

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-A
Report Version : V1.0



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



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., Zudong Township, Hsinchu
County 310, Taiwan, R.O.C.
Test Result : Complied

Documented By : 

(Amelia Wu / Project Specialist)

Approved By : 

(Rueyyan Lin / Supervisor)

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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-RFUSBT2V01-A	V1.0	Original application.	Dec. 10, 2021
2290111R-RFNAOTHV02-A	V1.0	<p>1. Adding a new product name / model number "PACKTALK NEO".</p> <p>The difference between original product name / model number and new product name / model number, please refer to the section 1.1 for detail.</p> <p>2. Adding new accessory "USB audio kit and Cradle" for model: PACKTALK NEO use only.</p> <p>After evaluating, the worst result of original report is selected to verify radiated emission, radiated emission band edge tests and record in the report.</p>	Dec. 16, 2022

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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	2402 ~ 2480 MHz
Channel Number	79 Channels
Type of Modulation	Frequency Hopping Spread Spectrum
Data Rate	BR uses a GFSK (1 Mbps)
	EDR uses a combination of π/4-DQPSK (2 Mbps) and 8DPSK (3 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
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
1	AMOTECH	AMAN301512ST01	Chip	2.21

EUT Operational Condition	
Testing Voltage	AC 120V/60Hz

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	20	2422 MHz	40	2442 MHz	60	2462 MHz
01	2403 MHz	21	2423 MHz	41	2443 MHz	61	2463 MHz
02	2404 MHz	22	2424 MHz	42	2444 MHz	62	2464 MHz
03	2405 MHz	23	2425 MHz	43	2445 MHz	63	2465 MHz
04	2406 MHz	24	2426 MHz	44	2446 MHz	64	2466 MHz
05	2407 MHz	25	2427 MHz	45	2447 MHz	65	2467 MHz
06	2408 MHz	26	2428 MHz	46	2448 MHz	66	2468 MHz
07	2409 MHz	27	2429 MHz	47	2449 MHz	67	2469 MHz
08	2410 MHz	28	2430 MHz	48	2450 MHz	68	2470 MHz
09	2411 MHz	29	2431 MHz	49	2451 MHz	69	2471 MHz
10	2412 MHz	30	2432 MHz	50	2452 MHz	70	2472 MHz
11	2413 MHz	31	2433 MHz	51	2453 MHz	71	2473 MHz
12	2414 MHz	32	2434 MHz	52	2454 MHz	72	2474 MHz
13	2415 MHz	33	2435 MHz	53	2455 MHz	73	2475 MHz
14	2416 MHz	34	2436 MHz	54	2456 MHz	74	2476 MHz
15	2417 MHz	35	2437 MHz	55	2457 MHz	75	2477 MHz
16	2418 MHz	36	2438 MHz	56	2458 MHz	76	2478 MHz
17	2419 MHz	37	2439 MHz	57	2459 MHz	77	2479 MHz
18	2420 MHz	38	2440 MHz	58	2460 MHz	78	2480 MHz
19	2421 MHz	39	2441 MHz	59	2461 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			
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Test Items	Test Mode	Modulation	Channel	Result
Radiated Emission	Mode 1	8-DPSK	78	Pass
Radiated Emission Band Edge	Mode 1	8-DPSK	78	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

