

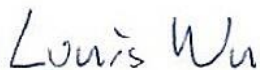


FCC RADIO TEST REPORT

FCC ID : QYLAX210NG
Equipment : WLAN Module
Brand Name : Getac
Model Name : AX210NGW
Applicant : Getac Technology Corporation.
5F., Building A, No. 209, Sec.1,
Nangang Rd., Nangang Dist., Taipei
City 11568, Taiwan, R.O.C.
Standard : FCC Part 15 Subpart E §15.407

The product was received on Nov. 15, 2021 and testing was performed from Nov. 30, 2021 to Jan. 11, 2022. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this partial report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.



Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issue Date
FR1O0537E	01	Initial issue of report	Jan. 27, 2022
FR1O0537E	02	Revise Summary and Appendix C	Feb. 11, 2022
FR1O0537E	03	Revise Model Name, Test Mode and SKU list	Feb. 17, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.403(i)	6dB & 26dB Bandwidth	-	See Note
-	2.1049	99% Occupied Bandwidth	-	See Note
3.1	15.407(a)	Maximum Conducted Output Power	Pass	-
-	15.407(a)	Power Spectral Density	-	See Note
3.2	15.407(b)	Unwanted Emissions	Pass	-
3.3	15.207	AC Conducted Emission	Pass	-
3.4	15.203 15.407(a)	Antenna Requirement	Pass	-

Note: The module (Model: AX210NGW) makes no difference after verifying output power, this report reuses test data from the module report.

Declaration of Conformity:

- The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
- The measurement uncertainty please refer to report "Uncertainty of Evaluation"

Comments and Explanations:

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Yun Huang

Report Producer: Lucy Wu

1 General Description

1.1 Product Feature of Equipment Under Test

Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n/ax, Wi-Fi 5GHz 802.11a/n/ac/ax and Wi-Fi 6GHz 802.11a/n/ac/ax

Product Feature	
Sample 1	EUT with Host 1
Sample 2	EUT with Host 2
Sample 3	EUT with Host 3
Sample 4	EUT with Host 4
Sample 5	EUT with Host 5
Antenna Type	WLAN: <Main>: PIFA Antenna <Aux.>: PIFA Antenna Bluetooth: PIFA Antenna

Antenna information		
5725 MHz ~ 5850 MHz	Peak Gain (dBi)	<Main>: 3.50 <Aux.>: 3.63

Remark: The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations in report summary.



The product was installed into Notebook (Brand Name: Getac, Model Name: X600, X600 Pro X600Y (Y= 10 characters, Y can be 0-9, a-z, A-Z, “-“, “_” or blank for marketing purpose and no impact safety related critical components and constructions.)) during test, which can be referred the following information:

Host Information	
Host 1	SKU A
Host 2	SKU B
Host 3	SKU C
Host 4	SKU D
Host 5	SKU E

SKU List					
DVT SKUs	SKU A (STD)	SKU B (STD)	SKU C (STD)	SKU D (Pro)	SKU E (Pro)
CPU	I5-11500H	I5-11500H	I5-11500H	I7-11850H	I7-11850H
Display	B156HTN03.8 , AUO	B156HTN03.8 , AUO	B156HTN03.8 , AUO	B156HTN03.8 , AUO	B156HTN03.8 , AUO
Camera	FO20FF-790H , FOXLINK	FO20FF-790H , FOXLINK	FO20FF-790H , FOXLINK	FN20FF-679H, FOXLINK	FN20FF-679H, FOXLINK
MXM	w/o MXM	Nvidia RTX3000	Nvidia GTX1650	Nvidia RTX3000	Nvidia GTX1650
Memory	16GB	16GB	16GB	32GB	32GB
Main storage	512GB	512GB	512GB	1TB	1TB
Second storage	512GB	512GB	512GB	1TB	1TB
Third storage	512GB	512GB	512GB	1TB	1TB
Touch pad	TP-PCT3854	TP-PCT3854	TP-PCT3854	TP-PCT3854	TP-PCT3854
Smart card	Yes	Yes	Yes	Yes	Yes
SD card	No	No	No	Yes	Yes
PCMCIA/EXPRESS card	PCMCIA	PCMCIA	PCMCIA	N/A	N/A
Wifi+BT	AX210NGW	AX210NGW	AX210NGW	AX210NGW	AX210NGW
WWAN	w/o WWAN	EM7511	EM7511	EM7511	EM7511
GPS/GNSS	Mc-1010-V2b	combo with WWAN	combo with WWAN	combo with WWAN	combo with WWAN
AC adapter	FSP150-ABBN3 THP0K15W4A5-1 G	FSP230-AJAN3 THP0K23W4A5-1 G	FSP230-AJAN3 THP0K23W4A5-1 G	FSP230-AJAN3 THP0K23W4A5-1 G	FSP230-AJAN3 THP0K23W4A5-1 G
FPR	ETU-811JG	ETU-811JG	ETU-811JG	N/A	ETU-811JG
RFID	NA	NA	NA	NA	NA
Main Battery	BP3S2P3450P-02	BP3S2P3450P-02	BP3S2P3450P-02	BP3S2P3450P-02	BP3S2P3450P-02
Optional IO	RS232	RS232	RS232	VGA	VGA
Pass through	No	No	No	Yes	Yes
Expansion	NA	NA	NA	RS232/RS422 x1 PCMCIA x1 + Express card x1	RS232/RS422 x1 PCMCIA x1 + Express card x1
ODD	NA	NA	NA	BDR-UD03ASW, PIONEER	BDR-UD03ASW, PIONEER
2nd Battery	NA	NA	NA	BP3S2P2100S-03	BP3S2P2100S-03
Connectivity module	NA	NA	NA	4 RJ45 module	4 RJ45 module

1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. CO05-HY (TAF Code: 1190)
Remark	The Conducted Emission test item subcontracted to Sporton International Inc. EMC & Wireless Communications Laboratory.

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. TH05-HY, 03CH11-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW1190 and TW3786

1.4 Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).
- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151 [*]	5755	159 [*]	5795
	153	5765	161	5805
	155 [#]	5775	165	5825

Note:

1. The above Frequency and Channel with "^{*}" are 802.11n HT40 and 802.11ac VHT40 and 802.11ax HE40.
2. The above Frequency and Channel with "[#]" are 802.11ac VHT80 and 802.11ax HE80.

2.2 Test Mode

The final test modes consider the modulation and the worst data rates as shown in the table below.

Single Mode

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT80	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0

MIMO Mode

Modulation	Data Rate
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT80	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : WLAN (5GHz) Link + Bluetooth Link + H-Pattern + Earphone + Battery 1 + USB Cable (Charging from AC Adapter 1) for Sample 1
	Mode 2 : LTE Band 7 Link + WLAN (5GHz) Link + Bluetooth Link + H-Pattern + Earphone + Battery 1 + USB Cable (Charging from AC Adapter 2) for Sample 2
	Mode 3 : LTE Band 7 Link + WLAN (5GHz) Link + Bluetooth Link + H-Pattern + Earphone + Battery 1 + Battery 2 + USB Cable (Charging from AC Adapter 4) for Sample 4
	Mode 4 : LTE Band 7 Link + WLAN (5GHz) Link + Bluetooth Link + H-Pattern + Earphone + Battery 1 + Battery 2 + USB Cable (Charging from AC Adapter 4) for Sample 5
Remark:	
1. The worst case of Conducted Emission is mode 2; only the test data of it was reported.	
2. For Radiated Test Cases, the tests were performed with Adapter 2, Battery 1 and Sample 2.	

