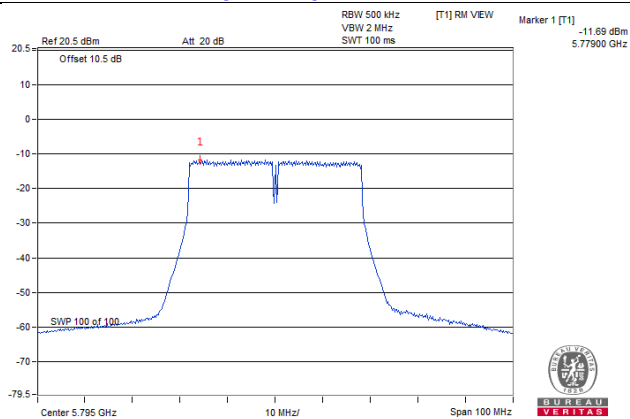
802.11a_Chain 2 / CH157



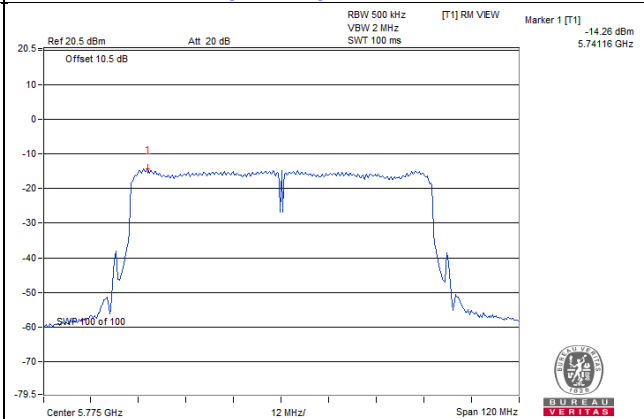
802.11ac (20MHz)_Chain 1 / CH149



802.11ac (40MHz)_Chain 1 / CH159



802.11ac (80MHz)_Chain 2 / CH155

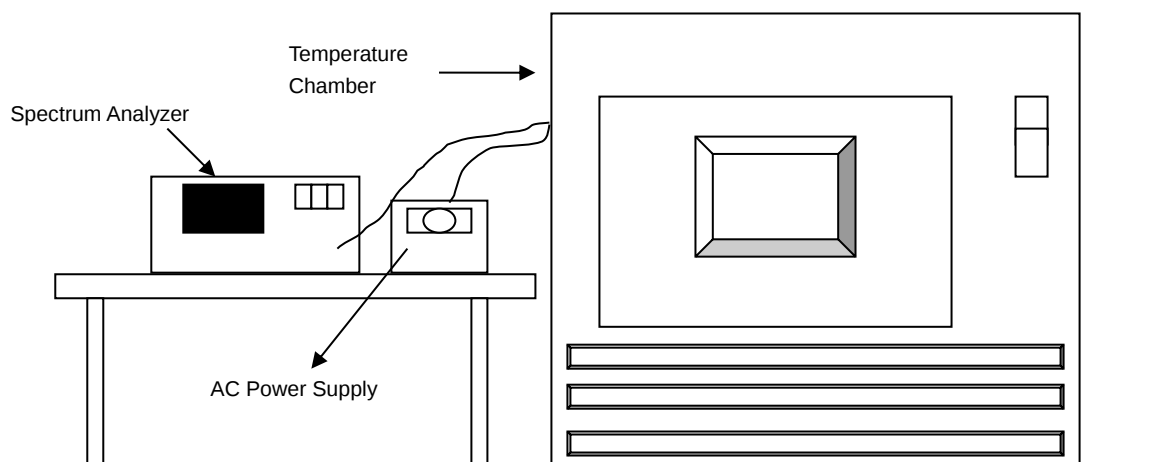


4.6 Frequency Stability Measurement

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	5179.9883	Pass	5179.9873	Pass	5179.9922	Pass	5179.9881	Pass
40	120	5180.0113	Pass	5180.0152	Pass	5180.0135	Pass	5180.0111	Pass
30	120	5179.9965	Pass	5179.9997	Pass	5179.9965	Pass	5179.9958	Pass
20	120	5180.0017	Pass	5180.0022	Pass	5180.0001	Pass	5180.0031	Pass
10	120	5179.9766	Pass	5179.9742	Pass	5179.9759	Pass	5179.9776	Pass
0	120	5179.9952	Pass	5179.9944	Pass	5179.9908	Pass	5179.9956	Pass
-10	120	5179.9924	Pass	5179.9897	Pass	5179.9888	Pass	5179.9913	Pass
-20	120	5179.9995	Pass	5179.9995	Pass	5179.9962	Pass	5179.9955	Pass
-30	120	5180.0254	Pass	5180.0252	Pass	5180.0236	Pass	5180.0252	Pass