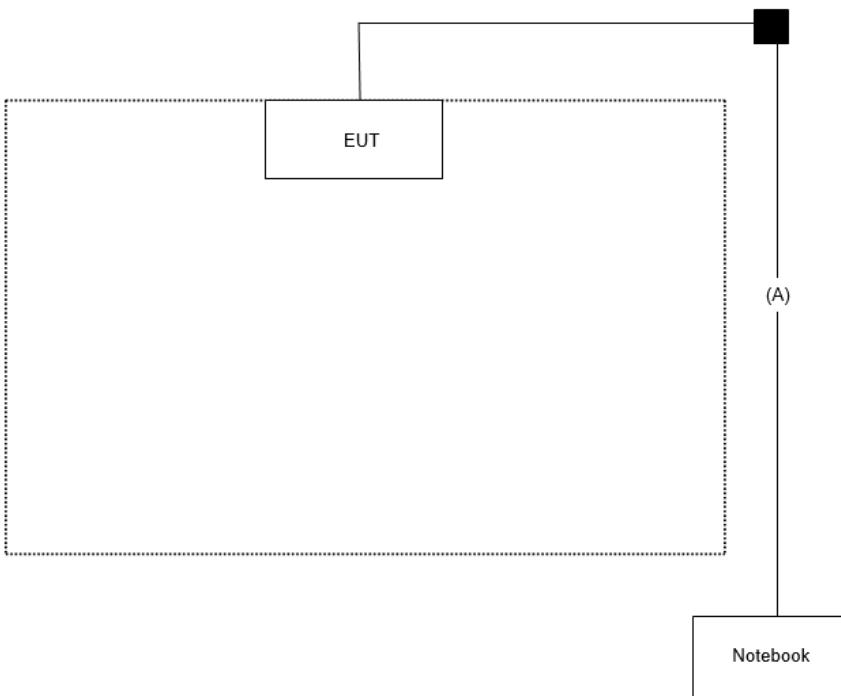
The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

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	23 ~ 24.8	Gary Liao Getaz Yang	2022/10/21 ~ 2022/10/24	HC-CB02
Humidity (%RH)		61 ~ 62			
Temperature (°C)	Radiated Emission Band Edge	23 ~ 24.8	Ling Chen Getaz Yang	2022/10/21 ~ 2022/10/24	HC-CB02
Humidity (%RH)		61 ~ 62			

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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. +886-3-582-8001 2. +886-3-582-8001
Fax number	<ol style="list-style-type: none"> 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	44287	2022/10/21	2023/10/20
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 above 1GHz

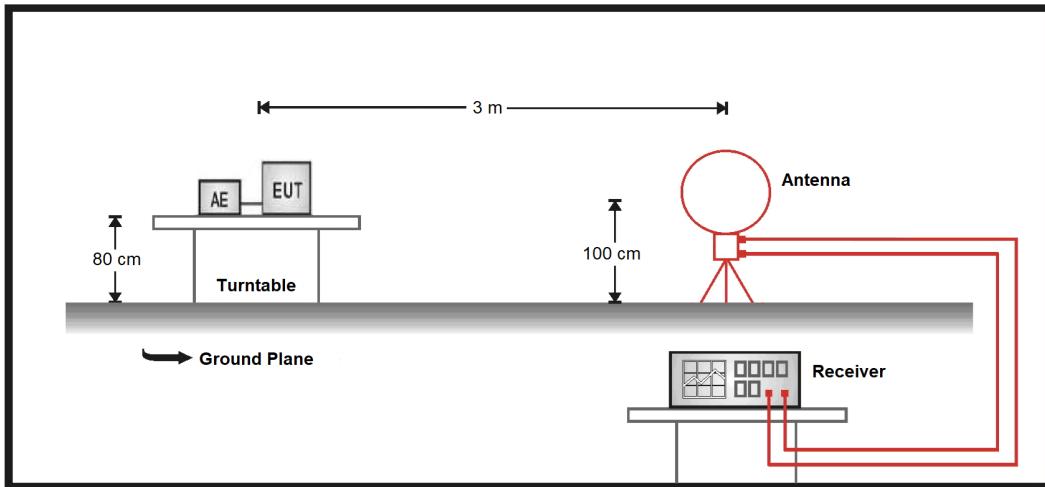
1.10. Duty Cycle

Refer to original report for test data.