<Ant. 1>

Ch. #		Band IV : 5725-5850 MHz
		802.11ac VHT80
L	Low	-
M	Middle	155
H	High	-

<Ant. 2>

Ch. #		Band IV : 5725-5850 MHz
		802.11ax HE40
L	Low	-
M	Middle	-
H	High	159

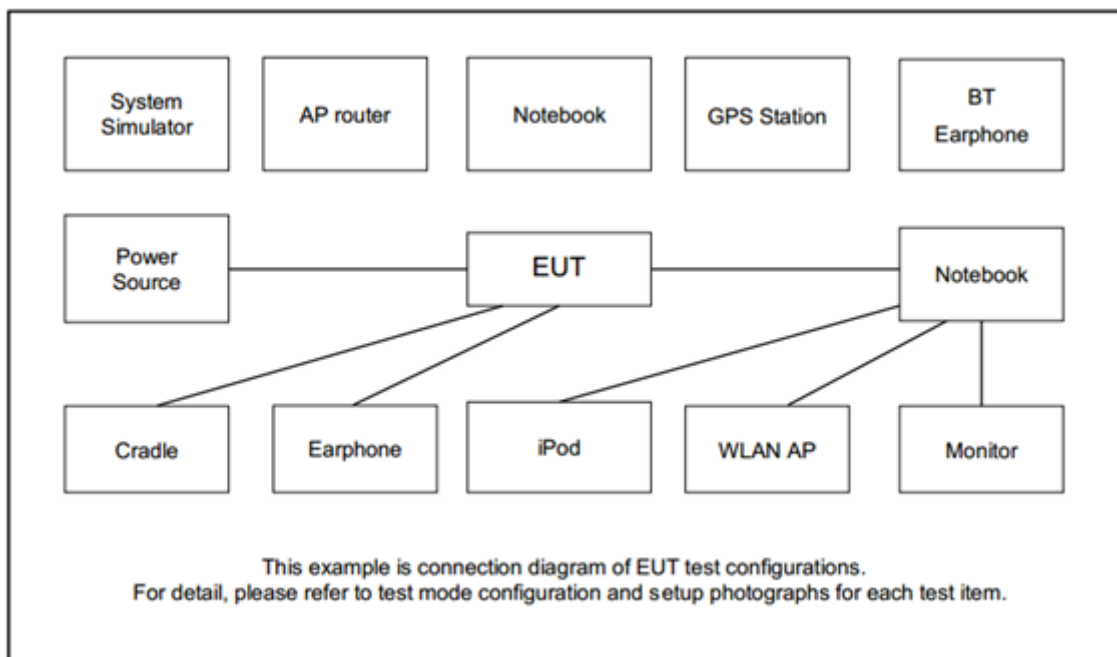
MIMO <Ant. 1+2>

Ch. #		Band IV : 5725-5850 MHz	
		802.11ax HE20	802.11ax HE40
L	Low	-	-
M	Middle	157	-
H	High	-	159

Remark:

1. For radiation spurious emission, the modulation and the data rate picked for testing are determined by the Max. RF conducted power.
2. Ant. 1 means Chain A (Aux.) and Ant. 2 means Chain B (Main).

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
3.	WLAN AP	ASUS	GT-AXE11000	MSQ-RTAXJF00	N/A	Unshielded, 1.8m
4.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A
5.	Notebook	Dell	Latitude 3400	FCC DoC	N/A	AC I/P : Unshielded, 1.2m DC O/P : Shielded, 1.8m

2.5 EUT Operation Test Setup

The RF test items, utility “DRTU Version 22.21070.0.0-OEM.DRTU12463” was installed in Host which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

3 Test Result

3.1 Maximum Conducted Output Power Measurement

3.1.1 Limit of Maximum Conducted Output Power

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

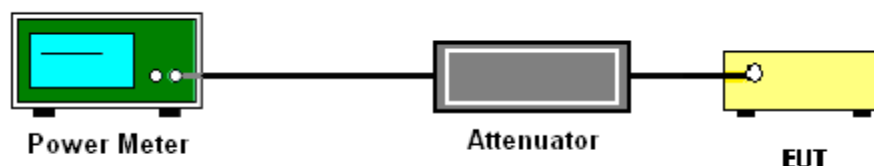
3.1.3 Test Procedures

The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM-G (Measurement using a gated RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit at its maximum power control level.
3. Measure the average power of the transmitter.
4. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01

3.1.4 Test Setup



3.1.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.2 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.2.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5.725-5.85 GHz band:

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

- (2) Unwanted spurious emissions falls in restricted bands shall comply with the general field strength limits as below table,

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

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

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27	68.3

- (3) KDB789033 D02 v02r01 G)2)c)

(i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.

(ii) Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are based on the use of a peak detector.

3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

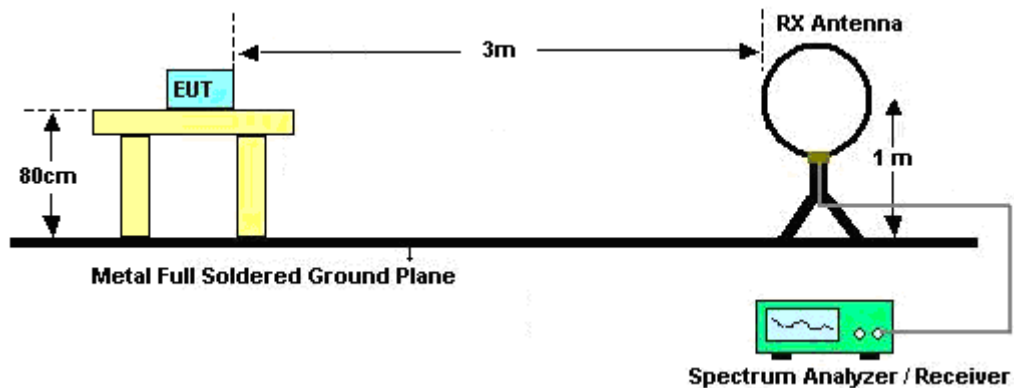
3.2.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000 MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW $\geq$ 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (3) Procedures for Average Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
3. The EUT is set 3 meters away from the receiving antenna which is mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.

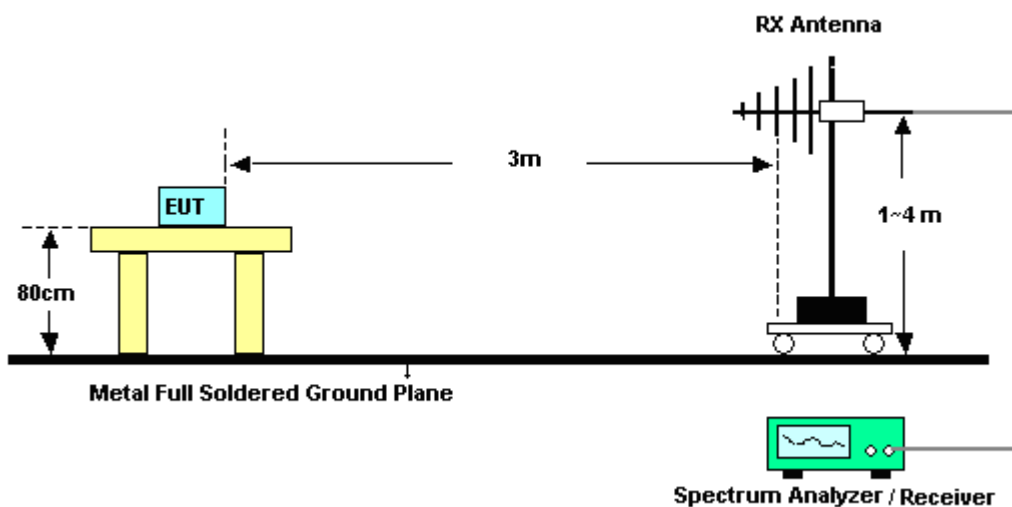
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-“.
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-“.

