Variant FCC Test Report

Product Name	:	PACKTALK EDGE, PACKTALK CUSTOM, PACKTALK NEO
Brand Name	:	Cardo Systems, LTD
Model No.	:	PACKTALK EDGE/CUSTOM, PACKTALK NEO
FCC ID	:	Q95ER28
Applicant	:	Cardo Systems, LTD
Address	:	101 E. Park Blvd, Suite 600, Plano TX, 75074 USA
Date of Receipt	:	Oct. 22, 2021
Issued Date	:	Dec. 16, 2022
Report No.	:	2290111R-RFNAOTHV02-C
Report Version	:	V1.0

Testing Laboratory
3024

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.
This report must not be used to claim product endorsement by TAF or any agency of the government.
Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Product Name	:	PACKTALK EDGE, PACKTALK CUSTOM, PACKTALK NEO
Applicant	:	Cardo Systems, LTD
Address	:	101 E. Park Blvd, Suite 600, Plano TX, 75074 USA
Manufacturer	:	Cardo Systems, LTD
Address	:	101 E. Park Blvd, Suite 600, Plano TX, 75074 USA
Brand Name	:	Cardo Systems, LTD
Model No.	:	PACKTALK EDGE/CUSTOM, PACKTALK NEO
FCC ID	:	Q95ER28
EUT Voltage	:	DC 5V (host equipment) DC 3.7 for battery
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C Section 15.247 ANSI C63.10: 2013
Laboratory Name	:	DEKRA Testing and Certification Co., Ltd. Hsin Chu Laboratory
Address	:	No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 310, Taiwan, R.O.C.
Test Result	:	Complied

Documented By : Amelia Wu

(Amelia Wu / Project Specialist)

Approved By : Rueyyan.Lin

(Rueyyan Lin / Supervisor)

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of DEKRA Testing and Certification Co., Ltd.

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Dec. 16, 2022

Class I Permissive Change (C1PC)

Report No.	Version	Description	Issued Date
21A0733R-RFUSOTHV05-A	V1.0	Original application.	Dec. 10, 2021
2290111R-RFNAOTHV02-C	V1.0	1. Adding a new product name / model number “PACKTALK NEO”. The difference between original product name / model number and new product name / model number, please refer to the section 1.1 for detail. 2. Adding new accessory “USB audio kit and Cradle” for model: PACKTALK NEO use only. After evaluating, the worst result of original report is selected to verify radiated emission, radiated emission band edge tests and record in the report.	Dec. 16, 2022

TABLE OF CONTENTS

1. General Information

1.1 EUT Description

Product Name	PACKTALK EDGE, PACKTALK CUSTOM, PACKTALK NEO
Brand Name	Cardo Systems, LTD
Model No.	PACKTALK EDGE/CUSTOM, PACKTALK NEO
Frequency Range	2405 ~ 2475 MHz
Channel Number	8 Channels
Type of Modulation / Data Rate	O-QPSK / 1 Mbps

Model No.: PACKTALK EDGE/CUSTOM, Accessories Information				
No.	Equipment Name	Brand Name	Model No.	Description
1	Headphone	JBL	40mm 32ohm speakers	3 wire audio lines
2	USB Cable	Hailink	USB 2.0 A/M to Type C cable 28# L=60cm	Shielded cable w/o ferrite core, 0.6m
3	Microphone	Transound	Boom Microphone	2 wire audio lines
4	Audio Kit	Leflexo	Pack Talk Edge Audio kit	5 wire audio lines

Model No.: PACKTALK NEO, Accessories Information				
No.	Equipment Name	Brand Name	Model No.	Description
1	Headphone	JBL	40mm 32ohm speakers	3 wire audio lines
2	USB Cable	Hailink	USB 2.0 A/M to Type C cable 28# L=60cm	Shielded cable w/o ferrite core, 0.6m
3	Microphone	Transound	Boom Microphone	2 wire audio lines
4	USB audio kit	Cardo	USB audio kit	N/A
5	Cradle	Cardo	Cradle	N/A

The difference for each product name / model number is shown as below:

EUT	1		2
Product Name	PACKTALK EDGE	PACKTALK CUSTOM	PACKTALK NEO
Model No.	PACKTALK EDGE/CUSTOM		PACKTALK NEO
PCB Version	PCB00291		PCB00295
Hardware	USB type C (without audio function) USB Data		USB type C (with audio function) Audio Switch Chip = USB has 2 input option (Data or Audio)
Accessory	Audiokit		USB audio kit Cradle
Note	The difference are related to pay per feature on the mobile application that manufacturer enable the user to use but the product is exactly the same. For instance, noise cancellation feature can be operate by mobile app and for PACKTALK CUSTOM user pay per this feature.		-

