

FCC Test Report (WLAN)

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FCC ID: TX2-RTL8852BE

Test Model: RTL8852BE

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Release Control Record

Issue No.	Description	Date Issued
RFBBUI-WTW-P21040655-1	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 20 to July 13, 2021

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 EMC characteristics under the conditions specified in this report.

Prepared by : Vivian Huang , **Date:** Aug. 02, 2021
Vivian Huang / Specialist

Approved by : Clark Lin , **Date:** Aug. 02, 2021
Clark Lin / 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 -14.52dB at 25.875 MHz.
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 -1.5 dB at 5350.00 MHz, 5727.81 MHz, 5148.00 MHz, 5353.63 MHz, 5496.91 MHz, 5725.00 MHz, 5150.00 MHz, 5470.00 MHz, 5736.44 MHz, 5929.56 MHz, 5361.10 MHz, 5467.25 MHz, 5736.69 MHz, 5643.50 MHz, 5148.36 MHz and 5351.20 MHz
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

Note:

- For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.
- For U-NII-1, U-NII-2A, U-NII-2C band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex B. 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
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 (WLAN)

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
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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, 80MHz) and 802.11ax mode for 20MHz (40MHz, 80MHz), 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

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
42	5210 MHz

FOR 5260 ~ 5320MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

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

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

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
58	5290 MHz

FOR 5500 ~ 5720MHz

12 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz

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

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	138	5690 MHz
122	5610 MHz		

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
155	5775 MHz

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

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	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter	RU Configuration
802.11a	5180-5320	36 to 64	36, 40, 48, 52, 60, 64	OFDM	BPSK	6Mb/s	-
802.11ax (HE20)		36 to 64	36, 40, 48, 52, 60, 64	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		38 to 62	38, 46, 54, 62	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		42, 58	42, 58	OFDMA	BPSK	MCS0	-
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6Mb/s	-
802.11ax (HE20)		100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		102 to 142	102, 110, 134, 142	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		106 to 138	106, 122, 138	OFDMA	BPSK	MCS0	-
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6Mb/s	-
802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		151 to 159	151, 159	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		155	155	OFDMA	BPSK	MCS0	-
802.11ax (RU26)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8, 26/8
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
802.11ax (RU52)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40, 52/40
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
802.11ax (RU106)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	106/53, 106/53, 106/54
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	106/53, 106/54, 106/54
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	106/53, 106/53, 106/54, 106/54
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	106/53, 106/54, 106/54

1TX							
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter	RU Configuration
802.11a	5180-5320	36 to 64	36, 40, 48, 52, 60, 64	OFDM	BPSK	6Mb/s	-
802.11ax (HE20)		36 to 64	36, 40, 48, 52, 60, 64	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		38 to 62	38, 46, 54, 62	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		42, 58	42, 58	OFDMA	BPSK	MCS0	-
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6Mb/s	-
802.11ax (HE20)		100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		102 to 142	102, 110, 134, 142	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		106 to 138	106, 122, 138	OFDMA	BPSK	MCS0	-
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6Mb/s	-
802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		151 to 159	151, 159	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		155	155	OFDMA	BPSK	MCS0	-
802.11ax (RU26)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8, 26/8
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
802.11ax (RU52)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40, 52/40
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
802.11ax (RU106)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	106/53, 106/53, 106/54
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	106/53, 106/54, 106/54
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	106/53, 106/53, 106/54, 106/54
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	106/53, 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.

2TX (CDD Mode) & 1TX						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5180-5320, 5500-5720, 5745-5825	36 to 64, 100 to 144, 149 to 165	157	OFDMA	BPSK	MCS0

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	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5320, 5500-5720, 5745-5825	36 to 64, 100 to 144, 149 to 165	157	OFDMA	BPSK	MCS0

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	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter	RU Configuration
802.11a	5180-5320	36 to 64	36, 40, 48, 52, 60, 64	OFDM	BPSK	6Mb/s	-
802.11ac (VHT20) (Output power only)		36 to 64	36, 40, 48, 52, 60, 64	OFDM	BPSK	MCS0	-
802.11ac (VHT40) (Output power only)		38 to 62	38, 46, 54, 62	OFDM	BPSK	MCS0	-
802.11ac (VHT80) (Output power only)		42, 58	42, 58	OFDM	BPSK	MCS0	-
802.11ax (HE20)		36 to 64	36, 40, 48, 52, 60, 64	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		38 to 62	38, 46, 54, 62	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		42, 58	42, 58	OFDMA	BPSK	MCS0	-
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6Mb/s	-
802.11ac (VHT20) (Output power only)		100 to 144	100, 116, 140, 144	OFDM	BPSK	MCS0	-
802.11ac (VHT40) (Output power only)		102 to 142	102, 110, 134, 142	OFDM	BPSK	MCS0	-
802.11ac (VHT80) (Output power only)		106 to 138	106, 122, 138	OFDM	BPSK	MCS0	-
802.11ax (HE20)		100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		102 to 142	102, 110, 134, 142	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		106 to 138	106, 122, 138	OFDMA	BPSK	MCS0	-
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6Mb/s	-
802.11ac (VHT20) (Output power only)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0	-
802.11ac (VHT40) (Output power only)		151 to 159	151, 159	OFDM	BPSK	MCS0	-
802.11ac (VHT80) (Output power only)		155	155	OFDM	BPSK	MCS0	-
802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		151 to 159	151, 159	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		155	155	OFDMA	BPSK	MCS0	-

