

FCC Test Report

Report No.: RFBARR-WTW-P20110181K-7

FCC ID: RAS-MT7921K

Test Model: MT7921K

Received Date: 2021/10/21

Test Date: 2022/2/12 ~ 2022/2/14

Issued Date: 2022/2/16

Applicant: MediaTek Inc.

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

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Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RFBARR-WTW-P20110181K-7	Original release.	2022/2/16

1 Certificate of Conformity

Product: 2TX 11ax (WiFi6E) + BT/BLE Combo Card

Brand: MediaTek

Test Model: MT7921K

Sample Status: ENGINEERING SAMPLE

Applicant: MediaTek Inc.

Test Date: 2022/2/12 ~ 2022/2/14

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
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 EMC characteristics under the conditions specified in this report.

Prepared by : Vivian Huang , **Date:** 2022/2/16
Vivian Huang / Specialist

Approved by : Clark Lin , **Date:** 2022/2/16
Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	NA	Refer to Note 1 below
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.3 dB at 2390.00 MHz.
15.247(d)	Antenna Port Emission	NA	Refer to Note 1 below
15.247(a)(2)	6dB bandwidth	NA	Refer to Note 1 below
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	NA	Refer to Note 1 below
15.203	Antenna Requirement	PASS	Antenna connector is R-SMA or i-pex(MHF) not a standard connector.

Note:

1. Radiated Emissions and Conducted power were performed for this addendum. The others testing data refer to original test report.
2. 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) ($\pm$)
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.1 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	2TX 11ax (WiFi6E) + BT/BLE Combo Card
Brand	MediaTek
Test Model	MT7921K
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to 300 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201.0 Mbps
Operating Frequency	2.412 ~ 2.472GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 13 802.11n (HT40), VHT40, 802.11ax (HE40): 9
Output Power	2.412 ~ 2.472 GHz: 799.83 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

- This report is prepared for FCC class II change. The difference compared with the Report No.: RFBARR-WTW-P20110181F as the following:
 - ◆ Enable U-NII-4 and U-NII-3 & -4 span channels through software change.
- According to above condition, only Verify Output Power and Radiated Emission tests according to original report worst channels. And all data were verified to meet the requirements.
- Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	Bluetooth
2	WLAN (5GHz / 6GHz)	Bluetooth

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

4. The antennas provided to the EUT, please refer to the following table:

Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type	Cable Length (mm)	Cable Loss (dB)	Excluding Cable Loss Ant. Gain (dBi)
1	Chain0	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	R-SMA	150	2.4~2.4835GHz: 0.5 5.15~5.85GHz: 0.8	2.92 4.67
	Chain1	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	R-SMA	150	2.4~2.4835GHz: 0.5 5.15~5.85GHz: 0.8	2.92 4.67
2	Chain0	PSA	RFMTA340718EM LB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)	200	included cable loss	-
	Chain1	PSA	RFMTA340718EM LB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)	200	included cable loss	-
3	Chain0	PSA	RFMTA311020EM MB301	1.71 4.82 3.31	2.4~2.4835 5.15~5.85 5.92~7.125	PIFA	i-pex(MHF)	200	-	-
	Chain1	PSA	RFMTA311020EM MB301	1.71 4.82 3.31	2.4~2.4835 5.15~5.85 5.92~7.125	PIFA	i-pex(MHF)	200	-	-
4	Chain0	PSA	RFMTA311020EM MB301_V02	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)	200	-	-
	Chain1	PSA	RFMTA311020EM MB301_V02	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)	200	-	-
5	Chain0	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG	40	-	-
	Chain1	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG	40	-	-
6	Chain0	Luxshare-ICT	LA9RF059-CS-H (Main)	0.3 1.3 1.2	2.4~2.4835 5.15~5.85 5.925~7.125	Dipole	RP SMA PLUG	925	-	-
	Chain1	Luxshare-ICT	LA9RF059-CS-H (Aux)	-1.10 -1.10 1.4	2.4~2.4835 5.15~5.85 5.925~7.125	Dipole	RP SMA PLUG	876	-	-
7	Chain0	ASUS	14008-02650500 Main ant.	1.03 2.07 2.80	2.4~2.4835 5.15~5.85 5.925~7.125	Dipole	RP SMA PLUG	800	-	-
	Chain1	ASUS	14008-02650500 Aux ant.	2.27 2.01 3.08	2.4~2.4835 5.15~5.85 5.925~7.125	Dipole	RP SMA PLUG	800	-	-

Note: Max. gain was selected for the final test, except for the radiated emissions test.

