

FCC Test Report

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FCC ID: TX2-RTL8852BE

Test Model: RTL8852BE

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Test Date: May 05 to July 08, 2021

Issued Date: Aug. 02, 2021

Applicant: Realtek Semiconductor Corp.

Address: No. 2, Innovation Road II, Hsinchu Science Park, Hsinchu 300, Taiwan

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

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan

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

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



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Release Control Record

Issue No.	Description	Date Issued
RFBBUI-WTW-P21040655	Original release.	Aug. 02, 2021

1 Certificate of Conformity

Product: 11ax RTL8852BE Combo module

Brand: REALTEK

Test Model: RTL8852BE

Sample Status: Engineering sample

Applicant: Realtek Semiconductor Corp.

Test Date: May 05 to July 08, 2021

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 :

Cherry Chuo

Cherry Chuo / Specialist

Date:

Aug. 02, 2021

Approved by :

Clark Lin

Clark Lin / Technical Manager

Date:

Aug. 02, 2021

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	PASS	Meet the requirement of limit. Minimum passing margin is -14.65dB at 25.875 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.5 dB at 2488.00 MHz, 2484.60 MHz, 2483.50 MHz, 2388.26 MHz, 2388.17 MHz, 2484.74 MHz, 2485.36 MHz, 2483.85 MHz, 2388.78 MHz, 2483.90 MHz and 2389.62 MHz
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF) not a standard connector.

Note:

- For 2.4GHz band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
- 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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Conducted emissions	-	2.5 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.1 dB
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	11ax RTL8852BE Combo module
Brand	REALTEK
Test Model	RTL8852BE
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 VHT (20/40) mode in 2.4GHz 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 300 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201 Mbps
Operating Frequency	2.4GHz: 2.412 ~ 2.472 GHz 5GHz: 5.18 ~ 5.24 GHz, 5.26 ~ 5.32 GHz, 5.50 ~ 5.72 GHz, 5.745 ~ 5.825 GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 13, 802.11n (HT40), VHT40, 802.11ax (HE40): 9 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 25 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 12 802.11ac (VHT80), 802.11ax (HE80): 6
Output Power	For 2TX CDD Mode: 2.4 GHz: 307.683 mW 5.18 ~ 5.24 GHz: 247.192 mW 5.26 ~ 5.32 GHz: 248.568 mW 5.5 ~ 5.72 GHz: 244.863 mW 5.745 ~ 5.825 GHz: 348 mW Beamforming Mode: 2.4 GHz: 304.343 mW 5.18 ~ 5.24 GHz: 156.619 mW 5.26 ~ 5.32 GHz: 156.367 mW 5.5 ~ 5.72 GHz: 156.336 mW 5.745 ~ 5.825 GHz: 320.286 mW For 1TX 2.4 GHz: 175.792 mW 5.18 ~ 5.24 GHz: 172.187 mW 5.26 ~ 5.32 GHz: 173.38 mW 5.5 ~ 5.72 GHz: 171.791 mW 5.745 ~ 5.825 GHz: 176.604 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. The EUT has below HW SKU configuration, as below table:

SKU No.	Interface	Description
1	PCIe + USB	Single antenna port
2	PCIe + USB	Dual antenna port
3	PCIe + UART	Dual antenna port

Note: From the above HW SKUs, for conducted emission & radiated below 1GHz the worse case was found in **SKU No.: 3** and other test items the worse case was found in **SKU No.: 2**. Therefore only the test data of the SKU was recorded in this report.

2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN 5GHz	Bluetooth

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

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

Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Frequency Range (GHz)	Ant. Type	Connector Type	Cable Length (mm)
1	Chain 0	ARISTOTLE	RFA-27-JP326-MHF4300	3.5	2.4~2.4835	PIFA	i-pex(MHF)	300
				5	5.15~5.85			
				5	5.875~7.125			
	Chain 1	ARISTOTLE	RFA-27-JP326-MHF4300	3.5	2.4~2.4835	PIFA	i-pex(MHF)	300
				5	5.15~5.85			
				5	5.875~7.125			
2	Chain 0	ARISTOTLE	RFA-27-C38H1-MHF4300	3	2.4~2.4835	Dipole	i-pex(MHF)	300
				5	5.15~5.85			
				5	5.875~7.125			
	Chain 1	ARISTOTLE	RFA-27-C38H1-MHF4300	3	2.4~2.4835	Dipole	i-pex(MHF)	300
				5	5.15~5.85			
				5	5.875~7.125			

Note:

- From the above transmission chains, the worse case was found in transmission on Chain 0 for 1TX mode. Therefore only the test data of the mode was recorded in this report.
- The Bluetooth technology will fix transmission on Chain 1.
- Max. gain was selected for the final test, except for the radiated emissions test.

4. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	2TX/1TX Diversity	2RX
802.11g	2TX/1TX Diversity	2RX
802.11n (HT20)	2TX/1TX Diversity	2RX
802.11n (HT40)	2TX/1TX Diversity	2RX
VHT20	2TX/1TX Diversity	2RX
VHT40	2TX/1TX Diversity	2RX
802.11ax (HE20)	2TX/1TX Diversity	2RX
802.11ax (HE40)	2TX/1TX Diversity	2RX
802.11ax (RU26/52/106/242/484)	2TX/1TX Diversity	2RX
5GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11a	2TX/1TX Diversity	2RX
802.11n (HT20)	2TX/1TX Diversity	2RX
802.11n (HT40)	2TX/1TX Diversity	2RX
802.11ac (VHT20)	2TX/1TX Diversity	2RX
802.11ac (VHT40)	2TX/1TX Diversity	2RX
802.11ac (VHT80)	2TX/1TX Diversity	2RX
802.11ax (HE20)	2TX/1TX Diversity	2RX
802.11ax (HE40)	2TX/1TX Diversity	2RX
802.11ax (HE80)	2TX/1TX Diversity	2RX
802.11ax (RU26/52/106/242/484/996)	2TX/1TX Diversity	2RX

Note:

1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), VHT mode for 20MHz (40MHz) and 802.11ax mode for 20MHz (40MHz), therefore the manufacturer will control the power for 802.11n mode as same as the VHT mode and ax mode or more lower than it and investigated worst case to representative mode in test report. (Final test mode refer to section 3.2.1)

5. 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.
6. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.2 Description of Test Modes

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

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

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
1	√	√	√	√	2TX
2	√	√	-	√	1TX

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

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Note: 1. The EUT's PIFA antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

2. For 20MHz bandwidth, 40MHz bandwidth and 80MHz bandwidth of RU mode, the worst case was found in 20MHz bandwidth. Therefore only the test data of the mode was recorded in this report.

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.

2TX (CDD Mode)						
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter	RU Configuration
802.11b	1 to 13	1, 6, 11, 12, 13	DSSS	DBPSK	1Mb/s	-
802.11g	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	6Mb/s	-
802.11ax (HE20)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	-
802.11ax (HE40)	3 to 11	3, 6, 9, 10, 11	OFDMA	BPSK	MCS0	-
802.11ax (RU26)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8, 26/8, 26/8
802.11ax (RU52)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40, 52/40, 52/40
802.11ax (RU106)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	106/53, 106/54, 106/54, 106/54, 106/54
1TX						
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter	RU Configuration
802.11b	1 to 13	1, 6, 11, 12, 13	DSSS	DBPSK	1Mb/s	-
802.11g	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	6Mb/s	-
802.11ax (HE20)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	-
802.11ax (HE40)	3 to 11	3, 6, 9, 10, 11	OFDMA	BPSK	MCS0	-
802.11ax (RU26)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8, 26/8, 26/8
802.11ax (RU52)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40, 52/40, 52/40
802.11ax (RU106)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	106/53, 106/54, 106/54, 106/54, 106/54

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.