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter	RU Configuration
802.11ax (RU26)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8, 26/8
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
802.11ax (RU52)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40, 52/40
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
802.11ax (RU106)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	106/53, 106/53, 106/54
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	106/53, 106/54, 106/54
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	106/53, 106/53, 106/54, 106/54
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	106/53, 106/54, 106/54
Beamforming Mode (output power only)							
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter	RU Configuration
802.11ac (VHT20)	5180-5320	36 to 64	36, 40, 48, 52, 60, 64	OFDM	BPSK	MCS0	-
802.11ac (VHT40)		36 to 64	36, 40, 48, 52, 60, 64	OFDM	BPSK	MCS0	-
802.11ac (VHT80)		38 to 62	38, 46, 54, 62	OFDM	BPSK	MCS0	-
802.11ax (HE20)		42, 58	42, 58	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		36 to 64	36, 40, 48, 52, 60, 64	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		38 to 62	38, 46, 54, 62	OFDMA	BPSK	MCS0	-
802.11ac (VHT20)	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	MCS0	-
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	MCS0	-
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	BPSK	MCS0	-
802.11ax (HE20)		100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		102 to 142	102, 110, 134, 142	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		106 to 138	106, 122, 138	OFDMA	BPSK	MCS0	-
802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	MCS0	-
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	MCS0	-
802.11ac (VHT80)		155	155	OFDM	BPSK	MCS0	-
802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		151 to 159	151, 159	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		155	155	OFDMA	BPSK	MCS0	-

1TX							
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter	RU Configuration
802.11a	5180-5320	36 to 64	36, 40, 48, 52, 60, 64	OFDM	BPSK	6Mb/s	-
802.11ac (VHT20) (Output power only)		36 to 64	36, 40, 48, 52, 60, 64	OFDM	BPSK	MCS0	-
802.11ac (VHT40) (Output power only)		38 to 62	38, 46, 54, 62	OFDM	BPSK	MCS0	-
802.11ac (VHT80) (Output power only)		42, 58	42, 58	OFDM	BPSK	MCS0	-
802.11ax (HE20)		36 to 64	36, 40, 48, 52, 60, 64	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		38 to 62	38, 46, 54, 62	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		42, 58	42, 58	OFDMA	BPSK	MCS0	-
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6Mb/s	-
802.11ac (VHT20) (Output power only)		100 to 144	100, 116, 140, 144	OFDM	BPSK	MCS0	-
802.11ac (VHT40) (Output power only)		102 to 142	102, 110, 134, 142	OFDM	BPSK	MCS0	-
802.11ac (VHT80) (Output power only)		106 to 138	106, 122, 138	OFDM	BPSK	MCS0	-
802.11ax (HE20)		100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		102 to 142	102, 110, 134, 142	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		106 to 138	106, 122, 138	OFDMA	BPSK	MCS0	-
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6Mb/s	-
802.11ac (VHT20) (Output power only)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0	-
802.11ac (VHT40) (Output power only)		151 to 159	151, 159	OFDM	BPSK	MCS0	-
802.11ac (VHT80) (Output power only)		155	155	OFDM	BPSK	MCS0	-
802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	-
802.11ax (HE40)		151 to 159	151, 159	OFDMA	BPSK	MCS0	-
802.11ax (HE80)		155	155	OFDMA	BPSK	MCS0	-
802.11ax (RU26)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8, 26/8
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	26/0, 26/4, 26/8
802.11ax (RU52)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40, 52/40
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	52/37, 52/39, 52/40
802.11ax (RU106)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0	106/53, 106/53, 106/54
	5260-5320	52 to 64	52, 60, 64	OFDMA	BPSK	MCS0	106/53, 106/54, 106/54
	5500-5720	100 to 144	100, 116, 140, 144	OFDMA	BPSK	MCS0	106/53, 106/53, 106/54, 106/54
	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0	106/53, 106/54, 106/54

Test Condition:

Applicable To	Environmental Conditions	Input Power (System)	Tested By
RE $\geq$ 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.