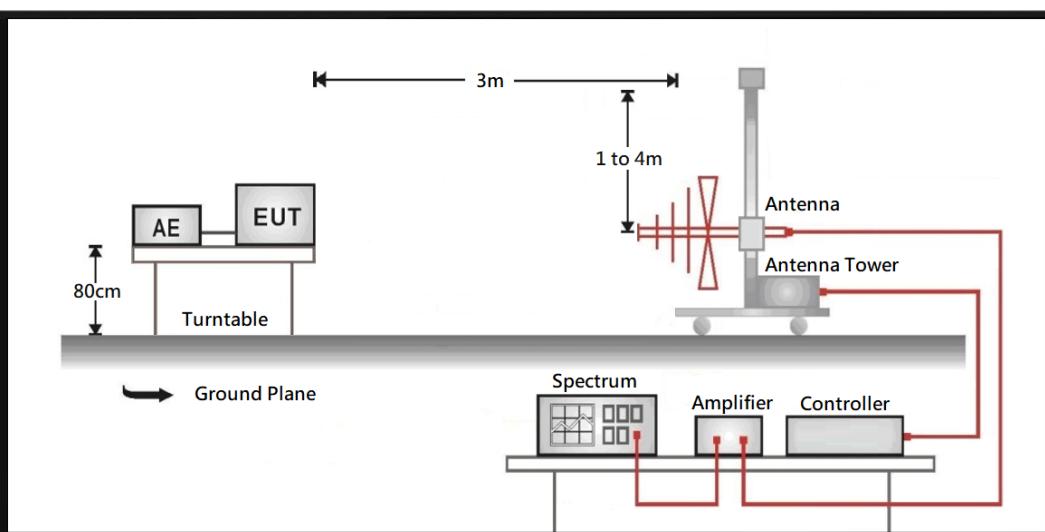
2. Radiated Emission

2.1. Test Setup

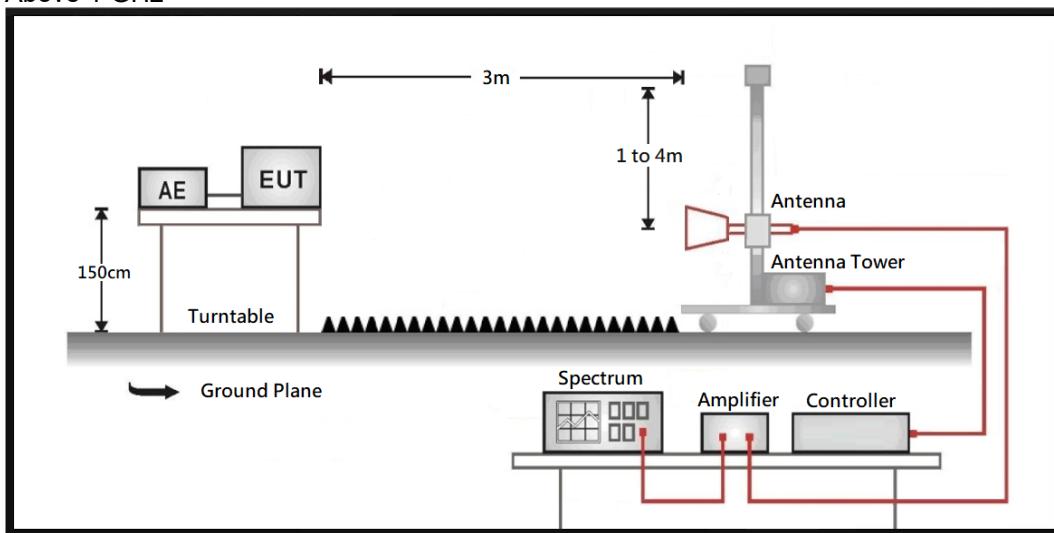
9 kHz ~ 30 MHz



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	$2400/F(\text{kHz})$	$20 \log (2400/F(\text{kHz}))$	300
0.490 – 1.705	$24000/F(\text{kHz})$	$20 \log (24000/F(\text{kHz}))$	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 FHSS test procedure of 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 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 from 9kHz (including the lowest oscillator frequency generated within the device up to the 10th harmonic) 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 measurements are included, emission measurements 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 1 MHz.