3.2.4 Test Setup

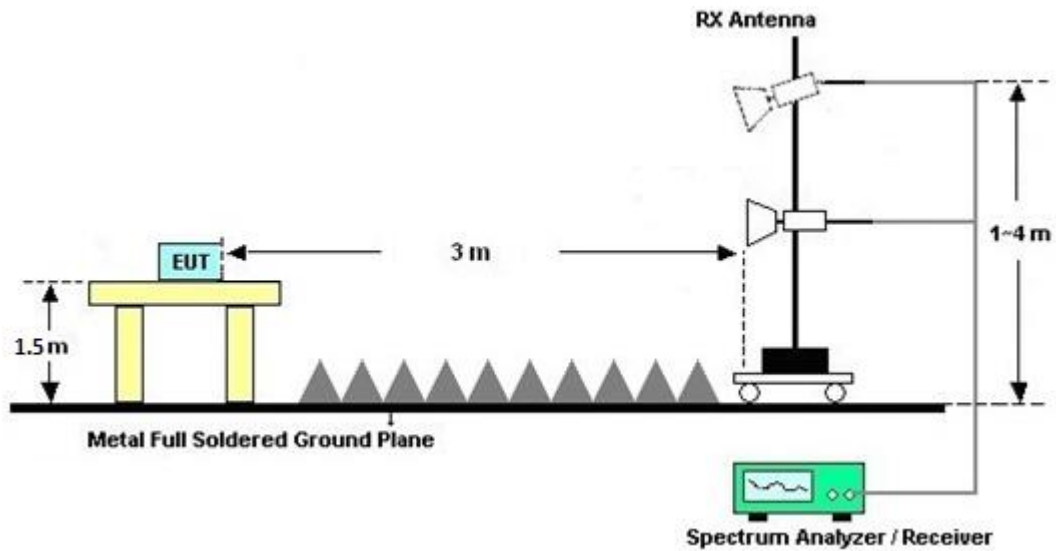
For radiated emissions below 30MHz



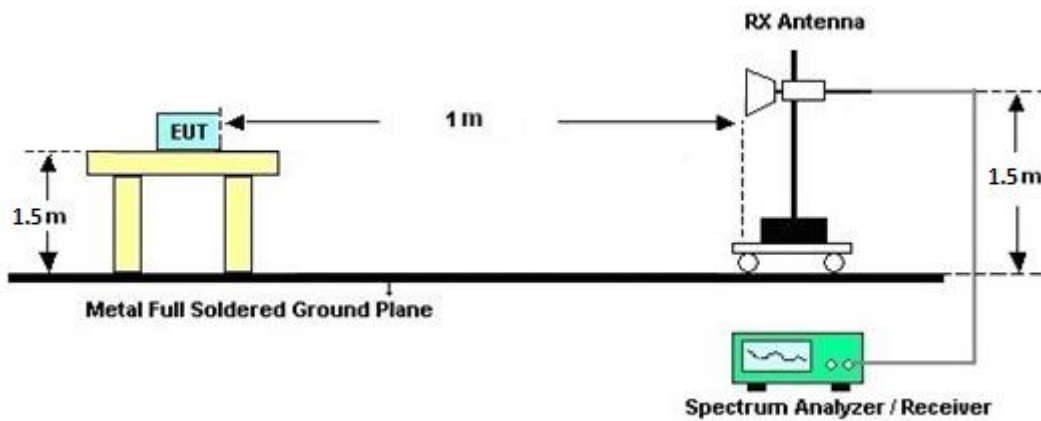
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



**3.2.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)**

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.2.6 Test Result of Radiated Band Edges

Please refer to Appendix C and D.

3.2.7 Duty Cycle

Please refer to Appendix E.

3.2.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

3.3 AC Conducted Emission Measurement

3.3.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

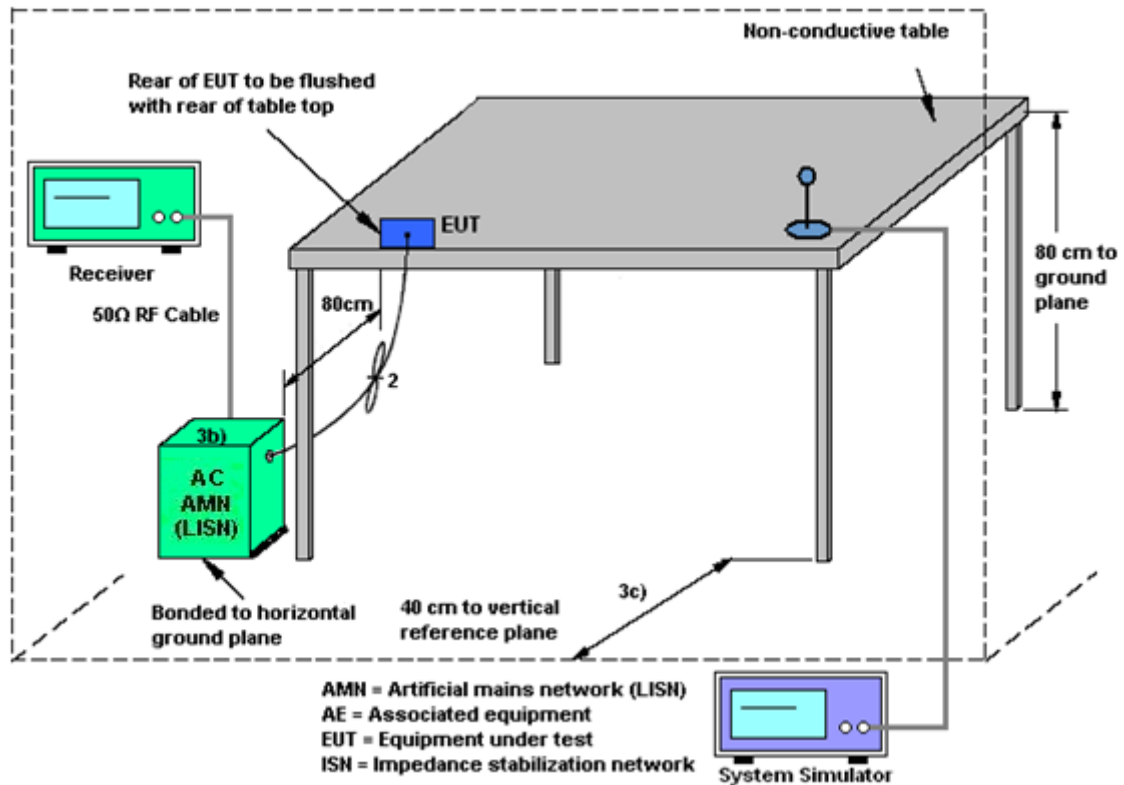
3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.3.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.3.4 Test Setup



3.3.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.4 Antenna Requirements

3.4.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.4.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECEP	DTM-303A	TP201996	N/A	Nov. 16, 2021	Nov. 30, 2021~ Dec. 02, 2021	Nov. 15, 2022	Conducted (TH05-HY)
Power Meter	DARE	RPR3006W	13I00030SNO 31(NO:182)	10MHz~6GHz	Dec. 30, 2020	Nov. 30, 2021~ Dec. 02, 2021	Dec. 29, 2021	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Aug. 30, 2021	Nov. 30, 2021~ Dec. 02, 2021	Aug. 29, 2022	Conducted (TH05-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW191204 (BOX8)	N/A	Jan. 07, 2021	Nov. 30, 2021~ Dec. 02, 2021	Jan. 06, 2022	Conducted (TH05-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT-N0602	30MHz~1GHz	Oct. 09, 2021	Dec. 11, 2021~ Dec. 15, 2021	Oct. 08, 2022	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz~18GHz	Oct. 25, 2021	Dec. 11, 2021~ Dec. 15, 2021	Oct. 24, 2022	Radiation (03CH11-HY)
Hygrometer	TECEP	DTM-303B	TP140325	N/A	Nov. 26, 2021	Dec. 11, 2021~ Dec. 15, 2021	Nov. 25, 2022	Radiation (03CH11-HY)
Hygrometer	TECEP	DTM-303B	TP200880	QA-3-031	Sep. 30, 2021	Dec. 11, 2021~ Dec. 15, 2021	Sep. 29, 2022	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 07, 2021	Dec. 11, 2021~ Dec. 15, 2021	Sep. 06, 2022	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 10, 2021	Dec. 11, 2021~ Dec. 15, 2021	Nov. 09, 2022	Radiation (03CH11-HY)
Preamplifier	Jet-Power	JPA0118-55-30 3	17100018000 55007	1GHz~18GHz	Jun. 16, 2021	Dec. 11, 2021~ Dec. 15, 2021	Jun. 15, 2022	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz~44GHz	Oct. 15, 2021	Dec. 11, 2021~ Dec. 15, 2021	Oct. 14, 2022	Radiation (03CH11-HY)
Filter	Wainwright	WHKX8-5872. 5-6750-18000- 40SS	SN3	6.75GHz High Pass Filter	Sep. 13, 2021	Dec. 11, 2021~ Dec. 15, 2021	Sep. 12, 2022	Radiation (03CH11-HY)
Filter	Wainwright	WLK4-1000-15 30-8000-40SS	SN11	1.53GHz Low Pass Filter	Sep. 13, 2021	Dec. 11, 2021~ Dec. 15, 2021	Sep. 12, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 11, 2021	Dec. 11, 2021~ Dec. 15, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz~40GHz	Mar. 11, 2021	Dec. 11, 2021~ Dec. 15, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102 , SUCOFLEX 104	811852/4,MY 2859/2,MY98 37/4PE	30MHz~18GHz	Nov. 15, 2021	Dec. 11, 2021~ Dec. 15, 2021	Nov. 14, 2022	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Dec. 11, 2021~ Dec. 15, 2021	N/A	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Dec. 11, 2021~ Dec. 15, 2021	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Dec. 11, 2021~ Dec. 15, 2021	N/A	Radiation (03CH11-HY)
Software	Audix	E3 6.09824_2019 1225	RK-000992	N/A	N/A	Dec. 11, 2021~ Dec. 15, 2021	N/A	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 28, 2020	Dec. 11, 2021~ Dec. 15, 2021	Dec. 27, 2021	Radiation (03CH11-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Dec. 12, 2021~ Jan. 11, 2022	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2021	Dec. 12, 2021~ Jan. 11, 2022	Nov. 30, 2022	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 17, 2021	Dec. 12, 2021~ Jan. 11, 2022	Nov. 16, 2022	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 03, 2021	Dec. 12, 2021~ Jan. 11, 2022	Dec. 02, 2022	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Dec. 12, 2021~ Jan. 11, 2022	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-FN	00691	N/A	Jul. 28, 2021	Dec. 12, 2021~ Jan. 11, 2022	Jul. 27, 2022	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 31, 2020	Dec. 12, 2021~ Dec. 29, 2021	Dec. 30, 2021	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 30, 2021	Dec. 30, 2021~ Jan. 11, 2022	Dec. 29, 2022	Conduction (CO05-HY)



5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.1 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.8 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.4 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.9 dB
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Junyu Jhou	Temperature:	21.3~25.5	°C
Test Date:	2021/11/30~2021/12/2	Relative Humidity:	52.1~55.5	%

Remark: For Conducted Test Items, Ant. 1 means Chain A (Aux.) and Ant. 2 means Chain B (Main).

