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-E3032110113
Report Version	:	V1.0

Test Report Certification

Issued Date : Dec. 09, 2020
Report No.: 20B0401R-E3032110113

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
FCC ID	:	NKR-LAA2
EUT Test Voltage	:	AC 100-240V / 50-60Hz
Testing Voltage	:	AC 120V / 60Hz
Trade Name	:	WNC
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C Section 15.247: 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

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1. General Information

1.1. EUT Description

Product Name	5G CPE
Trade Name	WNC
Model No.	FWAR
Frequency Range	2412-2462MHz for 802.11b/g/n/ac/ax-20BW 2422-2452MHz for 802.11n/ac/ax-40BW
Number of channel	802.11b/g/n/ac/ax-20MHz: 11; 802.11n/ac/ax-40MHz: 7
Channel separation	802.11b/g/n/ac/ax: 5 MHz
Type of Modulation	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n/ax: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 300Mbps 802.11ac: up to 400Mbps, 802.11ax: up to 573.5Mbps
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	Gain
1.	WNC	95XKAC15.GDNVZ	Dipole antenna	3.36dBi
2.	WNC	95XKAC15.GDOVZ	Dipole antenna	

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 802.11b/g & IEEE 802.11n/ac/ax(20MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz	04	2427 MHz
05	2432 MHz	06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	10	2457 MHz	11	2462 MHz	-	-

IEEE 802.11n/ac/ax/40MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 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-E3032110114 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.

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	11g	11	0+1	Complies
Radiated Emission	11g	11	0+1	Complies
Radiated Emission Band Edge	11g	11	0+1	Complies

Note:

This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110114 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.

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

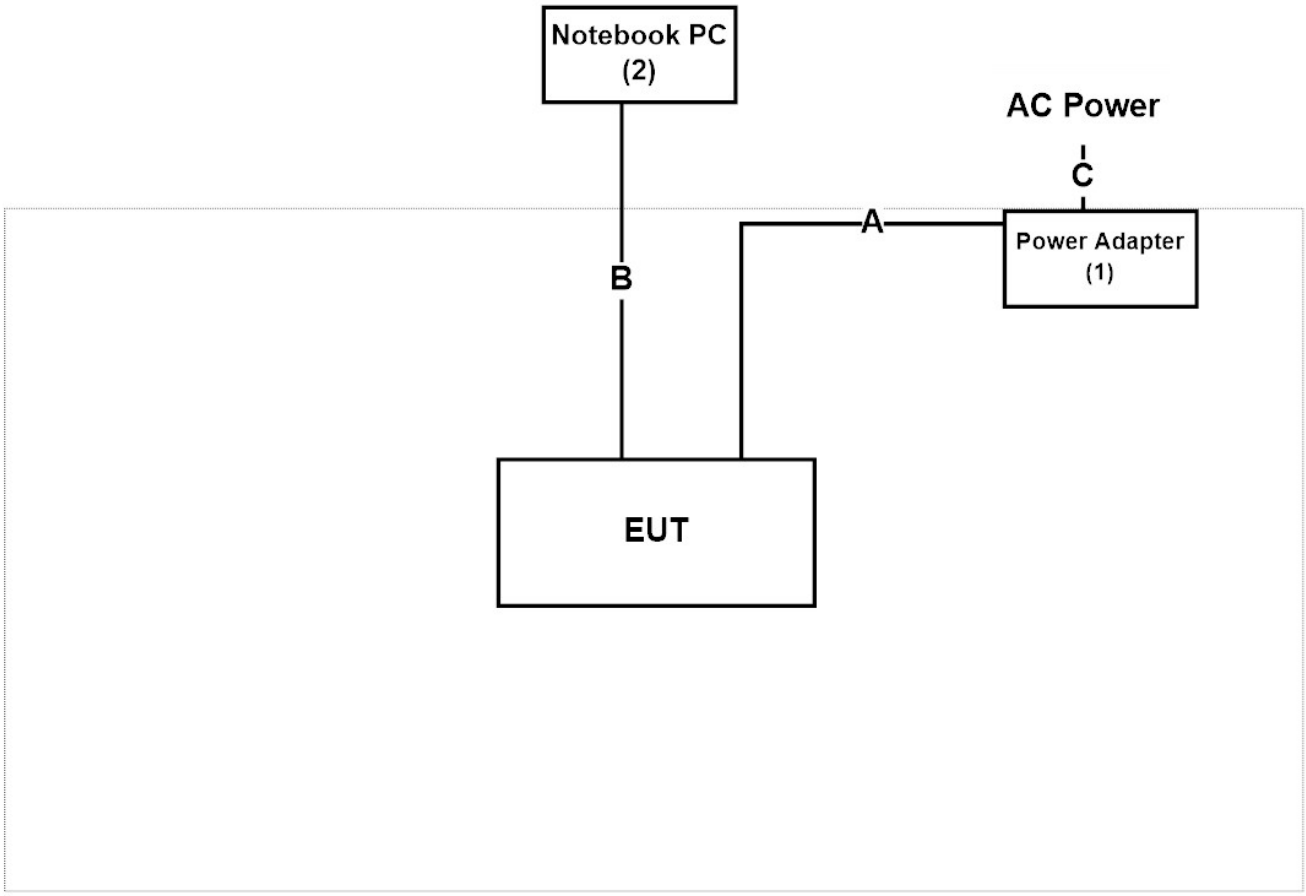
1.3. Tested System Details

The types for all equipment, 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 15 C 15.207	15 - 35	2
Humidity (%RH)	Conducted Emission	25 - 75	
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	1
Humidity (%RH)	Radiated Emission	25 - 75	
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	1
Humidity (%RH)	Radiated Emission 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 / CB2-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
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 9170	202	2019/12/27	2020/12/26
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
Horn Antenna	Schwarzbeck	BBHA 9120D	01656	2020/10/14	2021/10/13
Band Reject Filter	Micro-Tronics	BRM50702	G192	2020/03/09	2021/03/08
Signal Analyzer	R&S	FSV40	101435	2020/06/24	2021/06/23
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

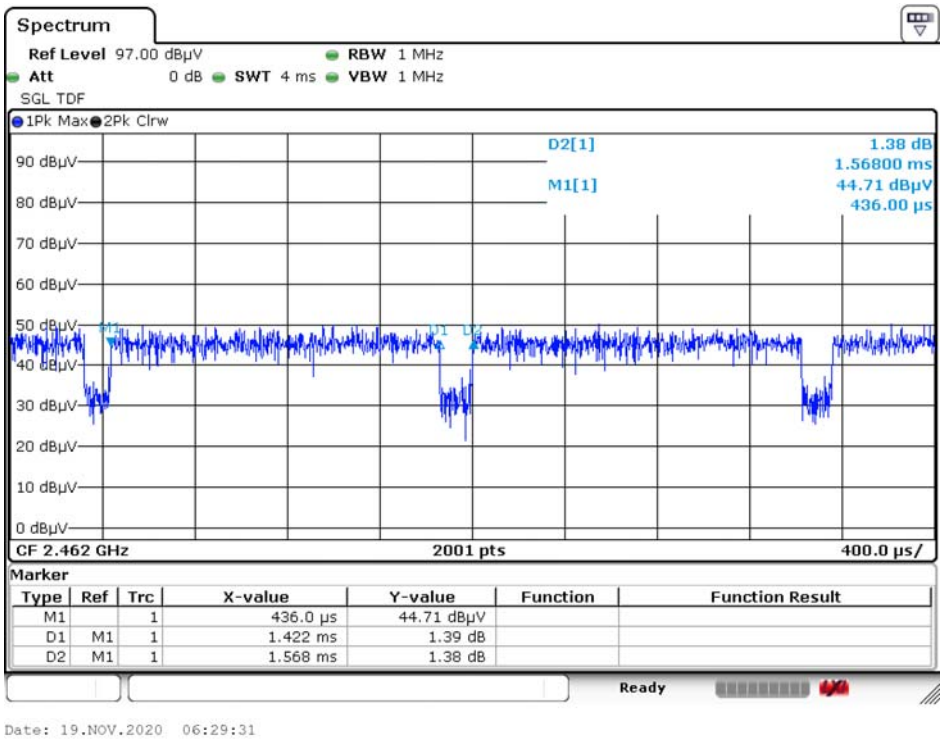
Radiated Emission Band Edge / CB2-H

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
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 9170	202	2019/12/27	2020/12/26
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
Horn Antenna	Schwarzbeck	BBHA 9120D	01656	2020/10/14	2021/10/13
Band Reject Filter	Micro-Tronics	BRM50702	G192	2020/03/09	2021/03/08
Signal Analyzer	R&S	FSV40	101435	2020/06/24	2021/06/23
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. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor(dB) linear voltage	Duty Factor(dB) Power	1/T Minimum VBW (kHz)
11G	1.422	1.568	90.69%	0.848929	0.42	0.703

