

FCC Test Report

Product Name	Wireless Headset
Model No.	GH50W
FCC ID	I4L-GH50W

Applicant	MICRO-STAR INT'L Co., LTD.
Address	No.69, Lide St., Zhonghe Dist., New Taipei City 235, Taiwan (R.O.C.)

Date of Receipt	Jan. 08, 2022
Issued Date	Mar. 28, 2022
Report No.	2210233R-RFUSOTHV06-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 report of the equipment and evaluated measurement uncertainty herein.

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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.

Test Report

Issued Date: Mar. 28, 2022

Report No.: 2210233R-RFUSOTHV06-A



Product Name	Wireless Headset
Applicant	MICRO-STAR INT'L Co., LTD.
Address	No.69, Lide St., Zhonghe Dist., New Taipei City 235, Taiwan (R.O.C.)
Manufacturer	GUANGDONG SOMIC TECHNOLOGY CO., LTD. DONGGUAN BRANCH
Model No.	GH50W
FCC ID	I4L-GH50W
EUT Rated Voltage	DC 5V (Power by USB) or DC 3.7V (Power by Battery)
EUT Test Voltage	DC 5V (Power by USB)
Trade Name	msi
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By

:



(Senior Project Specialist / Genie Chang)

Tested By

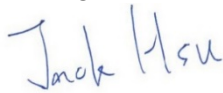
:



(Senior Engineer / Bill Lin)

Approved By

:



(Senior Engineer / Jack Hsu)

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Appendix 1: EUT Test Photographs

Appendix 2: Product Photos: Please refer to the file: 2210233R-Product Photos-Wireless Headset

Revision History

Report No.	Version	Description	Issued Date
2210233R-RFUSOTHV06-A	V1.0	Initial issue of report.	2022-03-28

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Headset
Trade Name	msi
Model No.	GH50W
FCC ID	I4L-GH50W
Frequency Range	2403.35 – 2477.35MHz
Channel Number	38CH
Type of Modulation	GFSK
Antenna Type	PCB Antenna
Channel Control	Auto
Battery	MFR: Wiliyong, M/N: 523450
Audio Cable	MFR: msi, M/N: GM50W Audio cable Non-shielded, 1.37m
USB Cable	MFR: msi, M/N: GM50W USB cable Non-shielded, 1.32m
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	SOMIC	SOMIC 2.4GHz	PCB Antenna	0dBi for 2.4GHz

Note: The antenna of EUT is conform to FCC 15.203

Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01: 2.40335GHz		Channel 02: 2.40535GHz		Channel 03: 2.40735GHz		Channel 04: 2.40935GHz	
Channel 05: 2.41135GHz		Channel 06: 2.41335GHz		Channel 07: 2.41535GHz		Channel 08: 2.41735GHz	
Channel 09: 2.41935GHz		Channel 10: 2.42135GHz		Channel 11: 2.42335GHz		Channel 12: 2.42535GHz	
Channel 13: 2.42735GHz		Channel 14: 2.42935GHz		Channel 15: 2.43135GHz		Channel 16: 2.43335GHz	
Channel 17: 2.43535GHz		Channel 18: 2.43735GHz		Channel 19: 2.43935GHz		Channel 20: 2.44135GHz	
Channel 21: 2.44335GHz		Channel 22: 2.44535GHz		Channel 23: 2.44735GHz		Channel 24: 2.44935GHz	
Channel 25: 2.45135GHz		Channel 26: 2.45335GHz		Channel 27: 2.45535GHz		Channel 28: 2.45735GHz	
Channel 29: 2.45935GHz		Channel 30: 2.46135GHz		Channel 31: 2.46335GHz		Channel 32: 2.46535GHz	
Channel 33: 2.46735GHz		Channel 34: 2.46935GHz		Channel 35: 2.47135GHz		Channel 36: 2.47335GHz	
Channel 37: 2.47535GHz		Channel 38: 2.47735GHz					

Note:

1. The EUT is a Wireless Headset with a built-in 2.4GHz wireless transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance of transmitter with Part 15 Subpart C Paragraph 15.249 for spread spectrum devices.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit
	Mode 2: Charge Mode
	Mode 3: Normal Mode

