FCC Test Report

Product Name	：	5G CPE
Trade Name	：	WNC
Model No.	：	FWAR
FCC ID	：	NKR-LAA2

Applicant	：	Wistron NeWeb Corporation
Address	：	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan

Date of Receipt	：	Nov. 16, 2020
Issued Date	：	Dec. 09, 2020
Report No.	：	20B0401R-E3032110126
Report Version	：	V1.0

Testing Laboratory
3024

Test Report Certification

Issued Date : Dec. 09, 2020
Report No. : 20B0401R-E3032110126

Product Name	:	5G CPE
Applicant	:	Wistron NeWeb Corporation
Address	:	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan
Manufacturer	:	Wistron NeWeb Corporation
Address	:	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan
Model No.	:	FWAR
Trade Name	:	WNC
FCC ID	:	NKR-LAA2
EUT Voltage	:	AC 100-240V / 50-60Hz
Testing Voltage	:	AC 120V / 60Hz
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart E Section 15.407: 2019 ANSI C63.10: 2013
Laboratory Name	:	Hsin Chu Laboratory
Address	:	No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 310, Taiwan, R.O.C. TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result	:	Complied

Documented By : Carol Tsai

(Carol Tsai / Senior Engineering Adm. Specialist)

Tested By : Neil yeh

(Neil Yeh / Senior Engineer)

Approved By : Louis Hsu

(Louis Hsu / Deputy Manager)

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Dec. 09, 2020

TABLE OF CONTENTS

1. General Information

1.1. EUT Description

Product Name	5G CPE	
Trade Name	WNC	
Model No.	FWAR	
Frequency Range/ Channel Number	IEEE 802.11a/n (20MHz)	5180~5240MHz / 4 Channels 5260-5320MHz / 4 Channels 5500-5700MHz / 11 Channels 5745~5825MHz / 5 Channels
	IEEE 802.11ac/ax (20MHz)	5180~5240MHz / 4 Channels 5260-5320MHz / 4 Channels 5500-5700MHz / 11 Channels 5720MHz / 1 Channels 5745~5825MHz / 5 Channels
	IEEE 802.11 a/n (40MHz)	5190~5230MHz / 2 Channels 5270-5310MHz / 2 Channels 5510-5670MHz / 5 Channels 5755~5795MHz / 2 Channels
	IEEE 802.11ac/ax (40MHz)	5190~5230MHz / 2 Channels 5270-5310MHz / 2 Channels 5510-5670MHz / 5 Channels 5710MHz / 1 Channels 5755~5795MHz / 2 Channels
	IEEE 802.11ac/ax (80MHz)	5210~5210MHz / 1 Channel 5290MHz / 1 Channels 5530-5690MHz / 3 Channels 5775~5775MHz / 1 Channel
Type of Modulation	IEEE 802.11a/n/ac/ax	OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Data Speed	IEEE 802.11a	6 - 54Mbps
	IEEE 802.11n	Up to 600Mbps
	IEEE 802.11ac	Up to 1733.3Mbps
	IEEE 802.11ax	Up to 2402Mbps
Antenna Type	Dipole Antenna	
Antenna Gain	Refer to the table “Antenna List”	
HW Version	0.3.3	
SW Version	0.16.06.1dbg	

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Directioal Gain
1.	WNC	95XKAC15.GDNVZ	Dipole antenna	5.22dBi for 5150~5250 GHz
2.	WNC	95XKAC15.GDOVZ	Dipole antenna	5.22dBi For 5.25~5.35GHz
3.	WNC	95XKAC15.GDPVZ	Dipole antenna	5.15dBi for 5.47~5.725GHz
4.	WNC	95XKAC15.GDQVZ	Dipole antenna	5.15dBi for 5725~5850 GHz

Accessories Information	
Power Adapter (1) (White/Black/Gray)	MFR: Delta, M/N: ADP-120VH D Input: AC 100-240V~2.5A, 50-60Hz Output: 20V, 6A Cable Out: Non-Shielded, 3.0m Power Cord: Non-Shielded, 1.8m
Power Adapter (2) (White/Black/Gray)	MFR: Delta, M/N: ADP-65JH HB Input: AC 100-240V~2.5A, 50-60Hz Output: 19V, 3.42A Cable Out: Non-Shielded, 3.0m Power Cord: Non-Shielded, 1.8m

Channel List

IEEE 802.11a/n (20MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz	48	5240 MHz
52	5260 MHz	56	5280 MHz	60	5300 MHz	64	5320 MHz
100	5500 MHz	104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz	128	5640 MHz
132	5660 MHz	136	5680 MHz	140	5700 MHz	149	5745 MHz
153	5765 MHz	157	5785 MHz	161	5805 MHz	165	5825 MHz

IEEE 802.11ac/ax (20MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz	48	5240 MHz
52	5260 MHz	56	5280 MHz	60	5300 MHz	64	5320 MHz
100	5500 MHz	104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz	128	5640 MHz
132	5660 MHz	136	5680 MHz	140	5700 MHz	144	5720MHz
149	5745 MHz	153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz	-					

IEEE 802.11n (40MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270MHz	62	5310 MHz
102	5510 MHz	110	5550 MHz	118	5590MHz	126	5630 MHz
134	5670 MHz	151	5755 MHz	159	5795 MHz	-	

IEEE 802.11ac/ax (40MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270MHz	62	5310 MHz
102	5510 MHz	110	5550 MHz	118	5590MHz	126	5630 MHz
134	5670 MHz	142	5710MHz	151	5755 MHz	159	5795 MHz

IEEE 802.11ac/ax (80MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz	106	5530 MHz	122	5610 MHz
138	5690MHz	155	5775 MHz	-			

Note:

1. This device including 2.4GHz b/g/n/ac/ax and 5GHz a/n/ac/ax transmitting and receiving functions.
2. The EUT description is from the customer declaration.
3. This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110126, 2071064R-E3032110126 is housing and software. The software changes as following:
   1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
   2) Close 5G FR2 band n261 by software.

   According to above conditions, Conducted Emission, Radiated Emission and Radiated Emission Band Edge worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report. For DFS, the mechanism is identical with software change.

1.2. Test Mode

Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D) Mode 2: Transmit Mode (ADP: ADP-65JH HB)

Test Items	Modulation	Channel	Antenna	Result
Conducted Emission	11ax(20MHz)	165	1+2+3+4	Complies
Radiated Emission	11ax(20MHz)	165	1+2+3+4	Complies
Band Edge	11ax(20MHz)	165	1+2+3+4	Complies

Note:

This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110126, 2071064R-E3032110126 is housing and software. The software changes as following:

1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.

2) Close 5G FR2 band n261 by software.

According to above conditions, Conducted Emission, Radiated Emission and Radiated Emission Band Edge worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report. For DFS, the mechanism is identical with software change.

Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

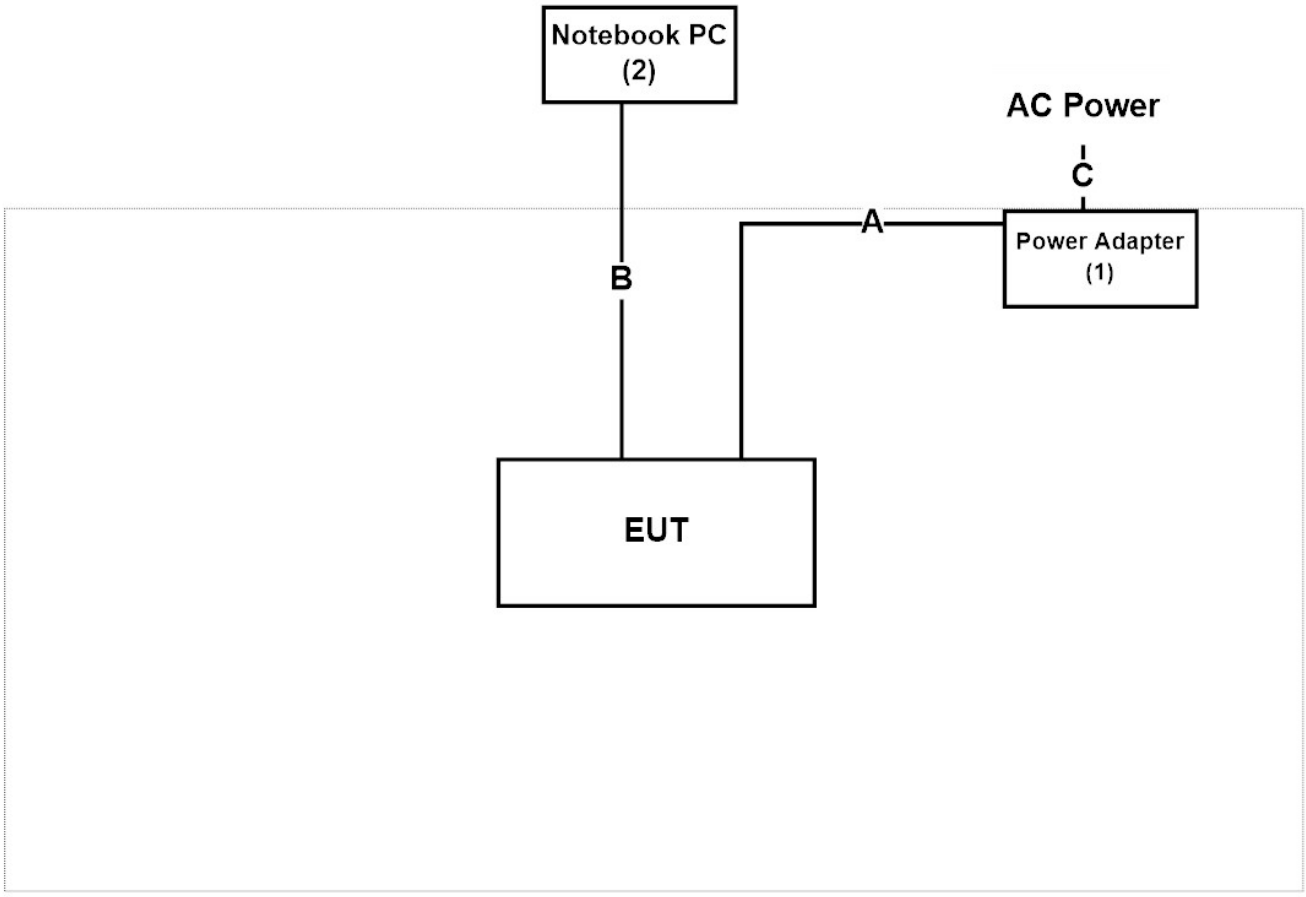
1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Power Adapter	Delta	ADP-120VH D/ ADP-65JH HB	N/A	N/A
2	Notebook PC	DELL	Latitude 5501	9V4JL13	N/A