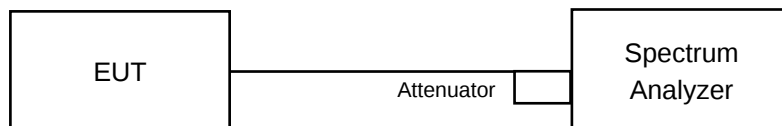
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0027	Pass	5180.0031	Pass	5179.9999	Pass	5180.0037	Pass
	120	5180.0017	Pass	5180.0022	Pass	5180.0001	Pass	5180.0031	Pass
	102	5180.0027	Pass	5180.002	Pass	5179.9992	Pass	5180.0035	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
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.40	16.41	16.41	16.41	0.5	PASS
157	5785	16.41	16.41	16.41	16.41	0.5	PASS
165	5825	16.41	16.41	16.41	16.41	0.5	PASS

802.11ac (20MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.64	17.66	17.66	17.67	0.5	PASS
157	5785	17.65	17.66	17.65	17.64	0.5	PASS
165	5825	17.65	17.65	17.65	17.64	0.5	PASS

802.11ac (40MHz)

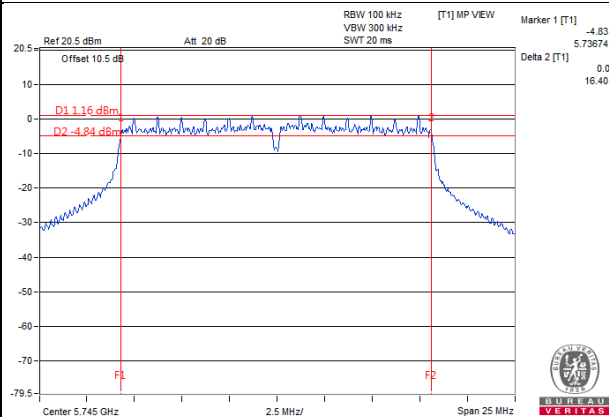
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	36.46	36.50	36.48	36.45	0.5	PASS
159	5795	36.43	36.43	36.46	36.47	0.5	PASS

802.11ac (80MHz)

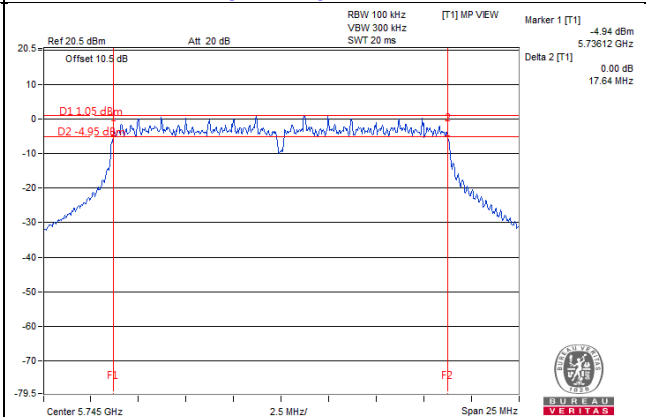
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.75	75.75	75.76	75.76	0.5	PASS