1TX/2TX (CDD Mode)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter
802.11g	1 to 13	6	OFDM	BPSK	6Mb/s

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.

2TX (CDD Mode)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter
802.11g	1 to 13	6	OFDM	BPSK	6Mb/s

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.

2TX (CDD Mode)						
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter	RU Configuration
802.11b	1 to 13	1, 6, 11, 12, 13	DSSS	DBPSK	1Mb/s	-
802.11g	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	6Mb/s	-
VHT20 (Output power only)	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	MCS0	-
VHT40 (Output power only)	3 to 11	3, 6, 9, 10, 11	OFDM	BPSK	MCS0	-
802.11ax (HE20)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	-
802.11ax (HE40)	3 to 11	3, 6, 9, 10, 11	OFDMA	BPSK	MCS0	-
802.11ax (RU26)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8, 26/8
802.11ax (RU52)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40, 52/40, 52/40
802.11ax (RU106)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	106/53, 106/54, 106/54, 106/54, 106/54

2TX (Beamforming Mode) (output power only)						
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter	
VHT20	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	MCS0	
VHT40	3 to 11	3, 6, 9, 10, 11	OFDM	BPSK	MCS0	
802.11ax (HE20)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	
802.11ax (HE40)	3 to 11	3, 6, 9, 10, 11	OFDMA	BPSK	MCS0	
1TX						
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter	RU Configuration
802.11b	1 to 13	1, 6, 11, 12, 13	DSSS	DBPSK	1Mb/s	-
802.11g	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	6Mb/s	-
VHT20 (Output power only)	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	MCS0	-
VHT40 (Output power only)	3 to 11	3, 6, 9, 10, 11	OFDM	BPSK	MCS0	-
802.11ax (HE20)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	-
802.11ax (HE40)	3 to 11	3, 6, 9, 10, 11	OFDMA	BPSK	MCS0	-
802.11ax (RU26)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8, 26/8, 26/8
802.11ax (RU52)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40, 52/40, 52/40
802.11ax (RU106)	1 to 13	1, 6, 11, 12, 13	OFDMA	BPSK	MCS0	106/53, 106/54, 106/54, 106/54, 106/54

Test Condition:

Applicable To	Environmental Conditions	Input Power (System)	Tested By
RE≥1G	25deg. C, 71%RH	120Vac, 60Hz	Sampson Chen
RE<1G	25deg. C, 71%RH	120Vac, 60Hz	Sampson Chen
PLC	25deg. C, 65%RH	120Vac, 60Hz	Sampson Chen
APCM	25deg. C, 60%RH	120Vac, 60Hz	Kevin Ko

3.3 Duty Cycle of Test Signal

For Mode 1:

Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11b: Duty cycle = $8.188 \text{ ms} / 8.203 \text{ ms} = 0.998$

802.11g: Duty cycle = $1.359 \text{ ms} / 1.375 \text{ ms} = 0.988$

802.11ax (HE20): Duty cycle = $0.985 \text{ ms} / 0.994 \text{ ms} = 0.991$

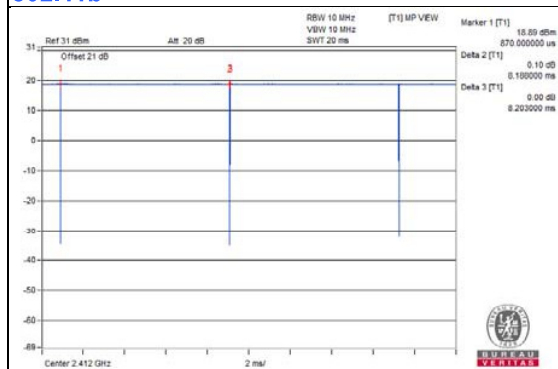
802.11ax (HE40): Duty cycle = $0.519 \text{ ms} / 0.528 \text{ ms} = 0.983$

802.11ax (RU26): Duty cycle = $4.881 / 4.893 = 0.998$

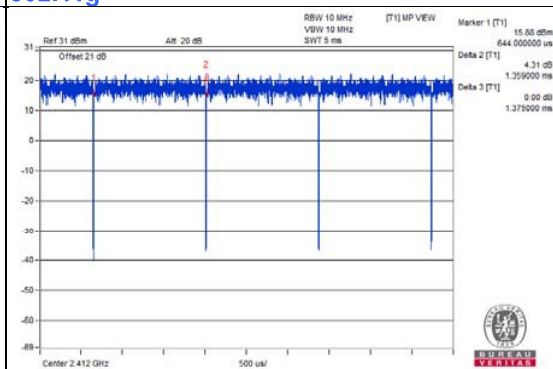
802.11ax (RU52): Duty cycle = $2.474 / 2.485 = 0.996$

802.11ax (RU106): Duty cycle = $1.2 / 1.208 = 0.993$

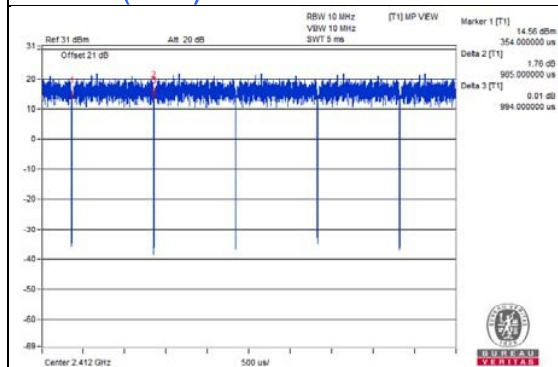
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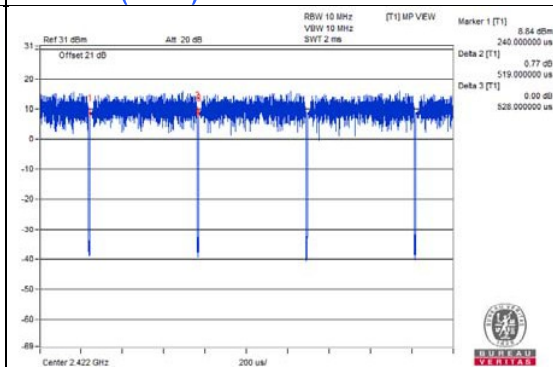
802.11g