Antenna Information				
Ant.	Brand Name	Model No.	Type	Gain (dBi)
0	N/A	N/A	PCB	0

EUT Operational Condition	
Testing Voltage	AC 120V/60Hz

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2405 MHz	01	2415 MHz	02	2425 MHz	03	2435 MHz
04	2445 MHz	05	2455 MHz	06	2465 MHz	07	2475 MHz

Note: The above EUT information is declared by the manufacturer.

1.2 Test Mode

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Test Mode	Mode 1: Transmit

Test Items	Test Mode	Modulation	Channel	Result
Radiated Emission	Mode 1	O-QPSK	00	Pass
Radiated Emission Band Edge	Mode 1	O-QPSK	00	Pass

Note:

1. Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. The EUT was performed at X axis, Y axis and Z axis position for transmitter spurious emission and receiver spurious emission tests.

   The worst case was found at Z axis, so the measurement will follow this same test configuration.

1.3 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.

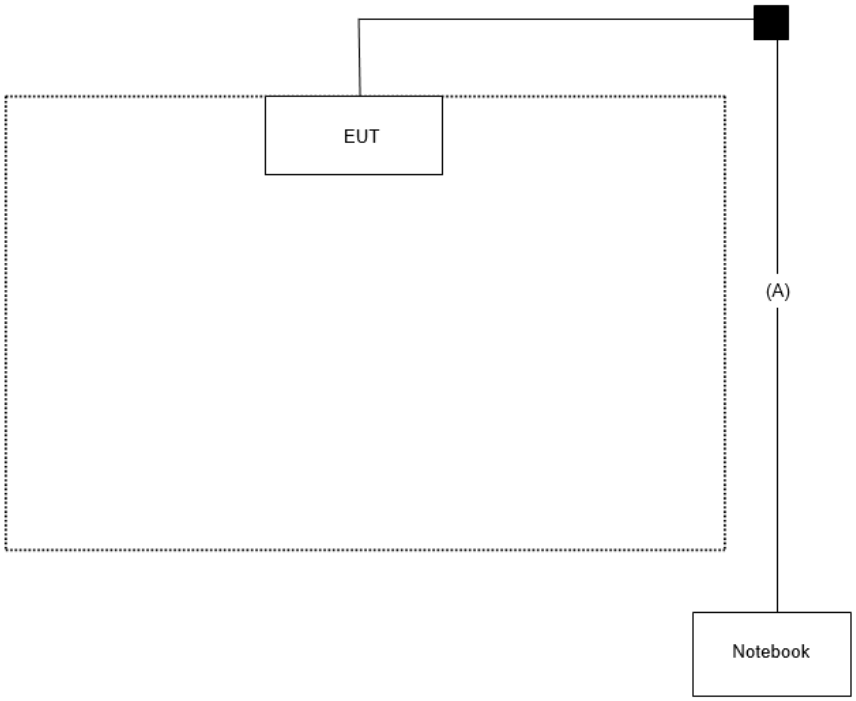
1.4 Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system.

	Product	Manufacturer	Model No.	Serial No.
1	Notebook	Lenovo	Thinkpad	N/A

1.5 Configuration of tested System

Connection Diagram



	Signal Cable Type	Signal cable Description
A	USB Cable	Shielded, 10m

1.6 EUT Operation of during Test

1	Execute control command by software “Bluetest3”.
2	Configure the test mode, the test channel, and the data rate.
3	Press “Start TX” to start the continuous transmitting.
4	Verify that the EUT works properly.

1.7 Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Actually	Tested by	Test Date	Test Site
Temperature (°C)	Radiated Emission	24	Ling Chen	2022/09/29	HC-CB02
Humidity (%RH)		58			
Temperature (°C)	Radiated Emission Band Edge	24 ~ 25.3	Ling Chen	2022/09/29 ~ 2022/10/03	HC-CB02
Humidity (%RH)		52 ~ 58			

Note: Test site information refers to Laboratory Information.