TEST RESULTS DATA
Average Power Table

Band IV single antenna												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	149	5745	21.00	20.80		30.00	30.00	3.63	3.50	Pass
11a	6Mbps	1	157	5785	21.00	20.90		30.00	30.00	3.63	3.50	Pass
11a	6Mbps	1	165	5825	20.80	20.80		30.00	30.00	3.63	3.50	Pass
HT20	MCS0	1	149	5745	20.80	20.70		30.00	30.00	3.63	3.50	Pass
HT20	MCS0	1	157	5785	20.90	20.80		30.00	30.00	3.63	3.50	Pass
HT20	MCS0	1	165	5825	21.10	20.70		30.00	30.00	3.63	3.50	Pass
HT40	MCS0	1	151	5755	21.00	20.80		30.00	30.00	3.63	3.50	Pass
HT40	MCS0	1	159	5795	21.00	20.80		30.00	30.00	3.63	3.50	Pass
VHT80	MCS0	1	155	5775	19.90	19.80		30.00	30.00	3.63	3.50	Pass

Band IV MIMO												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
HT20	MCS0	2	149	5745	20.80	21.00	23.91	30.00		3.63		Pass
HT20	MCS0	2	157	5785	20.90	20.90	23.91	30.00		3.63		Pass
HT20	MCS0	2	165	5825	20.90	20.90	23.91	30.00		3.63		Pass
HT40	MCS0	2	151	5755	21.10	21.30	24.21	30.00		3.63		Pass
HT40	MCS0	2	159	5795	21.00	21.10	24.06	30.00		3.63		Pass
VHT80	MCS0	2	155	5775	19.00	19.40	22.21	30.00		3.63		Pass

TEST RESULTS DATA
Average Power Table

Band IV single antenna													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
						Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
HE20	MCS0	1	149	5745	Full	21.00	20.80		30.00	30.00	3.63	3.50	Pass
HE20	MCS0	1	157	5785	Full	21.00	20.90		30.00	30.00	3.63	3.50	Pass
HE20	MCS0	1	165	5825	Full	20.80	20.80		30.00	30.00	3.63	3.50	Pass
HE40	MCS0	1	151	5755	Full	20.70	20.90		30.00	30.00	3.63	3.50	Pass
HE40	MCS0	1	159	5795	Full	20.60	20.80		30.00	30.00	3.63	3.50	Pass
HE80	MCS0	1	155	5775	Full	19.80	19.60		30.00	30.00	3.63	3.50	Pass

Band IV MIMO													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	RU Config.	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
						Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
HE20	MCS0	2	149	5745	Full	20.80	21.10	23.96	30.00		3.63		Pass
HE20	MCS0	2	157	5785	Full	21.00	21.00	24.01	30.00		3.63		Pass
HE20	MCS0	2	165	5825	Full	21.20	20.90	24.06	30.00		3.63		Pass
HE40	MCS0	2	151	5755	Full	20.70	21.00	23.86	30.00		3.63		Pass
HE40	MCS0	2	159	5795	Full	20.90	20.90	23.91	30.00		3.63		Pass
HE80	MCS0	2	155	5775	Full	18.80	19.00	21.91	30.00		3.63		Pass



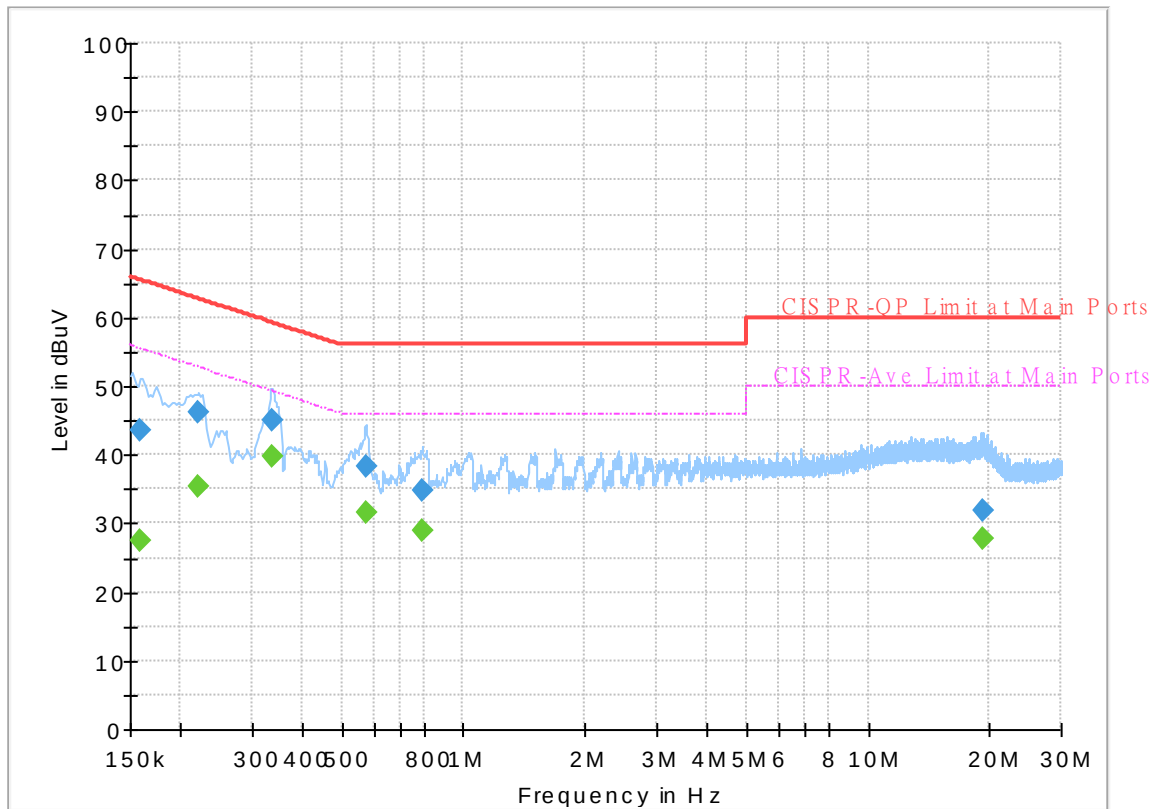
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Calvin Wang	Temperature :	23~26℃
		Relative Humidity :	45~55%