1.4. Configuration of tested System

Connection Diagram



Signal Cable Type		Signal cable Description
A	Power Cable	Non-Shielded, 3m
B	LAN Cable	Non-Shielded, 2m
C	Power Cable	Non-Shielded, 1.8m

1.5. EUT Exercise Software

1	Setup the EUT as shown in Section 1.4.
2	Execute software “QSPR v5.0-00163” on the Notebook PC.
3	Configure the test mode, the test channel, and the data rate.
4	Press “OK” to start the continuous Transmit.
5	Verify that the EUT works properly.

1.6. Comments and Remarks

The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required	Test Site
Temperature (°C)	FCC PART 15E 15.407	15 - 35	2
Humidity (%RH)	Conducted Emission	25 - 75	
Temperature (°C)	FCC PART 15E 15.407	15 - 35	1
Humidity (%RH)	Radiated Emission	25 - 75	
Temperature (°C)	FCC PART 15E 15.407	15 - 35	1
Humidity (%RH)	Band Edge	25 - 75	

Note: Test site information refers to Laboratory Information.

Laboratory Information

USA	:	**FCC Registration Number: TW3024**
Canada	:	**IC Registration Number: 22397-1 / 22397-2 / 22397-3**

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw

If you have any comments, please don't hesitate to contact us. Our test sites as below:

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
Address	1. No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 2. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
Phone number	1. +886-3-582-8001 2. +886-3-582-8001
Fax number	1. +886-3-582-8958 2. +886-3-582-8958
Email address	info.tw@dekra.com
Website	http://www.dekra.com.tw

1.8. List of Test Equipment

Conducted Emission / SR2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2020/01/08	2021/01/07
Test Receiver	R&S	ESCS 30	836858/022	2020/02/25	2021/02/24
LISN	R&S	ENV216	100092	2020/06/22	2021/06/21

Radiated Emission / CB4-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2020/10/12	2021/10/11
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
Signal Analyzer	R&S	FSV40	101435	2020/06/24	2021/06/23
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2020/02/21	2021/02/20
Bilog Antenna	Teseq	CBL6112D	23191	2020/06/12	2021/06/11
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2020/06/04	2021/06/03
Horn Antenna	Schwarzbeck	BBHA 9120D	01656	2020/10/14	2021/10/13
Horn Antenna	Schwarzbeck	BBHA 9170	202	2019/12/27	2020/12/26
Horn Antenna	Schwarzbeck	BBHA 9170	203	2020/03/09	2021/03/08
Pre-Amplifier	DEKRA	AP-025C	12183122	2020/09/03	2021/09/02
Pre-Amplifier	EMCI	EMC11830I	980366	2020/11/30	2021/11/29
Pre-Amplifier	DEKRA	AP-400C	201801231	2019/12/03	2020/12/02
Band Reject Filter	Micro-Tronics	BRM50716	G089	2020/03/18	2021/03/17
Band Reject Filter	Micro-Tronics	BRM50716	G068	2020/03/09	2021/03/08
Coaxial Cable(13m)	Huber+Suhner	SF104	CB2-H	2020/07/25	2021/07/24
DEKRA Testing System	DEKRA	Version 1.2	CB2-H	NA	NA

Band Edge / CB4-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2020/10/12	2021/10/11
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
Signal Analyzer	R&S	FSV40	101435	2020/06/24	2021/06/23
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2020/02/21	2021/02/20
Bilog Antenna	Teseq	CBL6112D	23191	2020/06/12	2021/06/11
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2020/06/04	2021/06/03
Horn Antenna	Schwarzbeck	BBHA 9120D	01656	2020/10/14	2021/10/13
Horn Antenna	Schwarzbeck	BBHA 9170	202	2019/12/27	2020/12/26
Horn Antenna	Schwarzbeck	BBHA 9170	203	2020/03/09	2021/03/08
Pre-Amplifier	DEKRA	AP-025C	12183122	2020/09/03	2021/09/02
Pre-Amplifier	EMCI	EMC11830I	980366	2020/11/30	2021/11/29
Pre-Amplifier	DEKRA	AP-400C	201801231	2019/12/03	2020/12/02
Band Reject Filter	Micro-Tronics	BRM50716	G089	2020/03/18	2021/03/17
Band Reject Filter	Micro-Tronics	BRM50716	G068	2020/03/09	2021/03/08
Coaxial Cable(13m)	Huber+Suhner	SF104	CB2-H	2020/07/25	2021/07/24
DEKRA Testing System	DEKRA	Version 1.2	CB2-H	NA	NA

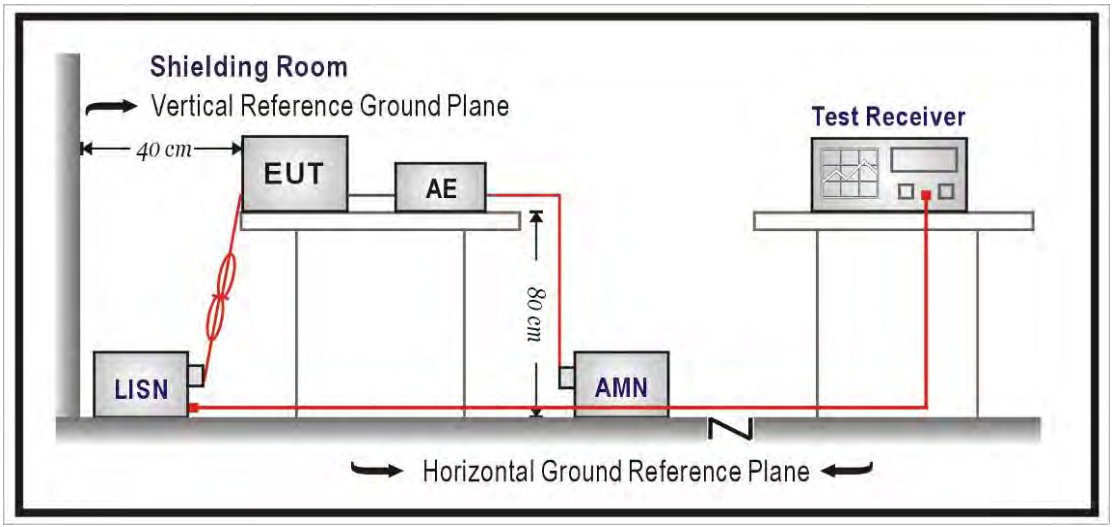
Note: All equipment upon which need to calibrated are with calibration period of 1 year.

1.9. Uncertainty

Test item	Uncertainty
Conducted Emission	± 2.26 dB
Radiated Emission	30MHz~1GHz as ± 3.43 dB 1GHz~26.5GHz as ± 3.65 dB
Band Edge	± 3.65 dB

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Remark: In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

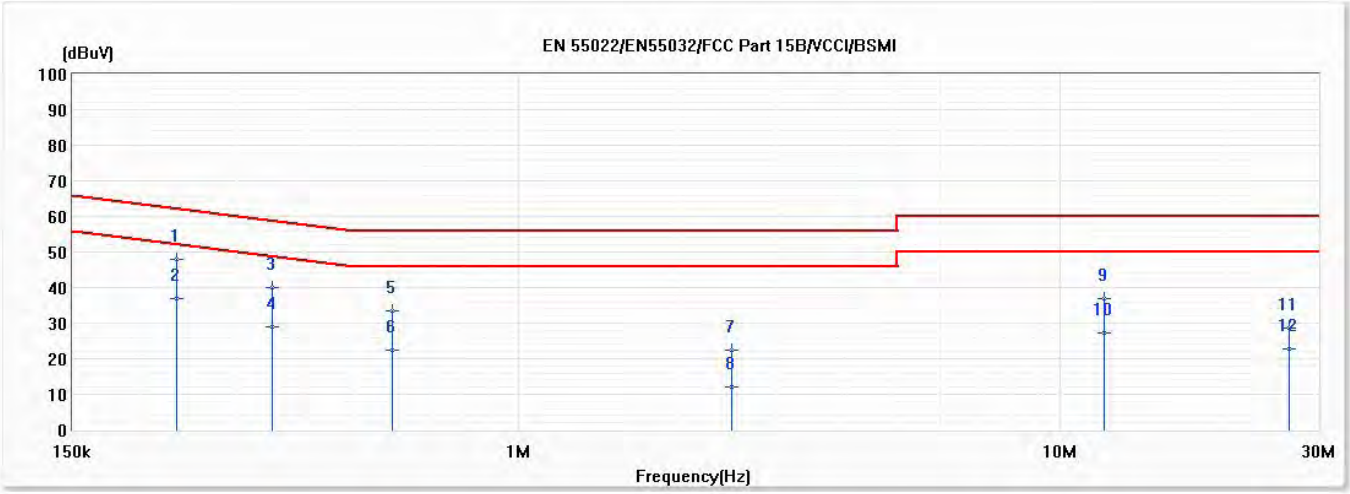
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