5. The EUT incorporates a MIMO function:

2.4GHZ BAND		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX

Note: The EUT doesn't support beamforming function.

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.

7. The above Antenna information is declared by manufacturer, the laboratory shall not be held responsible.

3.2 Description of Test Modes

13 channels are provided for 802.11b, 802.11g and 802.11n (HT20), VHT20, 802.11ax (HE20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442		

9 channels are provided for 802.11n (HT40), VHT40, 802.11ax (HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	8	2447
4	2427	9	2452
5	2432	10	2457
6	2437	11	2462
7	2442		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO		DESCRIPTION
	RE≥1G	APCM	
1	√	√	With PIFA antenna (Ant. Set 2)
2	√	-	With Dipole antenna (Ant. Set 1)

Where **RE≥1G**: Radiated Emission above 1GHz & Bandedge Measurement

APCM: Antenna Port Conducted Measurement

Note: In the original, the EUT's antenna (PIFA) had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter
802.11b	1 to 13	2	DSSS	DBPSK	1 Mb/s
802.11g	1 to 13	6	OFDM	BPSK	6 Mb/s
802.11ax (HE20)	1 to 13	6	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 11	6	OFDMA	BPSK	MCS0

Antenna Port Conducted Measurement:

- ☒ 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter
802.11b	1 to 13	2	DSSS	DBPSK	1 Mb/s
802.11g	1 to 13	6	OFDM	BPSK	6 Mb/s
802.11ax (HE20)	1 to 13	6	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 11	6	OFDMA	BPSK	MCS0

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (System)	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Carter Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leon Dai

3.3 Duty Cycle of Test Signal

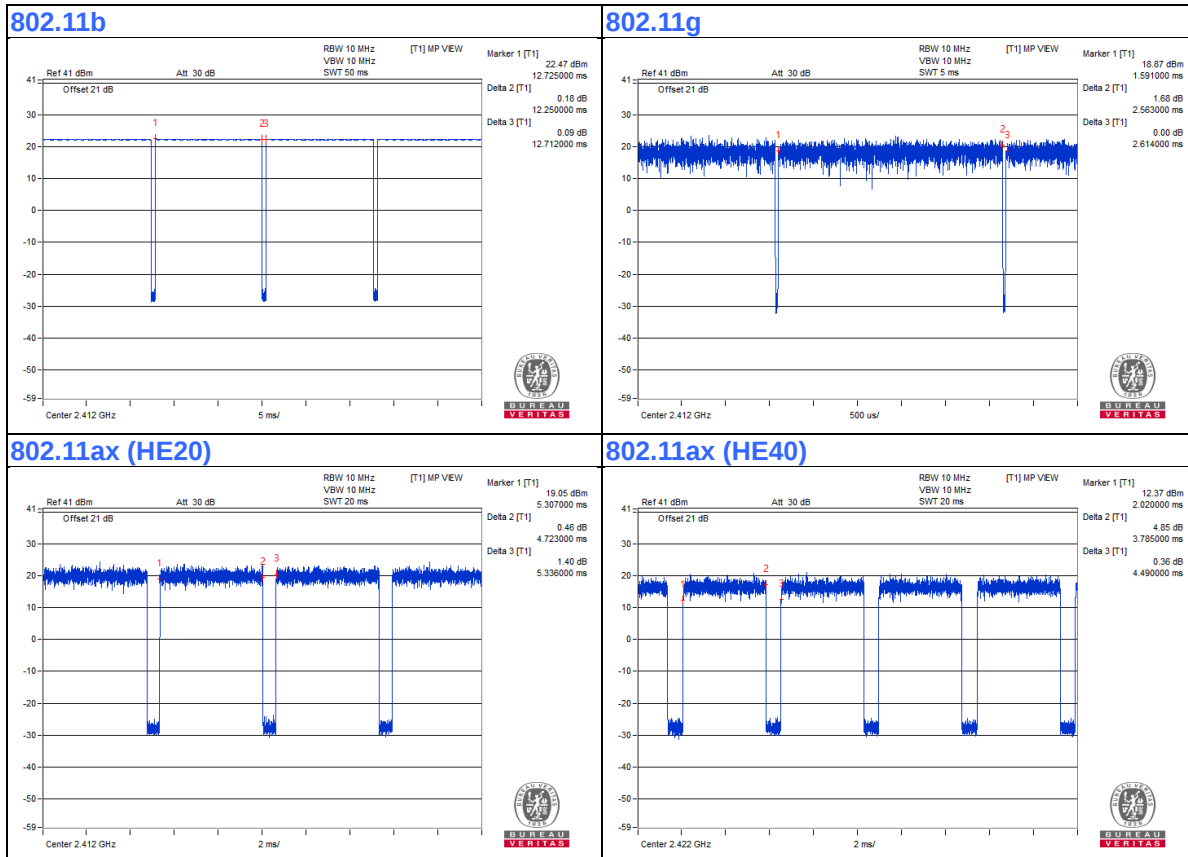
If duty cycle of test signal is $\geq 98\%$, duty factor is not required.
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11b: Duty cycle = $12.25 \text{ ms} / 12.712 \text{ ms} = 0.964$, Duty factor = $10 * \log (1/\text{Duty cycle}) = 0.16 \text{ dB}$