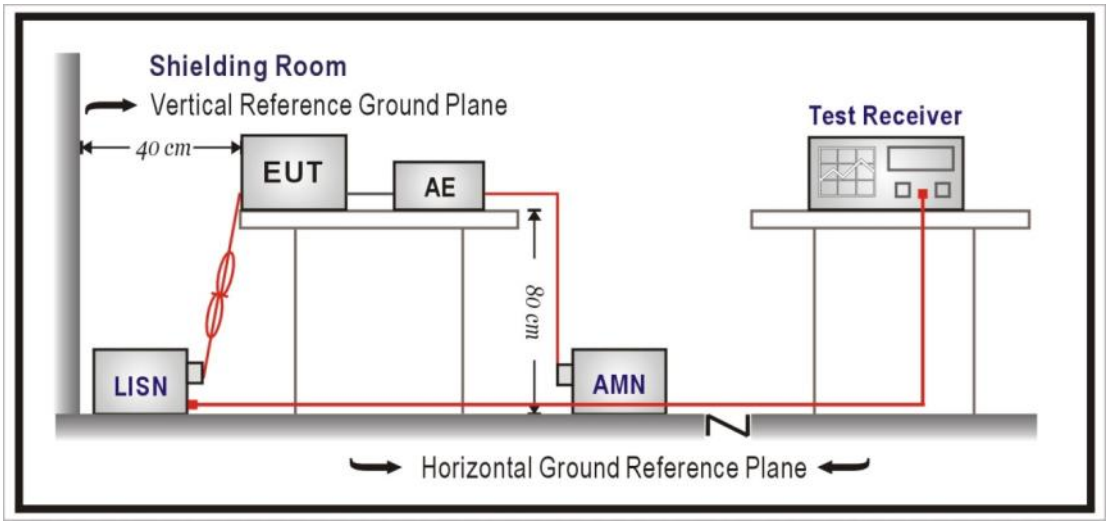


1.10. Uncertainty

Test item	Uncertainty
Conducted Emission	± 2.26 dB
Radiated Emission	30MHz~1GHz as ±3.43 dB 1GHz~26.5GHz as ±3.65 dB
Radiated Emission Band Edge	± 3.9 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

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

2.3. Test Procedure

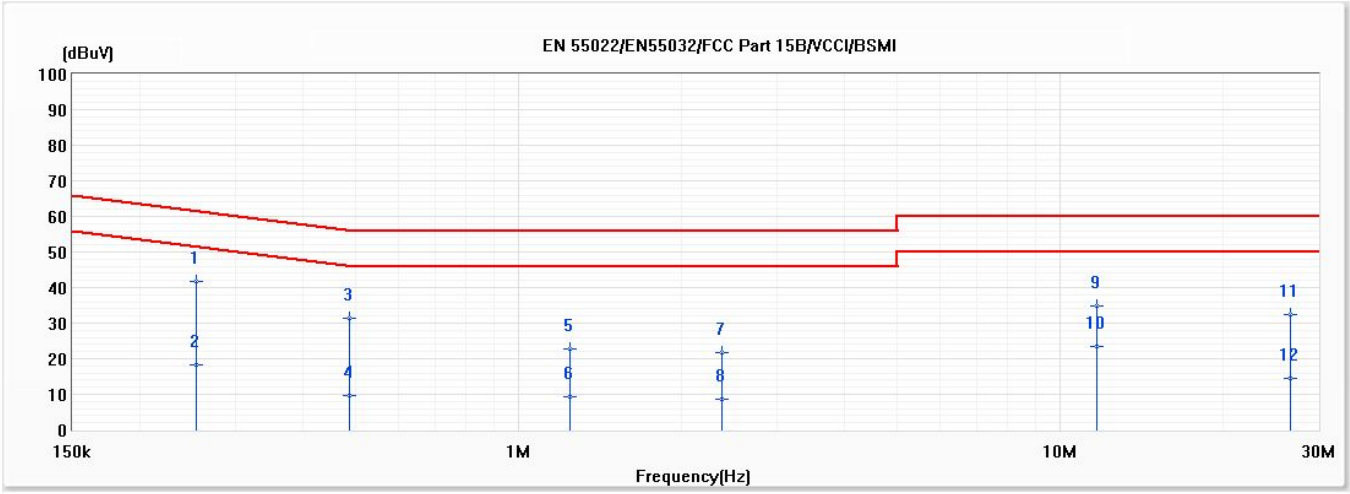
The EUT was setup according to ANSI C63.4: 2013 and tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.
The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 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 15.207: 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	802.11g-CDD-2462MHz	Humidity (%RH)	60

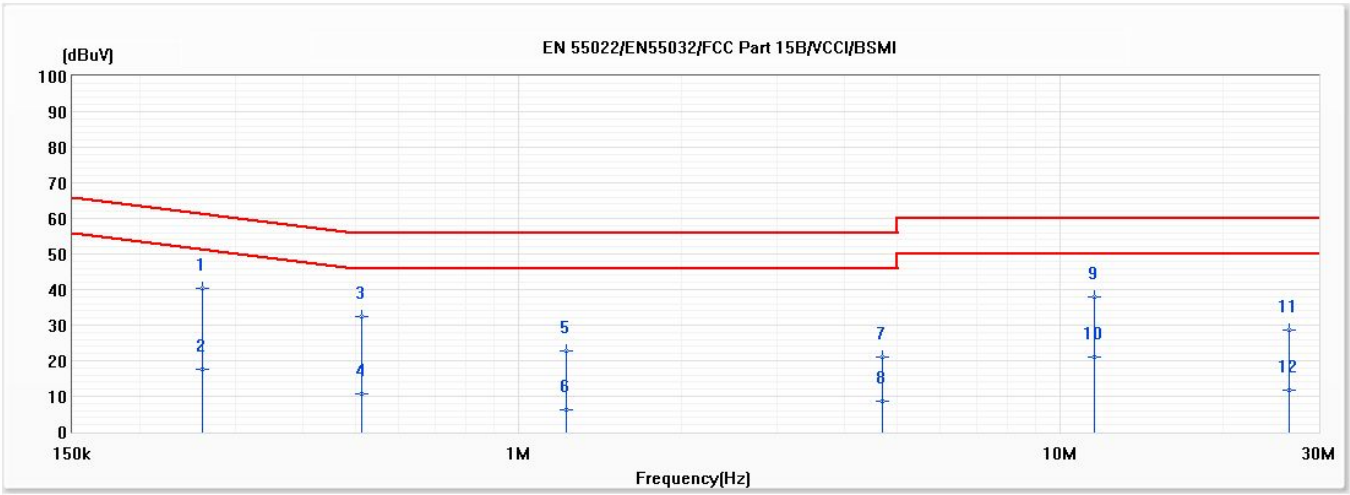


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.254	41.62	61.64	-20.02	31.96	9.65	QP
2	0.254	18.30	51.64	-33.33	8.65	9.65	AV
3	0.488	31.35	56.20	-24.85	21.66	9.69	QP
4	0.488	9.66	46.20	-36.55	-0.03	9.69	AV
5	1.246	22.73	56.00	-33.27	12.98	9.75	QP
6	1.246	9.32	46.00	-36.68	-0.43	9.75	AV
7	2.371	21.59	56.00	-34.41	11.78	9.80	QP
8	2.371	8.47	46.00	-37.53	-1.34	9.80	AV
9	11.688	34.94	60.00	-25.06	24.77	10.16	QP
10	11.688	23.56	50.00	-26.44	13.39	10.16	AV
11	26.566	32.55	60.00	-27.45	22.10	10.45	QP
12	26.566	14.41	50.00	-35.59	3.97	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	802.11g-CDD-2462MHz	Humidity (%RH)	60