2.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.407: 2019

2.5. Test Result

Model No	FWAR	Site	SR2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/30
Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D)	Engineer	Neil Yeh
Phase	L	Temperature (℃)	22.3
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	60



No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.234	48.09	62.31	-14.23	38.44	9.65	QP
2	0.234	36.92	52.31	-15.39	27.27	9.65	AV
3	0.350	39.88	58.95	-19.07	30.21	9.67	QP
4	0.350	29.12	48.95	-19.83	19.45	9.67	AV
5	0.583	33.39	56.00	-22.61	23.69	9.70	QP
6	0.583	22.25	46.00	-23.75	12.55	9.70	AV
7	2.468	22.56	56.00	-33.44	12.74	9.81	QP
8	2.468	12.21	46.00	-33.79	2.40	9.81	AV
9	12.059	36.99	60.00	-23.01	26.82	10.18	QP
10	12.059	27.26	50.00	-22.74	17.09	10.18	AV
11	26.486	28.64	60.00	-31.36	18.19	10.45	QP
12	26.486	22.80	50.00	-27.20	12.35	10.45	AV

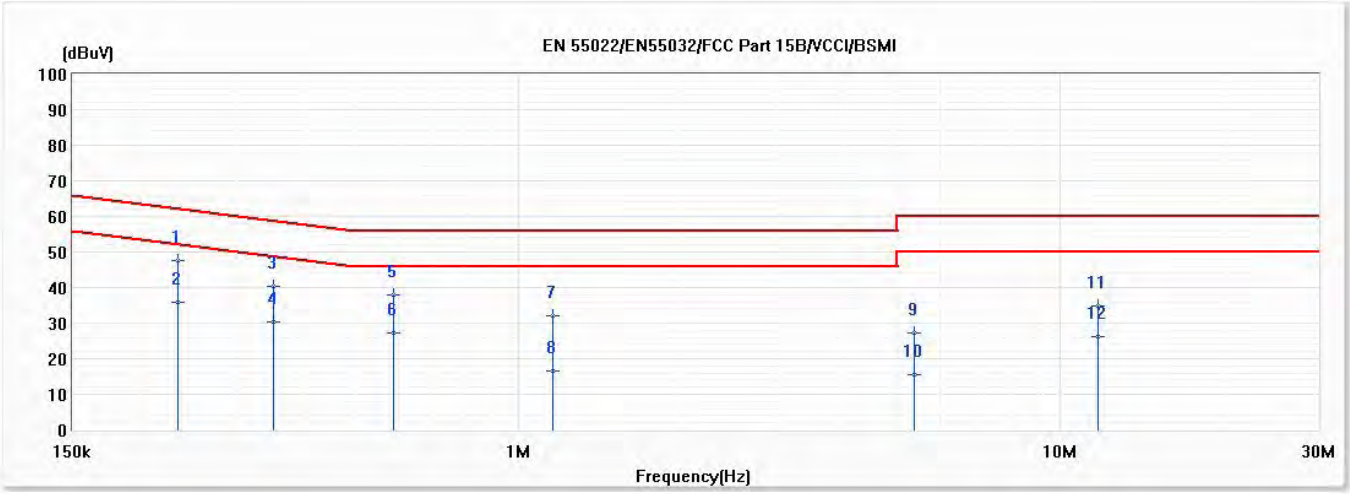
Remark:

1. "*" means this data is the worst emission level.

2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).

3. Margin = Emission Level - Limit.

Model No	FWAR	Site	SR2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/30
Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D)	Engineer	Neil Yeh
Phase	N	Temperature (℃)	22.3
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	60

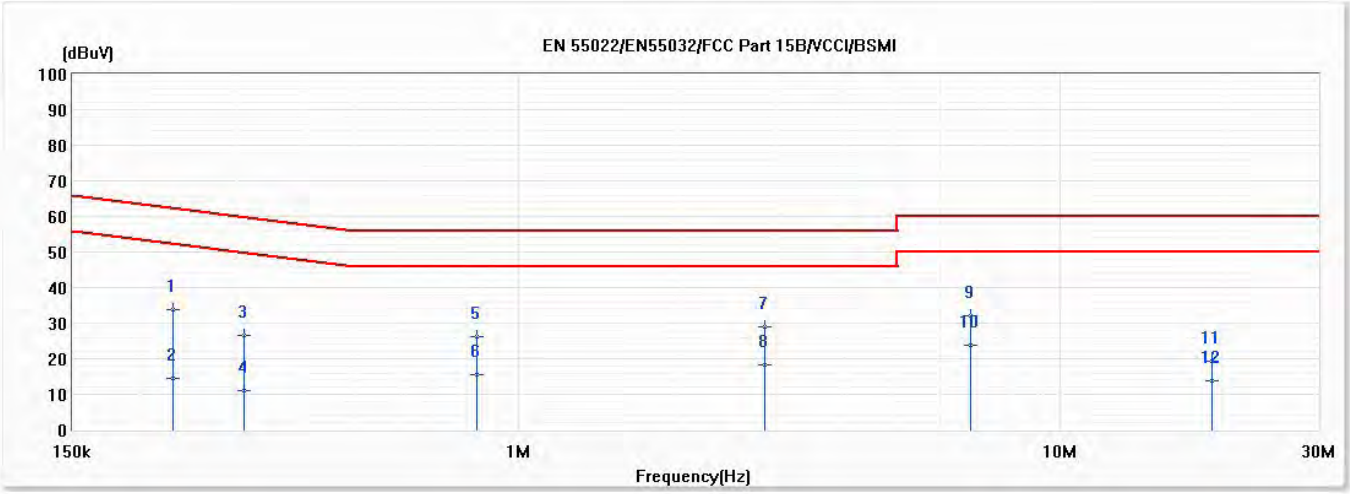


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.235	47.50	62.26	-14.76	37.85	9.64	QP
2	0.235	36.00	52.26	-16.26	26.36	9.64	AV
3	0.352	40.50	58.92	-18.42	30.83	9.66	QP
4	0.352	30.45	48.92	-18.47	20.79	9.66	AV
5	0.588	38.01	56.00	-17.99	28.32	9.69	QP
6	0.588	27.36	46.00	-18.64	17.67	9.69	AV
7	1.154	31.95	56.00	-24.05	22.22	9.73	QP
8	1.154	16.42	46.00	-29.58	6.69	9.73	AV
9	5.378	27.17	60.00	-32.83	17.22	9.95	QP
10	5.378	15.59	50.00	-34.41	5.63	9.95	AV
11	11.730	34.99	60.00	-25.01	24.78	10.21	QP
12	11.730	26.07	50.00	-23.93	15.86	10.21	AV

Remark:

1. "*" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level - Limit.

Model No	FWAR	Site	SR2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/30
Test Mode	Mode 2: Transmit Mode (ADP: ADP-65JH HB)	Engineer	Neil Yeh
Phase	L	Temperature (℃)	22.3
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	60

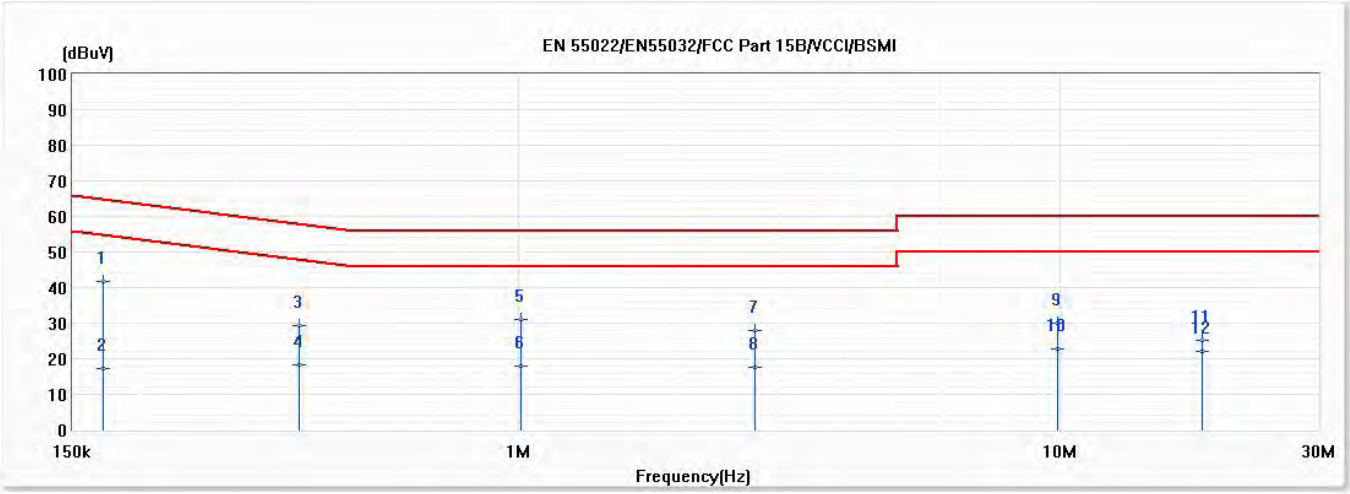


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.230	33.67	62.47	-28.80	24.02	9.65	QP
2	0.230	14.41	52.47	-38.06	4.76	9.65	AV
3	0.310	26.68	59.96	-33.28	17.02	9.67	QP
4	0.310	11.18	49.96	-38.78	1.51	9.67	AV
5	0.836	26.36	56.00	-29.64	16.64	9.73	QP
6	0.836	15.62	46.00	-30.38	5.90	9.73	AV
7	2.842	29.03	56.00	-26.97	19.19	9.83	QP
8	2.842	18.36	46.00	-27.64	8.52	9.83	AV
9	6.815	32.23	60.00	-27.77	22.23	10.00	QP
*10	6.815	23.65	50.00	-26.35	13.64	10.00	AV
11	19.080	19.42	60.00	-40.58	9.06	10.36	QP
12	19.080	13.79	50.00	-36.21	3.44	10.36	AV

Remark:

1. "*" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level - Limit.