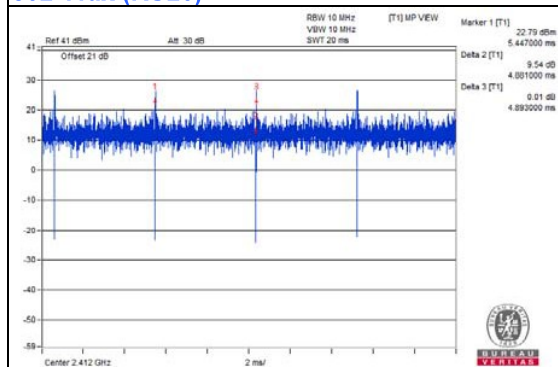
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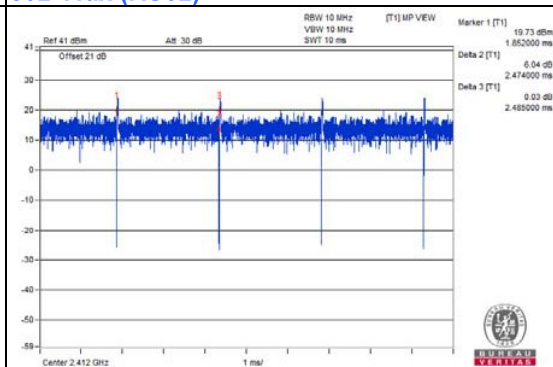
802.11ax (HE40)



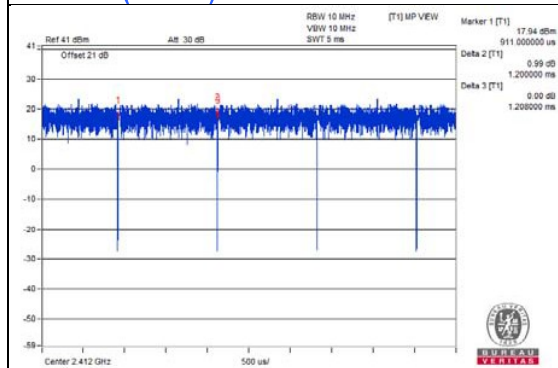
802.11ax (RU26)



802.11ax (RU52)



802.11ax (RU106)



For Mode 2:

Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11b: Duty cycle = 8.188 ms / 8.203 ms = 0.998

802.11g: Duty cycle = 1.359 ms / 1.375 ms = 0.988

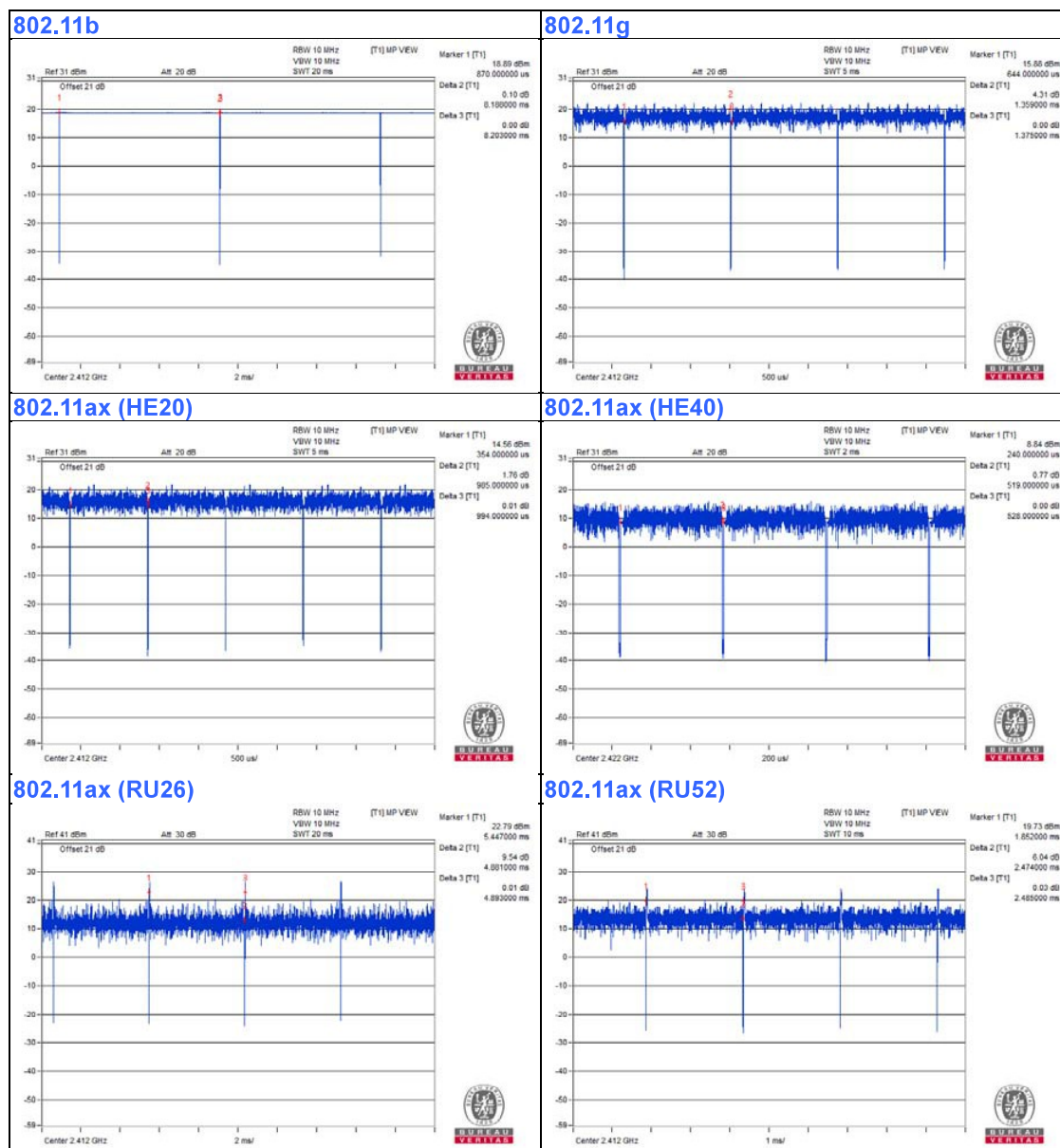
802.11ax (HE20): Duty cycle = 0.985 ms / 0.994 ms = 0.991

802.11ax (HE40): Duty cycle = 0.519 ms / 0.528 ms = 0.983

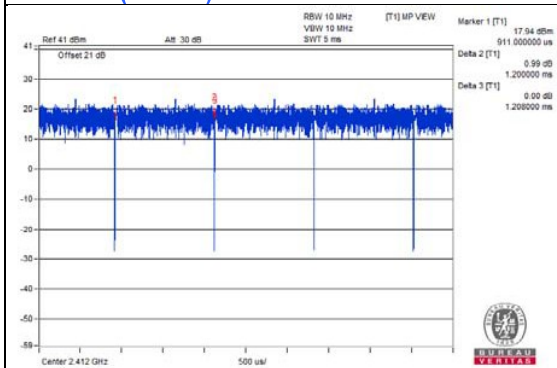
802.11ax (RU26): Duty cycle = 4.881 / 4.893 = 0.998

802.11ax (RU52): Duty cycle = 2.474 / 2.485 = 0.996

802.11ax (RU106): Duty cycle = 1.2 / 1.208 = 0.993



802.11ax (RU106)



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	E6420	B92T3R1	FCC DoC	Provided by Lab
B.	Test Tool	Realtek	NA	NA	NA	Supplied by client
C.	Adapter	DELL	FA65NE0-00	NA	NA	Provided by Lab

Note:

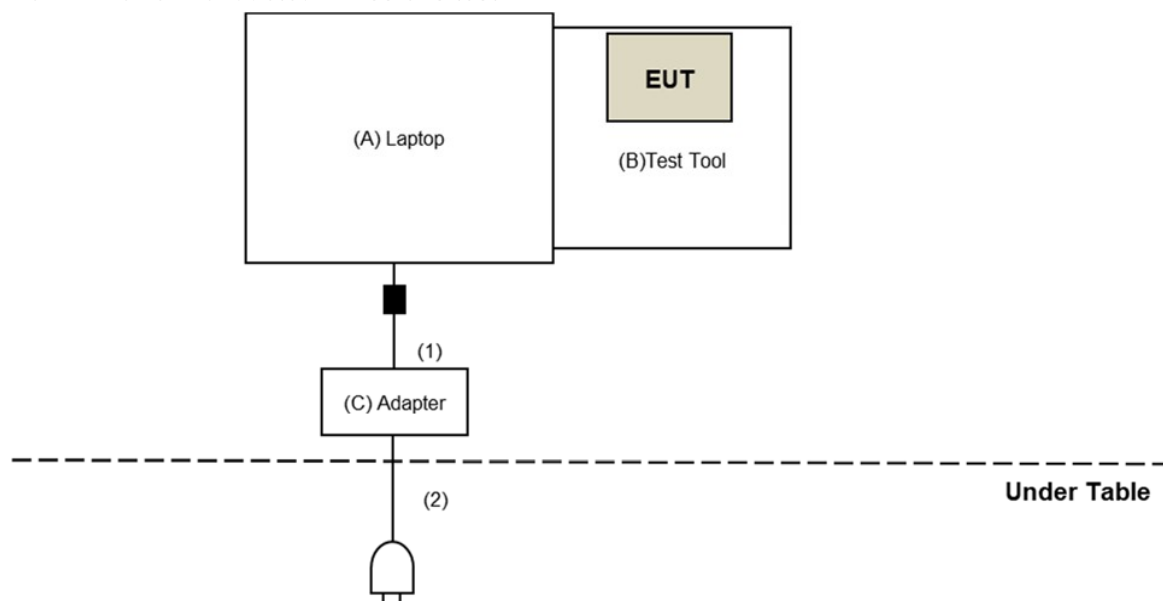
1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.8	No	1	Provided by Lab
2.	AC Cable	1	1	No	0	Provided by Lab

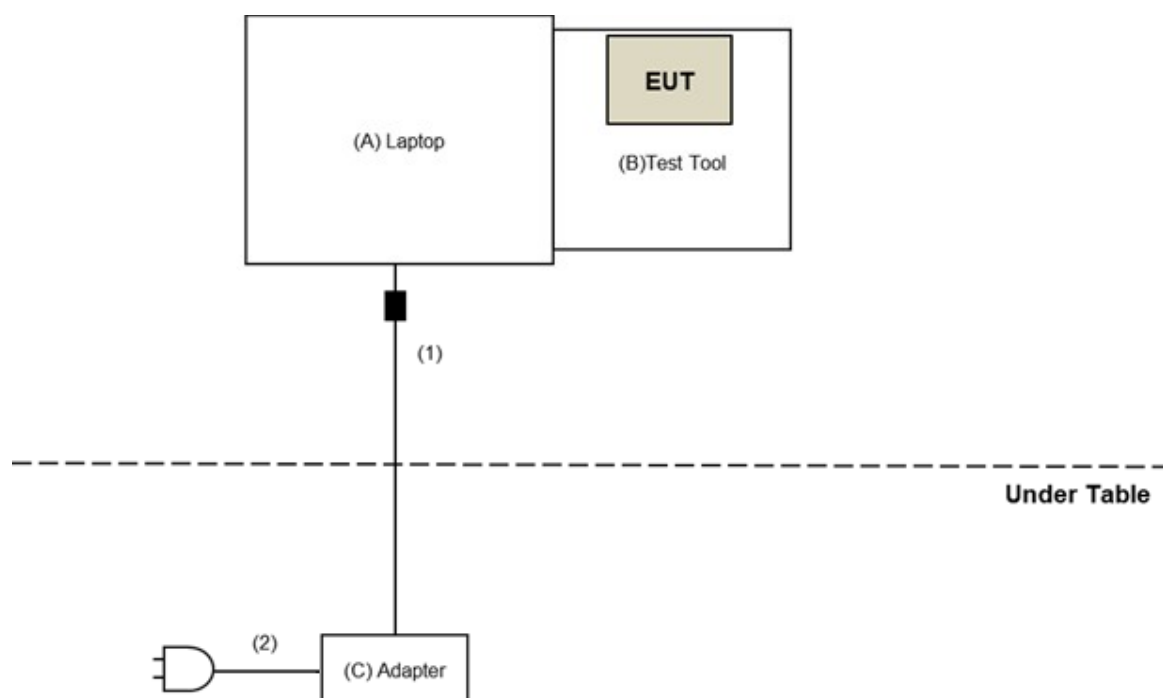
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

For AC Power Conducted Emissions 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 30dB 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 (above 1GHz) and Bandedge test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESR3	102528	Mar. 02, 2021	Mar. 01, 2022
Spectrum Analyzer Keysight	N9030B	MY57142938	Apr. 26, 2021	Apr. 25, 2022
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-1819	Nov. 22, 2020	Nov. 21, 2021
Pre-Amplifier EMCI	EMC12630SE	980509	Apr. 26, 2021	Apr. 25, 2022
RF Cable EMCI	EMC104-SM-SM-1500	180503	Apr. 26, 2021	Apr. 25, 2022
RF Cable EMCI	EMC104-SM-SM-2000	180501	Apr. 26, 2021	Apr. 25, 2022
RF Cable EMCI	EMC104-SM-SM-6000	180506	Apr. 26, 2021	Apr. 25, 2022
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 11, 2021	Jan. 10, 2022
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 22, 2020	Nov. 21, 2021
RF Cable	EMC102-KM-KM-1200	160924	Jan. 11, 2021	Jan. 10, 2022
RF Cable	EMC-KM-KM-4000	200214	Mar. 10, 2021	Mar. 09, 2022
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 5.
3. Tested Date: May 05 to July 03, 2021

For Radiated Emission (below 1GHz) test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESR3	102528	Mar. 02, 2021	Mar. 01, 2022
Spectrum Analyzer Keysight	N9030B	MY57142938	Apr. 26, 2021	Apr. 25, 2022
Pre-Amplifier EMCI	EMC001340	980142	May 24, 2021	May 23, 2022
Loop Antenna Electro-Metrics	EM-6879	264	Mar. 05, 2021	Mar. 04, 2022
RF Cable	5D-FB	LOOPCAB-001	Jan. 07, 2021	Jan. 06, 2022
RF Cable	5D-FB	LOOPCAB-002	Jan. 07, 2021	Jan. 06, 2022
Pre-Amplifier EMCI	EMC330N	980538	Apr. 26, 2021	Apr. 25, 2022
Trilog Broadband Antenna SCHWARZBECK	VULB9168	9168-0842	Nov. 03, 2020	Nov. 02, 2021
RF Cable	8D	966-5-1	Apr. 26, 2021	Apr. 25, 2022
RF Cable	8D	966-5-2	Apr. 26, 2021	Apr. 25, 2022
RF Cable	8D	966-5-3	Apr. 26, 2021	Apr. 25, 2022
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	Jan. 11, 2021	Jan. 10, 2022
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 5.
3. Tested Date: June 19, 2021