Laboratory Information

USA	**:**	**FCC Registration Number: TW3024**
Canada	**:**	**CAB identifier : TW3024**

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.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 2. No.372, 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
Note: Test site number for address 1 includes HC-SR02. Test site number for address 2 includes HC-CB02, HC-CB03, HC-CB04, HC-SR10 and HC-SR12.	

1.8 List of Test Equipment

HC-CB02

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal and Spectrum Analyzer	R&S	FSVA40	101435	2022/05/30	2023/05/29
Trilog Broadband Antenna	Schwarzbeck	VULB 9168	1272	2022/05/19	2023/05/18
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2022/05/06	2023/05/05
Horn Antenna	Schwarzbeck	BBHA 9170	203	2022/02/23	2023/02/22
Pre-Amplifier	EMCI	EMC01820I	980365	2022/04/15	2023/04/14
Pre-Amplifier	EMEC	EM01G18GA	060741	2022/05/06	2023/05/05
Pre-Amplifier	DEKRA	AP-400C	201801231	2022/09/27	2023/09/26
Coaxial Cable(13m)	Suhner	SF104	HC-CB02	2022/08/15	2023/08/14
Coaxial Cable(3m)	Suhner,Rosnol	SF102_UP0264	HC-CB02_1	2022/08/14	2023/08/13
EMI Test Receiver	R&S	ESR7	102260	2021/12/22	2022/12/21
Magnetic Loop Antenna	Teseq	HLA 6121	49611	2022/03/18	2023/03/17
Radiated Software	AUDIX	e3 V9	HC-CB02_1	N/A	N/A

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

1.9 Measurement Uncertainty

Uncertainties have been calculated according to the DEKRA internal document with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2).

Test item	Uncertainty
Radiated Emission	± 3.25 dB below 1 GHz ± 3.32 dB above 1 GHz
Radiated Emission Band Edge	± 3.32 dB

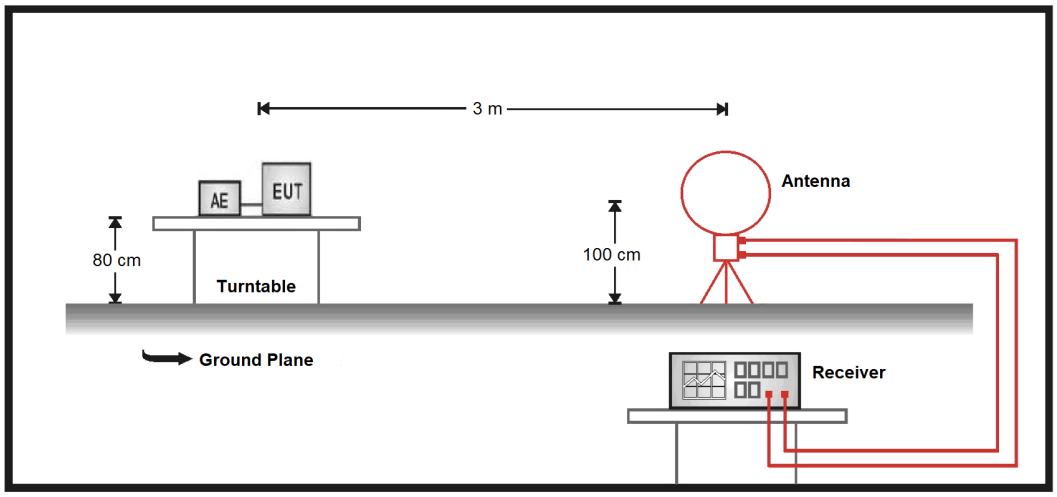
1.10 Duty Cycle

Refer to original report for test data.