802.11a: Duty cycle = 1.359 ms / 1.386 ms = 0.981

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

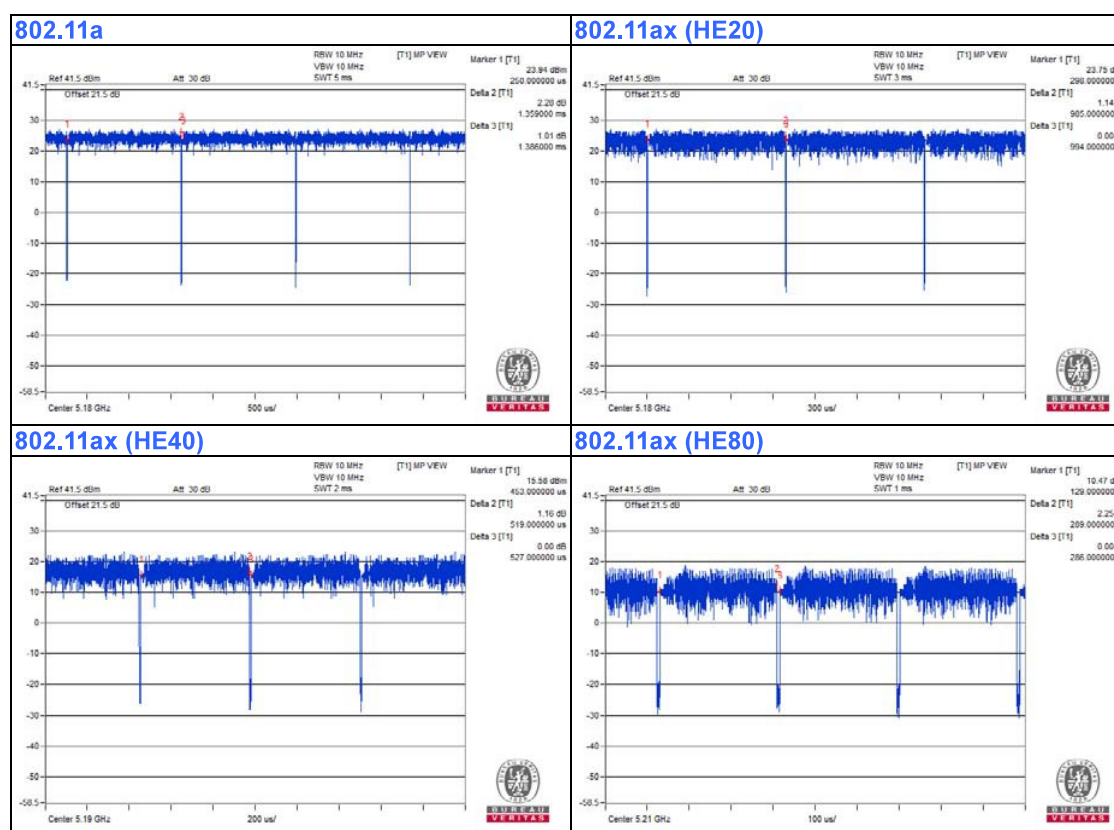
802.11ax (HE40): Duty cycle = 0.519 ms / 0.527 ms = 0.985

802.11ax (HE80): Duty cycle = 0.289 ms / 0.286 ms = 0.99

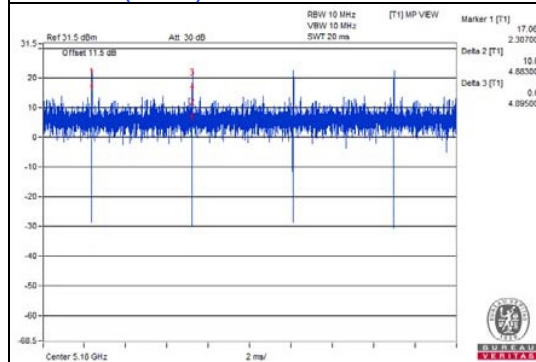
802.11ax (RU26): Duty cycle = 4.883 ms / 4.895 ms = 0.998

802.11ax (RU52): Duty cycle = 2.473 ms / 2.484 ms = 0.996

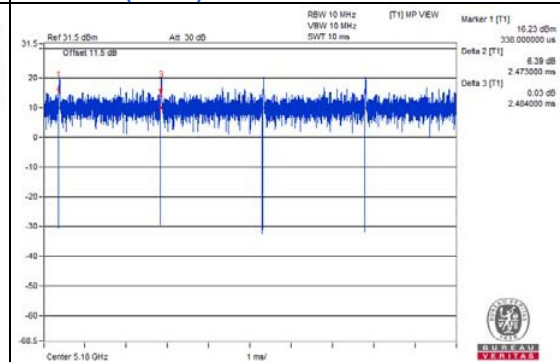
802.11ax (RU106): Duty cycle = 1.199 ms / 1.208 ms = 0.993



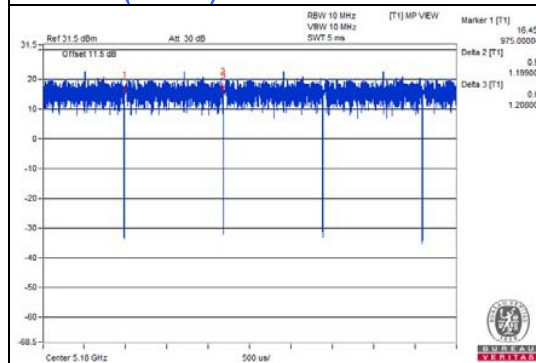
802.11ax (RU26)



802.11ax (RU52)



802.11ax (RU106)



For Mode 2:

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

802.11a: Duty cycle = 1.359 ms / 1.386 ms=0.981

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

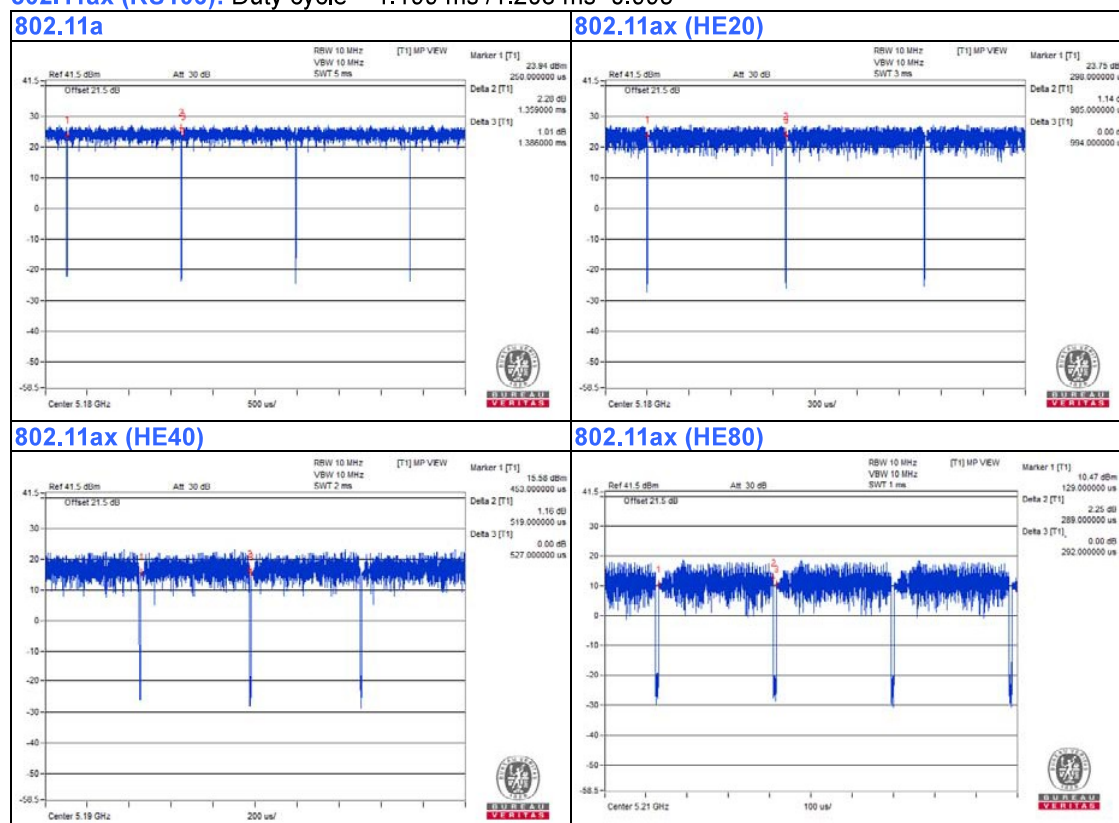
802.11ax (HE40): Duty cycle = 0.519 ms /0.527 ms=0.985

802.11ax (HE80): Duty cycle = 0.289 ms /0.292 ms=0.99

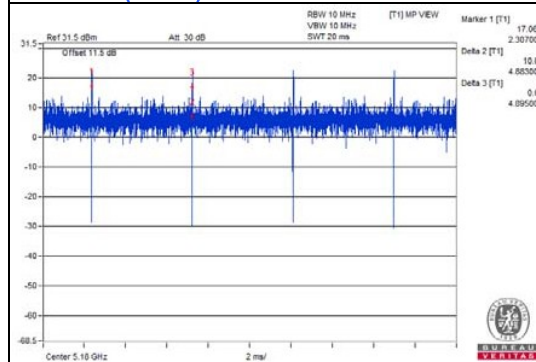
802.11ax (RU26): Duty cycle = 4.883 ms /4.895 ms=0.998

802.11ax (RU52): Duty cycle = 2.473 ms /2.484 ms=0.996

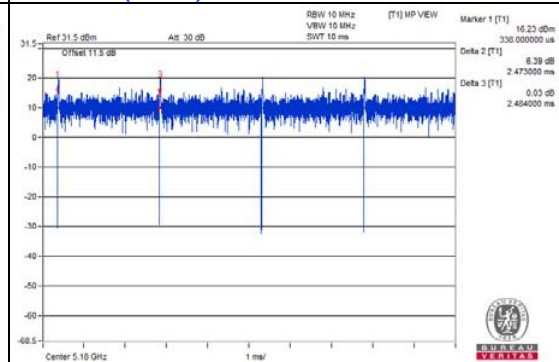
802.11ax (RU106): Duty cycle = 1.199 ms /1.208 ms=0.993



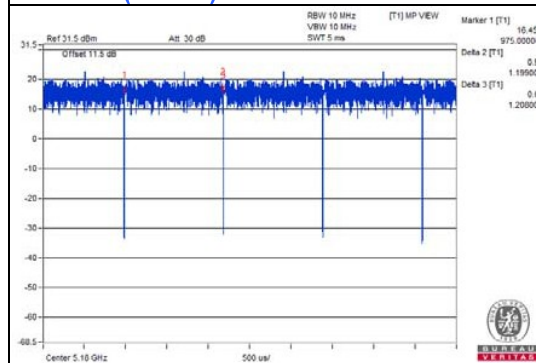
802.11ax (RU26)



802.11ax (RU52)



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:

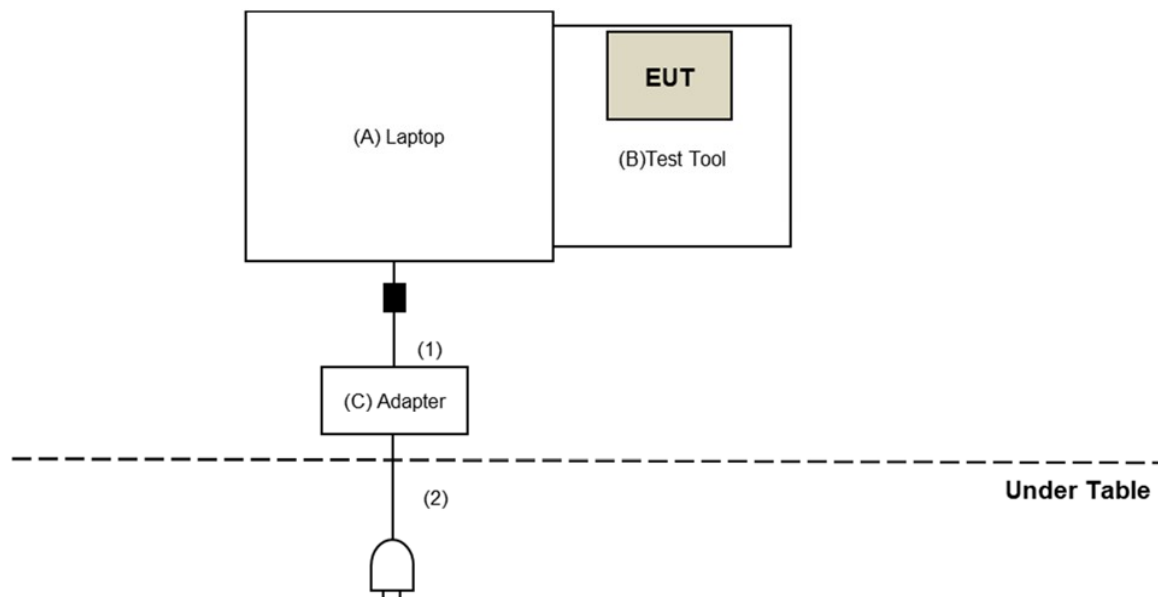
1. All power cords of the above support units are non-shielded (1.8m).