802.11g: Duty cycle = $2.563 \text{ ms} / 2.614 \text{ ms} = 0.98$

802.11ax (HE20): Duty cycle = $4.723 \text{ ms} / 5.336 \text{ ms} = 0.885$, Duty factor = $10 * \log (1/\text{Duty cycle}) = 0.53 \text{ dB}$

802.11ax (HE40): Duty cycle = $3.785 \text{ ms} / 4.49 \text{ ms} = 0.843$, Duty factor = $10 * \log (1/\text{Duty cycle}) = 0.74 \text{ dB}$



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.

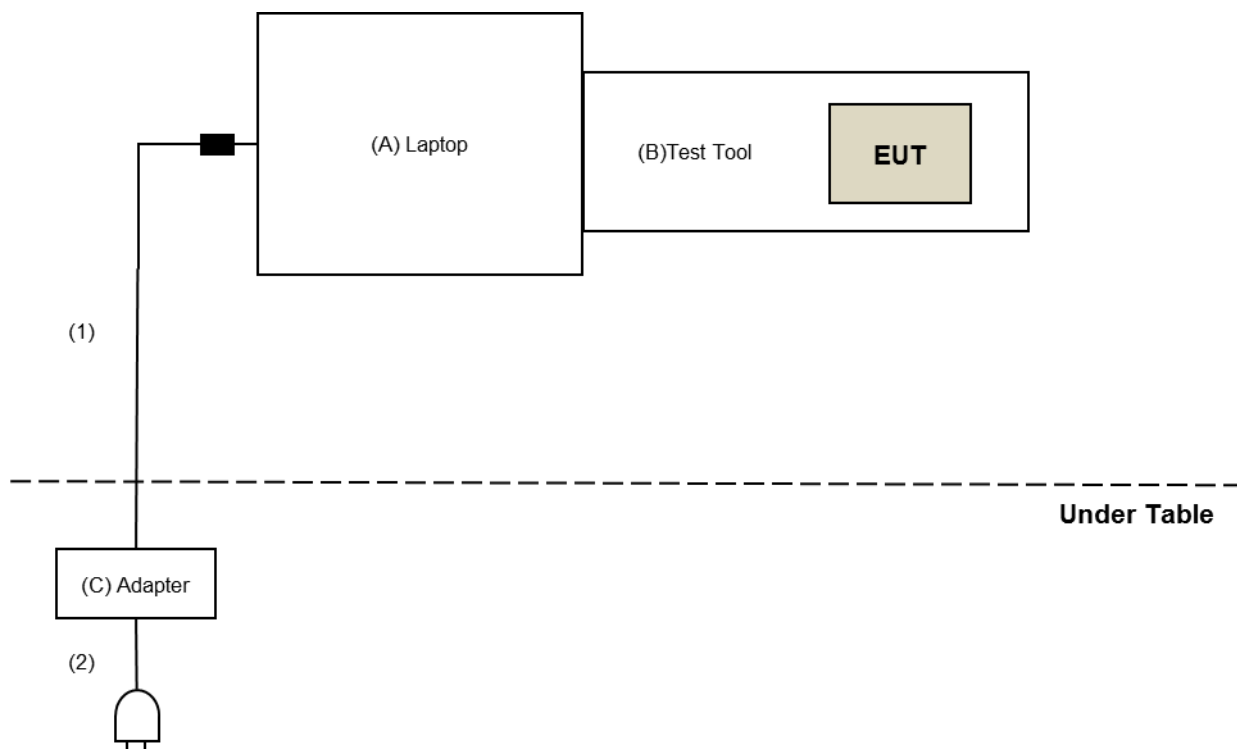
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6440	H7LYQ32	FCC DoC	Provided by Lab
B.	Test Tool	MTK	NA	NA	NA	Supplied by client
C.	Adapter	Dell	FA65NE0-00	NA	NA	Provided by Lab