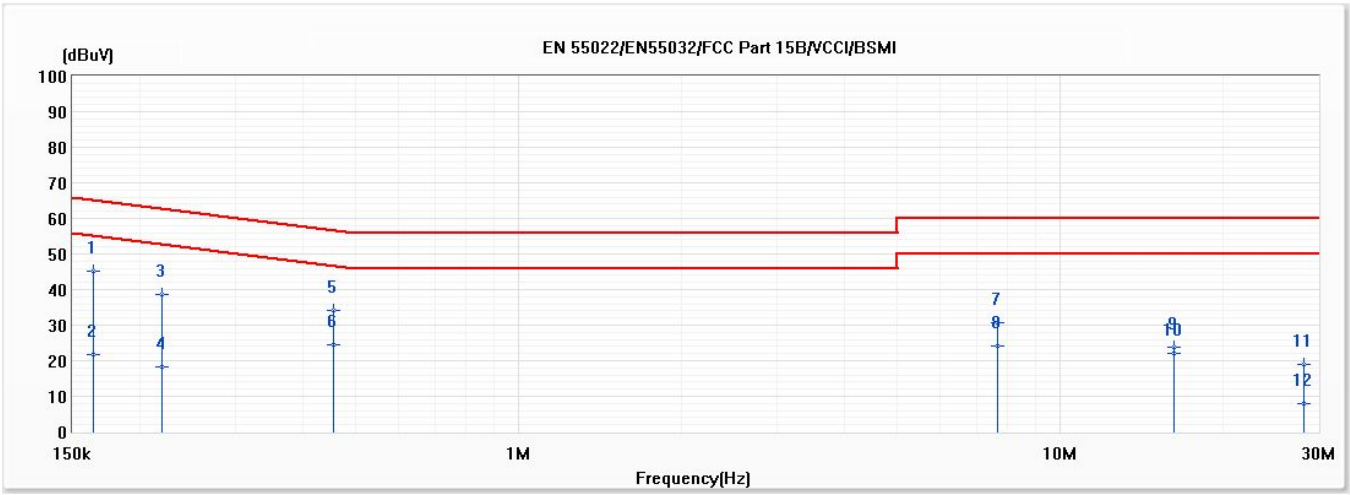


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.261	40.40	61.41	-21.02	30.75	9.64	QP
2	0.261	17.64	51.41	-33.77	8.00	9.64	AV
3	0.512	32.30	56.00	-23.70	22.62	9.68	QP
4	0.512	10.52	46.00	-35.48	0.84	9.68	AV
5	1.225	22.69	56.00	-33.31	12.96	9.73	QP
6	1.225	6.37	46.00	-39.63	-3.36	9.73	AV
7	4.698	21.04	56.00	-34.96	11.12	9.92	QP
8	4.698	8.47	46.00	-37.53	-1.45	9.92	AV
9	11.553	38.08	60.00	-21.92	27.88	10.20	QP
10	11.553	20.91	50.00	-29.09	10.71	10.20	AV
11	26.469	28.58	60.00	-31.42	17.92	10.67	QP
12	26.469	11.72	50.00	-38.28	1.05	10.67	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	802.11g-CDD-2462MHz	Humidity (%RH)	60

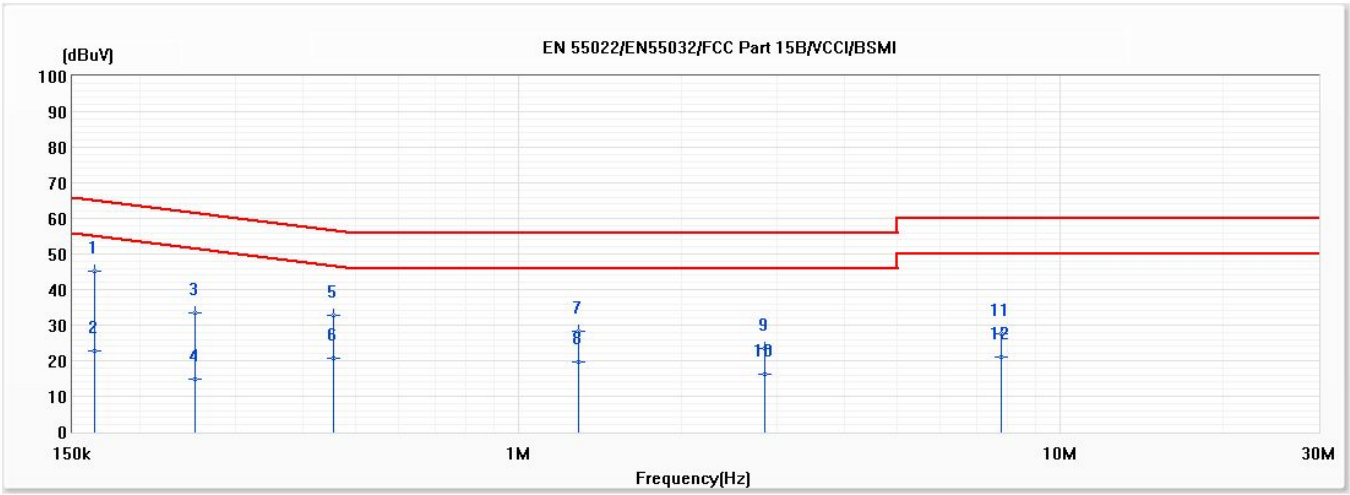


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.164	45.23	65.27	-20.05	35.58	9.65	QP
2	0.164	21.81	55.27	-33.47	12.16	9.65	AV
3	0.219	38.55	62.86	-24.31	28.90	9.65	QP
4	0.219	18.36	52.86	-34.50	8.71	9.65	AV
5	0.454	34.22	56.80	-22.58	24.53	9.68	QP
6	0.454	24.33	46.80	-22.47	14.64	9.68	AV
7	7.664	30.70	60.00	-29.30	20.66	10.03	QP
8	7.664	24.12	50.00	-25.88	14.08	10.03	AV
9	16.228	23.78	60.00	-36.22	13.49	10.29	QP
10	16.228	22.19	50.00	-27.81	11.91	10.29	AV
11	28.210	18.87	60.00	-41.13	8.41	10.46	QP
12	28.210	7.88	50.00	-42.12	-2.59	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.

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	802.11g-CDD-2462MHz	Humidity (%RH)	60



No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.164	45.07	65.24	-20.17	35.44	9.64	QP
2	0.164	22.62	55.24	-32.62	12.98	9.64	AV
3	0.252	33.42	61.68	-28.26	23.78	9.64	QP
4	0.252	14.75	51.68	-36.94	5.10	9.64	AV
5	0.454	32.77	56.80	-24.04	23.09	9.67	QP
6	0.454	20.76	46.80	-26.05	11.08	9.67	AV
7	1.292	28.13	56.00	-27.87	18.39	9.73	QP
8	1.292	19.73	46.00	-26.27	9.99	9.73	AV
9	2.845	23.61	56.00	-32.39	13.79	9.82	QP
10	2.845	16.11	46.00	-29.89	6.29	9.82	AV
11	7.779	27.43	60.00	-32.57	17.38	10.05	QP
12	7.779	20.99	50.00	-29.01	10.94	10.05	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-E3032110114 is housing and software. The software changes as following:

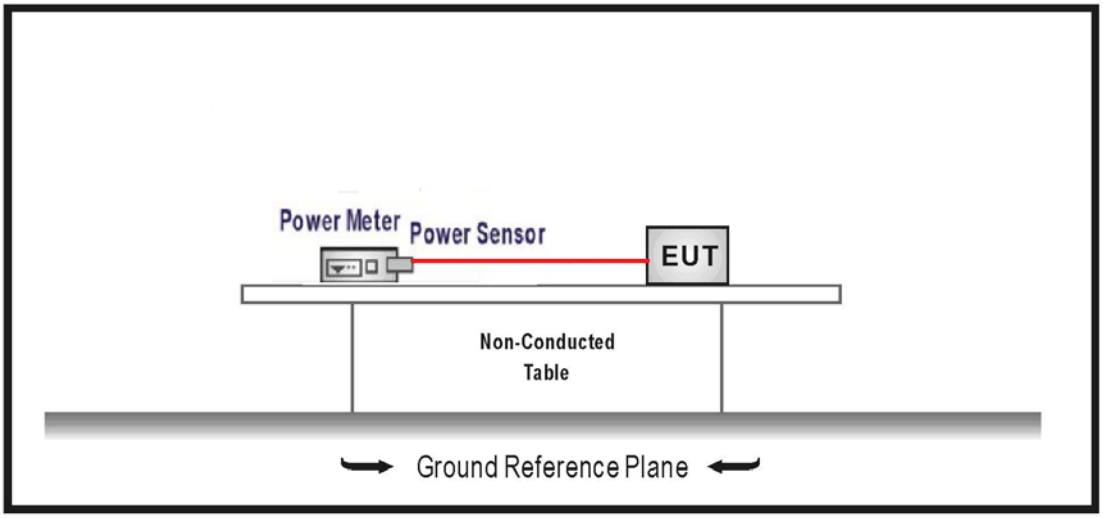
1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.

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.

3. Maximum peak conducted output power

3.1. Test Setup



3.2. Test procedures

The EUT was tested according to DTS test procedure section 8.3.1.3 of KDB 558074 D01 v05r02 & Subclause 11.9.1.3 of ANSI C63.10 Measurement to FCC 47CFR 15.247 requirements.