EUT Information

Report NO : 100537
Test Mode : Mode 2
Test Voltage : 120Vac/60Hz
Phase : Line

Full Spectrum



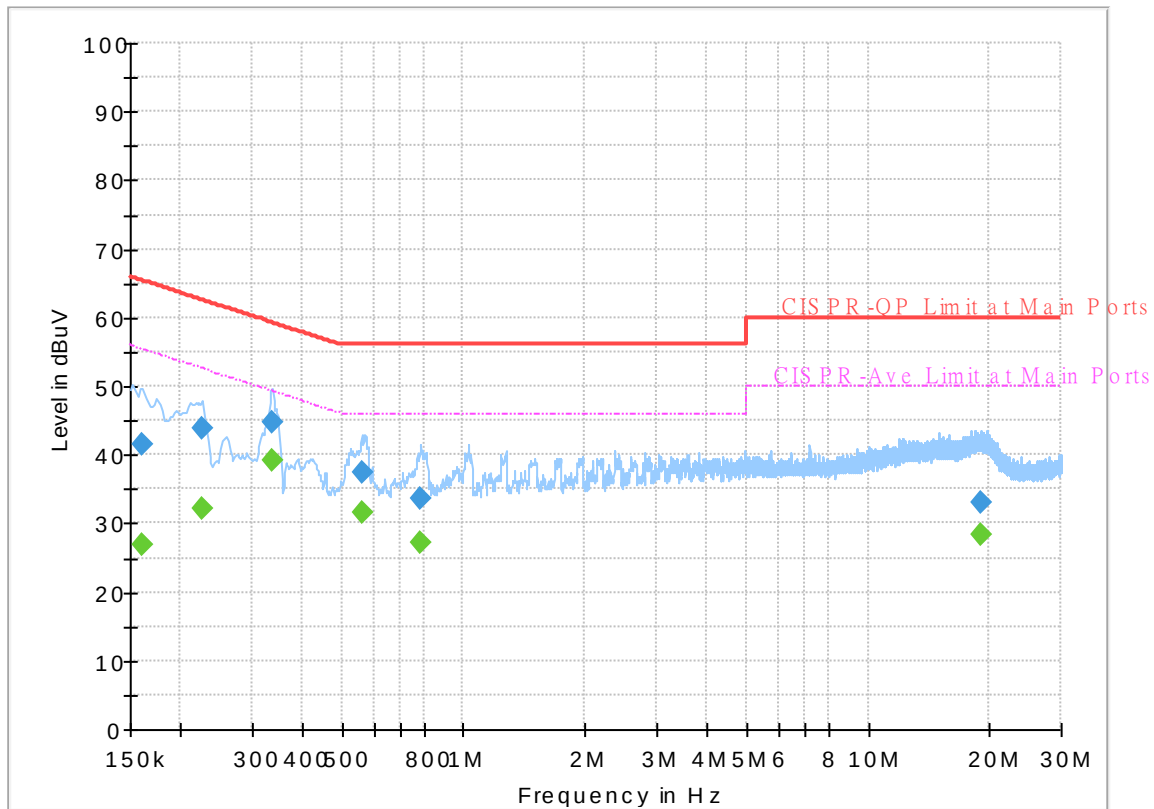
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.159000	---	27.55	55.52	27.97	L1	OFF	19.6
0.159000	43.50	---	65.52	22.02	L1	OFF	19.6
0.222000	---	35.46	52.74	17.28	L1	OFF	19.6
0.222000	46.34	---	62.74	16.40	L1	OFF	19.6
0.336750	---	39.68	49.28	9.60	L1	OFF	19.6
0.336750	45.08	---	59.28	14.20	L1	OFF	19.6
0.573000	---	31.70	46.00	14.30	L1	OFF	19.8
0.573000	38.30	---	56.00	17.70	L1	OFF	19.8
0.791250	---	28.84	46.00	17.16	L1	OFF	20.0
0.791250	34.71	---	56.00	21.29	L1	OFF	20.0
19.302000	---	27.89	50.00	22.11	L1	OFF	20.4
19.302000	31.88	---	60.00	28.12	L1	OFF	20.4

EUT Information

Report NO : 100537
 Test Mode : Mode 2
 Test Voltage : 120Vac/60Hz
 Phase : Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.161250	---	26.97	55.40	28.43	N	OFF	19.6
0.161250	41.61	---	65.40	23.79	N	OFF	19.6
0.226500	---	32.07	52.58	20.51	N	OFF	19.6
0.226500	43.83	---	62.58	18.75	N	OFF	19.6
0.336750	---	39.06	49.28	10.22	N	OFF	19.6
0.336750	44.87	---	59.28	14.41	N	OFF	19.6
0.561750	---	31.68	46.00	14.32	N	OFF	19.8
0.561750	37.41	---	56.00	18.59	N	OFF	19.8
0.782250	---	27.23	46.00	18.77	N	OFF	20.0
0.782250	33.55	---	56.00	22.45	N	OFF	20.0
19.065750	---	28.38	50.00	21.62	N	OFF	20.5
19.065750	33.06	---	60.00	26.94	N	OFF	20.5



Appendix C. Radiated Spurious Emission

Test Engineer :	Daniel Lee, Hayden Wu, James Chiu and Troye Hsieh	Temperature :	20.1~21.4°C
		Relative Humidity :	55.2~67.3%

Remark: For Radiated Spurious Emission Test Items, Ant. 1 means Chain A (Aux.) and Ant. 2 means Chain B (Main).

Band 4 - 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preampl Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac VHT80 CH 155 5775MHz		5644	62.32	-5.88	68.2	53	32.09	10.73	33.5	208	73	P	H
		5697.5	68.6	-34.76	103.36	59.13	32.19	10.79	33.51	208	73	P	H
		5714	73.7	-35.42	109.12	64.15	32.26	10.81	33.52	208	73	P	H
		5723.5	76.65	-42.13	118.78	67.06	32.29	10.82	33.52	208	73	P	H
	*	5775	110.51	-	-	100.76	32.4	10.88	33.53	208	73	P	H
	*	5775	102.49	-	-	92.74	32.4	10.88	33.53	208	73	A	H
		5851.75	72.59	-45.62	118.21	62.67	32.51	10.96	33.55	208	73	P	H
		5855.25	69.69	-41.04	110.73	59.76	32.52	10.96	33.55	208	73	P	H
		5877.25	63.98	-39.55	103.53	53.95	32.61	10.98	33.56	208	73	P	H
		5927	58.85	-9.35	68.2	48.65	32.75	11.02	33.57	208	73	P	H
		5646.25	57.83	-10.37	68.2	48.51	32.09	10.73	33.5	400	151	P	V
		5693.5	64.36	-36.05	100.41	54.89	32.19	10.79	33.51	400	151	P	V
		5718.75	71.25	-39.2	110.45	61.67	32.28	10.82	33.52	400	151	P	V
		5724.75	71.27	-50.36	121.63	61.67	32.3	10.82	33.52	400	151	P	V
	*	5775	105.5	-	-	95.75	32.4	10.88	33.53	400	151	P	V
	*	5775	97.5	-	-	87.75	32.4	10.88	33.53	400	151	A	V
		5850	64.44	-57.76	122.2	54.54	32.5	10.95	33.55	400	151	P	V
		5858	62.02	-47.94	109.96	52.08	32.53	10.96	33.55	400	151	P	V
		5909	56.14	-23.87	80.01	45.98	32.72	11.01	33.57	400	151	P	V
		5935.25	54.19	-14.01	68.2	43.96	32.77	11.03	33.57	400	151	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		11550	46.05	-27.95	74	50.64	39.8	17.8	62.19	-	-	P	H
		17325	45.89	-22.31	68.2	41.26	40.77	22.11	58.25	-	-	P	H
		17978	53.14	-20.86	74	40.54	46.45	22.8	56.65	-	-	P	H
		17978	43.03	-10.97	54	30.43	46.45	22.8	56.65	-	-	A	H
													H
													H
		11550	45.76	-28.24	74	50.35	39.8	17.8	62.19	-	-	P	V
		17325	45.75	-22.45	68.2	41.12	40.77	22.11	58.25	-	-	P	V
		17967	52.69	-21.31	74	40.31	46.27	22.79	56.68	-	-	P	V
		17967	42.65	-11.35	54	30.27	46.27	22.79	56.68	-	-	A	V
													V
													V
Remark	- No other spurious found. - All results are PASS against Peak and Average limit line. - The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only. - The emission level close to 18GHz is checked that the average emission level is noise floor only.												

Emission below 1GHz

5GHz WIFI 802.11ac VHT80 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11ac VHT80 LF		30	20.36	-19.64	40	27.79	24.27	0.79	32.49	-	-	P	H
		140.58	28.47	-15.03	43.5	42	17.18	1.79	32.5	-	-	P	H
		273.47	32.64	-13.36	46	43.87	18.71	2.5	32.44	-	-	P	H
		514.03	35.1	-10.9	46	40.48	23.86	3.36	32.6	-	-	P	H
		839.95	31.05	-14.95	46	29.93	28.69	4.37	31.94	-	-	P	H
		976.72	35.48	-18.52	54	31	30.74	4.75	31.01	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
		36.79	33.76	-6.24	40	44.34	21.05	0.92	32.55	-	-	P	V
		155.13	28.36	-15.14	43.5	42.42	16.56	1.88	32.5	-	-	P	V
		517.91	39.21	-6.79	46	44.58	23.85	3.38	32.6	-	-	P	V
		560.59	39.01	-6.99	46	42.12	25.97	3.52	32.6	-	-	P	V
		675.05	30.93	-15.07	46	33.11	26.34	3.89	32.41	-	-	P	V
		978.66	35.59	-18.41	54	31.16	30.66	4.75	30.98	-	-	P	V
													V
												V	
												V	
												V	
												V	
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against limit line. 3. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.												