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.6	No	1	Provided by Lab
2.	AC Cable	1	1	No	0	Provided by Lab

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

3.4.1 Configuration of System under Test

For Radiated Emissions test:



3.5 General Description of Applied Standards 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 C (15.247)

ANSI C63.10-2013

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

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

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. Other emissions shall be at least 20dB below the highest level of the desired power:

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:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. 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.

4.1.2 Test Instruments

For Radiated Emission Test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	2021/11/19	2022/11/18
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-783	2021/11/14	2022/11/13
Pre_Amplifier EMCI	EMC 12630 SE	980638	2021/4/7	2022/4/6
RF Cable-Frequency Range : 1-26.5GHz EMCI	EMC104-SM-SM-1200	160922	2021/12/24	2022/12/23
RF Coaxial Cable EMCI	EMC104-SM-SM-2000	180502	2021/4/26	2022/4/25
RF Coaxial Cable EMCI	EMC104-SM-SM-6000	210704	2021/11/9	2022/11/8
Pre_Amplifier EMCI	EMC184045SE	980387	2022/1/10	2023/1/9
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170519	2021/11/14	2022/11/13
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2022/1/10	2023/1/9
RF cable (40GHz) EMCI	EMC-KM-KM-4000	200214	2021/3/10	2022/3/9

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 966 Chamber No. 4.
3. Tested Date: 2022/2/12

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter Anritsu	ML2495A	1529002	2021/6/21	2022/6/20
Pulse Power Sensor Anritsu	MA2411B	1339443	2021/5/31	2022/5/30
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2021/4/13	2022/4/12
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

- NOTE:**
1. The test was performed in Oven room 2.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: 2022/2/14

4.1.3 Test Procedures

For Radiated emission above 1GHz

- a. The EUT was placed on the top of a rotating table 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 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:

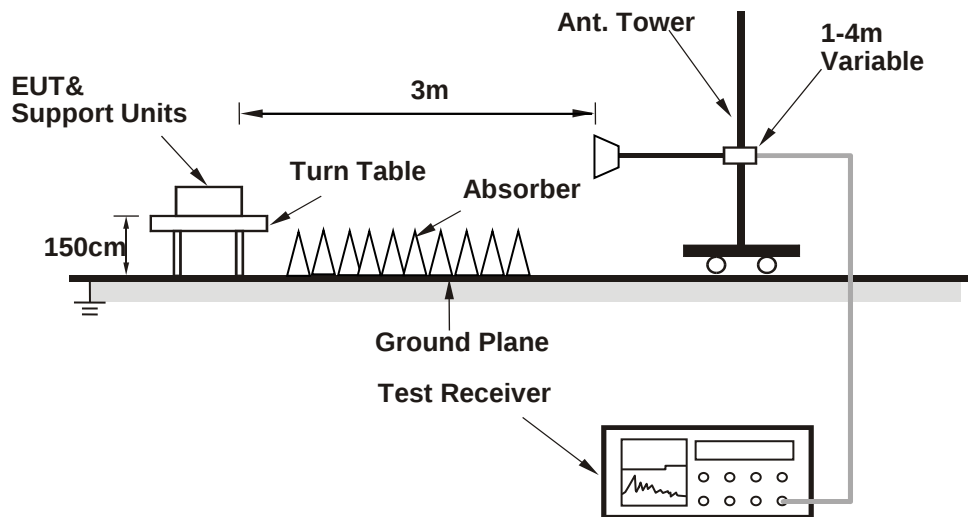
1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
3. 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 above 1GHz