3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2019

3.5. Test Result

Note:

This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110114 is housing and software. The software changes as following:

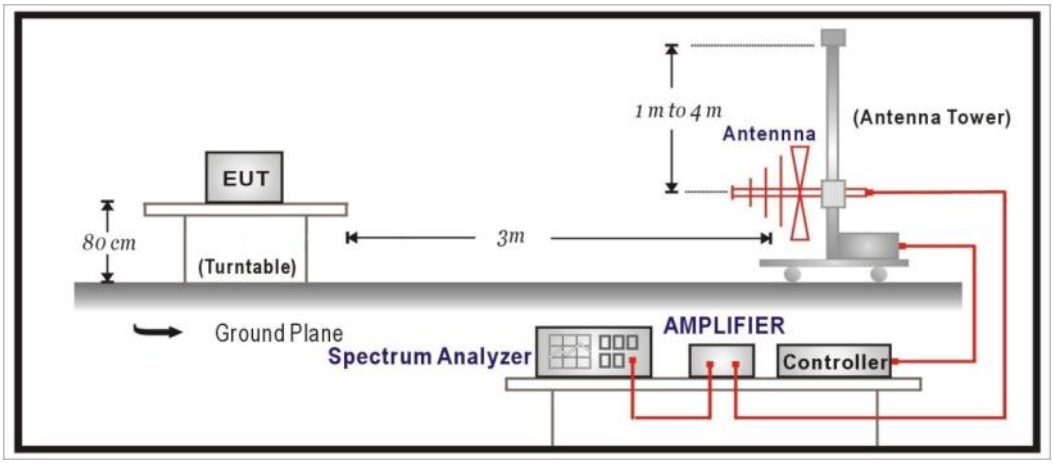
1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
2) Close 5G FR2 band n261 by software.

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.

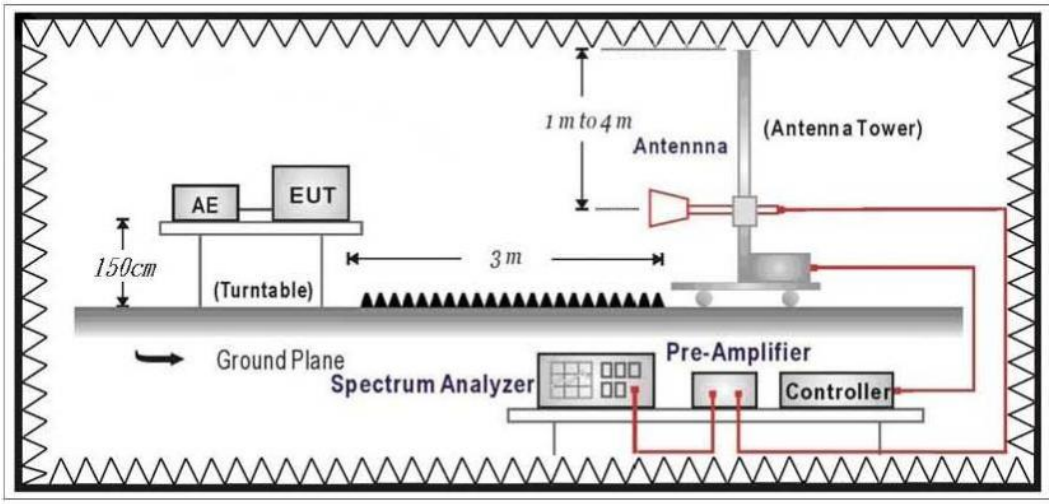
4. Radiated Emission

4.1. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



4.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

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

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.3. Test Procedure

The EUT was setup according to ANSI C63.10:2013 and tested according to DTS test procedure of KDB 558074 D01 v05r02 for compliance to FCC 47CFR 15.247 requirements.
The EUT and its simulators are placed on a turn table which is 1.5 meter above ground(under 1GHz) or 1.5 meter above ground (above 1GHz). The turn table can rotate 360 degrees to determine the position of the maximum emission level.
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.
On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

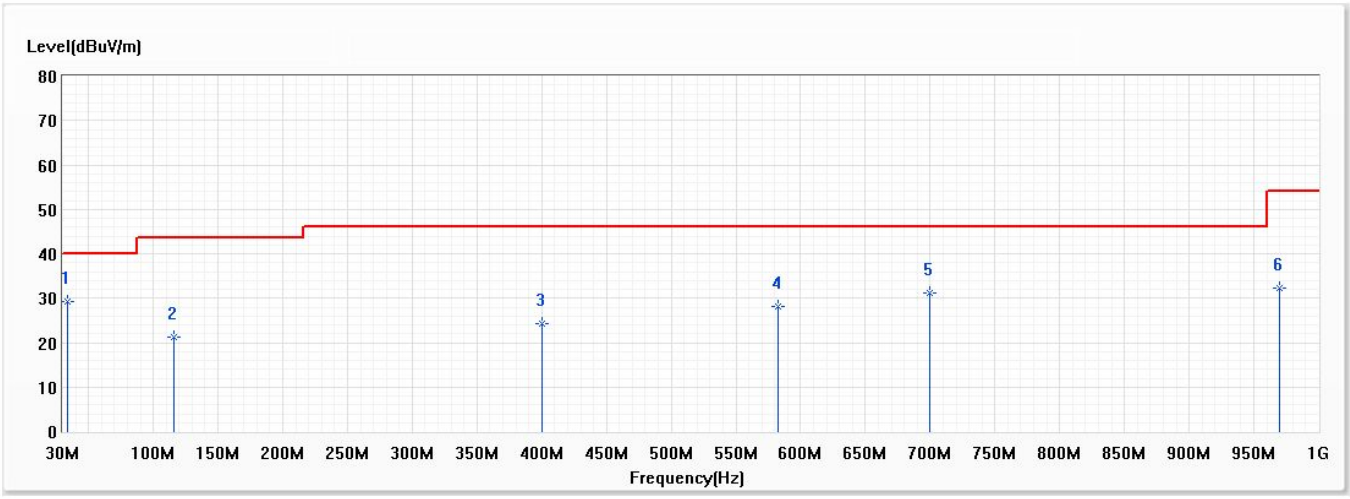
4.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2019

4.5. 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	802.11g-CDD-2462MHz	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	34.001	29.29	40.00	-10.71	26.88	2.41	QP
2	115.603	21.35	43.50	-22.15	24.00	-2.65	QP
3	400.661	24.31	46.00	-21.69	22.60	1.71	QP
4	582.779	28.19	46.00	-17.81	23.20	4.99	QP
5	699.300	31.20	46.00	-14.80	25.04	6.16	QP
6	969.809	32.38	54.00	-21.62	23.17	9.21	QP

Note:

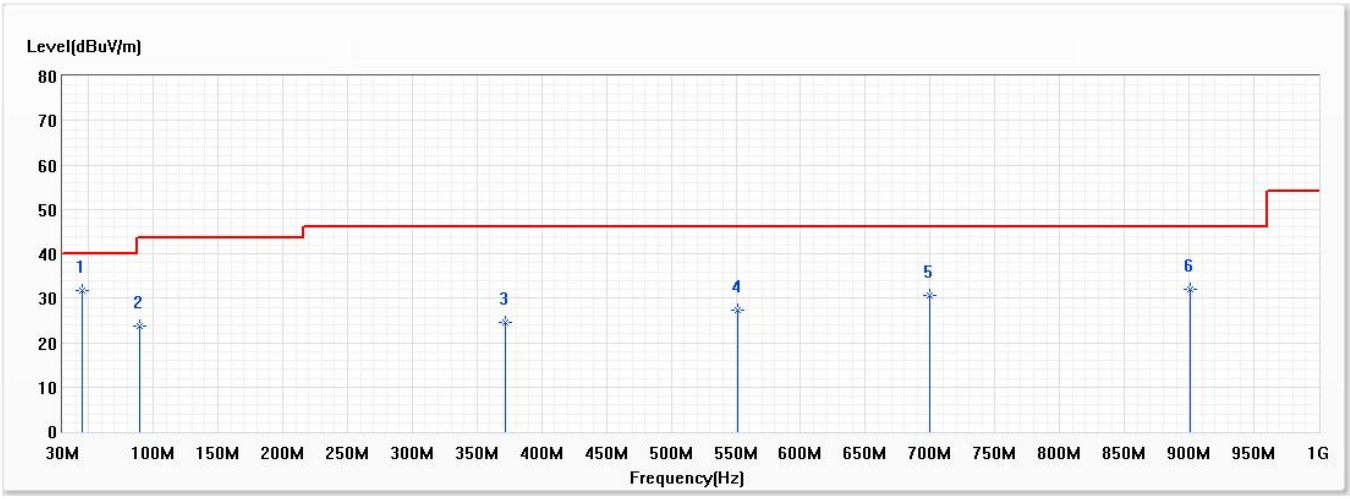
1. All reading levels is Quasi-Peak value.