Model No	FWAR	Site	SR2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/30
Test Mode	Mode 2: Transmit Mode (ADP: ADP-65JH HB)	Engineer	Neil Yeh
Phase	N	Temperature (℃)	22.3
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	60



No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.171	41.65	64.92	-23.26	32.02	9.64	QP
2	0.171	17.25	54.92	-37.66	7.62	9.64	AV
3	0.394	29.40	57.98	-28.58	19.73	9.67	QP
4	0.394	18.17	47.98	-29.81	8.50	9.67	AV
5	1.010	30.96	56.00	-25.04	21.24	9.72	QP
6	1.010	17.92	46.00	-28.08	8.20	9.72	AV
7	2.730	28.03	56.00	-27.97	18.21	9.82	QP
8	2.730	17.71	46.00	-28.29	7.90	9.82	AV
9	9.889	29.90	60.00	-30.10	19.77	10.14	QP
10	9.889	22.91	50.00	-27.09	12.78	10.14	AV
11	18.243	25.32	60.00	-34.68	14.86	10.46	QP
12	18.243	22.14	50.00	-27.86	11.67	10.46	AV

Remark:

1. "*" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level - Limit.

Note:

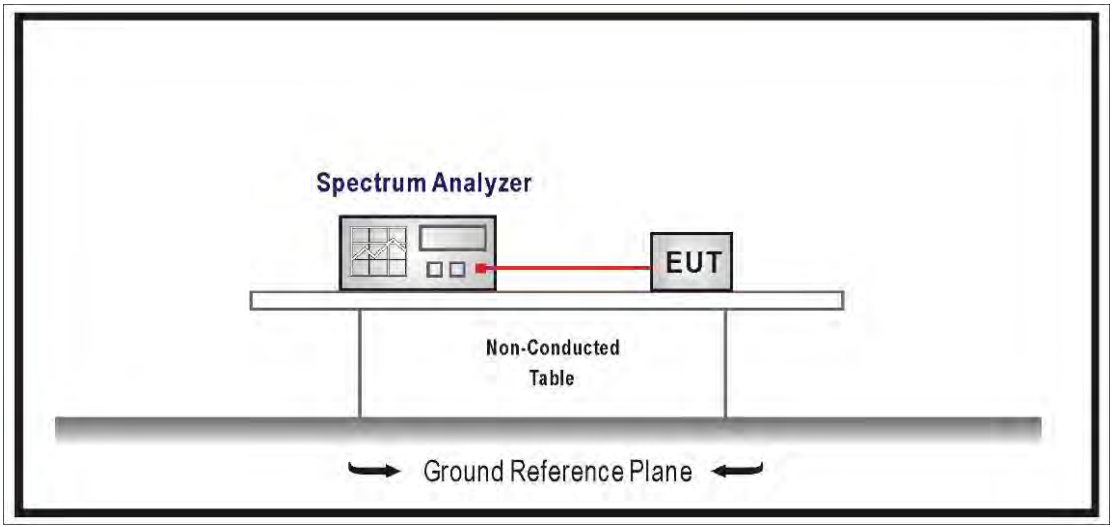
This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110126, 2071064R-E3032110126 is housing and software. The software changes as following:

1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
2) Close 5G FR2 band n261 by software.

According to above conditions, Conducted Emission, Radiated Emission and Radiated Emission Band Edge worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report. For DFS, the mechanism is identical with software change.

3. 26dB & 99% & DTS Bandwidth

3.1. Test Setup



3.2. Limits

99% & 26dB Bandwidth : No Required

6dB Bandwidth ≧ 500KHz

3.3. Test Procedure

99% & 26dB Bandwidth :

The EUT was tested according to U-NII test procedure of KDB 789033 D02 v02r01

Set RBW 1% of the emission bandwidth, VBW equal to 3 times the RBW.

DTS Bandwidth :

Set RBW = 100KHz, VBW≧3xRBW, Sweep time=Auto, Set Peak detector.

3.4. Test Result

Note:

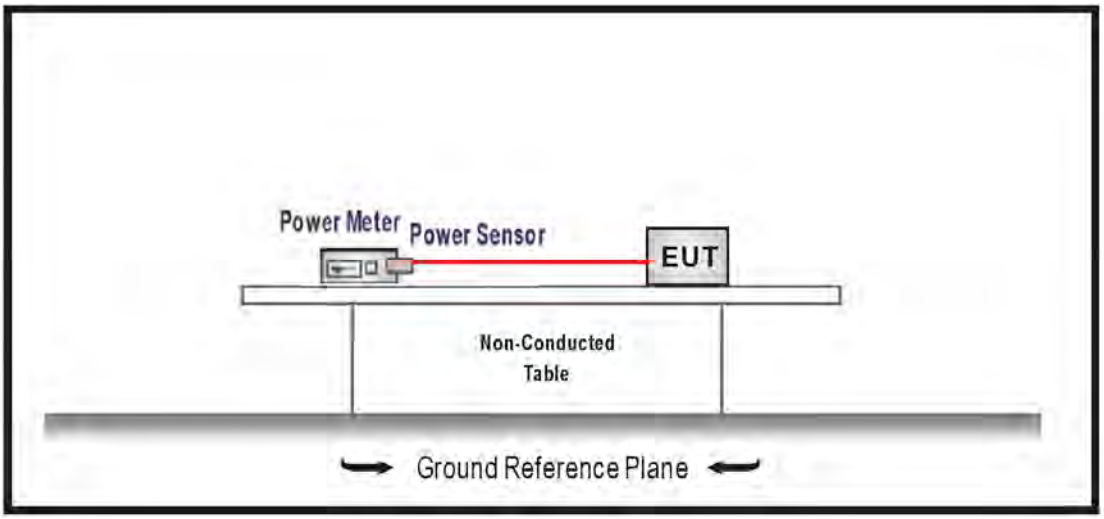
This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110126, 2071064R-E3032110126 is housing and software. The software changes as following:

1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
2) Close 5G FR2 band n261 by software.

According to above conditions, Conducted Emission, Radiated Emission and Radiated Emission Band Edge worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report. For DFS, the mechanism is identical with software change.

4. Maximum conducted output power

4.1. Test Setup



4.2. Limits

1. For the band 5.15-5.25 GHz, the Maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1W. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum conducted output power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

2. For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. The maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3. For the band 5.25-5.35 GHz, the Maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum conducted output power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

4. For the band 5.725-5.850 GHz, the Maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1W. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum conducted output power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

4.3. Test Procedure

The EUT was setup to ANSI C63.10: 2013; tested to U-NII test procedure of KDB 789033 D02 v02r01 for compliance to FCC 47CFR Subpart E requirements. The Method PM-G of the Maximum conducted output power was used.

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

4.4. Test Result

Note:

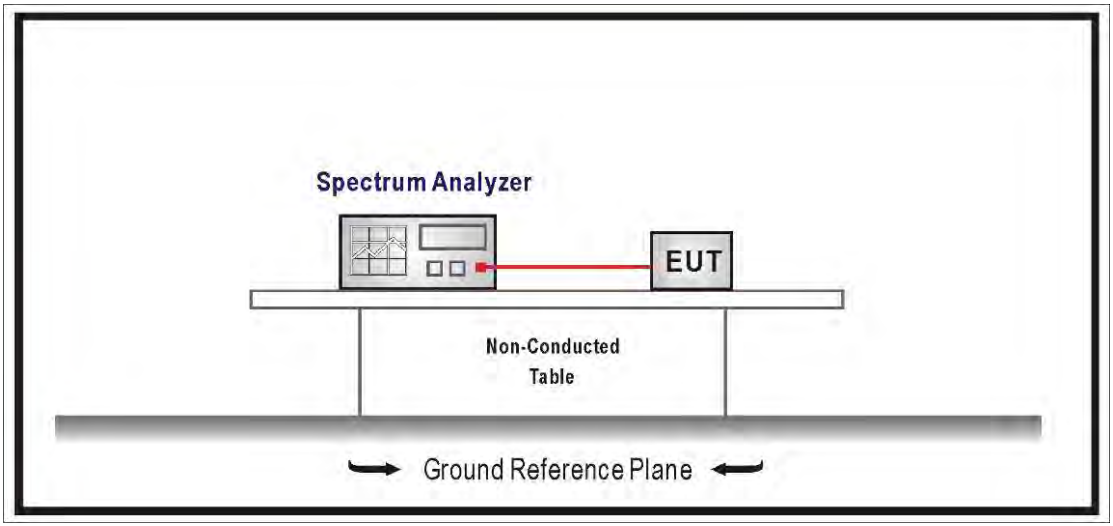
This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110126, 2071064R-E3032110126 is housing and software. The software changes as following:

1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
2) Close 5G FR2 band n261 by software.