Band 4 5725~5850MHz

WIFI 802.11ax HE40_Full (Band Edge @ 3m)

WIFI Ant. 2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Full CH 159 5795MHz		5644.75	49.62	-18.58	68.2	40.3	32.09	10.73	33.5	200	288	P	H
		5696.5	54.79	-47.83	102.62	45.32	32.19	10.79	33.51	200	288	P	H
		5720	57.23	-53.57	110.8	47.65	32.28	10.82	33.52	200	288	P	H
		5720.5	57.23	-54.71	111.94	47.65	32.28	10.82	33.52	200	288	P	H
	*	5795	111.59	-	-	101.83	32.4	10.9	33.54	200	288	P	H
	*	5795	102.18	-	-	92.42	32.4	10.9	33.54	200	288	A	H
		5850.25	59.26	-62.37	121.63	49.35	32.5	10.96	33.55	200	288	P	H
		5857.5	57.39	-52.71	110.1	47.45	32.53	10.96	33.55	200	288	P	H
		5892.25	54.19	-38.21	92.4	44.09	32.67	10.99	33.56	200	288	P	H
		5925	51.5	-16.7	68.2	41.3	32.75	11.02	33.57	200	288	P	H
													H
													H
		5639	50.35	-17.85	68.2	41.05	32.08	10.72	33.5	194	83	P	V
		5698	53.56	-50.17	103.73	44.08	32.2	10.79	33.51	194	83	P	V
		5720	56.92	-53.88	110.8	47.34	32.28	10.82	33.52	194	83	P	V
		5724	58.52	-61.4	119.92	48.92	32.3	10.82	33.52	194	83	P	V
	*	5795	109.82	-	-	100.06	32.4	10.9	33.54	194	83	P	V
	*	5795	100.92	-	-	91.16	32.4	10.9	33.54	194	83	A	V
		5851.5	57.28	-61.5	118.78	47.36	32.51	10.96	33.55	194	83	P	V
		5862.25	55.86	-52.91	108.77	45.89	32.55	10.97	33.55	194	83	P	V
		5883.5	53.29	-45.6	98.89	43.23	32.63	10.99	33.56	194	83	P	V
		5942.75	52.18	-16.02	68.2	41.93	32.79	11.04	33.58	194	83	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11ax HE40_Full (Harmonic @ 3m)

WIFI Ant. 2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Full CH 159 5795MHz		11590	46.3	-27.7	74	51	39.72	17.47	62.26	-	-	P	H
		17385	47.32	-20.88	68.2	42.05	41.19	21.65	58.1	-	-	P	H
		17967	53.7	-20.3	74	41.32	46.27	22.25	56.68	-	-	P	H
		17967	43.53	-10.47	54	31.15	46.27	22.25	56.68	-	-	A	H
													H
													H
		11590	45.76	-28.24	74	50.46	39.72	17.47	62.26	-	-	P	V
		17385	47.75	-20.45	68.2	42.48	41.19	21.65	58.1	-	-	P	V
		17978	53.58	-20.42	74	40.98	46.45	22.26	56.65	-	-	P	V
		17978	43.38	-10.62	54	30.78	46.45	22.26	56.65	-	-	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only. 4. The emission level close to 18GHz is checked that the average emission level is noise floor only.												



Band 4 - 5725~5850MHz

WIFI 802.11ax HE20_Full (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ax HE20 Full CH 157 5785MHz		5629.5	48.77	-19.43	68.2	39.49	32.06	10.71	33.49	215	168	P	H
		5666.5	50.39	-30.06	80.45	41	32.13	10.76	33.5	215	168	P	H
		5717.25	54.35	-55.68	110.03	44.79	32.27	10.81	33.52	215	168	P	H
		5722	55.52	-59.84	115.36	45.93	32.29	10.82	33.52	215	168	P	H
	*	5785	117.7	-	-	107.94	32.4	10.89	33.53	215	168	P	H
	*	5785	108.67	-	-	98.91	32.4	10.89	33.53	215	168	A	H
		5852.75	53.31	-62.62	115.93	43.39	32.51	10.96	33.55	215	168	P	H
		5857.25	53.06	-57.11	110.17	43.12	32.53	10.96	33.55	215	168	P	H
		5883.5	50.84	-48.05	98.89	40.78	32.63	10.99	33.56	215	168	P	H
		5938.25	50.6	-17.6	68.2	40.36	32.78	11.03	33.57	215	168	P	H
													H
													H
		5649.25	49.32	-18.88	68.2	39.98	32.1	10.74	33.5	291	167	P	V
		5696	50.81	-51.44	102.25	41.34	32.19	10.79	33.51	291	167	P	V
		5709.25	51.68	-56.11	107.79	42.14	32.24	10.81	33.51	291	167	P	V
		5722.75	53.86	-63.21	117.07	44.27	32.29	10.82	33.52	291	167	P	V
	*	5785	118.03	-	-	108.27	32.4	10.89	33.53	291	167	P	V
	*	5785	107.9	-	-	98.14	32.4	10.89	33.53	291	167	A	V
		5852.25	51.78	-65.29	117.07	41.86	32.51	10.96	33.55	291	167	P	V
		5863.25	50.58	-57.91	108.49	40.61	32.55	10.97	33.55	291	167	P	V
		5899.5	49.96	-37.07	87.03	39.82	32.7	11	33.56	291	167	P	V
		5947	49.99	-18.21	68.2	39.74	32.79	11.04	33.58	291	167	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11ax HE20 Full (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Full CH 157 5785MHz		11570	47.03	-26.97	74	51.68	39.76	17.82	62.23	-	-	P	H
		17355	46.9	-21.3	68.2	41.94	40.99	22.15	58.18	-	-	P	H
		17978	53.75	-20.25	74	41.15	46.45	22.8	56.65	-	-	P	H
		17978	43.7	-10.3	54	31.1	46.45	22.8	56.65	-	-	A	H
													H
													H
		11570	46.82	-27.18	74	51.47	39.76	17.82	62.23	-	-	P	V
		17355	45.75	-22.45	68.2	40.79	40.99	22.15	58.18	-	-	P	V
		17978	54.62	-19.38	74	42.02	46.45	22.8	56.65	-	-	P	V
		17978	43.6	-10.4	54	31	46.45	22.8	56.65	-	-	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only. 4. The emission level close to 18GHz is checked that the average emission level is noise floor only.												



Band 4 5725~5850MHz

WIFI 802.11ax HE40_Full (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Full CH 159 5795MHz		5645.5	50.76	-17.44	68.2	41.44	32.09	10.73	33.5	200	168	P	H
		5699.5	58.95	-45.88	104.83	49.47	32.2	10.79	33.51	200	168	P	H
		5720	63.34	-47.46	110.8	53.76	32.28	10.82	33.52	200	168	P	H
		5724.5	65.02	-56.04	121.06	55.42	32.3	10.82	33.52	200	168	P	H
	*	5795	114.97	-	-	105.21	32.4	10.9	33.54	200	168	P	H
	*	5795	105.33	-	-	95.57	32.4	10.9	33.54	200	168	A	H
		5850	67.9	-54.3	122.2	58	32.5	10.95	33.55	200	168	P	H
		5860	67.23	-42.17	109.4	57.28	32.54	10.96	33.55	200	168	P	H
		5877	61.31	-42.4	103.71	51.28	32.61	10.98	33.56	200	168	P	H
		5927.25	50.89	-17.31	68.2	40.69	32.75	11.02	33.57	200	168	P	H
													H
													H
		5633.25	49.56	-18.64	68.2	40.26	32.07	10.72	33.49	293	168	P	V
		5692.5	55.81	-43.86	99.67	46.34	32.19	10.79	33.51	293	168	P	V
		5719	61.71	-48.81	110.52	52.13	32.28	10.82	33.52	293	168	P	V
		5723.25	63.25	-54.96	118.21	53.66	32.29	10.82	33.52	293	168	P	V
	*	5795	113.33	-	-	103.57	32.4	10.9	33.54	293	168	P	V
	*	5795	102.97	-	-	93.21	32.4	10.9	33.54	293	168	A	V
		5853.25	60.76	-54.03	114.79	50.84	32.51	10.96	33.55	293	168	P	V
		5855.25	61.64	-49.09	110.73	51.71	32.52	10.96	33.55	293	168	P	V
		5883.5	57.06	-41.83	98.89	47	32.63	10.99	33.56	293	168	P	V
		5937	50.18	-18.02	68.2	39.95	32.77	11.03	33.57	293	168	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11ax HE40_Full (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Full CH 159 5795MHz		11590	46.64	-27.36	74	51.34	39.72	17.84	62.26	-	-	P	H
		17385	47.22	-20.98	68.2	41.95	41.19	22.18	58.1	-	-	P	H
		18000	53.58	-20.42	74	40.56	46.8	22.82	56.6	-	-	P	H
		18000	43.74	-10.26	54	30.72	46.8	22.82	56.6	-	-	A	H
													H
													H
		11590	45.92	-28.08	74	50.62	39.72	17.84	62.26	-	-	P	V
		17385	46.95	-21.25	68.2	41.68	41.19	22.18	58.1	-	-	P	V
		17967	53.38	-20.62	74	41	46.27	22.79	56.68	-	-	P	V
		17967	43.41	-10.59	54	31.03	46.27	22.79	56.68	-	-	A	V
													V
													V
Remark	- No other spurious found. - All results are PASS against Peak and Average limit line. - The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only. - The emission level close to 18GHz is checked that the average emission level is noise floor only.												