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

1.1.1 EUT Operating Conditions

- Connected the EUT with the Laptop which is placed on the testing table.
- Controlling software (MT7961 QA 0.0.2.33) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.6 Test Results (Mode 1)

Above 1GHz Data :

RF Mode	TX 802.11b	Channel	CH 2 : 2417 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.2 PK	74.0	-19.8	3.58 H	301	58.7	-4.5
2	2390.00	43.8 AV	54.0	-10.2	3.58 H	301	48.3	-4.5
3	*2417.00	106.9 PK			3.58 H	301	111.4	-4.5
4	*2417.00	105.1 AV			3.58 H	301	109.6	-4.5
5	4834.00	50.7 PK	74.0	-23.3	1.05 H	65	50.7	0.0
6	4834.00	48.9 AV	54.0	-5.1	1.05 H	65	48.9	0.0
7	7251.00	48.1 PK	74.0	-25.9	1.83 H	302	42.1	6.0
8	7251.00	42.7 AV	54.0	-11.3	1.83 H	302	36.7	6.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.0 PK	74.0	-20.0	2.12 V	310	58.5	-4.5
2	2390.00	44.0 AV	54.0	-10.0	2.12 V	310	48.5	-4.5
3	*2417.00	107.6 PK			2.12 V	310	112.1	-4.5
4	*2417.00	105.3 AV			2.12 V	310	109.8	-4.5
5	4834.00	49.3 PK	74.0	-24.7	1.96 V	70	49.3	0.0
6	4834.00	47.4 AV	54.0	-6.6	1.96 V	70	47.4	0.0
7	7251.00	49.3 PK	74.0	-24.7	1.56 V	186	43.3	6.0
8	7251.00	44.5 AV	54.0	-9.5	1.56 V	186	38.5	6.0

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.

RF Mode	TX 802.11g	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.7 PK	74.0	-11.3	3.07 H	328	67.2	-4.5
2	2390.00	51.8 AV	54.0	-2.2	3.07 H	328	56.3	-4.5
3	*2437.00	112.1 PK			3.07 H	328	116.6	-4.5
4	*2437.00	104.2 AV			3.07 H	328	108.7	-4.5
5	2483.50	57.7 PK	74.0	-16.3	3.07 H	328	62.2	-4.5
6	2483.50	47.1 AV	54.0	-6.9	3.07 H	328	51.6	-4.5
7	4874.00	44.1 PK	74.0	-29.9	1.13 H	72	44.3	-0.2
8	4874.00	33.8 AV	54.0	-20.2	1.13 H	72	34.0	-0.2
9	7311.00	49.9 PK	74.0	-24.1	1.75 H	314	43.7	6.2
10	7311.00	38.0 AV	54.0	-16.0	1.75 H	314	31.8	6.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.4 PK	74.0	-11.6	1.34 V	185	66.9	-4.5
2	2390.00	51.6 AV	54.0	-2.4	1.34 V	185	56.1	-4.5
3	*2437.00	109.7 PK			1.34 V	185	114.2	-4.5
4	*2437.00	101.8 AV			1.34 V	185	106.3	-4.5
5	2483.50	57.4 PK	74.0	-16.6	1.34 V	185	61.9	-4.5
6	2483.50	46.9 AV	54.0	-7.1	1.34 V	185	51.4	-4.5
7	4874.00	43.7 PK	74.0	-30.3	1.93 V	69	43.9	-0.2
8	4874.00	33.8 AV	54.0	-20.2	1.93 V	69	34.0	-0.2
9	7311.00	45.9 PK	74.0	-28.1	1.56 V	190	39.7	6.2
10	7311.00	40.4 AV	54.0	-13.6	1.56 V	190	34.2	6.2

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.