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	802.11g-CDD-2462MHz	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	45.035	31.61	40.00	-8.39	35.77	-4.16	QP
2	89.898	23.84	43.50	-19.66	30.47	-6.63	QP
3	371.925	24.61	46.00	-21.39	23.93	0.68	QP
4	551.011	27.32	46.00	-18.68	22.78	4.54	QP
5	699.300	30.71	46.00	-15.29	24.55	6.16	QP
6	900.454	31.98	46.00	-14.02	23.54	8.44	QP

Note:

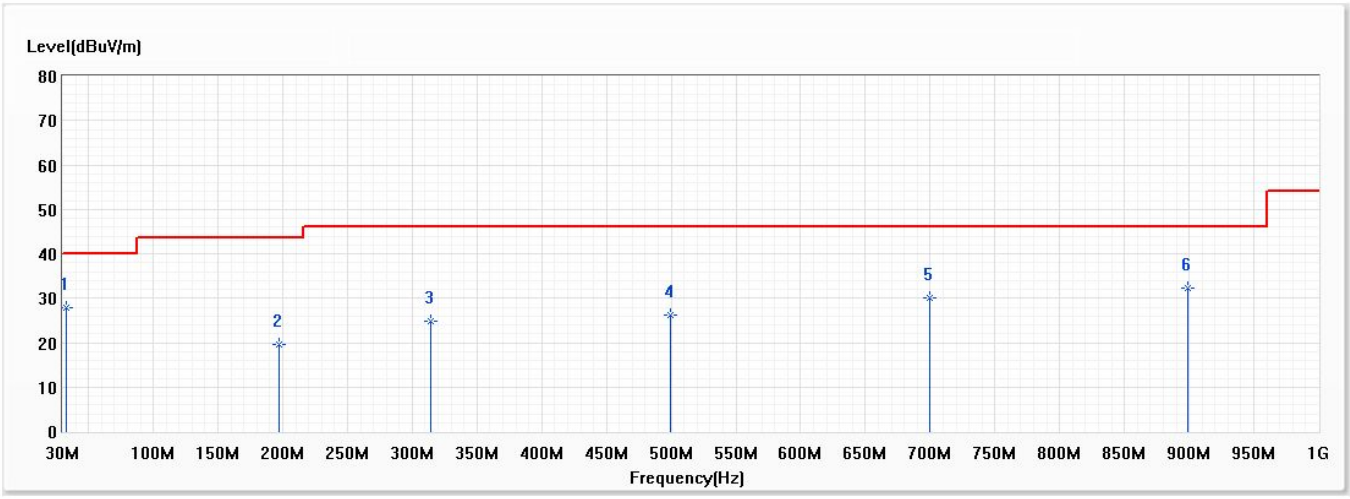
1. All reading levels is Quasi-Peak value.

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	802.11g-CDD-2462MHz	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	32.789	27.92	40.00	-12.08	24.71	3.21	QP
2	196.719	19.66	43.50	-23.84	25.15	-5.49	QP
3	314.574	24.81	46.00	-21.19	25.86	-1.05	QP
4	499.844	26.13	46.00	-19.87	22.90	3.23	QP
5	699.300	29.94	46.00	-16.06	23.78	6.16	QP
6	898.756	32.30	46.00	-13.70	23.88	8.42	QP

Note:

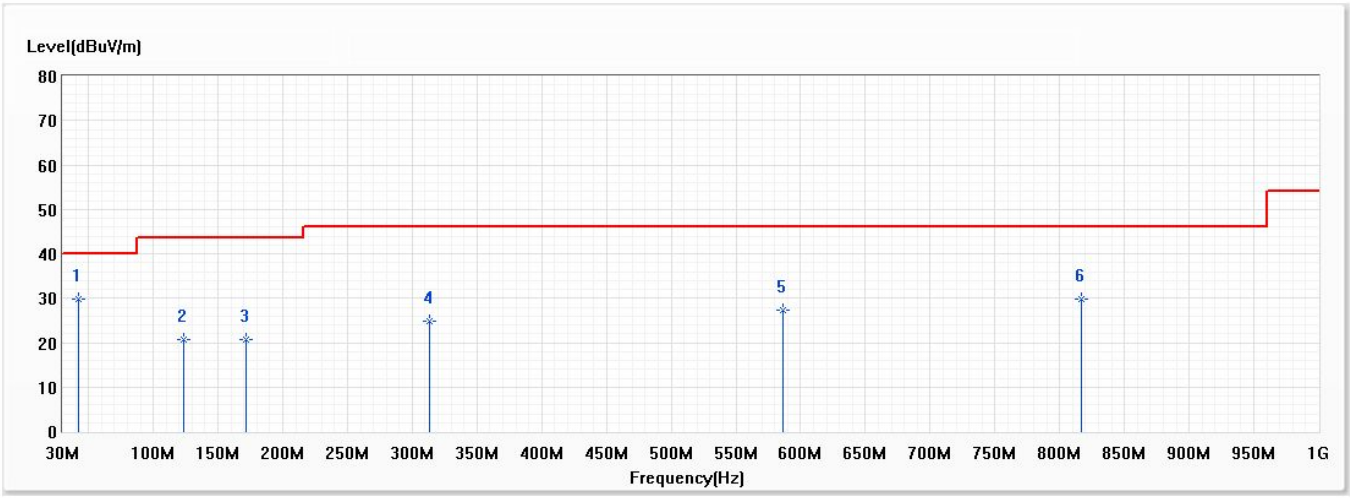
1. All reading levels is Quasi-Peak value.

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	802.11g-CDD-2462MHz	Humidity (%RH)	55.0



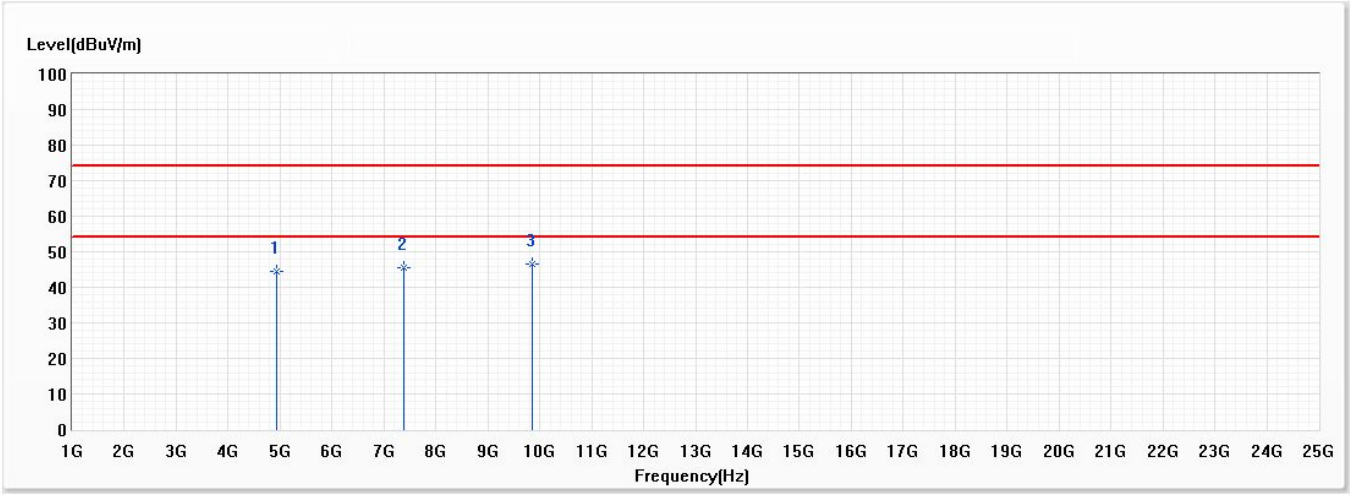
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	42.489	29.70	40.00	-10.30	32.42	-2.72	QP
2	123.726	20.72	43.50	-22.78	23.01	-2.29	QP
3	171.984	20.78	43.50	-22.72	26.36	-5.58	QP
4	312.998	24.75	46.00	-21.25	25.80	-1.05	QP
5	586.780	27.32	46.00	-18.68	22.39	4.93	QP
6	816.670	29.92	46.00	-16.08	22.83	7.09	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 (℃)	22.0
Test Condition	802.11g-CDD-2462MHz	Humidity (%RH)	55.0