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	101516	Mar. 08, 2021	Mar. 07, 2022
Power meter Anritsu	ML2495A	1529002	July 22, 2020	July 21, 2021
Power sensor Anritsu	MA2411B	1339443	May 31, 2021	May 30, 2022
10dB Attenuator Woken	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
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: June 01 to July 08, 2021

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

NOTE:

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

For Radiated emission above 30MHz

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

Note:

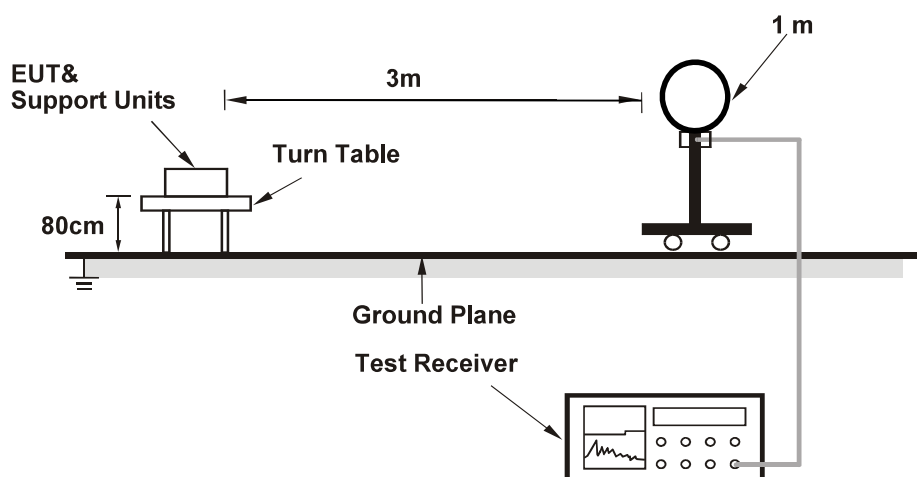
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

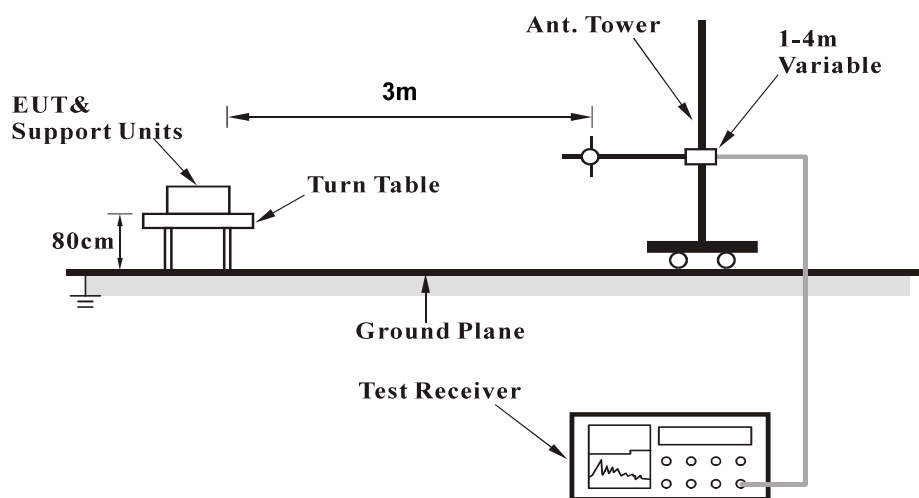
No deviation.

4.1.5 Test Setup

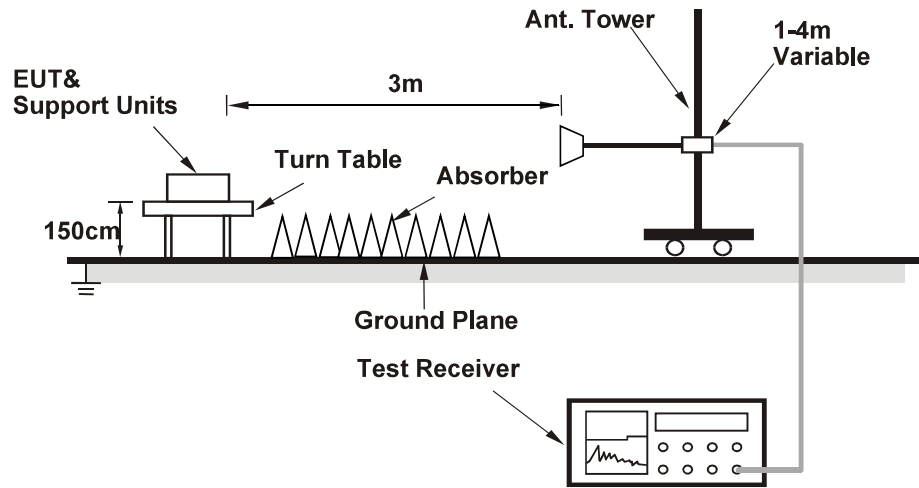
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- a. Connected the EUT with the Laptop which is placed on testing table.
- b. Controlling software (RTL8852B MP Toolkit V1.0.16) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results (Mode 1)

Dipole Antenna

RF Mode	TX 802.11b	Channel	CH 1 : 2412 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	2373.90	55.7 PK	74.0	-18.3	1.50 H	118	58.3	-2.6
2	2373.90	44.0 AV	54.0	-10.0	1.50 H	118	46.6	-2.6
3	2389.00	52.5 PK	74.0	-21.5	1.50 H	118	55.2	-2.7
4	2389.00	44.3 AV	54.0	-9.7	1.50 H	118	47.0	-2.7
5	*2412.00	103.6 PK			1.50 H	118	106.3	-2.7
6	*2412.00	101.3 AV			1.50 H	118	104.0	-2.7
7	4824.00	45.5 PK	74.0	-28.5	1.04 H	269	43.7	1.8
8	4824.00	42.7 AV	54.0	-11.3	1.04 H	269	40.9	1.8
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	2385.30	59.1 PK	74.0	-14.9	1.67 V	123	61.8	-2.7
2	2385.30	49.5 AV	54.0	-4.5	1.67 V	123	52.2	-2.7
3	*2412.00	113.7 PK			1.67 V	123	116.4	-2.7
4	*2412.00	111.3 AV			1.67 V	123	114.0	-2.7
5	4824.00	44.3 PK	74.0	-29.7	1.28 V	78	42.5	1.8
6	4824.00	41.3 AV	54.0	-12.7	1.28 V	78	39.5	1.8

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 802.11b	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	54.3 PK	74.0	-19.7	1.46 H	132	57.0	-2.7
2	2390.00	41.3 AV	54.0	-12.7	1.46 H	132	44.0	-2.7
3	*2437.00	104.8 PK			1.46 H	132	107.5	-2.7
4	*2437.00	102.5 AV			1.46 H	132	105.2	-2.7
5	2483.50	57.3 PK	74.0	-16.7	1.46 H	132	60.1	-2.8
6	2483.50	41.9 AV	54.0	-12.1	1.46 H	132	44.7	-2.8
7	4874.00	45.9 PK	74.0	-28.1	1.01 H	267	44.2	1.7
8	4874.00	42.9 AV	54.0	-11.1	1.01 H	267	41.2	1.7
9	7311.00	49.3 PK	74.0	-24.7	1.48 H	288	42.1	7.2
10	7311.00	44.1 AV	54.0	-9.9	1.48 H	288	36.9	7.2
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	58.8 PK	74.0	-15.2	1.63 V	128	61.5	-2.7
2	2390.00	46.6 AV	54.0	-7.4	1.63 V	128	49.3	-2.7
3	*2437.00	114.3 PK			1.63 V	128	117.0	-2.7
4	*2437.00	112.6 AV			1.63 V	128	115.3	-2.7
5	2483.50	61.2 PK	74.0	-12.8	1.63 V	128	64.0	-2.8
6	2483.50	46.1 AV	54.0	-7.9	1.63 V	128	48.9	-2.8
7	4874.00	44.8 PK	74.0	-29.2	1.23 V	87	43.1	1.7
8	4874.00	41.8 AV	54.0	-12.2	1.23 V	87	40.1	1.7
9	7311.00	54.2 PK	74.0	-19.8	2.93 V	50	47.0	7.2
10	7311.00	50.8 AV	54.0	-3.2	2.93 V	50	43.6	7.2