According to above conditions, Conducted Emission, Radiated Emission and Radiated Emission Band Edge worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report. For DFS, the mechanism is identical with software change.

5. Maximum power spectral density

5.1. Test Setup



5.2. Limits

1. For the band 5.15-5.25 GHz, the Maximum power spectral density shall not exceed 17 dBm in any 1MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
2. For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi
3. For the band 5.25-5.35 GHz, the Maximum power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
4. For the band 5.725-5.850 GHz, the Maximum power spectral density shall not exceed 30 dBm in any 500KHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi..

5.3. Test Procedure

The EUT was setup to ANSI C63.10: 2013; tested to U-NII test procedure of KDB 789033 D02 v02r01 for compliance to FCC 47CFR Subpart E requirements.

For Band1 : Set RBW=1MHz, VBW=3MHz with RMS detector. The PPSD is the highest level found across the emission in any 1-MHz band after 100 sweeps of averaging.

For Band4 : Set RBW=500KHz, VBW=1.5MHz with RMS detector. The PPSD is the highest level found across the emission in any 500KHz band after 100 sweeps of averaging.

5.4. Test Result

Note:

This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110126, 2071064R-E3032110126 is housing and software. The software changes as following:

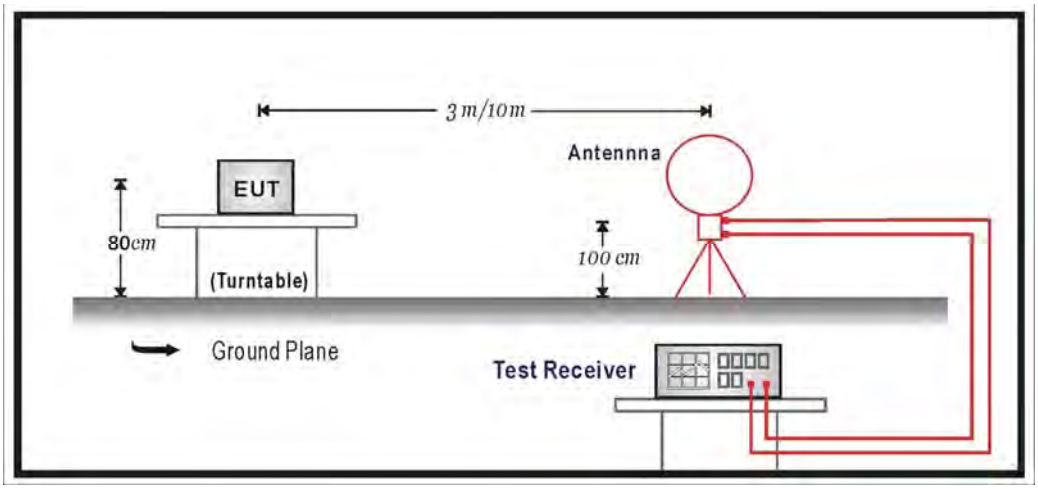
1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
2) Close 5G FR2 band n261 by software.

According to above conditions, Conducted Emission, Radiated Emission and Radiated Emission Band Edge worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report. For DFS, the mechanism is identical with software change.

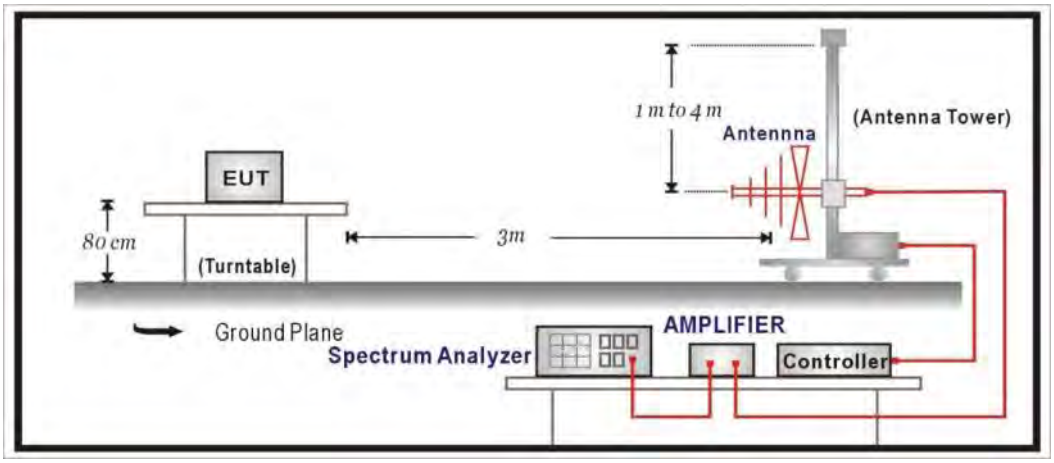
6. Radiated Emission

6.1. Test Setup

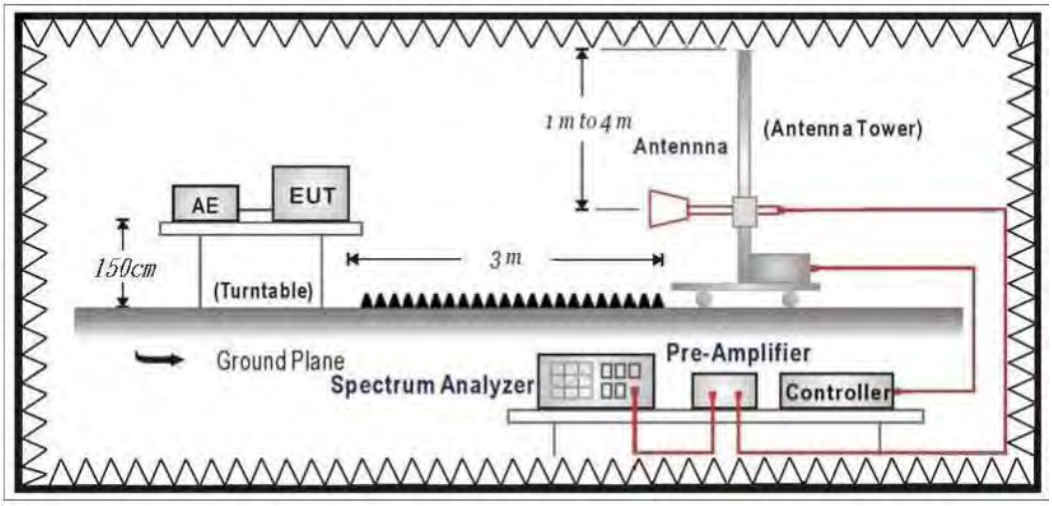
Under 30MHz Test Setup:



Under 1GHz Test Setup:



Above 1GHz Test Setup:



6.2. Limits

➢ General Radiated Emission Limits

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section. Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

Remark:
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➢ Unwanted Emission out of the restricted bands Limits

FCC Part 15 Subpart C Paragraph 15.407(b) Limits		
Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength (dBuV/m@3m)
5150 - 5250	-27	68.3
5250 - 5350	-27	68.3
5470 - 5725	-27	68.3
5725 - 5850	-27 (Note1)	68.3
	-17 (Note2)	78.3

Remark:
1. For frequencies more than 10 MHz above or below the band edges.
2. For frequency range from the band edges to 10 MHz above or below the band edges.
3. uV/m = $\frac{1000000\sqrt{30\times EIRP}}{3}$, RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)

6.3. Test Procedure

The EUT and its simulators are placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

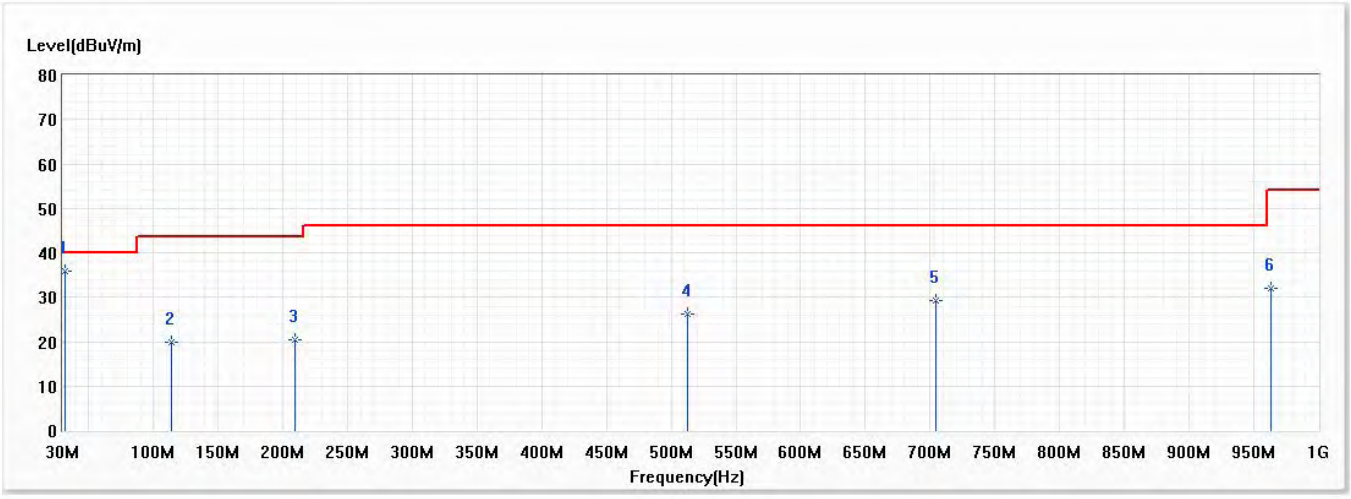
The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field dtrength of harmonics measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 KHz, above 1GHz are 1 MHz.