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 149		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H
5745MHz													

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
= 55.45 (dBμV/m)
2. Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
= 43.54 (dBμV/m)
2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)
= 43.54(dBμV/m) – 54(dBμV/m)
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

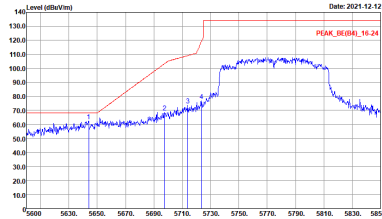
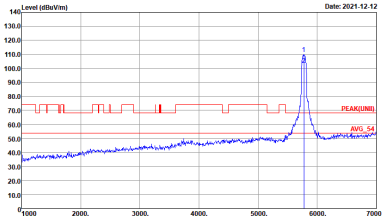
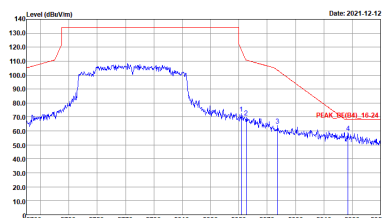


Appendix D. Radiated Spurious Emission Plots

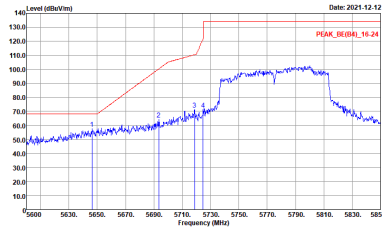
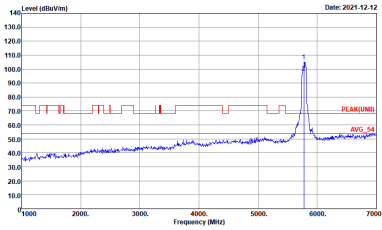
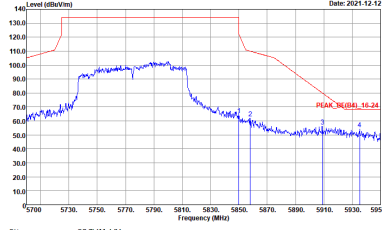
Test Engineer :	Daniel Lee, Hayden Wu, James Chiu and Troye Hsieh	Temperature :	20.1~21.4°C
		Relative Humidity :	55.2~67.3%

Remark: For Radiated Spurious Emission Test Items, Ant. 1 means Chain A (Aux.) and Ant. 2 means Chain B (Main).

Band 4 - 5725~5850MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 HORIZONTAL : RBW:3000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 HORIZONTAL : RBW:3000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 HORIZONTAL : RBW:3000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

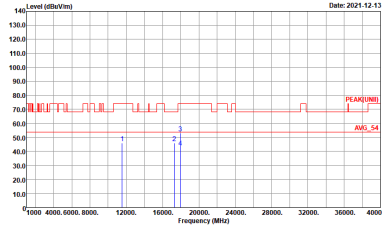
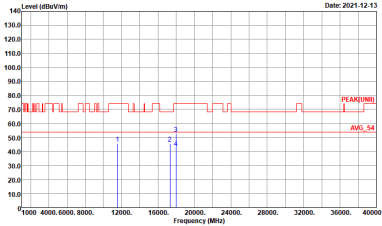


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

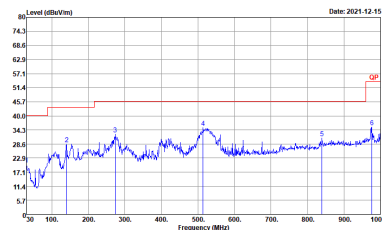
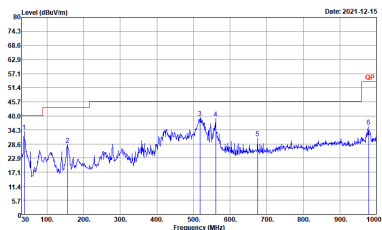


Band 4 - 5725~5850MHz

WIFI 802.11ax HE20 Full (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ax HE20 Full CH155 5775MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 HORIZONTAL	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 VERTICAL

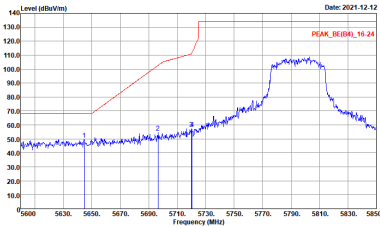
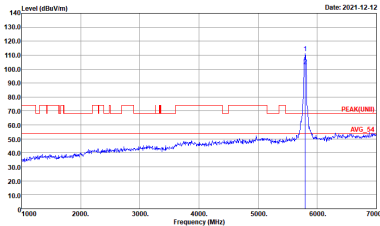
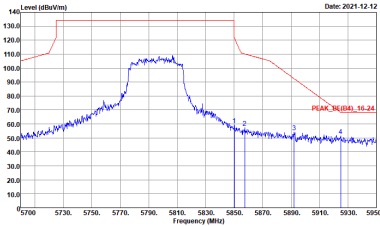
Emission below 1GHz
5GHz WIFI 802.11ac VHT80 (LF @ 3m)

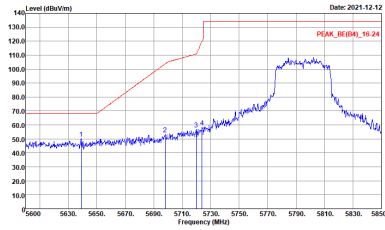
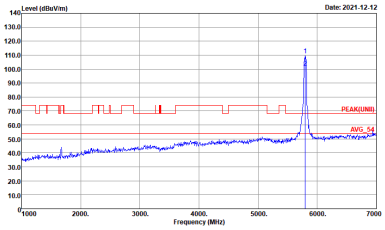
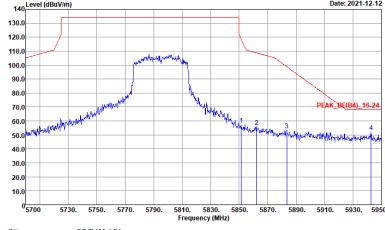
WIFI	5GHz WIFI	
ANT	802.11ac VHT80 LF	
1	Horizontal	Vertical
QP / Peak	 Site : 03CH11-HY Condition : QP 3m BE-LOG 35414-211009 HORIZONTAL	 Site : 03CH11-HY Condition : QP 3m BE-LOG 35414-211009 VERTICAL



Band 4 - 5725~5850MHz

WIFI 802.11ax HE40 Full (Band Edge @ 3m)

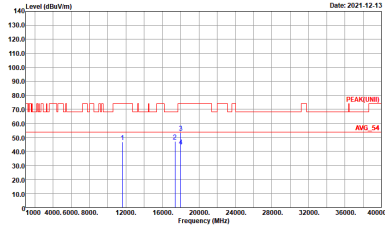
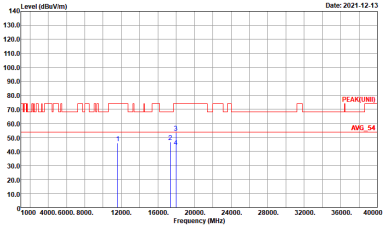
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH159 5795MHz	
2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH159 5795MHz	
2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto
	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	Left blank