RF Mode	TX 802.11ax (HE20)	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.0 PK	74.0	-12.0	2.55 H	345	66.5	-4.5
2	2390.00	51.5 AV	54.0	-2.5	2.55 H	345	56.0	-4.5
3	*2437.00	113.1 PK			2.55 H	345	117.6	-4.5
4	*2437.00	103.4 AV			2.55 H	345	107.9	-4.5
5	2483.50	58.3 PK	74.0	-15.7	2.55 H	345	62.8	-4.5
6	2483.50	47.0 AV	54.0	-7.0	2.55 H	345	51.5	-4.5
7	4874.00	44.1 PK	74.0	-29.9	1.09 H	84	44.3	-0.2
8	4874.00	33.8 AV	54.0	-20.2	1.09 H	84	34.0	-0.2
9	7311.00	50.2 PK	74.0	-23.8	1.68 H	316	44.0	6.2
10	7311.00	38.2 AV	54.0	-15.8	1.68 H	316	32.0	6.2

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	60.2 PK	74.0	-13.8	1.29 V	156	64.7	-4.5
2	2390.00	50.0 AV	54.0	-4.0	1.29 V	156	54.5	-4.5
3	*2437.00	110.0 PK			1.29 V	156	114.5	-4.5
4	*2437.00	101.2 AV			1.29 V	156	105.7	-4.5
5	2483.50	58.2 PK	74.0	-15.8	1.29 V	156	62.7	-4.5
6	2483.50	47.3 AV	54.0	-6.7	1.29 V	156	51.8	-4.5
7	4874.00	43.3 PK	74.0	-30.7	1.97 V	55	43.5	-0.2
8	4874.00	33.4 AV	54.0	-20.6	1.97 V	55	33.6	-0.2
9	7311.00	45.6 PK	74.0	-28.4	1.67 V	196	39.4	6.2
10	7311.00	39.8 AV	54.0	-14.2	1.67 V	196	33.6	6.2

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.

RF Mode	TX 802.11ax (HE40)	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	65.0 PK	74.0	-9.0	2.67 H	326	69.5	-4.5
2	2390.00	53.7 AV	54.0	-0.3	2.67 H	326	58.2	-4.5
3	*2437.00	110.6 PK			2.67 H	326	115.1	-4.5
4	*2437.00	99.1 AV			2.67 H	326	103.6	-4.5
5	2483.50	66.3 PK	74.0	-7.7	2.67 H	326	70.8	-4.5
6	2483.50	52.4 AV	54.0	-1.6	2.67 H	326	56.9	-4.5
7	4874.00	41.0 PK	74.0	-33.0	1.21 H	70	41.2	-0.2
8	4874.00	32.4 AV	54.0	-21.6	1.21 H	70	32.6	-0.2
9	7311.00	43.0 PK	74.0	-31.0	1.76 H	346	36.8	6.2
10	7311.00	32.0 AV	54.0	-22.0	1.76 H	346	25.8	6.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.8 PK	74.0	-10.2	1.91 V	287	68.3	-4.5
2	2390.00	53.4 AV	54.0	-0.6	1.91 V	287	57.9	-4.5
3	*2437.00	108.4 PK			1.91 V	287	112.9	-4.5
4	*2437.00	97.3 AV			1.91 V	287	101.8	-4.5
5	2483.50	64.5 PK	74.0	-9.5	1.91 V	287	69.0	-4.5
6	2483.50	50.8 AV	54.0	-3.2	1.91 V	287	55.3	-4.5
7	4874.00	41.4 PK	74.0	-32.6	1.95 V	63	41.6	-0.2
8	4874.00	32.3 AV	54.0	-21.7	1.95 V	63	32.5	-0.2
9	7311.00	43.8 PK	74.0	-30.2	1.83 V	189	37.6	6.2
10	7311.00	32.7 AV	54.0	-21.3	1.83 V	189	26.5	6.2

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.