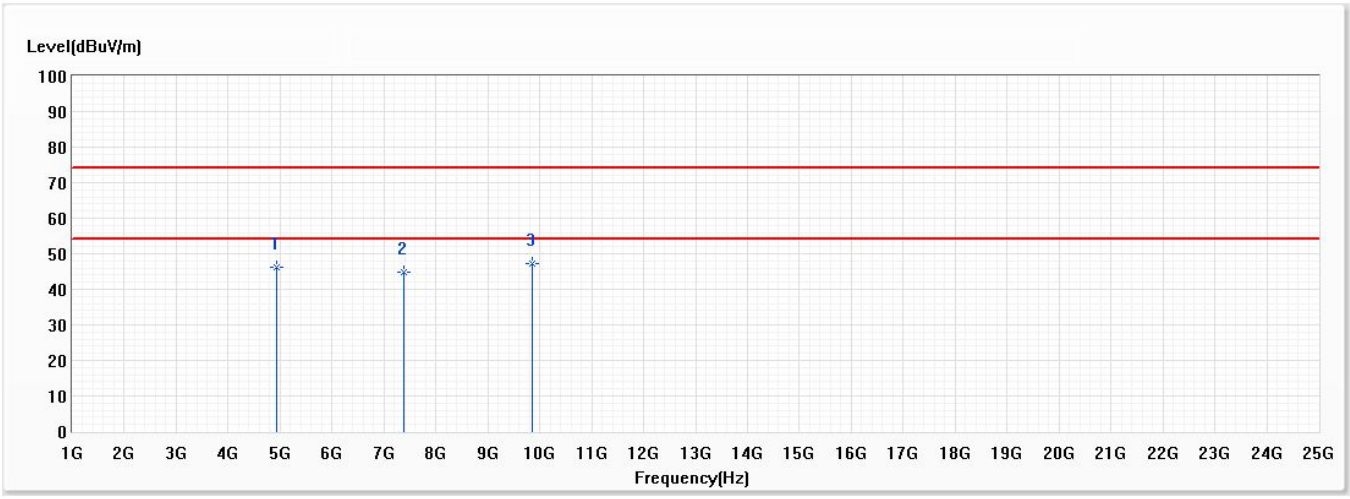


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4924.000	44.50	74.00	-29.50	56.20	-11.70	PK
2	7386.000	45.64	74.00	-28.36	49.81	-4.17	PK
* 3	9848.000	46.55	74.00	-27.45	47.77	-1.22	PK

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 13GHz were not included is because their levels are lower than 20dB form 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 (℃)	22.0
Test Condition	802.11g-CDD-2462MHz	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	4924.000	46.24	74.00	-27.76	57.94	-11.70	PK
2	7386.000	44.96	74.00	-29.04	49.13	-4.17	PK
* 3	9848.000	47.10	74.00	-26.90	48.32	-1.22	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 13GHz were not included is because their levels are lower than 20dB form limit.

Note:

This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110114 is housing and software. The software changes as following:

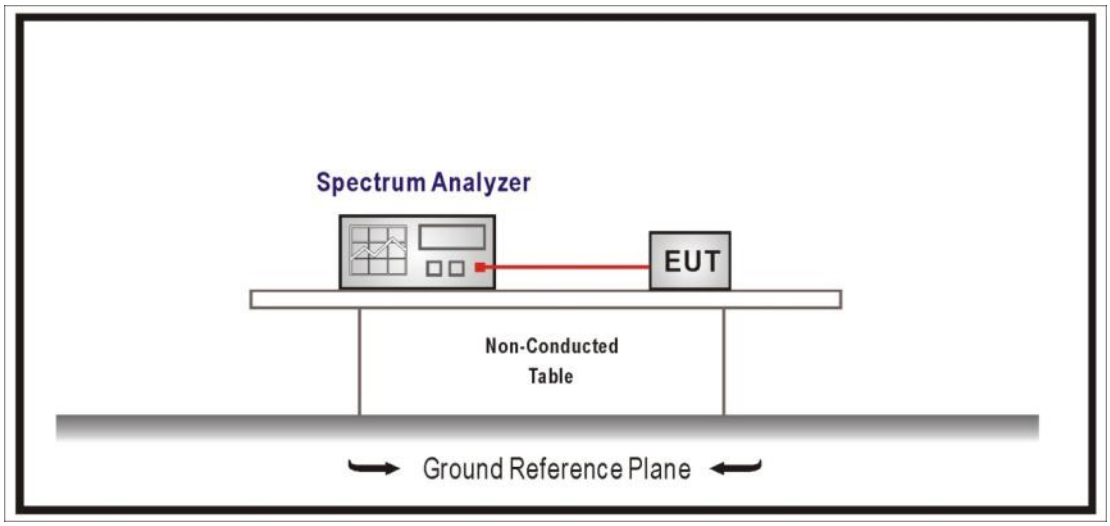
1) Add LTE band 4, band 12, band 14, band 29 and close band 13 by software.
2) Close 5G FR2 band n261 by software.

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.

5. RF antenna conducted test

5.1. Test Setup

RF Antenna Conducted Measurement:



5.2. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on an RF conducted or radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure section 11.2 of KDB 558074 D01 v05r02 for compliance to FCC 47CFR 15.247 requirements. Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

5.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2019

5.5. Test Result

Note:

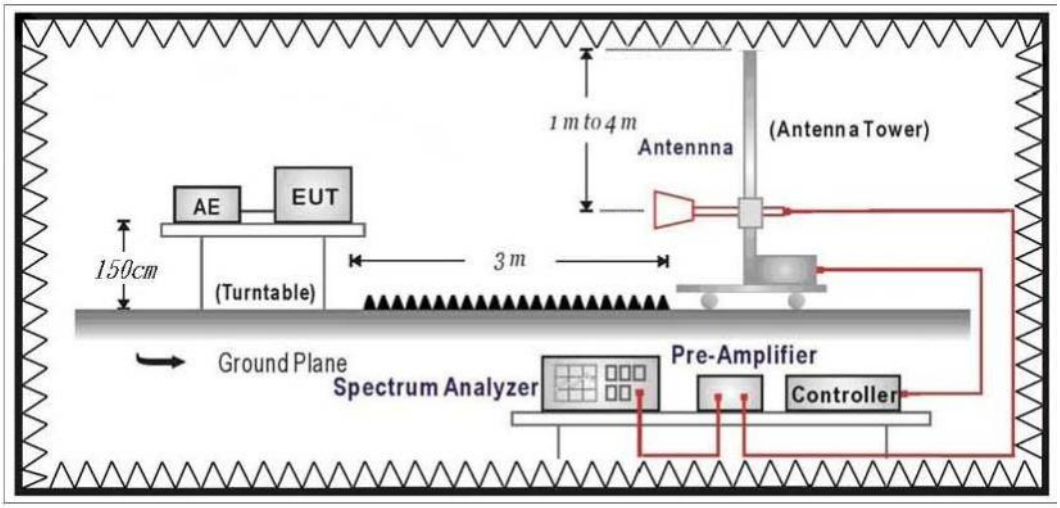
This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110114 is housing and software. The software changes as following:

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.

6. Radiated Emission Band Edge

6.1. Test Setup



6.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

6.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB 558074 D01 v05r02 for compliance to FCC 47CFR 15.247 requirements. 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.

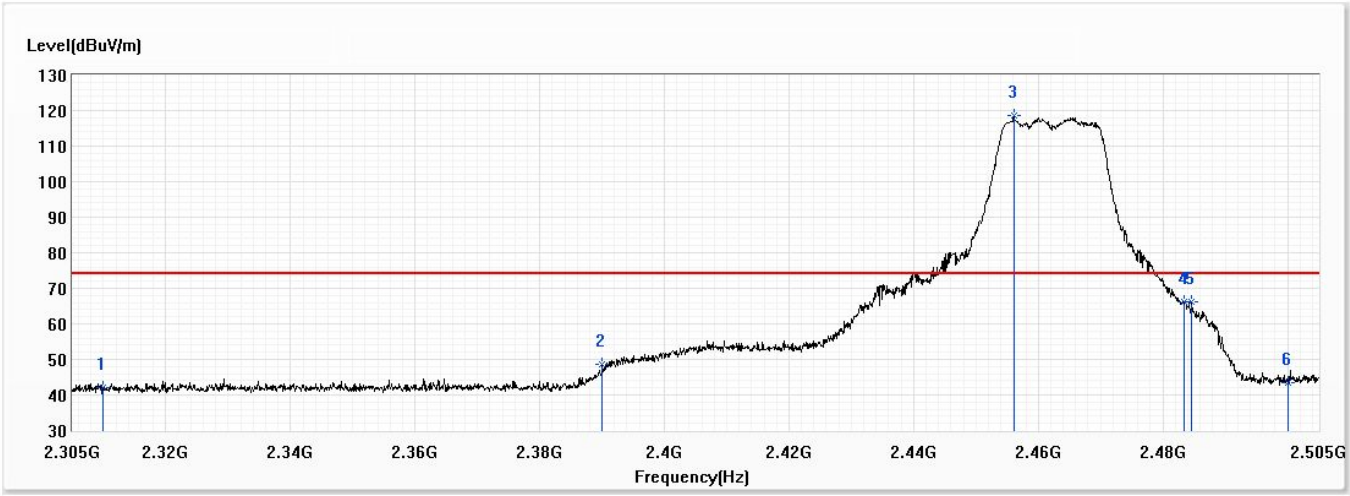
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