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

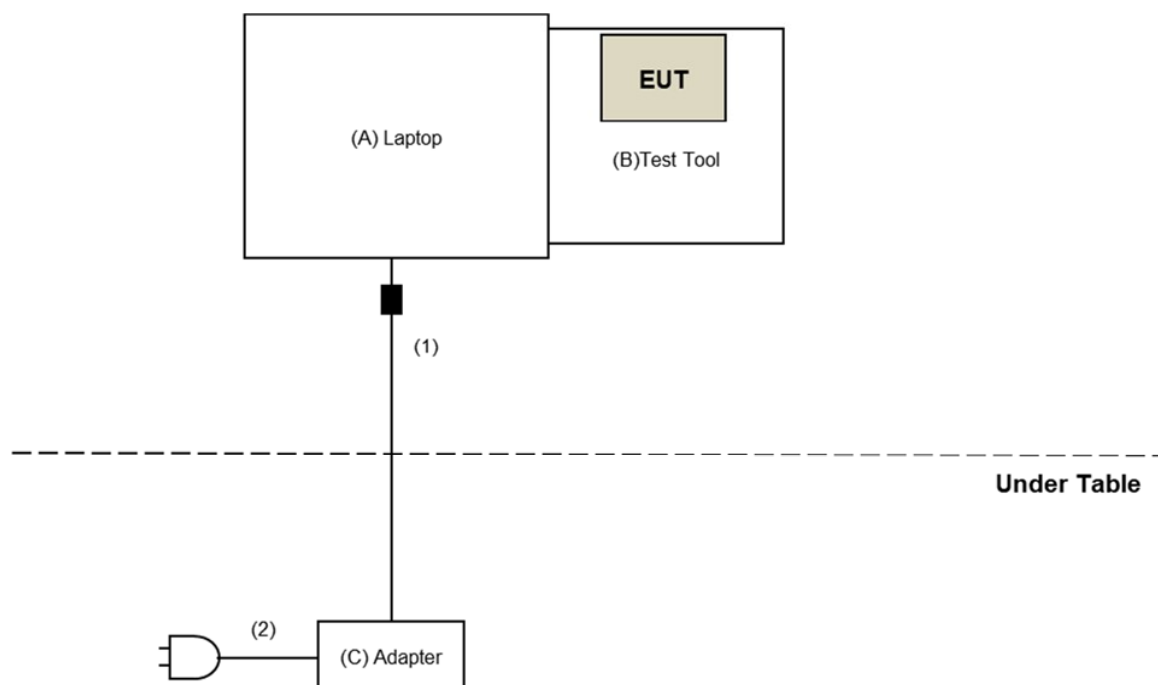
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

For AC Power Conducted Emissions test:



For Radiated Emissions test:



3.5 General Description of Applied 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:

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.

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 (dBuV/m)	AV:54 (dBuV/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(dBuV/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(dBuV/m) ^{*1} PK:105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK:122.2 (dBuV/m) ^{*4}
^{*1} beyond 75 MHz or more above of the band edge. ^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. ^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. ^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.			

Note:

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

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

4.1.2 Test Instruments

For Radiated Emission (above 1GHz), OOB 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 20 to July 05, 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	100964	Mar. 08, 2021	Mar. 07, 2022
Power meter Anritsu	ML2495A	1529002	June 21, 2021	June 20, 2022
Power sensor Anritsu	MA2411B	1339443	May 31, 2021	May 30, 2022
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
DC Power Supply Topward	6603D	795558	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 14, 2021	Jan. 13, 2022
True RMS Clamp Meter FLUKE	325	31130711WS	June 02, 2021	June 01, 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: July 05 to 13, 2021

4.1.3 Test Procedure

For Radiated emission below 30MHz

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

Note:

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

For Radiated emission above 30MHz

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

Note:

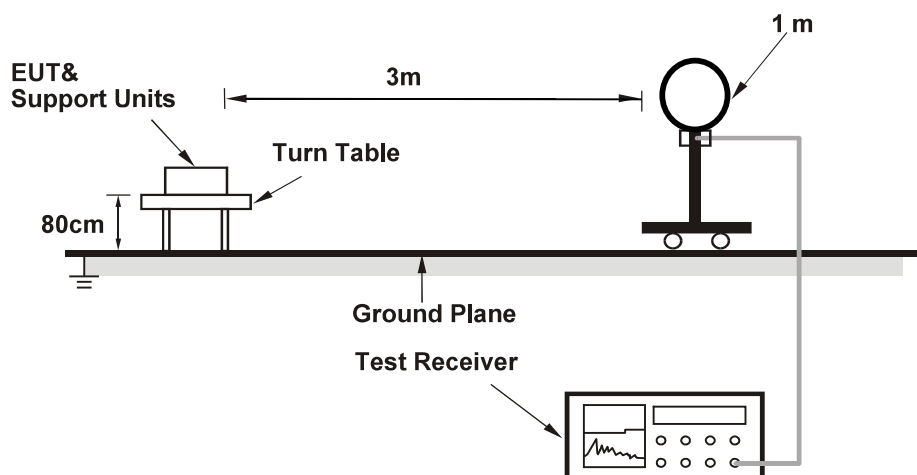
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