2.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

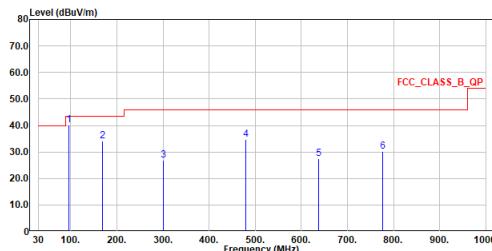
2.5. Test Result of Radiated Emissions (30 MHz ~ 1 GHz)

<For Ant 0>



<For Ant 1>

Site :HC-CB02
 Condition :3m Horizontal
 Mode :8DPSK_TX_2480MHz
 Test By :Gary

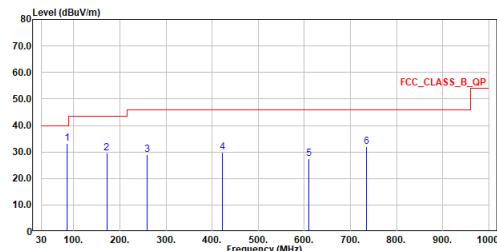


No.	Frequency	Level	Limit	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	95.960	40.15	43.50	-3.35	48.14	-7.99	QP
2	168.128	34.09	43.50	-9.41	36.87	-2.78	QP
3	299.854	26.91	46.00	-19.09	28.70	-1.79	QP
4	479.983	34.77	46.00	-11.23	31.81	2.96	QP
5	636.832	27.48	46.00	-18.52	20.97	6.51	QP
6	777.094	30.18	46.00	-15.82	21.30	8.88	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 :8DPSK_TX_2480MHz
 Test By :Gary



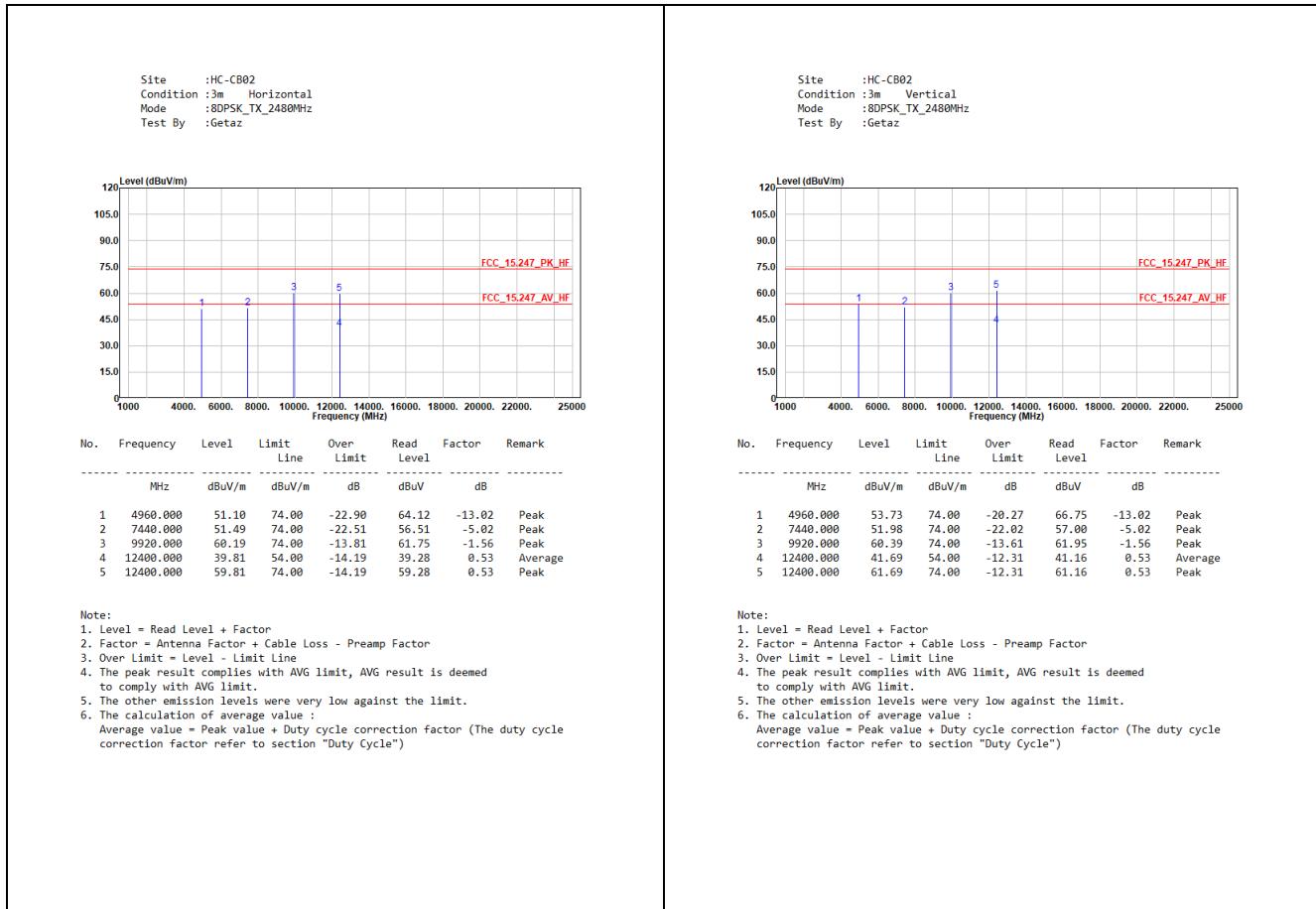
No.	Frequency	Level	Limit	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	85.969	33.26	40.00	-6.74	41.01	-7.75	QP
2	171.232	29.58	43.50	-13.92	32.52	-2.94	QP
3	258.532	29.12	46.00	-16.88	32.59	-3.47	QP
4	422.365	30.01	46.00	-15.99	28.49	1.52	QP
5	609.866	27.39	46.00	-18.61	21.14	6.25	QP
6	734.705	32.05	46.00	-13.95	24.09	7.96	QP