6.4. Test Result

30MHz-1GHz Spurious

Model No	FWAR	Site	CB2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/30
Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D)	Engineer	Ling Chen
Polarity	Horizontal	Temperature (℃)	23.0
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	55.0



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	31.455	35.88	40.00	-4.12	31.79	4.09	QP
2	113.905	19.88	43.50	-23.62	22.61	-2.73	QP
3	209.450	20.50	43.50	-23.00	25.27	-4.77	QP
4	512.575	26.33	46.00	-19.67	22.74	3.59	QP
5	704.150	29.28	46.00	-16.72	23.28	6.00	QP
6	963.625	32.02	54.00	-21.98	22.96	9.06	QP

Note:

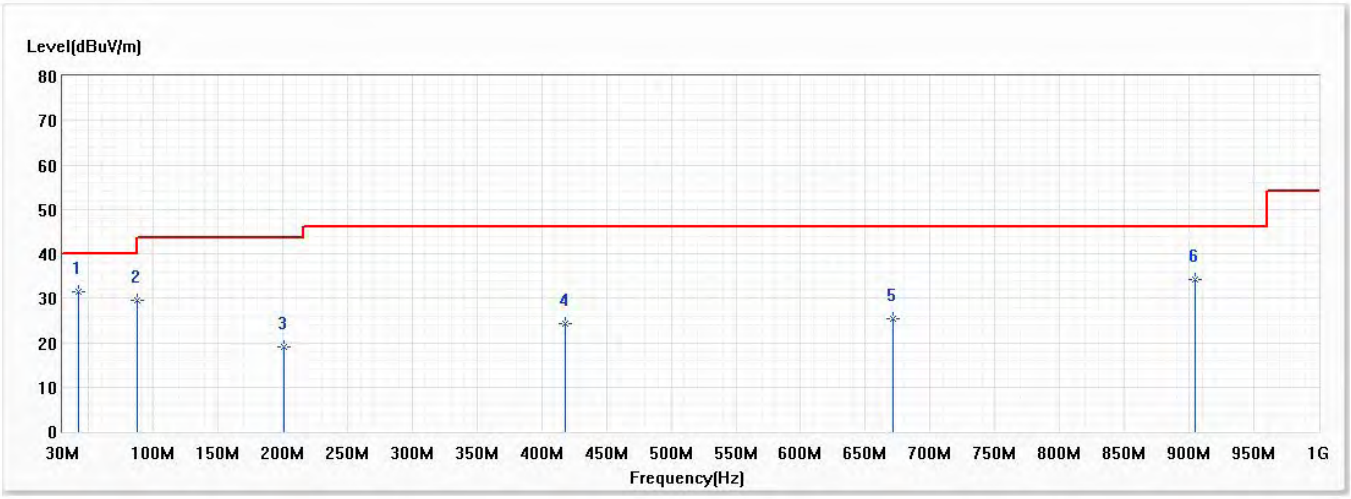
1. All reading levels is Quasi-Peak value.

2. “ * ”, means this data is the worst value.

3. Emission Level = Reading Level + Correct Factor

4. The emission under 30MHz were not included is because their levels are lower than 20dB from limit.

Model No	FWAR	Site	CB2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/30
Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D)	Engineer	Ling Chen
Polarity	Vertical	Temperature (℃)	23.0
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	55.0

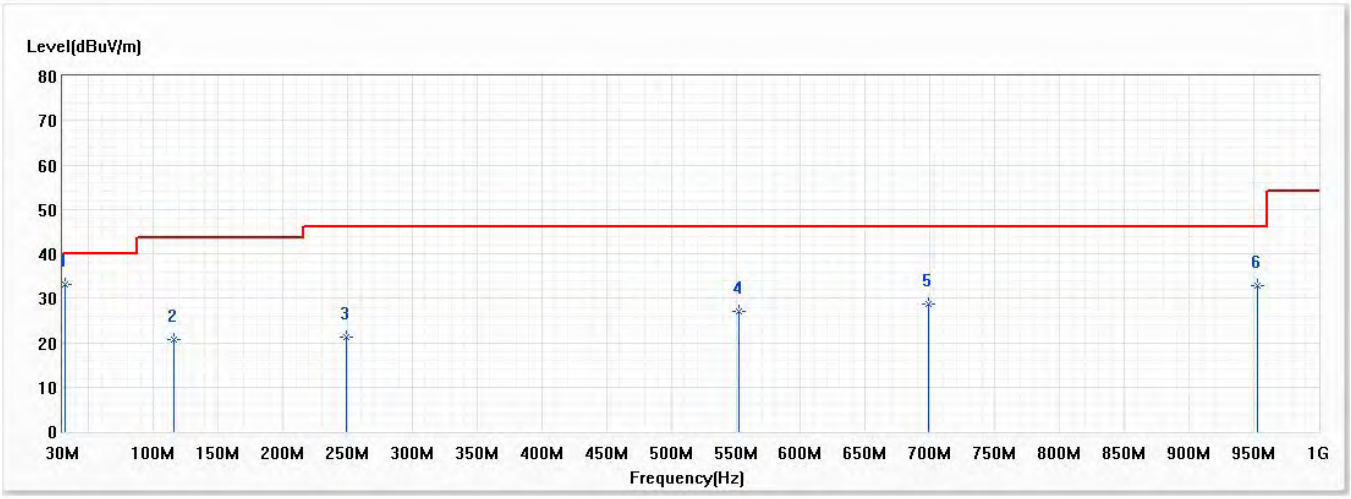


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	42.125	31.57	40.00	-8.43	34.10	-2.53	QP
2	87.715	29.51	40.00	-10.49	36.55	-7.04	QP
3	200.720	18.90	43.50	-24.60	23.88	-4.98	QP
4	418.000	24.41	46.00	-21.59	22.01	2.40	QP
5	671.655	25.27	46.00	-20.73	19.43	5.84	QP
6	904.455	34.32	46.00	-11.68	25.85	8.47	QP

Note:

1. All reading levels is Quasi-Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor
4. The emission under 30MHz were not included is because their levels are lower than 20dB from limit.

Model No	FWAR	Site	CB2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/30
Test Mode	Mode 2: Transmit Mode (ADP: ADP-65JH HB)	Engineer	Ling Chen
Polarity	Horizontal	Temperature (℃)	23.0
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	55.0



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	31.940	33.18	40.00	-6.82	29.35	3.83	QP
2	116.330	20.68	43.50	-22.82	23.25	-2.57	QP
3	249.220	21.36	46.00	-24.64	23.76	-2.40	QP
4	551.860	27.13	46.00	-18.87	22.58	4.55	QP
5	698.815	28.72	46.00	-17.28	22.57	6.15	QP
6	952.470	32.86	46.00	-13.14	24.06	8.80	QP

Note:

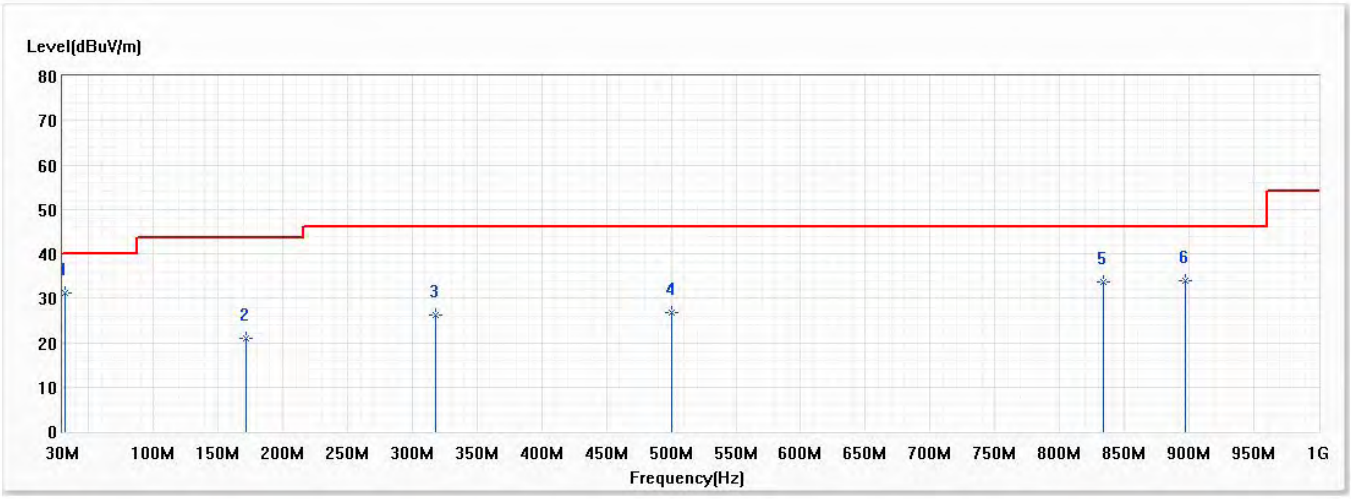
1. All reading levels is Quasi-Peak value.