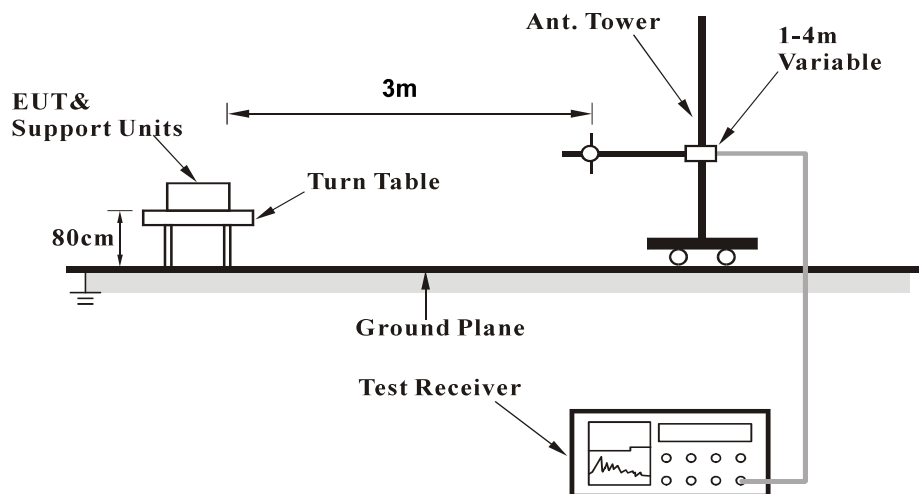
No deviation.

4.1.5 Test Setup

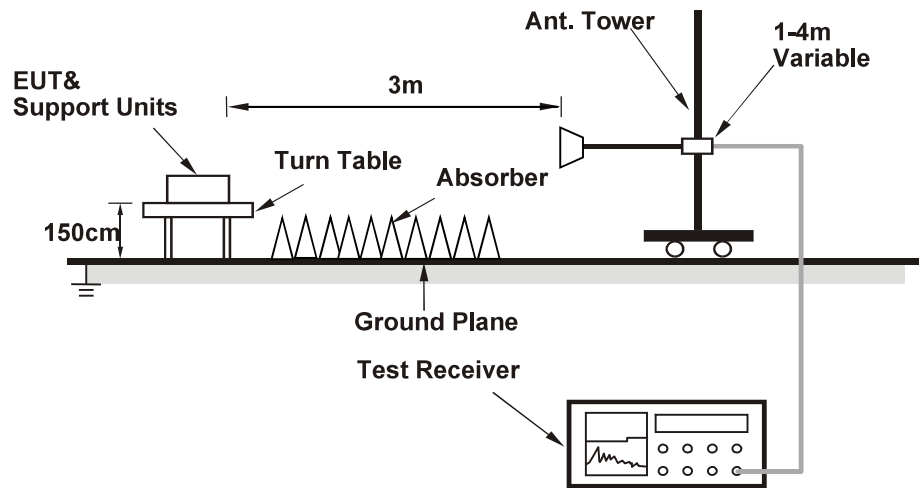
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

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

4.1.7 Test Results (Mode 1)

Dipole Antenna

Above 1GHz Data:

RF Mode	TX 802.11a	Channel	CH 36 : 5180 MHz
Frequency Range	1GHz ~ 40GHz	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	5150.00	59.0 PK	74.0	-15.0	1.37 H	129	56.7	2.3
2	5150.00	44.0 AV	54.0	-10.0	1.37 H	129	41.7	2.3
3	*5180.00	107.5 PK			1.37 H	129	105.3	2.2
4	*5180.00	98.0 AV			1.37 H	129	95.8	2.2
5	#10360.00	51.3 PK	68.2	-16.9	2.78 H	152	39.5	11.8
6	15540.00	57.6 PK	74.0	-16.4	1.48 H	352	45.8	11.8
7	15540.00	44.3 AV	54.0	-9.7	1.48 H	352	32.5	11.8
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	5150.00	65.0 PK	74.0	-9.0	1.35 V	277	62.7	2.3
2	5150.00	52.4 AV	54.0	-1.6	1.35 V	277	50.1	2.3
3	*5180.00	118.8 PK			1.35 V	277	116.6	2.2
4	*5180.00	109.2 AV			1.35 V	277	107.0	2.2
5	#10360.00	52.3 PK	68.2	-15.9	3.01 V	162	40.5	11.8
6	15540.00	59.4 PK	74.0	-14.6	3.74 V	291	47.6	11.8
7	15540.00	45.1 AV	54.0	-8.9	3.74 V	291	33.3	11.8