Note:

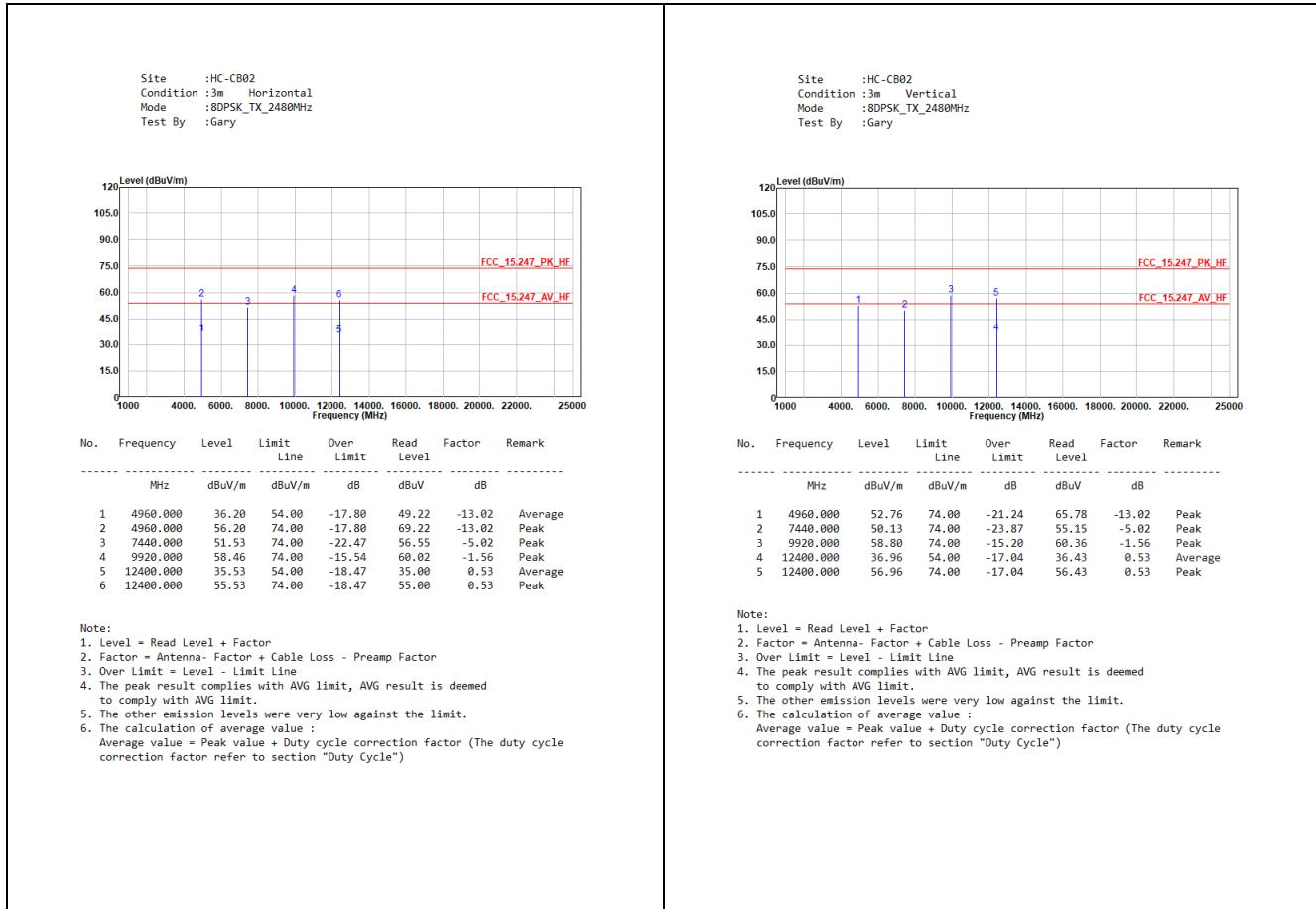
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.
5. The other emission levels were very low against the limit.