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 802.11b	Channel	CH 11 : 2462 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	*2462.00	106.2 PK			1.48 H	112	109.0	-2.8
2	*2462.00	102.3 AV			1.48 H	112	105.1	-2.8
3	2483.50	55.8 PK	74.0	-18.2	1.48 H	112	58.6	-2.8
4	2483.50	45.4 AV	54.0	-8.6	1.48 H	112	48.2	-2.8
5	2491.70	57.1 PK	74.0	-16.9	1.48 H	112	59.9	-2.8
6	2491.70	44.8 AV	54.0	-9.2	1.48 H	112	47.6	-2.8
7	4924.00	44.9 PK	74.0	-29.1	1.00 H	258	43.1	1.8
8	4924.00	42.1 AV	54.0	-11.9	1.00 H	258	40.3	1.8
9	7386.00	46.7 PK	74.0	-27.3	1.45 H	302	39.3	7.4
10	7386.00	41.8 AV	54.0	-12.2	1.45 H	302	34.4	7.4
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	*2462.00	113.5 PK			1.63 V	154	116.3	-2.8
2	*2462.00	111.0 AV			1.63 V	154	113.8	-2.8
3	2484.40	58.6 PK	74.0	-15.4	1.63 V	154	61.4	-2.8
4	2484.40	48.6 AV	54.0	-5.4	1.63 V	154	51.4	-2.8
5	2484.80	58.1 PK	74.0	-15.9	1.63 V	154	60.9	-2.8
6	2484.80	50.3 AV	54.0	-3.7	1.63 V	154	53.1	-2.8
7	4924.00	43.6 PK	74.0	-30.4	1.29 V	87	41.8	1.8
8	4924.00	40.9 AV	54.0	-13.1	1.29 V	87	39.1	1.8
9	7386.00	51.0 PK	74.0	-23.0	2.67 V	87	43.6	7.4
10	7386.00	47.3 AV	54.0	-6.7	2.67 V	87	39.9	7.4

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 802.11b	Channel	CH 12 : 2467 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	*2467.00	97.1 PK			1.49 H	113	99.9	-2.8
2	*2467.00	94.6 AV			1.49 H	113	97.4	-2.8
3	2484.70	55.3 PK	74.0	-18.7	1.49 H	113	58.1	-2.8
4	2484.70	44.4 AV	54.0	-9.6	1.49 H	113	47.2	-2.8
5	4934.00	45.0 PK	74.0	-29.0	1.05 H	269	43.2	1.8
6	4934.00	42.3 AV	54.0	-11.7	1.05 H	269	40.5	1.8
7	7401.00	46.9 PK	74.0	-27.1	1.43 H	292	39.4	7.5
8	7401.00	42.0 AV	54.0	-12.0	1.43 H	292	34.5	7.5

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	*2467.00	107.6 PK			1.67 V	297	110.4	-2.8
2	*2467.00	105.2 AV			1.67 V	297	108.0	-2.8
3	2484.22	59.8 PK	74.0	-14.2	1.67 V	297	62.6	-2.8
4	2484.22	52.3 AV	54.0	-1.7	1.67 V	297	55.1	-2.8
5	4934.00	43.6 PK	74.0	-30.4	1.24 V	83	41.8	1.8
6	4934.00	40.9 AV	54.0	-13.1	1.24 V	83	39.1	1.8
7	7401.00	50.6 PK	74.0	-23.4	2.63 V	80	43.1	7.5
8	7401.00	47.1 AV	54.0	-6.9	2.63 V	80	39.6	7.5

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 802.11b	Channel	CH 13 : 2472 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	*2472.00	96.6 PK			1.46 H	116	99.4	-2.8
2	*2472.00	93.6 AV			1.46 H	116	96.4	-2.8
3	2483.50	57.0 PK	74.0	-17.0	1.46 H	116	59.8	-2.8
4	2483.50	46.5 AV	54.0	-7.5	1.46 H	116	49.3	-2.8
5	4944.00	44.6 PK	74.0	-29.4	1.05 H	249	42.8	1.8
6	4944.00	42.0 AV	54.0	-12.0	1.05 H	249	40.2	1.8
7	7416.00	46.9 PK	74.0	-27.1	1.41 H	302	39.4	7.5
8	7416.00	41.9 AV	54.0	-12.1	1.41 H	302	34.4	7.5

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	*2472.00	104.7 PK			1.59 V	126	107.5	-2.8
2	*2472.00	102.2 AV			1.59 V	126	105.0	-2.8
3	2484.60	59.8 PK	74.0	-14.2	1.59 V	126	62.6	-2.8
4	2484.60	52.5 AV	54.0	-1.5	1.59 V	126	55.3	-2.8
5	4944.00	43.9 PK	74.0	-30.1	1.24 V	101	42.1	1.8
6	4944.00	41.4 AV	54.0	-12.6	1.24 V	101	39.6	1.8
7	7416.00	50.8 PK	74.0	-23.2	2.73 V	74	43.3	7.5
8	7416.00	47.3 AV	54.0	-6.7	2.73 V	74	39.8	7.5

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 1 : 2412 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	58.2 PK	74.0	-15.8	1.24 H	109	60.9	-2.7
2	2390.00	45.1 AV	54.0	-8.9	1.24 H	109	47.8	-2.7
3	*2412.00	107.1 PK			1.24 H	109	109.8	-2.7
4	*2412.00	96.2 AV			1.24 H	109	98.9	-2.7
5	4824.00	44.6 PK	74.0	-29.4	1.00 H	268	42.8	1.8
6	4824.00	41.7 AV	54.0	-12.3	1.00 H	268	39.9	1.8

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	61.2 PK	74.0	-12.8	1.65 V	131	63.9	-2.7
2	2390.00	47.7 AV	54.0	-6.3	1.65 V	131	50.4	-2.7
3	*2412.00	114.1 PK			1.65 V	131	116.8	-2.7
4	*2412.00	105.0 AV			1.65 V	131	107.7	-2.7
5	4824.00	43.4 PK	74.0	-30.6	1.25 V	81	41.6	1.8
6	4824.00	40.6 AV	54.0	-13.4	1.25 V	81	38.8	1.8