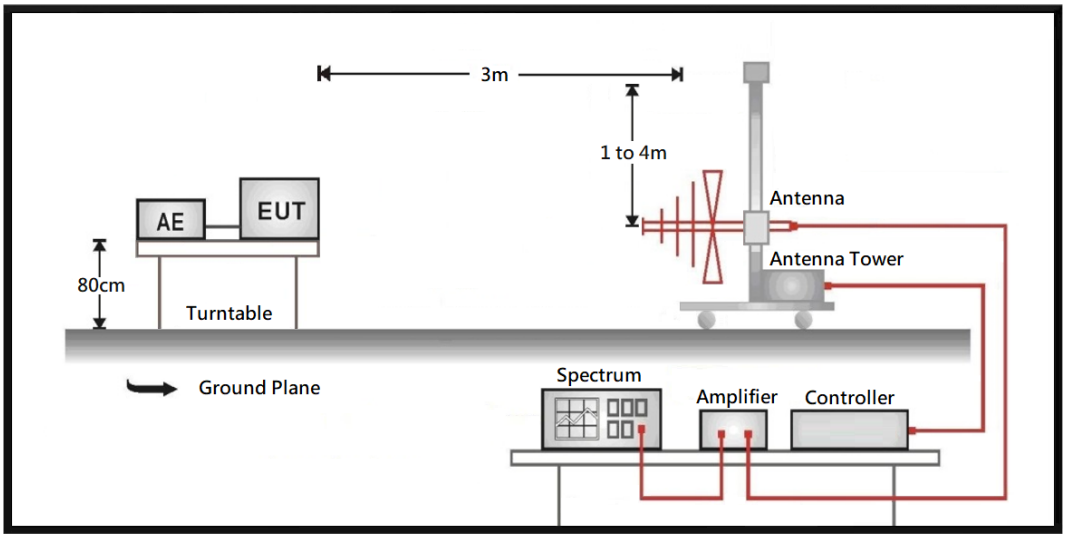
2. Radiated Emission

2.1 Test Setup

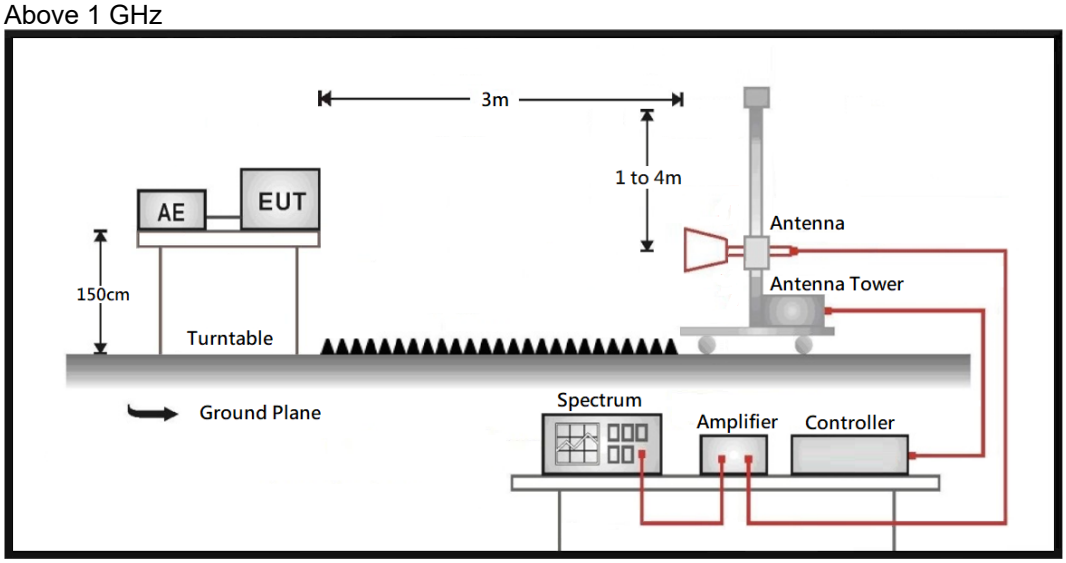
9 kHz ~ 30 MHz



30 MHz ~ 1 GHz



Above 1 GHz



2.2 Test Limit

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

Frequency (MHz)	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	20 log (2400/F(kHz))	300
0.490 – 1.705	24000/F(kHz)	20 log (24000/F(kHz))	30
1.705 - 30	30	29.5	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

Remarks:

1. Field strength (dBuV/m) = 20 log Field strength (uV/m)
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

2.3 Test Procedure

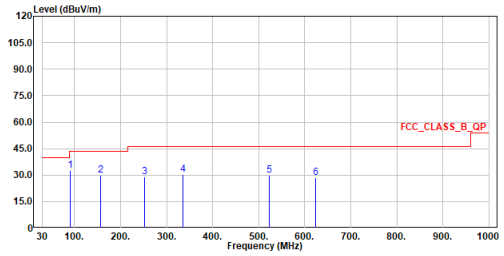
The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB 558074 D01V05r02 for compliance to FCC 47CFR 15.247 requirements.
The EUT and its simulators are placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine 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 form 9 kHz(inculde The the lowest oscillator frequency generated within the device up to the 10th harmonic) to 1000 MHz, the limit shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limit 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 1 GHz setting on the field strength meter is 120 kHz and above 1 GHz is 1MHz.