2. “ * ”, means this data is the worst value.

3. Emission Level = Reading Level + Correct Factor

4. The emission under 30MHz were not included is because their levels are lower than 20dB from limit.

Model No	FWAR	Site	CB2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/30
Test Mode	Mode 2: Transmit Mode (ADP: ADP-65JH HB)	Engineer	Ling Chen
Polarity	Vertical	Temperature (℃)	23.0
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	55.0



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	31.455	31.20	40.00	-8.80	27.11	4.09	QP
2	172.105	20.90	43.50	-22.60	26.48	-5.58	QP
3	318.090	26.34	46.00	-19.66	27.31	-0.97	QP
4	500.450	26.76	46.00	-19.24	23.51	3.25	QP
5	833.645	33.72	46.00	-12.28	25.94	7.78	QP
6	896.695	33.98	46.00	-12.02	25.62	8.36	QP

Note:

1. All reading levels is Quasi-Peak value.

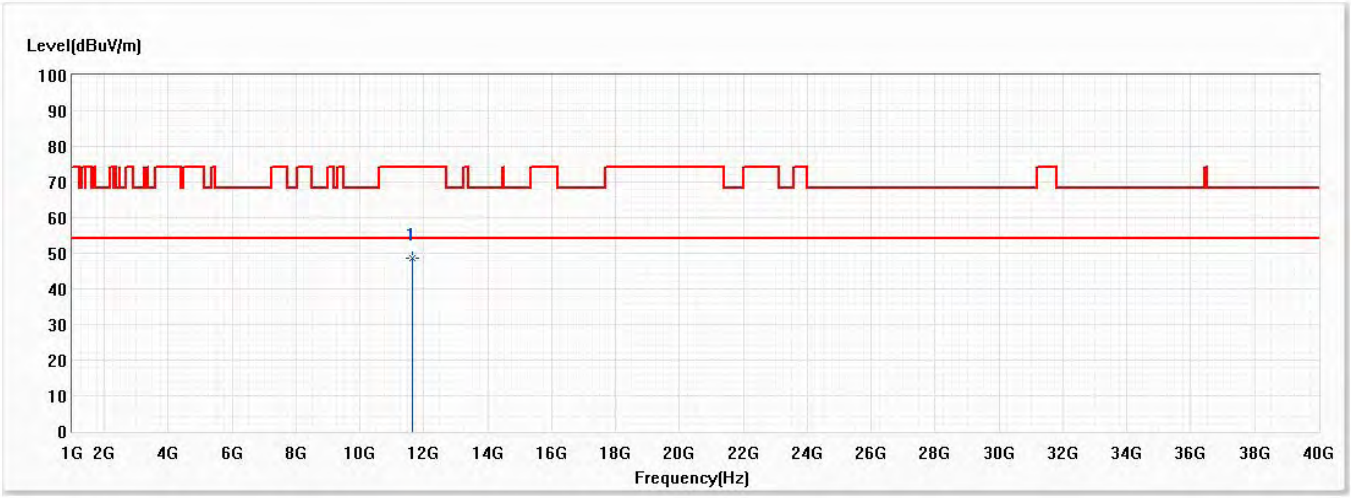
2. “ * ”, means this data is the worst value.

3. Emission Level = Reading Level + Correct Factor

4. The emission under 30MHz were not included is because their levels are lower than 20dB from limit.

Above 1GHz Spurious:

Model No	FWAR	Site	CB2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/25
Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D)	Engineer	Ling Chen
Polarity	Horizontal	Temperature (℃)	23.0
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	58.0

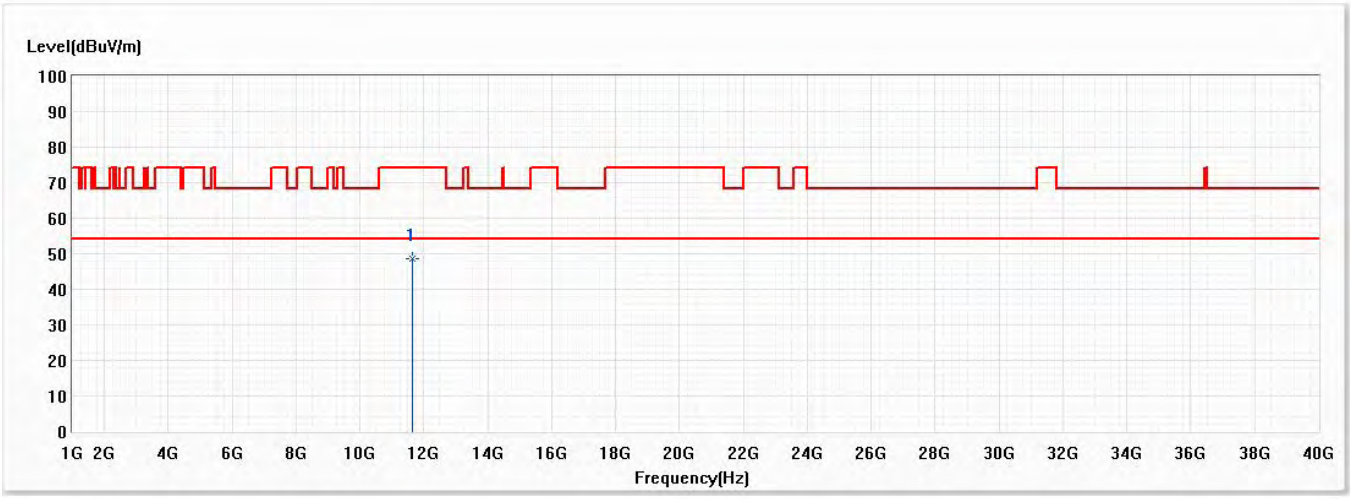


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	11650.000	48.51	74.00	-25.49	45.75	2.76	PK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission above 18GHz were not included is because their levels are lower than 20dB from limit.

Model No	FWAR	Site	CB2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/25
Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D)	Engineer	Ling Chen
Polarity	Vertical	Temperature (℃)	23.0
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	58.0



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	11650.000	48.78	74.00	-25.22	46.02	2.76	PK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission above 18GHz were not included is because their levels are lower than 20dB from limit.

Note:

This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110126, 2071064R-E3032110126 is housing and software. The software changes as following:

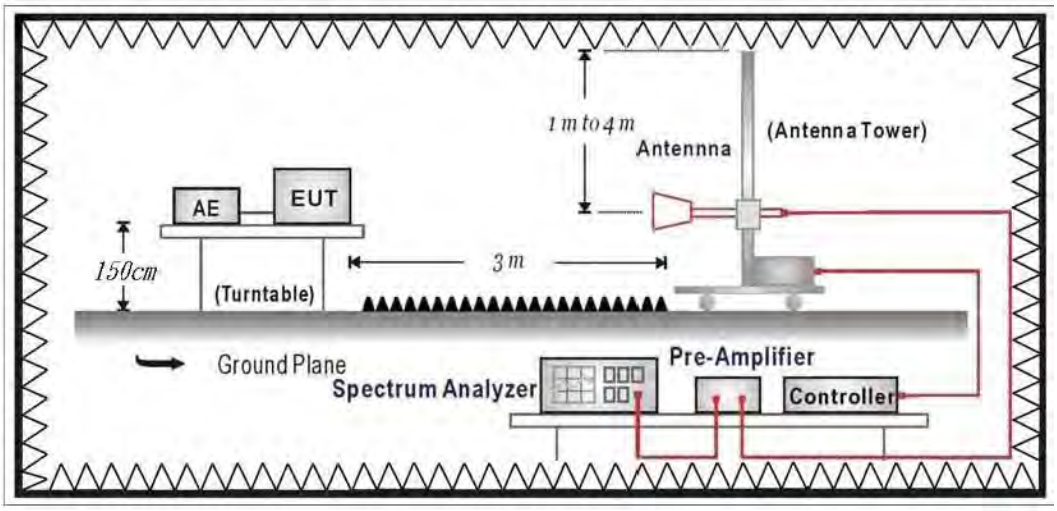
1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
2) Close 5G FR2 band n261 by software.

According to above conditions, Conducted Emission, Radiated Emission and Radiated Emission Band Edge worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report. For DFS, the mechanism is identical with software change.