4.1.7 Test Results (Mode 2)

Above 1GHz Data :

RF Mode	TX 802.11b	Channel	CH 2 : 2417 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.1 PK	74.0	-18.9	3.41 H	48	59.6	-4.5
2	2390.00	42.9 AV	54.0	-11.1	3.41 H	48	47.4	-4.5
3	*2417.00	102.1 PK			3.41 H	48	106.6	-4.5
4	*2417.00	99.4 AV			3.41 H	48	103.9	-4.5
5	4834.00	51.9 PK	74.0	-22.1	1.54 H	127	51.9	0.0
6	4834.00	50.8 AV	54.0	-3.2	1.54 H	127	50.8	0.0
7	7251.00	45.1 PK	74.0	-28.9	1.37 H	171	39.1	6.0
8	7251.00	37.2 AV	54.0	-16.8	1.37 H	171	31.2	6.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.0 PK	74.0	-18.0	1.35 V	116	60.5	-4.5
2	2390.00	45.3 AV	54.0	-8.7	1.35 V	116	49.8	-4.5
3	*2417.00	111.9 PK			1.35 V	116	116.4	-4.5
4	*2417.00	109.5 AV			1.35 V	116	114.0	-4.5
5	4834.00	49.0 PK	74.0	-25.0	1.26 V	33	49.0	0.0
6	4834.00	47.3 AV	54.0	-6.7	1.26 V	33	47.3	0.0
7	7251.00	46.0 PK	74.0	-28.0	1.19 V	158	40.0	6.0
8	7251.00	39.5 AV	54.0	-14.5	1.19 V	158	33.5	6.0

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.

RF Mode	TX 802.11g	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	60.0 PK	74.0	-14.0	3.29 H	219	64.5	-4.5
2	2390.00	45.1 AV	54.0	-8.9	3.29 H	219	49.6	-4.5
3	*2437.00	101.4 PK			3.29 H	219	105.9	-4.5
4	*2437.00	95.3 AV			3.29 H	219	99.8	-4.5
5	2483.50	54.5 PK	74.0	-19.5	3.29 H	219	59.0	-4.5
6	2483.50	41.9 AV	54.0	-12.1	3.29 H	219	46.4	-4.5
7	4874.00	48.4 PK	74.0	-25.6	1.51 H	122	48.6	-0.2
8	4874.00	46.7 AV	54.0	-7.3	1.51 H	122	46.9	-0.2
9	7311.00	44.9 PK	74.0	-29.1	1.27 H	166	38.7	6.2
10	7311.00	34.7 AV	54.0	-19.3	1.27 H	166	28.5	6.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	61.9 PK	74.0	-12.1	1.26 V	306	66.4	-4.5
2	2390.00	52.6 AV	54.0	-1.4	1.26 V	306	57.1	-4.5
3	*2437.00	112.3 PK			1.26 V	306	116.8	-4.5
4	*2437.00	104.9 AV			1.26 V	306	109.4	-4.5
5	2483.50	58.0 PK	74.0	-16.0	1.26 V	306	62.5	-4.5
6	2483.50	47.6 AV	54.0	-6.4	1.26 V	306	52.1	-4.5
7	4874.00	46.2 PK	74.0	-27.8	1.27 V	28	46.4	-0.2
8	4874.00	44.5 AV	54.0	-9.5	1.27 V	28	44.7	-0.2
9	7311.00	43.5 PK	74.0	-30.5	1.28 V	169	37.3	6.2
10	7311.00	36.1 AV	54.0	-17.9	1.28 V	169	29.9	6.2

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.

RF Mode	TX 802.11ax (HE20)	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	64.0 PK	74.0	-10.0	3.82 H	178	68.5	-4.5
2	2390.00	45.9 AV	54.0	-8.1	3.82 H	178	50.4	-4.5
3	*2437.00	105.1 PK			3.82 H	178	109.6	-4.5
4	*2437.00	94.1 AV			3.82 H	178	98.6	-4.5
5	2483.50	57.2 PK	74.0	-16.8	3.82 H	178	61.7	-4.5
6	2483.50	44.4 AV	54.0	-9.6	3.82 H	178	48.9	-4.5
7	4874.00	48.2 PK	74.0	-25.8	1.43 H	137	48.4	-0.2
8	4874.00	46.7 AV	54.0	-7.3	1.43 H	137	46.9	-0.2
9	7311.00	45.5 PK	74.0	-28.5	1.33 H	152	39.3	6.2
10	7311.00	35.1 AV	54.0	-18.9	1.33 H	152	28.9	6.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.2 PK	74.0	-11.8	1.29 V	98	66.7	-4.5
2	2390.00	52.8 AV	54.0	-1.2	1.29 V	98	57.3	-4.5
3	*2437.00	115.7 PK			1.29 V	98	120.2	-4.5
4	*2437.00	104.5 AV			1.29 V	98	109.0	-4.5
5	2483.50	60.3 PK	74.0	-13.7	1.29 V	98	64.8	-4.5
6	2483.50	49.1 AV	54.0	-4.9	1.29 V	98	53.6	-4.5
7	4874.00	45.5 PK	74.0	-28.5	1.30 V	28	45.7	-0.2
8	4874.00	44.1 AV	54.0	-9.9	1.30 V	28	44.3	-0.2
9	7311.00	44.1 PK	74.0	-29.9	1.17 V	182	37.9	6.2
10	7311.00	36.7 AV	54.0	-17.3	1.17 V	182	30.5	6.2