6.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2019

6.5. Test Result

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 (℃)	22.0
Test Condition	802.11g-CDD-2462MHz	Humidity (%RH)	55.0

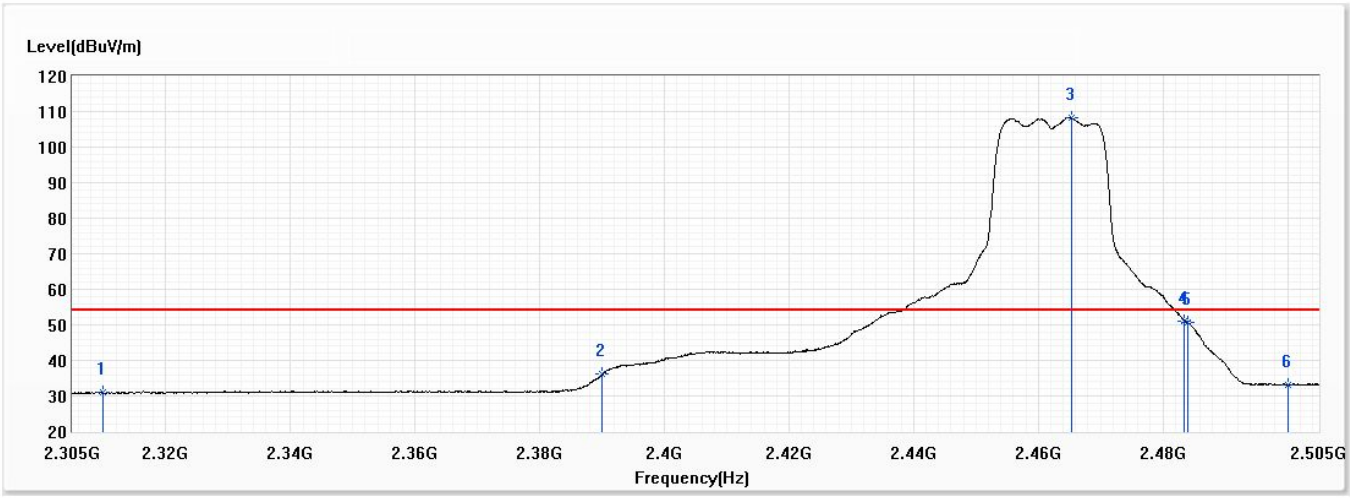


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2310.000	42.18	74.00	-31.82	29.03	13.15	PK
2	2390.000	48.54	74.00	-25.46	34.84	13.70	PK
! 3	2456.100	118.50	74.00	44.50	104.33	14.17	PK
4	2483.500	66.27	74.00	-7.73	51.91	14.36	PK
5	2484.600	66.09	74.00	-7.91	51.73	14.36	PK
6	2500.000	43.55	74.00	-30.45	29.07	14.48	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 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	2020/11/25
Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D)	Engineer	Ling Chen
Polarity	Horizontal	Temperature (℃)	22.0
Test Condition	802.11g-CDD-2462MHz	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	2310.000	30.87	54.00	-23.13	17.72	13.15	AV
2	2390.000	36.16	54.00	-17.84	22.46	13.70	AV
! 3	2465.300	108.32	54.00	54.32	94.08	14.24	AV
4	2483.500	51.20	54.00	-2.80	36.84	14.36	AV
5	2484.000	50.63	54.00	-3.37	36.27	14.36	AV
6	2500.000	33.22	54.00	-20.78	18.74	14.48	AV

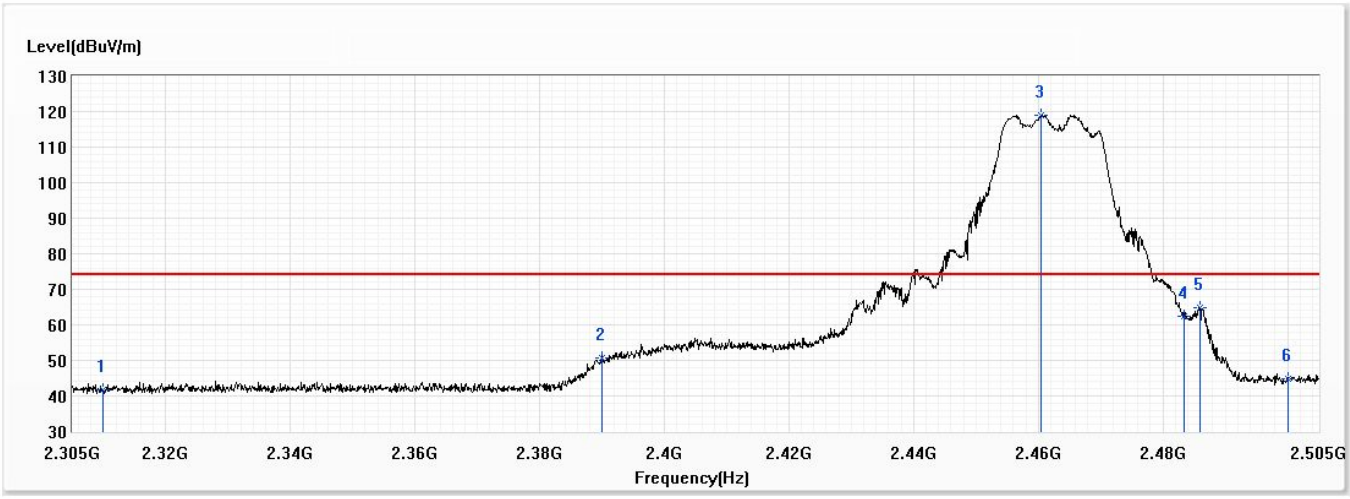
Note:

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

2. Emission Level = Reading Level + Correct Factor.

3. The 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	2020/11/25
Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D)	Engineer	Ling Chen
Polarity	Vertical	Temperature (℃)	22.0
Test Condition	802.11g-CDD-2462MHz	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	2310.000	41.80	74.00	-32.20	28.65	13.15	PK
2	2390.000	50.81	74.00	-23.19	37.11	13.70	PK
! 3	2460.500	118.86	74.00	44.86	104.66	14.20	PK
4	2483.500	62.41	74.00	-11.59	48.05	14.36	PK
5	2486.000	64.80	74.00	-9.20	50.42	14.38	PK
6	2500.000	44.96	74.00	-29.04	30.48	14.48	PK

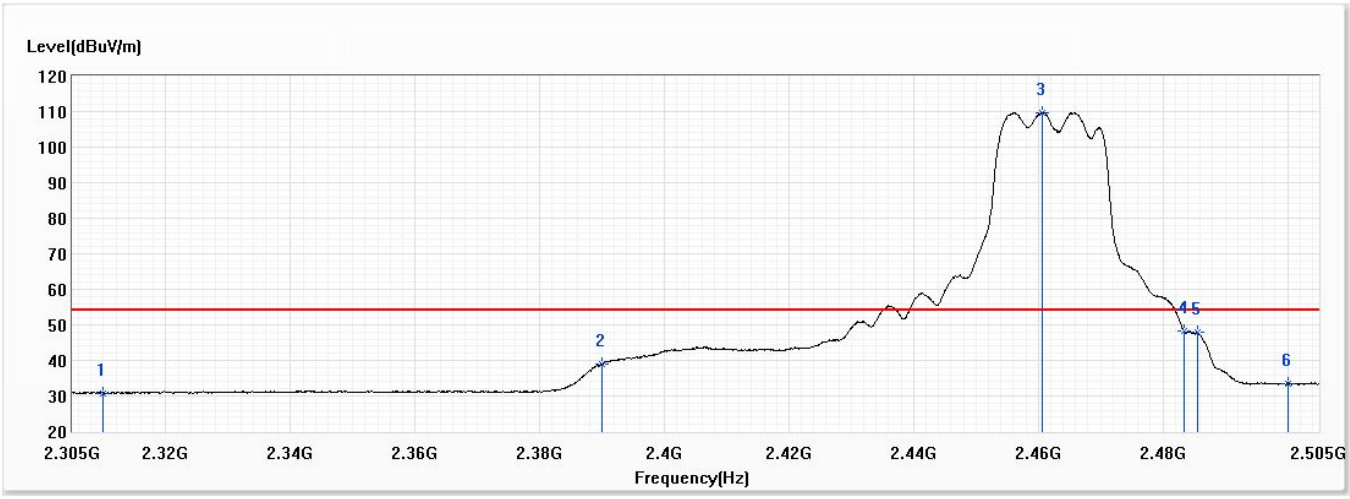
Note:

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

2. Emission Level = Reading Level + Correct Factor.

3. The 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	2020/11/25
Test Mode	Mode 1: Transmit Mode (ADP: ADP-120VH D)	Engineer	Ling Chen
Polarity	Vertical	Temperature (℃)	22.0
Test Condition	802.11g-CDD-2462MHz	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	2310.000	30.69	54.00	-23.31	17.54	13.15	AV
2	2390.000	38.93	54.00	-15.07	25.23	13.70	AV
! 3	2460.700	109.75	54.00	55.75	95.55	14.20	AV
4	2483.500	48.26	54.00	-5.74	33.90	14.36	AV
5	2485.500	47.90	54.00	-6.10	33.52	14.38	AV
6	2500.000	33.36	54.00	-20.64	18.88	14.48	AV

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 fundamental for reference only, it's not restricted by unwanted emission limit.

Note:

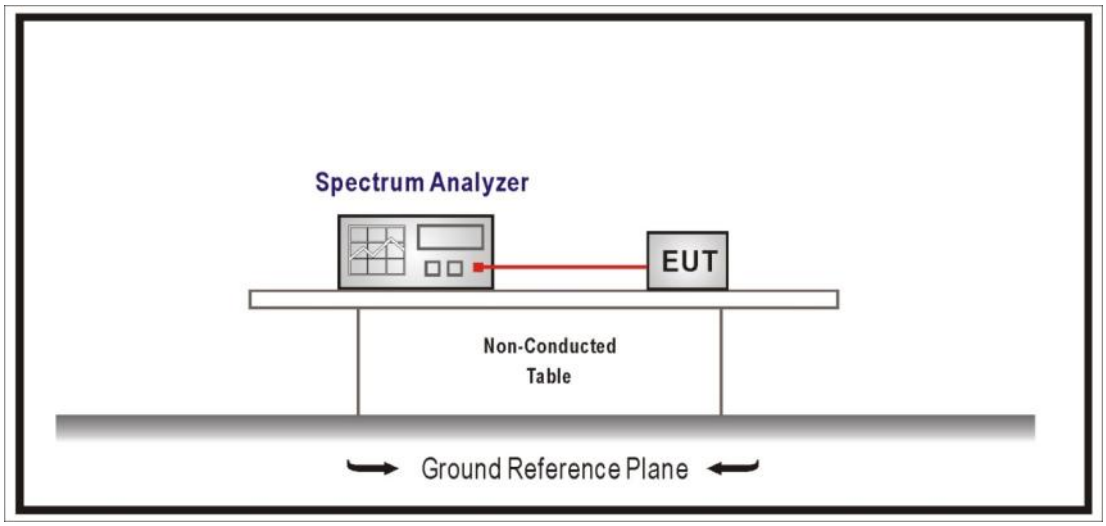
This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110114 is housing and software. The software changes as following:

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.

7. DTS Bandwidth

7.1. Test Setup



7.2. Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested procedure section 8.1 of KDB 558074 D01 v05r02 for compliance to FCC 47CFR 15.247 requirements. Set RBW = 100KHz, Set the VBW≧3xRBW, Sweep Time=Auto, Set Peak Detector.

7.3. Limits

The 6 dB bandwidth must be greater than 500 kHz.

7.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2019

7.5. Test Result

Note:

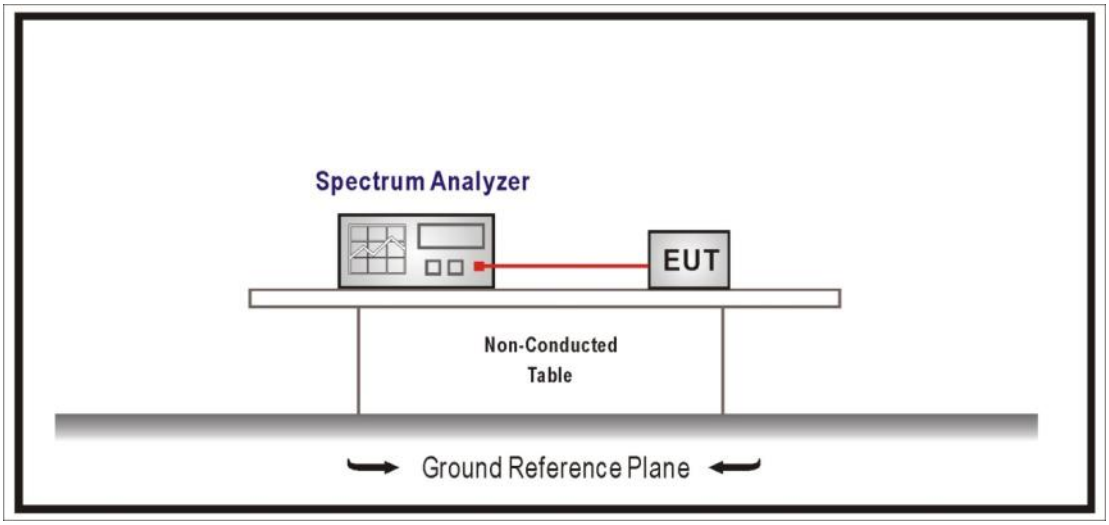
This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110114 is housing and software. The software changes as following:

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.

8. Occupied Bandwidth

8.1. Test Setup



8.2. Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB 558074 D01 v05r02 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 1-5% of the OBW, Set the VBW≧3xRBW, Sweep Time=Auto.

8.3. Limits

N/A

8.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2019

8.5. Test Result

Note:

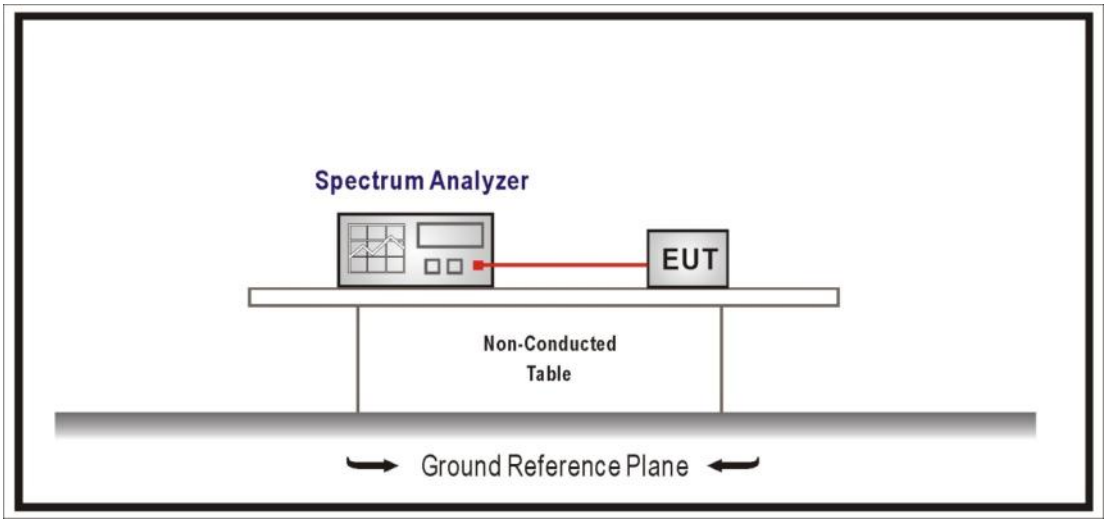
This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110114 is housing and software. The software changes as following:

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.

9. Power Density

9.1. Test Setup



9.2. Limits

The peak power spectral density conducted from the intentional radiated to the antenna shall not be greater than +8dBm in any 3kHz band during any time interval of continuous transmission.

9.3. Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure section 10.2 of KDB 558074 D01 v05r02 for compliance to FCC 47CFR 15.247 requirements.

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

9.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2019

9.5. Test Result

Note:

This report is prepared for Class II permissive change. The difference compared with original report no.: 2050962R-E3032110114 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.