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

<For Ant 0>

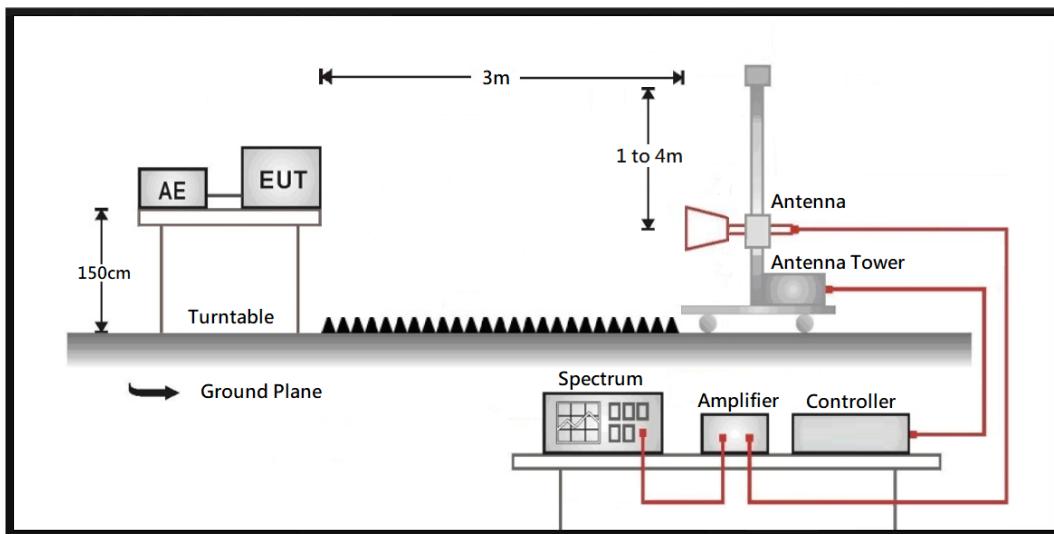


<For Ant 1>



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.