Spectrum Plot of Worst Value

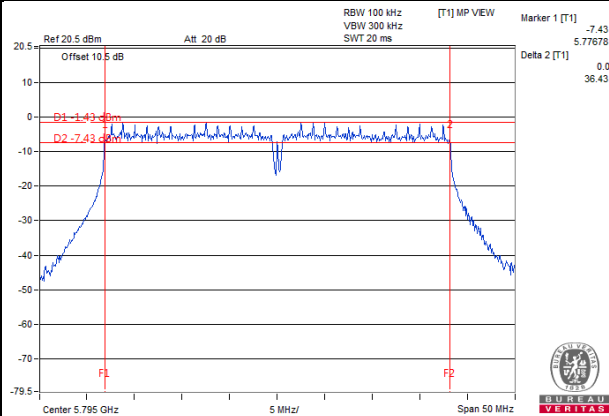
802.11a_Chain 0 / CH149



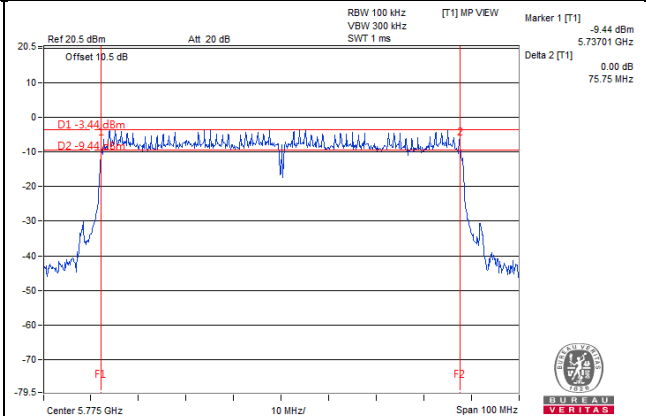
802.11ac (20MHz)_Chain 0 / CH149



802.11ac (40MHz)_Chain 0 / CH159