7. Band Edge

7.1. Test Setup

RF Radiated Measurement:



7.2. Limits

➢ **General Radiated Emission Limits**

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section. Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

Remark:
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

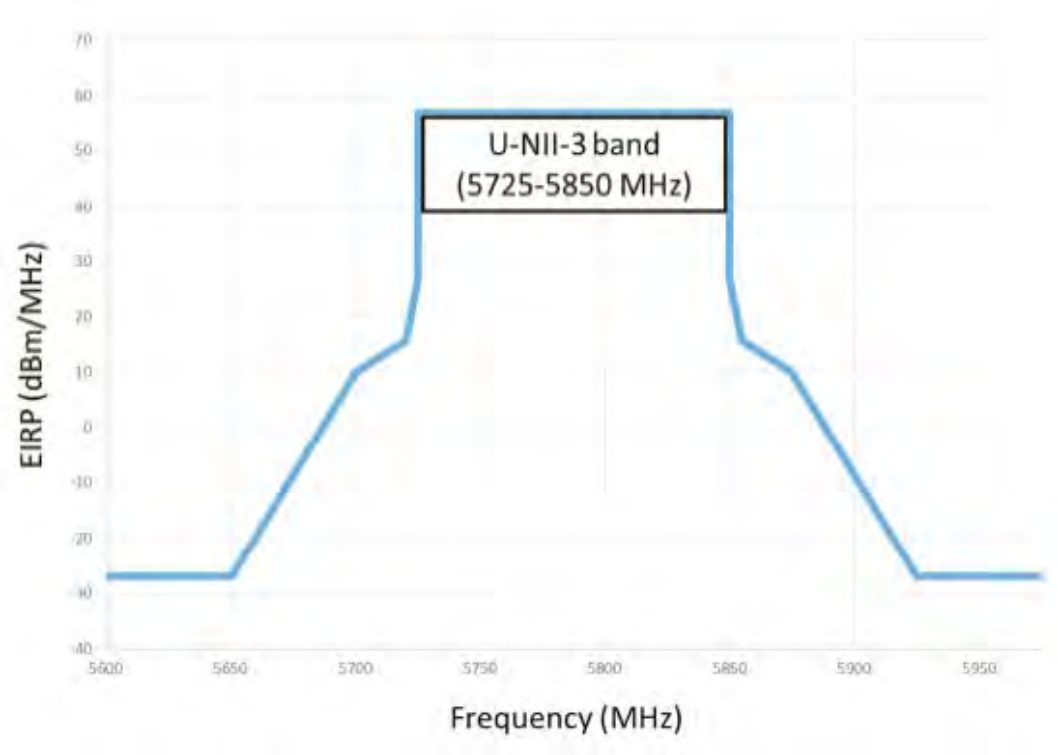
➢ **Unwanted Emission out of the restricted bands Limits**

FCC Part 15 Subpart E Paragraph 15.407(b) Limits		
Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength (dBuV/m@3m)
5150 - 5250	-27	68.3
5250 - 5350	-27	68.3
5470 - 5725	-27	68.3
5725 - 5850	-27 (Note1)	68.3
	-17 (Note2)	78.3

4. For transmitters operating in the 5.725-5.85 GHz band

(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 27dBm/MHz at the band edge.

(ii) Devices certified before March 2, 2019 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in Section 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in Section 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.



Remark:

1. For frequencies more than 10 MHz above or below the band edges.
2. For frequency range from the band edges to 10 MHz above or below the band edges.
3. uV/m = $\frac{1000000\sqrt{30 \times EIRP}}{3}$, RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)

7.3. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

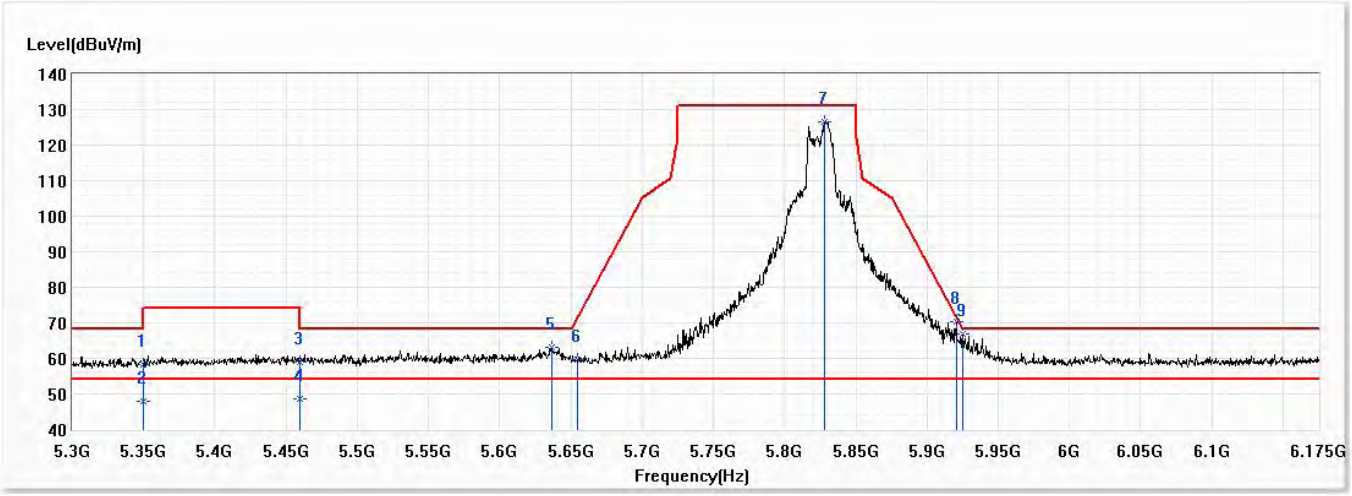
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 KHz, above 1GHz are 1 MHz.

7.4. Test Result

Model No	FWAR	Site	CB2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/19
Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D)	Engineer	Ling Chen
Polarity	Horizontal	Temperature (℃)	23.0
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	58.0

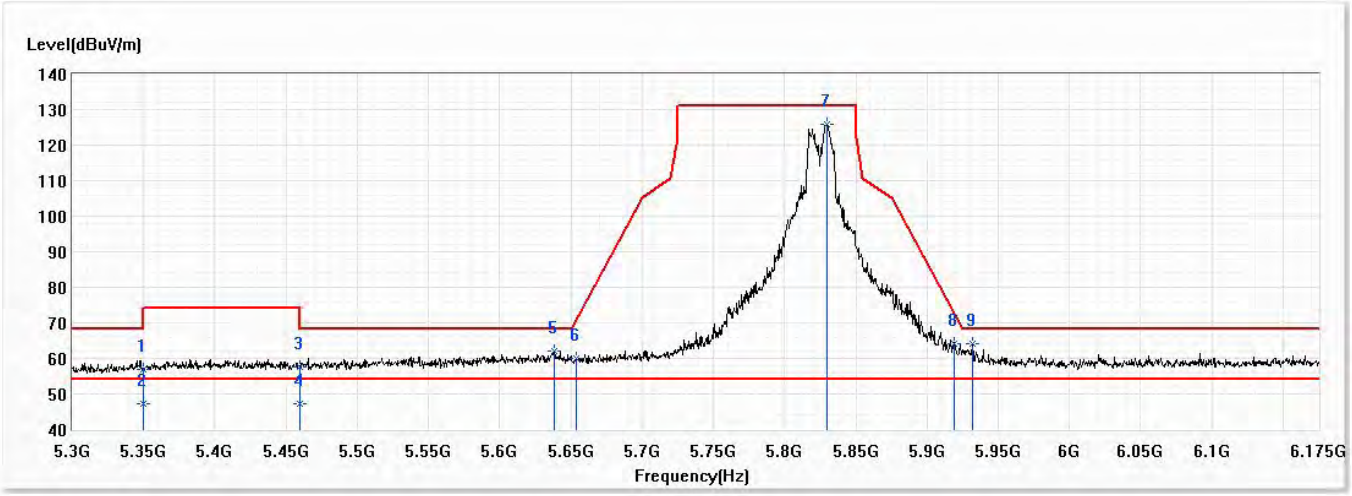


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	5350.000	58.21	74.00	-15.79	33.41	24.80	PK
2	5350.000	47.88	54.00	-6.12	23.08	24.80	AV
3	5460.000	59.10	74.00	-14.90	34.11	24.99	PK
4	5460.000	48.79	54.00	-5.21	23.80	24.99	AV
5	5636.438	62.95	68.20	-5.25	37.48	25.47	PK
6	5654.375	59.63	71.45	-11.82	34.11	25.52	PK
7	5828.500	126.64	131.20	-4.56	100.62	26.02	PK
* 8	5920.813	70.28	71.29	-1.00	43.99	26.29	PK
9	5925.188	66.94	68.20	-1.26	40.63	26.31	PK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
4. The fundamental for reference only, it's not restricted by unwanted emission limit.

Model No	FWAR	Site	CB2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/19
Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D)	Engineer	Ling Chen
Polarity	Vertical	Temperature (℃)	23.0
Test Condition	802.11ax20-CDD-5825MHz	Humidity (%RH)	58.0



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	5350.000	56.96	74.00	-17.04	32.16	24.80	PK
2	5350.000	47.13	54.00	-6.87	22.33	24.80	AV
3	5460.000	57.58	74.00	-16.42	32.59	24.99	PK
4	5460.000	47.22	54.00	-6.78	22.23	24.99	AV
5	5638.188	62.13	68.20	-6.07	36.66	25.47	PK
6	5653.938	59.85	71.13	-11.28	34.33	25.52	PK
7	5829.813	125.70	131.20	-5.50	99.67	26.03	PK
8	5919.500	63.99	72.25	-8.27	37.70	26.29	PK
* 9	5932.188	64.06	68.20	-4.14	37.73	26.33	PK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.

2. Emission Level = Reading Level + Correct Factor.

3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

4. The fundamental for reference only, it’s not restricted by unwanted emission limit.

Note:

This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110126, 2071064R-E3032110126 is housing and software. The software changes as following:

1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.

2) Close 5G FR2 band n261 by software.

According to above conditions, Conducted Emission, Radiated Emission and Radiated Emission Band Edge worst-case need to be performed and all data were verified to meet the requirements, and other test data refer to original report. For DFS, the mechanism is identical with software change.