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 40 : 5200 MHz
Frequency Range	1GHz ~ 40GHz	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	5150.00	58.4 PK	74.0	-15.6	1.32 H	143	56.1	2.3
2	5150.00	41.8 AV	54.0	-12.2	1.32 H	143	39.5	2.3
3	*5200.00	108.4 PK			1.32 H	143	106.3	2.1
4	*5200.00	99.2 AV			1.32 H	143	97.1	2.1
5	#10400.00	50.6 PK	68.2	-17.6	2.82 H	132	38.6	12.0
6	15600.00	57.4 PK	74.0	-16.6	1.47 H	357	45.9	11.5
7	15600.00	44.2 AV	54.0	-9.8	1.47 H	357	32.7	11.5
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	5150.00	61.4 PK	74.0	-12.6	1.51 V	281	59.1	2.3
2	5150.00	43.7 AV	54.0	-10.3	1.51 V	281	41.4	2.3
3	*5200.00	119.5 PK			1.51 V	281	117.4	2.1
4	*5200.00	110.1 AV			1.51 V	281	108.0	2.1
5	#10400.00	52.4 PK	68.2	-15.8	3.05 V	166	40.4	12.0
6	15600.00	58.6 PK	74.0	-15.4	3.80 V	289	47.1	11.5
7	15600.00	44.7 AV	54.0	-9.3	3.80 V	289	33.2	11.5

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 48 : 5240 MHz
Frequency Range	1GHz ~ 40GHz	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	5150.00	51.9 PK	74.0	-22.1	1.32 H	129	49.6	2.3
2	5150.00	38.8 AV	54.0	-15.2	1.32 H	129	36.5	2.3
3	*5240.00	108.6 PK			1.32 H	129	106.6	2.0
4	*5240.00	99.3 AV			1.32 H	129	97.3	2.0
5	5350.00	51.2 PK	74.0	-22.8	1.32 H	129	49.3	1.9
6	5350.00	38.2 AV	54.0	-15.8	1.32 H	129	36.3	1.9
7	#10480.00	50.4 PK	68.2	-17.8	2.80 H	156	38.5	11.9
8	15720.00	57.5 PK	74.0	-16.5	1.47 H	345	45.7	11.8
9	15720.00	44.4 AV	54.0	-9.6	1.47 H	345	32.6	11.8
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	5150.00	52.5 PK	74.0	-21.5	1.48 V	275	50.2	2.3
2	5150.00	39.6 AV	54.0	-14.4	1.48 V	275	37.3	2.3
3	*5240.00	119.4 PK			1.48 V	275	117.4	2.0
4	*5240.00	109.9 AV			1.48 V	275	107.9	2.0
5	5350.00	51.5 PK	74.0	-22.5	1.48 V	275	49.6	1.9
6	5350.00	38.4 AV	54.0	-15.6	1.48 V	275	36.5	1.9
7	#10480.00	52.8 PK	68.2	-15.4	3.00 V	173	40.9	11.9
8	15720.00	58.7 PK	74.0	-15.3	3.80 V	290	46.9	11.8
9	15720.00	44.6 AV	54.0	-9.4	3.80 V	290	32.8	11.8

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 52 : 5260 MHz
Frequency Range	1GHz ~ 40GHz	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	5150.00	51.8 PK	74.0	-22.2	1.31 H	124	49.5	2.3
2	5150.00	38.4 AV	54.0	-15.6	1.31 H	124	36.1	2.3
3	*5260.00	108.9 PK			1.31 H	124	106.9	2.0
4	*5260.00	99.4 AV			1.31 H	124	97.4	2.0
5	5350.00	50.1 PK	74.0	-23.9	1.31 H	124	48.2	1.9
6	5350.00	37.6 AV	54.0	-16.4	1.31 H	124	35.7	1.9
7	#10520.00	50.8 PK	68.2	-17.4	2.81 H	159	38.8	12.0
8	15780.00	57.5 PK	74.0	-16.5	1.46 H	329	46.0	11.5
9	15780.00	44.8 AV	54.0	-9.2	1.46 H	329	33.3	11.5
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	5150.00	52.4 PK	74.0	-21.6	1.34 V	280	50.1	2.3
2	5150.00	39.5 AV	54.0	-14.5	1.34 V	280	37.2	2.3
3	*5260.00	119.9 PK			1.34 V	280	117.9	2.0
4	*5260.00	110.1 AV			1.34 V	280	108.1	2.0
5	5350.00	51.2 PK	74.0	-22.8	1.34 V	280	49.3	1.9
6	5350.00	38.7 AV	54.0	-15.3	1.34 V	280	36.8	1.9
7	#10520.00	53.3 PK	68.2	-14.9	3.58 V	188	41.3	12.0
8	15780.00	59.9 PK	74.0	-14.1	3.60 V	280	48.4	11.5
9	15780.00	45.3 AV	54.0	-8.7	3.60 V	280	33.8	11.5

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11a	Channel	CH 60 : 5300 MHz
Frequency Range	1GHz ~ 40GHz	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	*5300.00	108.1 PK			1.34 H	117	106.4	1.7
2	*5300.00	99.1 AV			1.34 H	117	97.4	1.7
3	5350.00	55.3 PK	74.0	-18.7	1.34 H	117	53.4	1.9
4	5350.00	40.9 AV	54.0	-13.1	1.34 H	117	39.0	1.9
5	10600.00	50.7 PK	74.0	-23.3	2.74 H	135	38.8	11.9
6	10600.00	40.6 AV	54.0	-13.4	2.74 H	135	28.7	11.9
7	15900.00	57.4 PK	74.0	-16.6	1.49 H	342	46.1	11.3
8	15900.00	44.6 AV	54.0	-9.4	1.49 H	342	33.3	11.3