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.

RF Mode	TX 802.11ax (HE40)	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.4 PK	74.0	-17.6	2.61 H	159	60.9	-4.5
2	2390.00	44.1 AV	54.0	-9.9	2.61 H	159	48.6	-4.5
3	*2437.00	100.1 PK			2.61 H	159	104.6	-4.5
4	*2437.00	89.5 AV			2.61 H	159	94.0	-4.5
5	2483.50	56.6 PK	74.0	-17.4	2.61 H	159	61.1	-4.5
6	2483.50	44.4 AV	54.0	-9.6	2.61 H	159	48.9	-4.5
7	4874.00	48.6 PK	74.0	-25.4	1.42 H	159	48.8	-0.2
8	4874.00	45.5 AV	54.0	-8.5	1.42 H	159	45.7	-0.2
9	7311.00	44.9 PK	74.0	-29.1	1.30 H	151	38.7	6.2
10	7311.00	34.4 AV	54.0	-19.6	1.30 H	151	28.2	6.2

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.3 PK	74.0	-10.7	1.51 V	105	67.8	-4.5
2	2390.00	53.2 AV	54.0	-0.8	1.51 V	105	57.7	-4.5
3	*2437.00	109.9 PK			1.51 V	105	114.4	-4.5
4	*2437.00	100.4 AV			1.51 V	105	104.9	-4.5
5	2483.50	63.7 PK	74.0	-10.3	1.51 V	105	68.2	-4.5
6	2483.50	53.5 AV	54.0	-0.5	1.51 V	105	58.0	-4.5
7	4874.00	45.1 PK	74.0	-28.9	1.33 V	39	45.3	-0.2
8	4874.00	43.3 AV	54.0	-10.7	1.33 V	39	43.5	-0.2
9	7311.00	46.1 PK	74.0	-27.9	1.18 V	176	39.9	6.2
10	7311.00	36.4 AV	54.0	-17.6	1.18 V	176	30.2	6.2

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.

4.2 Conducted Output Power Measurement

4.2.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

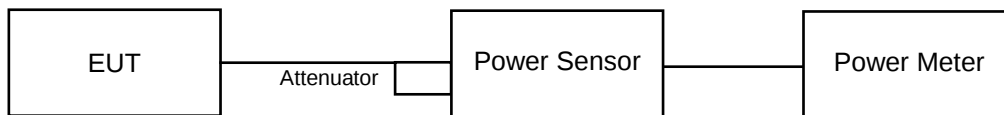
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was 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. Duty factor is not added to measured value.

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

Same as Item 4.3.6.

4.2.7 Test Results

FOR PEAK POWER

802.11b

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
2	2417	21.80	21.27	285.324	24.55	30.00	Pass

802.11g

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
6	2437	25.32	25.64	706.846	28.49	30.00	Pass

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
6	2437	26.30	25.72	799.83	29.03	30.00	Pass

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
6	2437	24.33	24.48	551.563	27.42	30.00	Pass

FOR AVERAGE POWER

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
2	2417	19.56	19.00	169.798	22.30

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
6	2437	18.17	18.46	135.76	21.33

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
6	2437	18.32	17.95	130.294	21.15

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
6	2437	16.33	16.27	85.318	19.31

5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

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

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

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Web Site: www.bureauveritas-adt.com

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

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