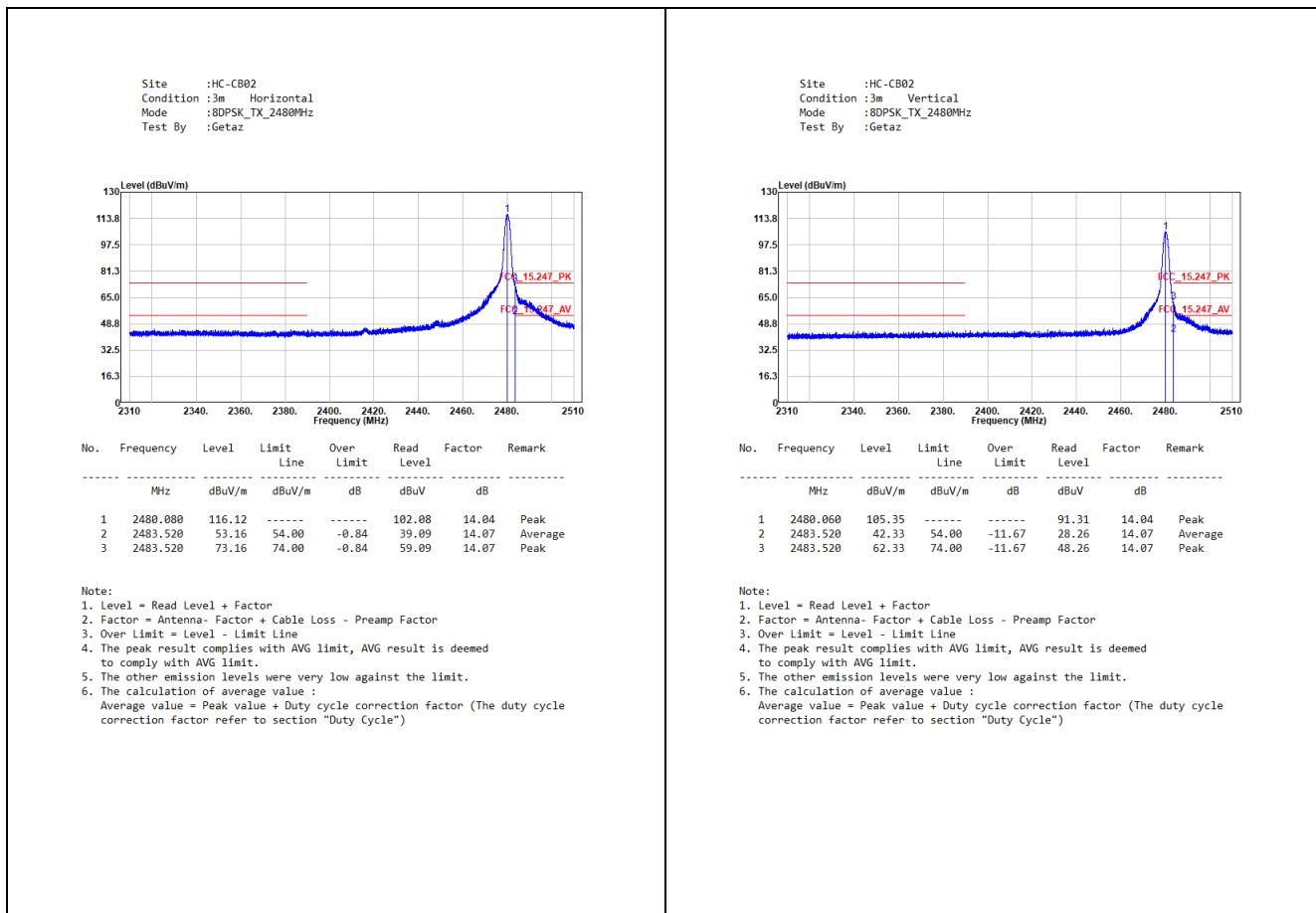
3.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

3.5. Test Result of Radiated Emission Band Edge

Band Edge

<For Ant 0>



<For Ant 1>