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	*5300.00	119.1 PK			1.32 V	283	117.4	1.7
2	*5300.00	109.7 AV			1.32 V	283	108.0	1.7
3	5350.00	64.1 PK	74.0	-9.9	1.32 V	283	62.2	1.9
4	5350.00	44.4 AV	54.0	-9.6	1.32 V	283	42.5	1.9
5	10600.00	53.3 PK	74.0	-20.7	3.60 V	182	41.4	11.9
6	10600.00	40.6 AV	54.0	-13.4	3.60 V	182	28.7	11.9
7	15900.00	59.7 PK	74.0	-14.3	3.66 V	293	48.4	11.3
8	15900.00	45.1 AV	54.0	-8.9	3.66 V	293	33.8	11.3

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 802.11a	Channel	CH 64 : 5320 MHz
Frequency Range	1GHz ~ 40GHz	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	*5320.00	106.2 PK			1.70 H	136	104.4	1.8
2	*5320.00	96.9 AV			1.70 H	136	95.1	1.8
3	5350.00	57.0 PK	74.0	-17.0	1.70 H	136	55.1	1.9
4	5350.00	41.0 AV	54.0	-13.0	1.70 H	136	39.1	1.9
5	10640.00	50.5 PK	74.0	-23.5	2.85 H	140	38.7	11.8
6	10640.00	40.3 AV	54.0	-13.7	2.85 H	140	28.5	11.8
7	15960.00	57.5 PK	74.0	-16.5	1.49 H	332	45.9	11.6
8	15960.00	44.4 AV	54.0	-9.6	1.49 H	332	32.8	11.6
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	*5320.00	118.2 PK			1.41 V	288	116.4	1.8
2	*5320.00	108.6 AV			1.41 V	288	106.8	1.8
3	5350.00	72.5 PK	74.0	-1.5	1.41 V	288	70.6	1.9
4	5350.00	52.5 AV	54.0	-1.5	1.41 V	288	50.6	1.9
5	10640.00	53.4 PK	74.0	-20.6	3.55 V	194	41.6	11.8
6	10640.00	40.9 AV	54.0	-13.1	3.55 V	194	29.1	11.8
7	15960.00	59.7 PK	74.0	-14.3	3.66 V	283	48.1	11.6
8	15960.00	44.9 AV	54.0	-9.1	3.66 V	283	33.3	11.6

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 802.11a	Channel	CH 100 : 5500 MHz
Frequency Range	1GHz ~ 40GHz	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	5460.00	51.8 PK	74.0	-22.2	1.35 H	139	49.7	2.1
2	5460.00	38.2 AV	54.0	-15.8	1.35 H	139	36.1	2.1
3	#5470.00	53.2 PK	68.2	-15.0	1.35 H	139	51.0	2.2
4	*5500.00	103.1 PK			1.35 H	139	101.0	2.1
5	*5500.00	94.3 AV			1.35 H	139	92.2	2.1
6	11000.00	50.7 PK	74.0	-23.3	2.76 H	150	38.3	12.4
7	11000.00	40.0 AV	54.0	-14.0	2.76 H	150	27.6	12.4
8	#16500.00	56.7 PK	68.2	-11.5	1.47 H	331	43.0	13.7

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	5460.00	59.9 PK	74.0	-14.1	1.43 V	272	57.8	2.1
2	5460.00	44.1 AV	54.0	-9.9	1.43 V	272	42.0	2.1
3	#5466.45	66.3 PK	68.2	-1.9	1.43 V	272	64.2	2.1
4	*5500.00	116.9 PK			1.43 V	272	114.8	2.1
5	*5500.00	106.8 AV			1.43 V	272	104.7	2.1
6	11000.00	55.4 PK	74.0	-18.6	3.95 V	174	43.0	12.4
7	11000.00	42.8 AV	54.0	-11.2	3.95 V	174	30.4	12.4
8	#16500.00	62.9 PK	68.2	-5.3	2.05 V	292	49.2	13.7

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.

RF Mode	TX 802.11a	Channel	CH 116 : 5580 MHz
Frequency Range	1GHz ~ 40GHz	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	5460.00	52.1 PK	74.0	-21.9	1.35 H	135	50.0	2.1
2	5460.00	41.3 AV	54.0	-12.7	1.35 H	135	39.2	2.1
3	#5470.00	53.8 PK	68.2	-14.4	1.35 H	135	51.6	2.2
4	*5580.00	108.3 PK			1.35 H	135	106.2	2.1
5	*5580.00	99.2 AV			1.35 H	135	97.1	2.1
6	11160.00	50.7 PK	74.0	-23.3	2.79 H	146	38.7	12.0
7	11160.00	40.3 AV	54.0	-13.7	2.79 H	146	28.3	12.0
8	#16740.00	57.3 PK	68.2	-10.9	1.50 H	344	42.0	15.3
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	5460.00	53.8 PK	74.0	-20.2	1.35 V	274	51.7	2.1
2	5460.00	42.4 AV	54.0	-11.6	1.35 V	274	40.3	2.1
3	#5470.00	55.6 PK	68.2	-12.6	1.35 V	274	53.4	2.2
4	*5580.00	119.4 PK			1.35 V	274	117.3	2.1
5	*5580.00	109.7 AV			1.35 V	274	107.6	2.1
6	11160.00	55.3 PK	74.0	-18.7	3.97 V	159	43.3	12.0
7	11160.00	43.0 AV	54.0	-11.0	3.97 V	159	31.0	12.0
8	#16740.00	62.8 PK	68.2	-5.4	2.08 V	278	47.5	15.3

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.