802.11ac (80MHz)_Chain 0 / CH155

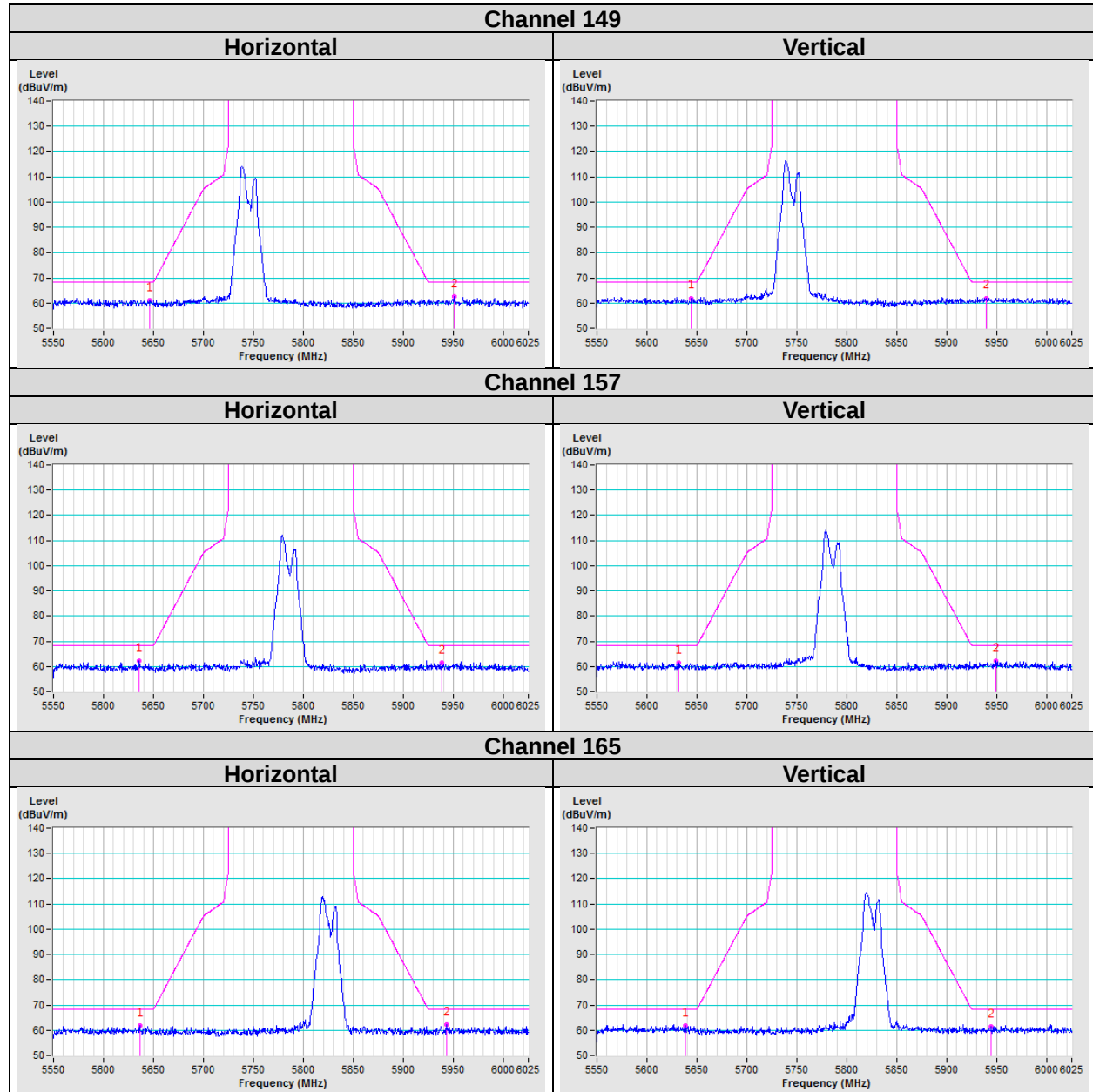


5 Pictures of Test Arrangements

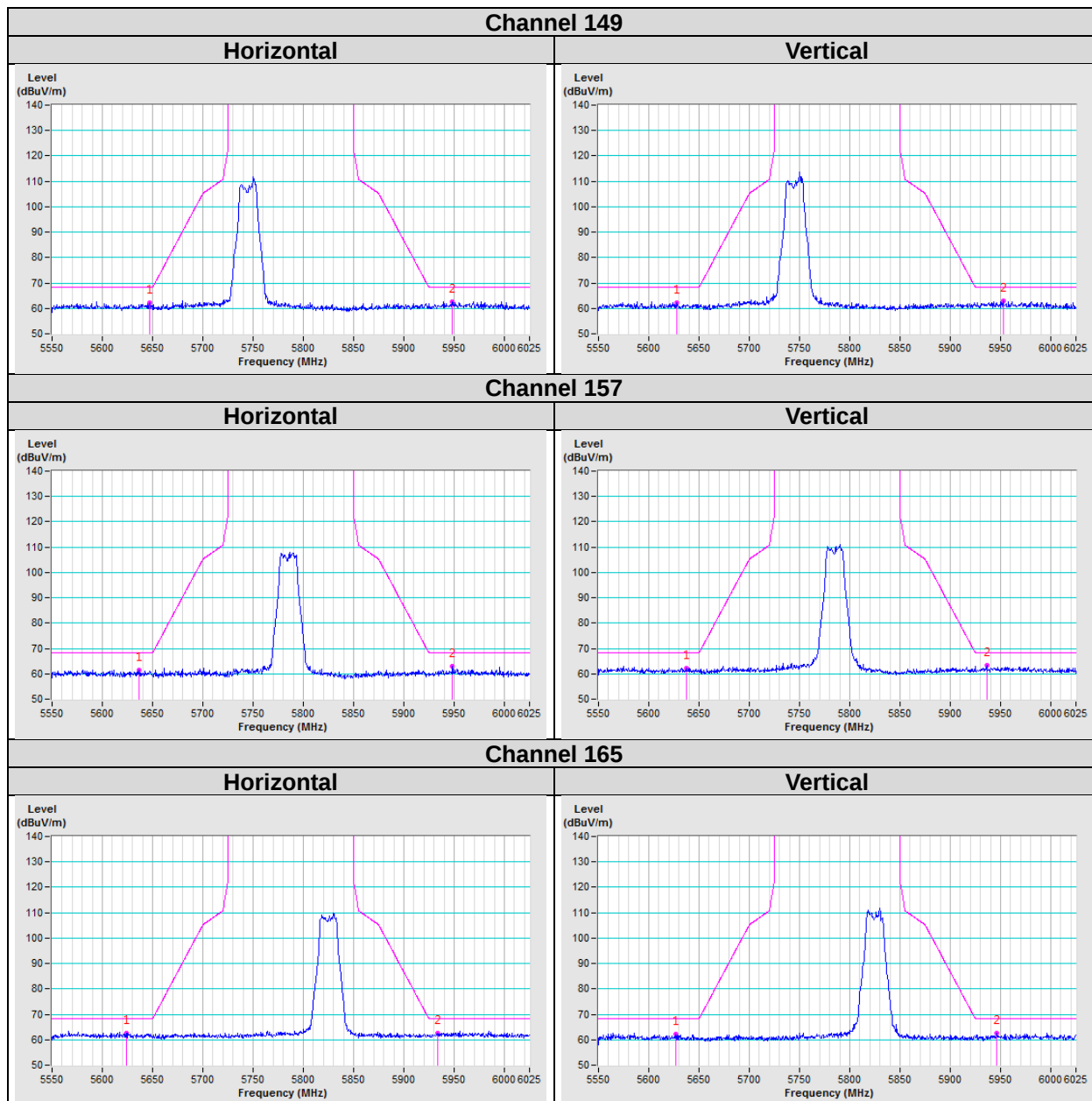
Please refer to the attached file (Test Setup Photo).