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	54.9 PK	74.0	-19.1	1.28 H	96	57.6	-2.7
2	2390.00	41.6 AV	54.0	-12.4	1.28 H	96	44.3	-2.7
3	*2437.00	111.4 PK			1.28 H	96	114.1	-2.7
4	*2437.00	100.7 AV			1.28 H	96	103.4	-2.7
5	2483.50	57.8 PK	74.0	-16.2	1.28 H	96	60.6	-2.8
6	2483.50	42.1 AV	54.0	-11.9	1.28 H	96	44.9	-2.8
7	4874.00	45.2 PK	74.0	-28.8	1.05 H	257	43.5	1.7
8	4874.00	42.2 AV	54.0	-11.8	1.05 H	257	40.5	1.7
9	7311.00	46.7 PK	74.0	-27.3	1.46 H	288	39.5	7.2
10	7311.00	42.1 AV	54.0	-11.9	1.46 H	288	34.9	7.2
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	58.6 PK	74.0	-15.4	1.54 V	122	61.3	-2.7
2	2390.00	46.6 AV	54.0	-7.4	1.54 V	122	49.3	-2.7
3	*2437.00	119.6 PK			1.54 V	122	122.3	-2.7
4	*2437.00	110.6 AV			1.54 V	122	113.3	-2.7
5	2483.50	61.4 PK	74.0	-12.6	1.54 V	122	64.2	-2.8
6	2483.50	46.5 AV	54.0	-7.5	1.54 V	122	49.3	-2.8
7	4874.00	43.7 PK	74.0	-30.3	1.32 V	81	42.0	1.7
8	4874.00	41.2 AV	54.0	-12.8	1.32 V	81	39.5	1.7
9	7311.00	51.1 PK	74.0	-22.9	2.64 V	93	43.9	7.2
10	7311.00	47.5 AV	54.0	-6.5	2.64 V	93	40.3	7.2

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 802.11g	Channel	CH 11 : 2462 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	*2462.00	108.3 PK			1.50 H	115	111.1	-2.8
2	*2462.00	97.3 AV			1.50 H	115	100.1	-2.8
3	2483.50	57.6 PK	74.0	-16.4	1.50 H	115	60.4	-2.8
4	2483.50	46.0 AV	54.0	-8.0	1.50 H	115	48.8	-2.8
5	2484.30	60.4 PK	74.0	-13.6	1.50 H	115	63.2	-2.8
6	2484.30	45.8 AV	54.0	-8.2	1.50 H	115	48.6	-2.8
7	4924.00	45.3 PK	74.0	-28.7	1.05 H	269	43.5	1.8
8	4924.00	42.4 AV	54.0	-11.6	1.05 H	269	40.6	1.8
9	7386.00	47.2 PK	74.0	-26.8	1.47 H	303	39.8	7.4
10	7386.00	42.0 AV	54.0	-12.0	1.47 H	303	34.6	7.4
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	*2462.00	113.9 PK			1.69 V	128	116.7	-2.8
2	*2462.00	105.3 AV			1.69 V	128	108.1	-2.8
3	2483.50	58.2 PK	74.0	-15.8	1.69 V	128	61.0	-2.8
4	2483.50	48.3 AV	54.0	-5.7	1.69 V	128	51.1	-2.8
5	2485.30	63.1 PK	74.0	-10.9	1.69 V	128	65.9	-2.8
6	2485.30	47.5 AV	54.0	-6.5	1.69 V	128	50.3	-2.8
7	4924.00	43.8 PK	74.0	-30.2	1.24 V	80	42.0	1.8
8	4924.00	41.0 AV	54.0	-13.0	1.24 V	80	39.2	1.8
9	7386.00	50.6 PK	74.0	-23.4	2.67 V	77	43.2	7.4
10	7386.00	47.1 AV	54.0	-6.9	2.67 V	77	39.7	7.4

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 12 : 2467 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	*2467.00	104.0 PK			1.54 H	113	106.8	-2.8
2	*2467.00	93.3 AV			1.54 H	113	96.1	-2.8
3	2483.50	58.3 PK	74.0	-15.7	1.54 H	113	61.1	-2.8
4	2483.50	45.6 AV	54.0	-8.4	1.54 H	113	48.4	-2.8
5	4934.00	45.9 PK	74.0	-28.1	1.04 H	264	44.1	1.8
6	4934.00	42.8 AV	54.0	-11.2	1.04 H	264	41.0	1.8
7	7401.00	47.2 PK	74.0	-26.8	1.50 H	306	39.7	7.5
8	7401.00	42.1 AV	54.0	-11.9	1.50 H	306	34.6	7.5
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	*2467.00	110.0 PK			1.67 V	125	112.8	-2.8
2	*2467.00	101.0 AV			1.67 V	125	103.8	-2.8
3	2483.50	58.2 PK	74.0	-15.8	1.67 V	125	61.0	-2.8
4	2483.50	47.5 AV	54.0	-6.5	1.67 V	125	50.3	-2.8
5	2484.40	59.8 PK	74.0	-14.2	1.67 V	125	62.6	-2.8
6	2484.40	46.1 AV	54.0	-7.9	1.67 V	125	48.9	-2.8
7	4934.00	44.1 PK	74.0	-29.9	1.30 V	64	42.3	1.8
8	4934.00	41.1 AV	54.0	-12.9	1.30 V	64	39.3	1.8
9	7401.00	49.9 PK	74.0	-24.1	2.70 V	84	42.4	7.5
10	7401.00	46.6 AV	54.0	-7.4	2.70 V	84	39.1	7.5

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 13 : 2472 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	*2472.00	102.6 PK			1.44 H	112	105.4	-2.8
2	*2472.00	92.2 AV			1.44 H	112	95.0	-2.8
3	2483.50	59.7 PK	74.0	-14.3	1.44 H	112	62.5	-2.8
4	2483.50	45.6 AV	54.0	-8.4	1.44 H	112	48.4	-2.8
5	4944.00	45.2 PK	74.0	-28.8	1.08 H	268	43.4	1.8
6	4944.00	42.1 AV	54.0	-11.9	1.08 H	268	40.3	1.8
7	7416.00	47.1 PK	74.0	-26.9	1.50 H	288	39.6	7.5
8	7416.00	42.0 AV	54.0	-12.0	1.50 H	288	34.5	7.5

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	*2472.00	109.2 PK			1.54 V	129	112.0	-2.8
2	*2472.00	100.0 AV			1.54 V	129	102.8	-2.8
3	2483.80	64.9 PK	74.0	-9.1	1.54 V	129	67.7	-2.8
4	2483.80	48.4 AV	54.0	-5.6	1.54 V	129	51.2	-2.8
5	4944.00	43.5 PK	74.0	-30.5	1.28 V	91	41.7	1.8
6	4944.00	40.9 AV	54.0	-13.1	1.28 V	91	39.1	1.8
7	7416.00	50.4 PK	74.0	-23.6	2.62 V	71	42.9	7.5
8	7416.00	47.0 AV	54.0	-7.0	2.62 V	71	39.5	7.5

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 1 : 2412 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	2378.80	57.4 PK	74.0	-16.6	1.26 H	111	60.0	-2.6
2	2378.80	44.7 AV	54.0	-9.3	1.26 H	111	47.3	-2.6
3	2390.00	56.3 PK	74.0	-17.7	1.26 H	111	59.0	-2.7
4	2390.00	45.3 AV	54.0	-8.7	1.26 H	111	48.0	-2.7
5	*2412.00	104.9 PK			1.26 H	111	107.6	-2.7
6	*2412.00	94.3 AV			1.26 H	111	97.0	-2.7
7	4824.00	44.8 PK	74.0	-29.2	1.04 H	267	43.0	1.8
8	4824.00	42.0 AV	54.0	-12.0	1.04 H	267	40.2	1.8