Band 4 - 5725~5850MHz

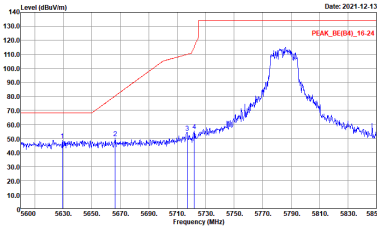
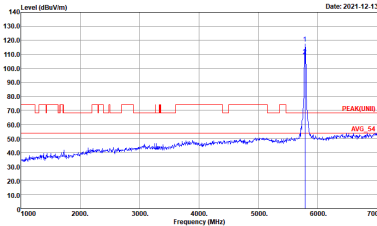
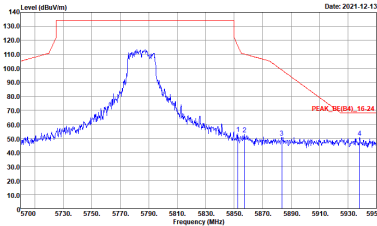
WIFI 802.11ax HE40 Full (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ax HE40 Full CH159 5795MHz	
2	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 HORIZONTAL	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 VERTICAL

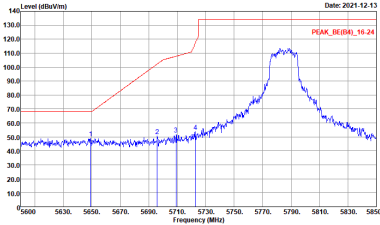
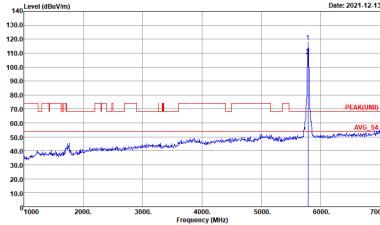
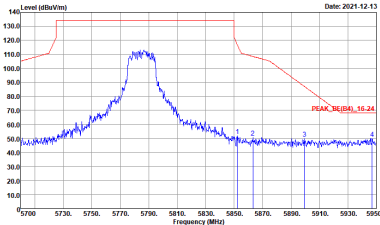


Band 4 - 5725~5850MHz

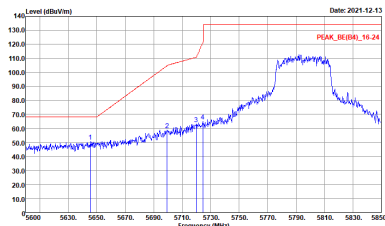
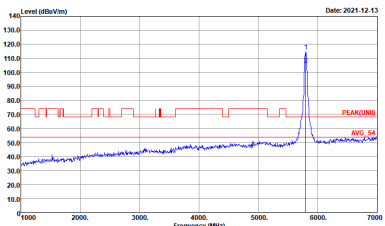
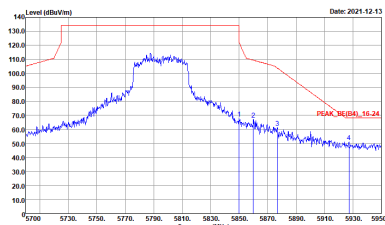
WIFI 802.11ax HE20 Full (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH157 5785MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 HORIZONTAL : RBW:1000.0000Hz VBW:3000.0000Hz SW1:Auto	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 HORIZONTAL : RBW:1000.0000Hz VBW:3000.0000Hz SW1:Auto
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 HORIZONTAL : RBW:1000.0000Hz VBW:3000.0000Hz SW1:Auto	Left blank

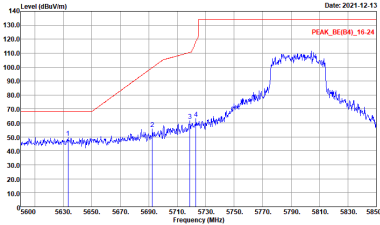
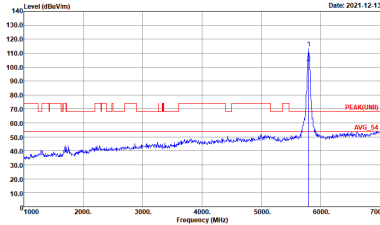
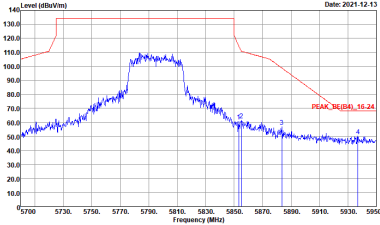


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ax HE20 Full CH157 5785MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

Band 4 5725~5850MHz
WIFI 802.11ax HE40 Full (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full HT40 CH159 5795MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ax HE40 Full CH159 5795MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	 Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto
	 Site : 03CH11-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1326_20211025 VERTICAL RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	Left blank

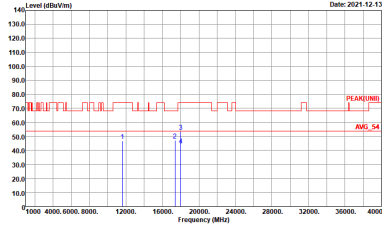
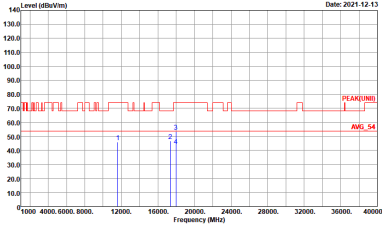


Band 4 - 5725~5850MHz

WIFI 802.11ax HE20 Full (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ax HE20 Full CH157 5785MHz	
1+2	Horizontal	Vertical
Peak Avg.	Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 HORIZONTAL	Site : 03CH11-HY Condition : PEAK(UNIT) 3m 91200_1326_20211025 VERTICAL

Band 4 5725~5850MHz
WIFI 802.11ax HE40 Full (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ax HE40 Full CH159 5795MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-4Y Condition : PEAK(UNIT) 3m 91200_1326_20211025 HORIZONTAL	 Site : 03CH11-4Y Condition : PEAK(UNIT) 3m 91200_1326_20211025 VERTICAL

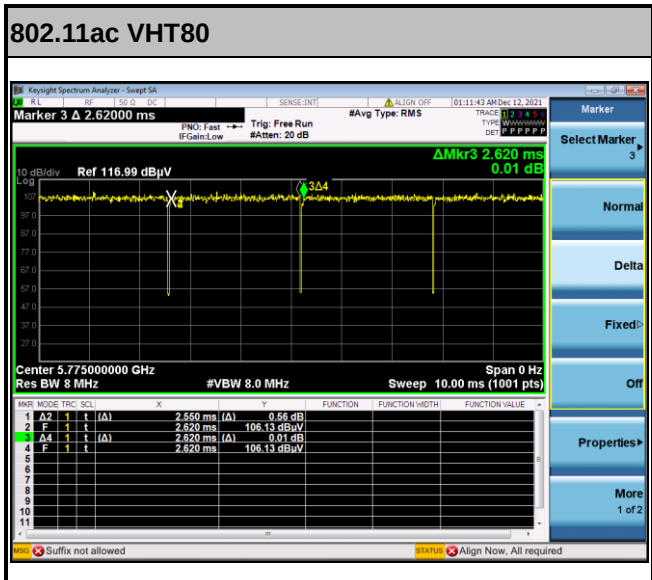


Appendix E. Duty Cycle Plots

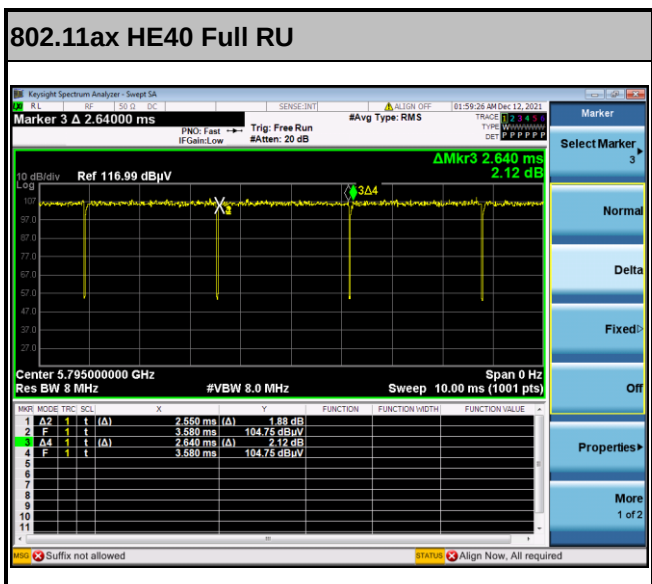
Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1	5GHz 802.11ac VHT80	97.33	2550	0.39	1kHz
2	5GHz 802.11ax HE40 Full RU	96.59	2550	0.39	1kHz
1+2	5GHz 802.11ax HE20 Full RU	99.12	-	-	10Hz
1+2	5GHz 802.11ax HE40 Full RU	98.54	-	-	10Hz

Remark: Ant. 1 means Chain A (Aux.) and Ant. 2 means Chain B (Main).

<Ant. 1>



<Ant. 2>





MIMO <Ant. 1+2>