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

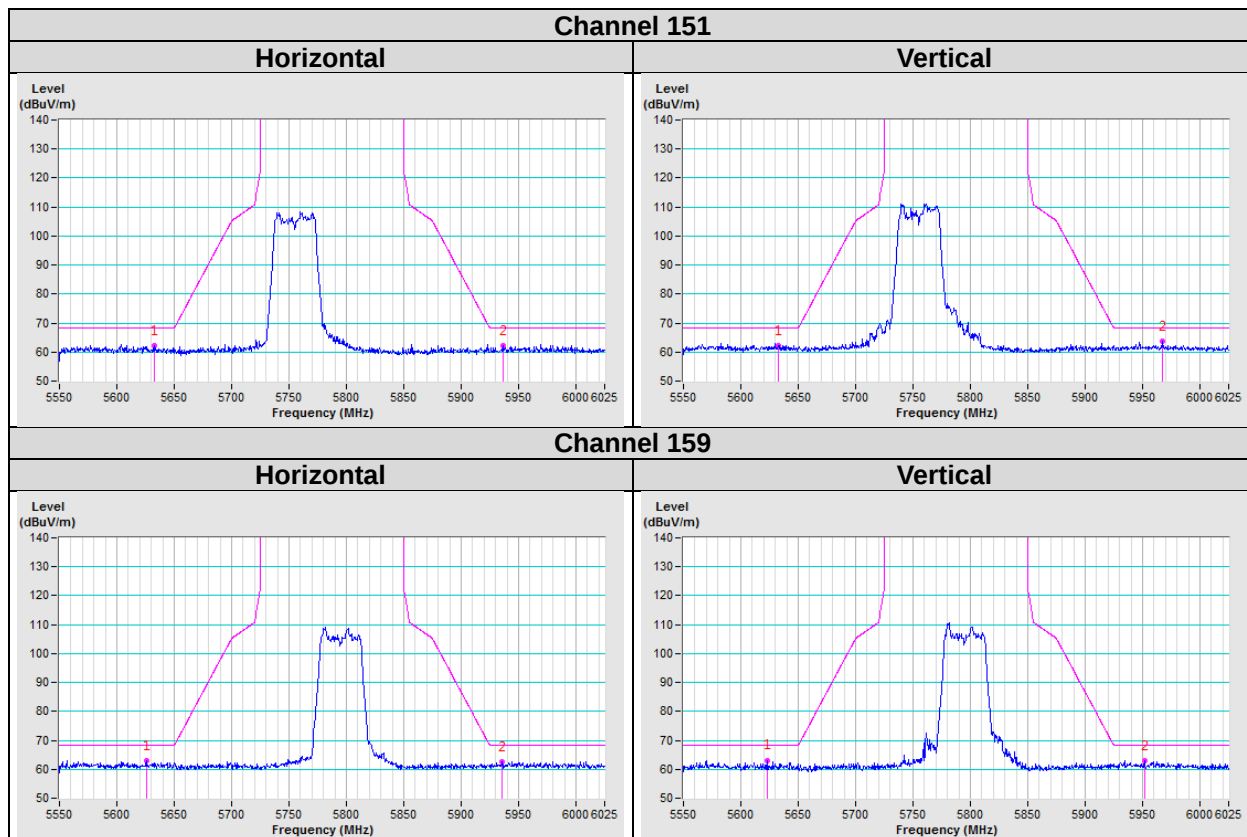
802.11a



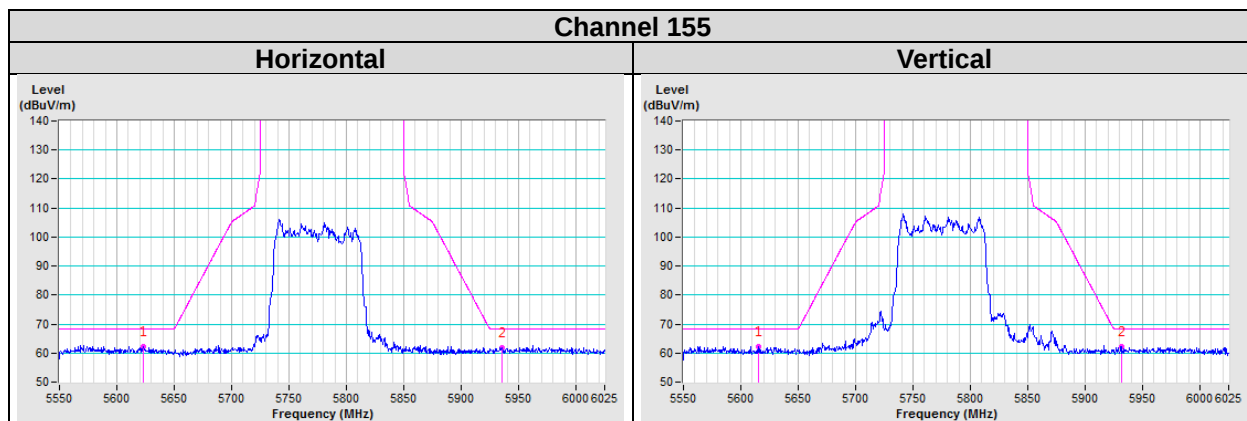
802.11ac (20MHz)



802.11ac (40MHz)