2.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

2.5 Test Result of Radiated Emissions (30 MHz ~ 1 GHz)

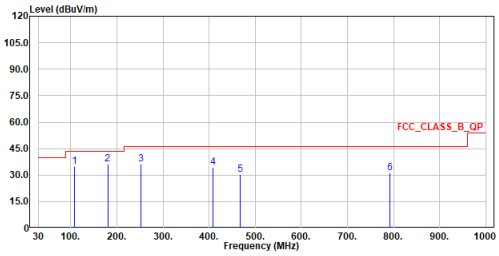
Site :HC-CB02
Condition :3m Horizontal
Mode :Zigbee_TX_2405MHz
Test by :Ling



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	89.752	32.47	43.50	-11.03	40.72	-8.25	QP
2	156.003	29.99	43.50	-13.51	32.41	-2.42	QP
3	251.936	29.14	46.00	-16.86	32.76	-3.62	QP
4	335.938	30.54	46.00	-15.46	31.25	-0.71	QP
5	522.081	29.90	46.00	-16.10	26.04	3.86	QP
6	624.028	28.63	46.00	-17.37	22.41	6.22	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.
5. The other emission levels were very low against the limit.

Site :HC-CB02
Condition :3m Vertical
Mode :Zigbee_TX_2405MHz
Test by :Ling

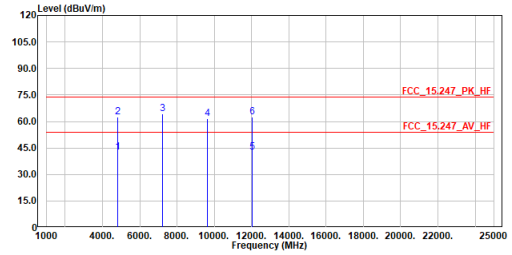


No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	108.085	34.85	43.50	-8.65	40.91	-6.06	QP
2	179.962	36.22	43.50	-7.28	40.19	-3.97	QP
3	251.839	36.21	46.00	-9.79	39.83	-3.62	QP
4	407.912	34.61	46.00	-11.39	33.58	1.03	QP
5	468.052	30.22	46.00	-15.78	27.41	2.81	QP
6	792.129	31.21	46.00	-14.79	22.17	9.04	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.
5. The other emission levels were very low against the limit.

2.6 Test Result of Radiated Emissions (1 GHz ~ 10th Harmonic)

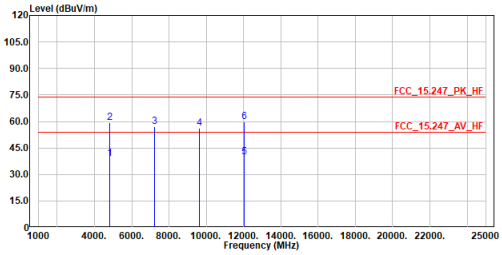
Site :CB2-H
Condition :3m Horizontal
Mode :Zigbee_TX_2405MHz
Test by :Ling



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4810.000	42.51	54.00	-11.49	56.17	-13.66	Average
2	4810.000	62.51	74.00	-11.49	76.17	-13.66	Peak
3	7215.000	64.21	74.00	-9.79	69.81	-5.60	Peak
4	9620.000	61.48	74.00	-12.52	63.81	-2.33	Peak
5	12025.000	42.53	54.00	-11.47	41.90	0.63	Average
6	12025.000	62.53	74.00	-11.47	61.90	0.63	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.
6. The calculation of average value :
Average value = Peak value + Duty cycle correction factor (The duty cycle correction factor refer to section "Duty Cycle")