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	2384.60	61.0 PK	74.0	-13.0	1.71 V	127	63.6	-2.6
2	2384.60	47.1 AV	54.0	-6.9	1.71 V	127	49.7	-2.6
3	2390.00	58.5 PK	74.0	-15.5	1.71 V	127	61.2	-2.7
4	2390.00	48.1 AV	54.0	-5.9	1.71 V	127	50.8	-2.7
5	*2412.00	115.8 PK			1.71 V	127	118.5	-2.7
6	*2412.00	105.0 AV			1.71 V	127	107.7	-2.7
7	4824.00	43.4 PK	74.0	-30.6	1.34 V	88	41.6	1.8
8	4824.00	40.7 AV	54.0	-13.3	1.34 V	88	38.9	1.8

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	53.6 PK	74.0	-20.4	1.24 H	109	56.3	-2.7
2	2390.00	40.9 AV	54.0	-13.1	1.24 H	109	43.6	-2.7
3	*2437.00	111.3 PK			1.24 H	109	114.0	-2.7
4	*2437.00	100.6 AV			1.24 H	109	103.3	-2.7
5	2483.50	57.2 PK	74.0	-16.8	1.24 H	109	60.0	-2.8
6	2483.50	41.9 AV	54.0	-12.1	1.24 H	109	44.7	-2.8
7	4874.00	45.0 PK	74.0	-29.0	1.04 H	246	43.3	1.7
8	4874.00	42.5 AV	54.0	-11.5	1.04 H	246	40.8	1.7
9	7311.00	46.8 PK	74.0	-27.2	1.40 H	286	39.6	7.2
10	7311.00	42.0 AV	54.0	-12.0	1.40 H	286	34.8	7.2
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	58.6 PK	74.0	-15.4	1.66 V	127	61.3	-2.7
2	2390.00	46.8 AV	54.0	-7.2	1.66 V	127	49.5	-2.7
3	*2437.00	119.4 PK			1.66 V	127	122.1	-2.7
4	*2437.00	110.4 AV			1.66 V	127	113.1	-2.7
5	2483.50	61.9 PK	74.0	-12.1	1.66 V	127	64.7	-2.8
6	2483.50	46.8 AV	54.0	-7.2	1.66 V	127	49.6	-2.8
7	4874.00	44.1 PK	74.0	-29.9	1.25 V	82	42.4	1.7
8	4874.00	41.3 AV	54.0	-12.7	1.25 V	82	39.6	1.7
9	7311.00	51.2 PK	74.0	-22.8	2.71 V	91	44.0	7.2
10	7311.00	47.6 AV	54.0	-6.4	2.71 V	91	40.4	7.2

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 11 : 2462 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	*2462.00	106.3 PK			1.50 H	115	109.1	-2.8
2	*2462.00	95.5 AV			1.50 H	115	98.3	-2.8
3	2483.50	57.2 PK	74.0	-16.8	1.50 H	115	60.0	-2.8
4	2483.50	46.2 AV	54.0	-7.8	1.50 H	115	49.0	-2.8
5	4924.00	45.0 PK	74.0	-29.0	1.03 H	258	43.2	1.8
6	4924.00	42.5 AV	54.0	-11.5	1.03 H	258	40.7	1.8
7	7386.00	46.6 PK	74.0	-27.4	1.40 H	304	39.2	7.4
8	7386.00	41.5 AV	54.0	-12.5	1.40 H	304	34.1	7.4

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	*2462.00	115.6 PK			1.36 V	98	118.4	-2.8
2	*2462.00	104.9 AV			1.36 V	98	107.7	-2.8
3	2483.50	63.2 PK	74.0	-10.8	1.36 V	98	66.0	-2.8
4	2483.50	50.1 AV	54.0	-3.9	1.36 V	98	52.9	-2.8
5	4924.00	43.1 PK	74.0	-30.9	1.23 V	86	41.3	1.8
6	4924.00	40.6 AV	54.0	-13.4	1.23 V	86	38.8	1.8
7	7386.00	51.1 PK	74.0	-22.9	2.68 V	101	43.7	7.4
8	7386.00	47.6 AV	54.0	-6.4	2.68 V	101	40.2	7.4

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 12 : 2467 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	*2467.00	101.9 PK			1.40 H	111	104.7	-2.8
2	*2467.00	92.2 AV			1.40 H	111	95.0	-2.8
3	2489.20	58.3 PK	74.0	-15.7	1.40 H	111	61.1	-2.8
4	2489.20	45.2 AV	54.0	-8.8	1.40 H	111	48.0	-2.8
5	4934.00	44.9 PK	74.0	-29.1	1.00 H	253	43.1	1.8
6	4934.00	41.9 AV	54.0	-12.1	1.00 H	253	40.1	1.8
7	7401.00	46.2 PK	74.0	-27.8	1.42 H	312	38.7	7.5
8	7401.00	41.5 AV	54.0	-12.5	1.42 H	312	34.0	7.5

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	*2467.00	112.5 PK			1.61 V	124	115.3	-2.8
2	*2467.00	101.5 AV			1.61 V	124	104.3	-2.8
3	2483.50	65.5 PK	74.0	-8.5	1.61 V	124	68.3	-2.8
4	2483.50	48.1 AV	54.0	-5.9	1.61 V	124	50.9	-2.8
5	4934.00	43.6 PK	74.0	-30.4	1.29 V	94	41.8	1.8
6	4934.00	40.6 AV	54.0	-13.4	1.29 V	94	38.8	1.8
7	7401.00	51.0 PK	74.0	-23.0	2.67 V	103	43.5	7.5
8	7401.00	47.2 AV	54.0	-6.8	2.67 V	103	39.7	7.5

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 13 : 2472 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	*2472.00	102.3 PK			1.47 H	113	105.1	-2.8
2	*2472.00	91.6 AV			1.47 H	113	94.4	-2.8
3	2483.50	58.3 PK	74.0	-15.7	1.47 H	113	61.1	-2.8
4	2483.50	46.1 AV	54.0	-7.9	1.47 H	113	48.9	-2.8
5	4944.00	45.1 PK	74.0	-28.9	1.05 H	251	43.3	1.8
6	4944.00	42.2 AV	54.0	-11.8	1.05 H	251	40.4	1.8
7	7416.00	47.2 PK	74.0	-26.8	1.45 H	293	39.7	7.5
8	7416.00	42.2 AV	54.0	-11.8	1.45 H	293	34.7	7.5

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	*2472.00	110.6 PK			1.52 V	125	113.4	-2.8
2	*2472.00	100.3 AV			1.52 V	125	103.1	-2.8
3	2483.50	71.5 PK	74.0	-2.5	1.52 V	125	74.3	-2.8
4	2483.50	48.7 AV	54.0	-5.3	1.52 V	125	51.5	-2.8
5	4944.00	43.1 PK	74.0	-30.9	1.24 V	93	41.3	1.8
6	4944.00	40.5 AV	54.0	-13.5	1.24 V	93	38.7	1.8
7	7416.00	51.2 PK	74.0	-22.8	2.65 V	77	43.7	7.5
8	7416.00	47.8 AV	54.0	-6.2	2.65 V	77	40.3	7.5

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.