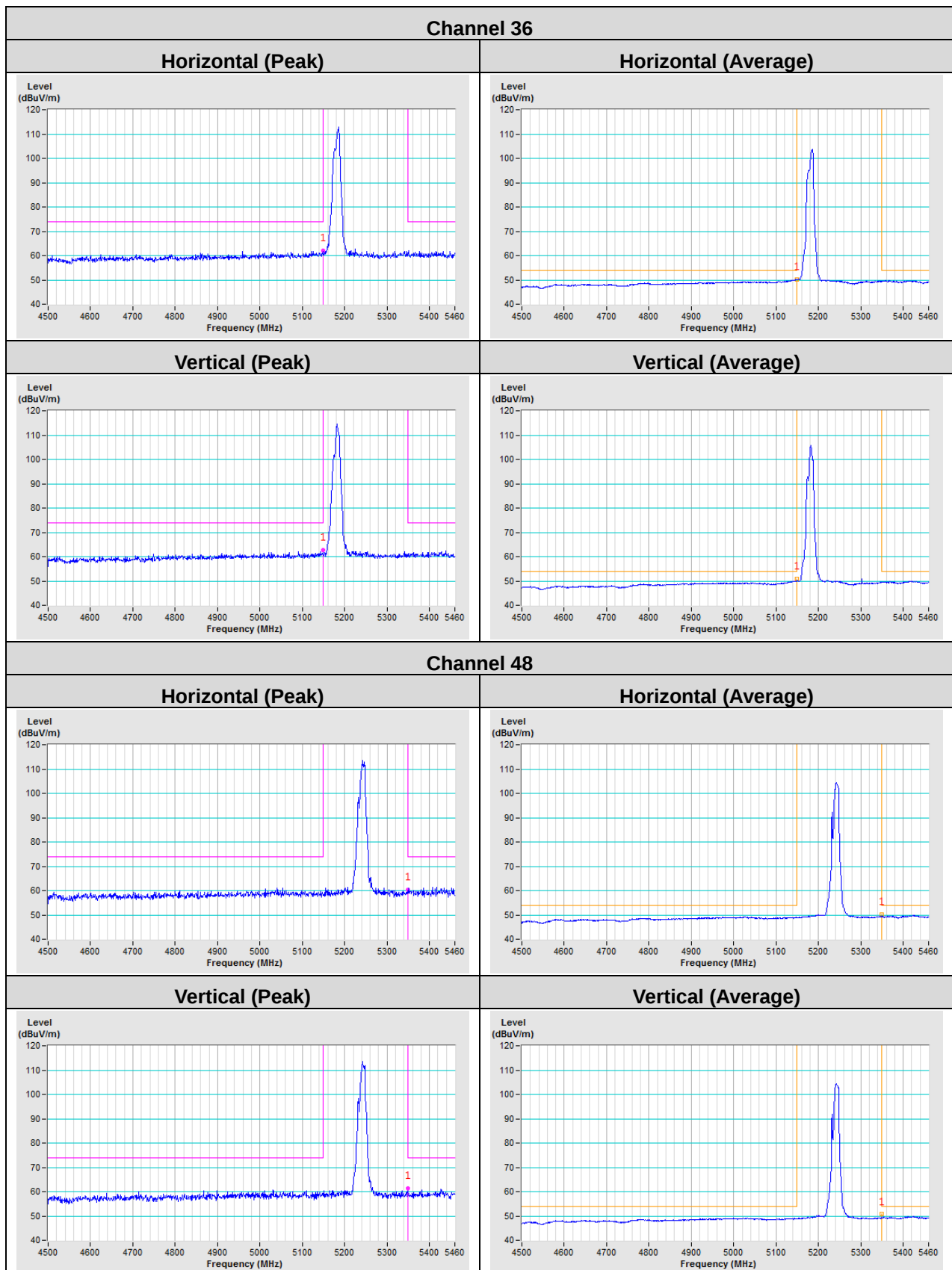


802.11ac (80MHz)