Site :CB2-H
Condition :3m Vertical
Mode :Zigbee_TX_2405MHz
Test by :Ling

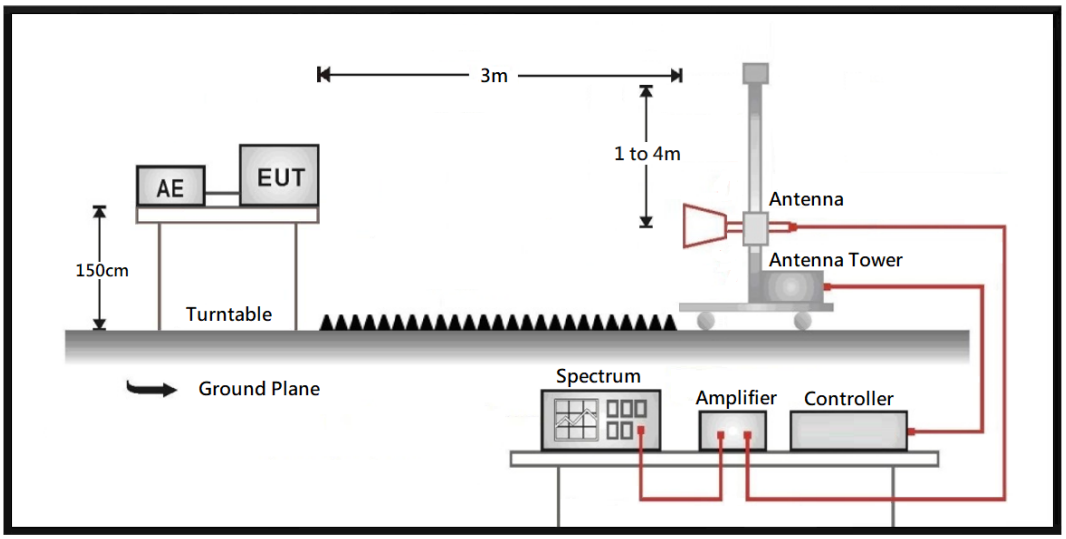


No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4810.000	39.13	54.00	-14.87	52.79	-13.66	Average
2	4810.000	59.13	74.00	-14.87	72.79	-13.66	Peak
3	7215.000	57.01	74.00	-16.99	62.61	-5.60	Peak
4	9620.000	56.34	74.00	-17.66	58.67	-2.33	Peak
5	12025.000	39.98	54.00	-14.02	39.35	0.63	Average
6	12025.000	59.98	74.00	-14.02	59.35	0.63	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.
6. The calculation of average value :
Average value = Peak value + Duty cycle correction factor (The duty cycle correction factor refer to section "Duty Cycle")

3. Radiated Emission Band Edge

3.1 Test Setup



3.2 Test Limit

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

Frequency (MHz)	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

Remarks:

1. Field strength (dBuV/m) = 20 log Field strength (uV/m)
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

3.3 Test Procedure

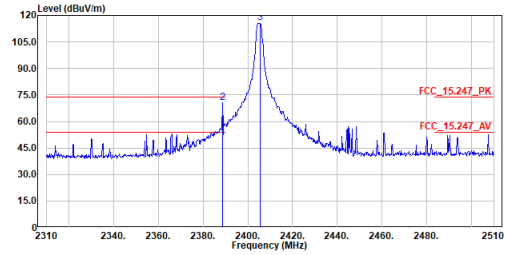
The EUT was setup according to ANSI C63.10: 2013 and tested according to the FCC KDB 558074 D01 v05r02 for compliance to FCC 47CFR 15.247 requirements.
The EUT and its simulators are placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The 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.

3.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

3.5 Test Result of Radiated Emission Band Edge

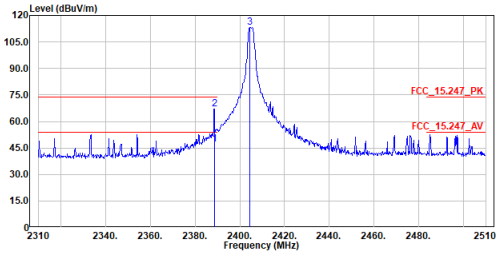
Site :CB2-H
Condition :3m Horizontal
Mode :Zigbee_TX_2405MHz
Test By :Ling



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2388.800	50.79	54.00	-3.21	37.36	13.43	Average
2	2388.800	70.79	74.00	-3.21	57.36	13.43	Peak
3	2405.600	115.89	------	------	102.36	13.53	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.
6. The calculation of average value :
Average value = Peak value + Duty cycle correction factor (The duty cycle correction factor refer to section "Duty Cycle")

Site :CB2-H
Condition :3m Vertical
Mode :Zigbee_TX_2405MHz
Test By :Ling



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2388.600	47.12	54.00	-6.88	33.69	13.43	Average
2	2388.600	67.12	74.00	-6.88	53.69	13.43	Peak
3	2404.600	113.39	------	------	99.87	13.52	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.
6. The calculation of average value :
Average value = Peak value + Duty cycle correction factor (The duty cycle correction factor refer to section "Duty Cycle")