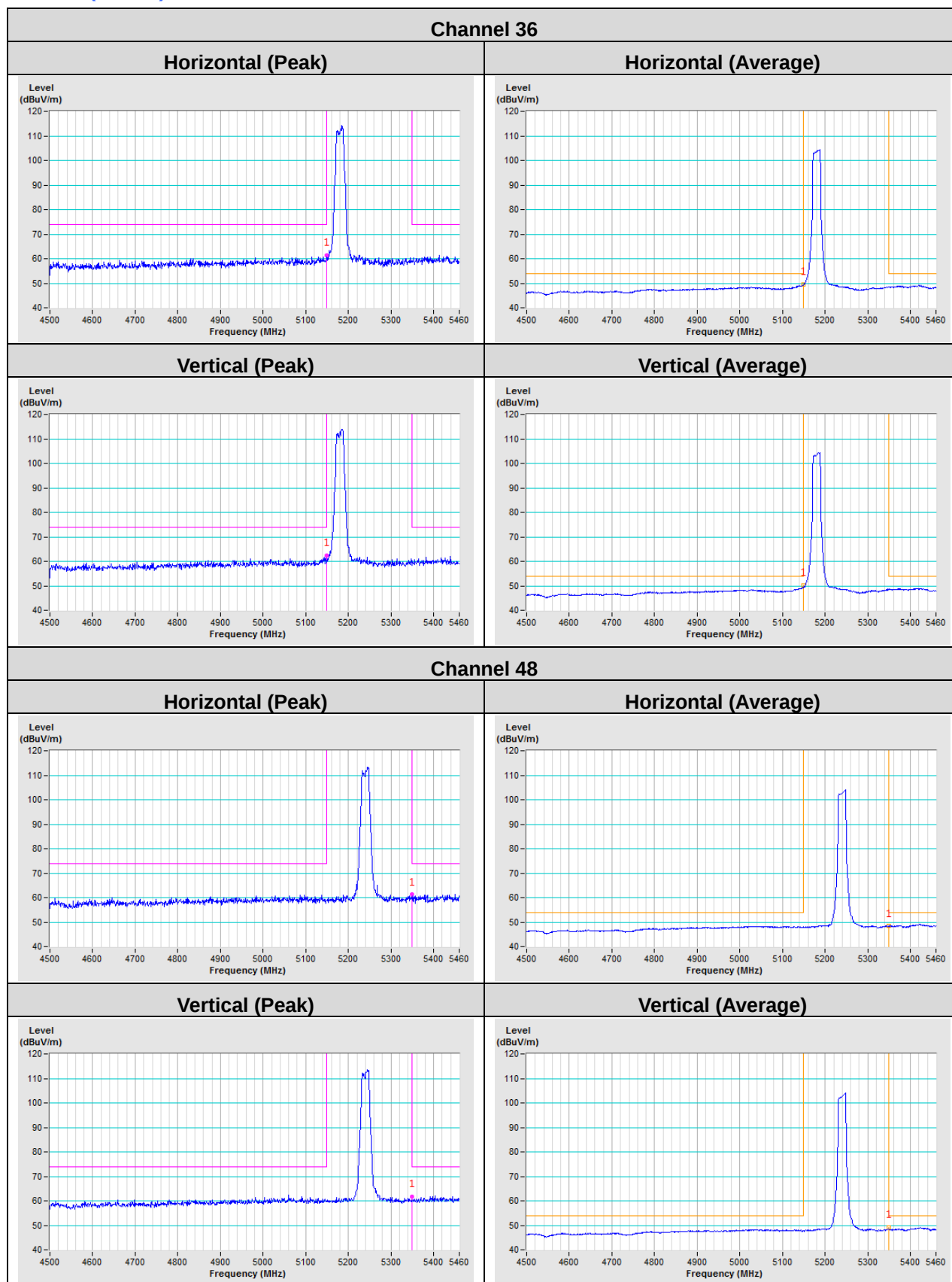


Annex B- Bandedge Measurement (For U-NII-1 band)

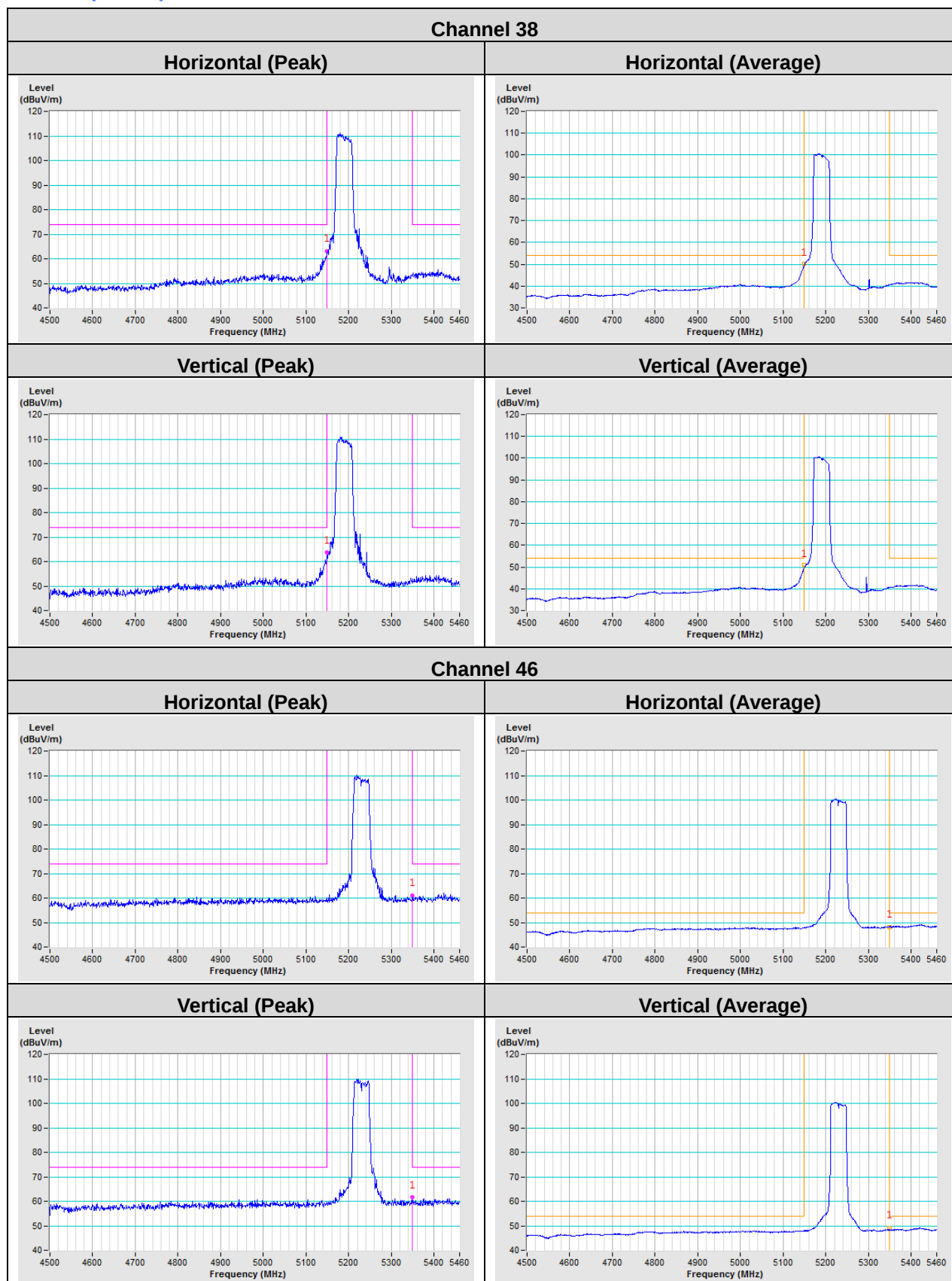
802.11a



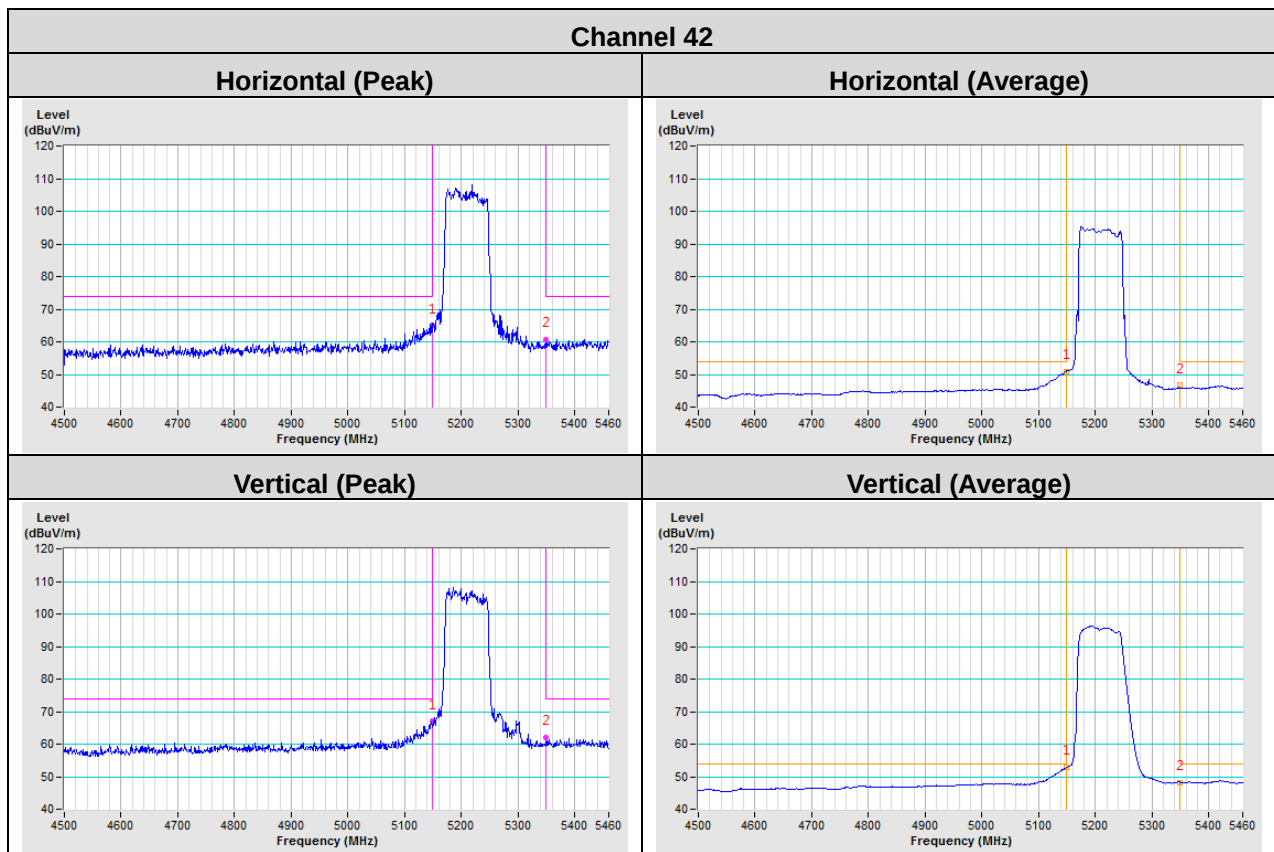
802.11ac (20MHz)



802.11ac (40MHz)



802.11ac (80MHz)



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:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

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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