1.2. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

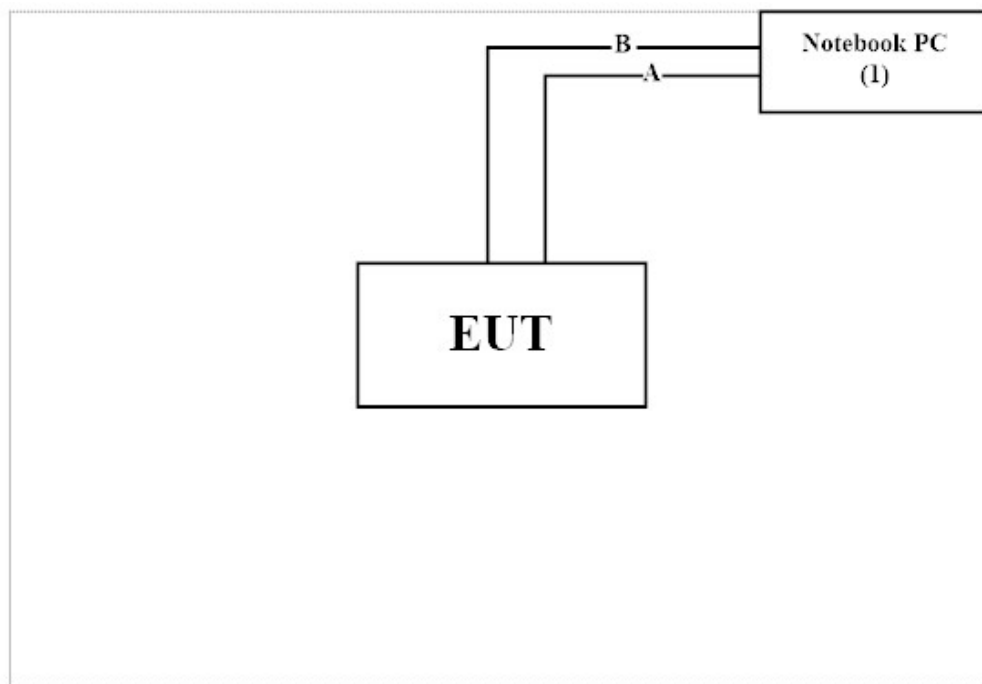
Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Notebook PC	DELL	Latitude E5440	FS9TK32	N/A

Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 1m
B	Audio Cable	Non-shielded, 1.37m

Charge mode:

Signal Cable Type		Signal cable Description
A	USB Cable	Non-Shielded, 1.32m
B	Audio Cable	Non-shielded, 1.37m

1.3. Configuration of Test System



1.4. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.3.
- (2) Execute “VMldebug V1.1.6.56” program on the Notebook PC.
- (3) Configure the test mode and the test channel
- (4) Start the continuous transmit.
- (5) Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	10~40 °C	22.1°C
	Humidity (%RH)	10~90 %	67.7%
Radiated Emission	Temperature (°C)	10~40 °C	22.7°C
	Humidity (%RH)	10~90 %	55.3%

USA : FCC Registration Number: TW0033

Canada : CAB Identifier Number: TW3023 / Company Number: 26930

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 5-22, Ruishukeng Linkou District, New Taipei City,
24451, Taiwan

Performed Location : No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City
333411, Taiwan, R.O.C.

Phone number : +886-3-275-7255
Fax number : +866-3-327-8031
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.6. List of Test Equipment

For Conduction measurements /SH1

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Data	Due. Data
X	EMI Test Receiver	R&S	ESR7	101601	2021.06.19	2022.06.18
X	Two-Line V-Network	R&S	ENV216	101306	2021.04.08	2022.04.07
X	Two-Line V-Network	R&S	ENV216	101307	2021.05.04	2022.05.03
X	Coaxial Cable	SUHNER	RG400_BNC	RF001	2021.05.24	2022.05.23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Testing System V2.0

For Radiated measurements /966-3

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Loop Antenna	AMETEK	HLA6121	56736	2021.04.14	2022.04.13
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-675	2021.08.10	2022.08.10
X	Horn Antenna	ETS-Lindgren	3117	00227700	2021.11.09	2022.11.08
	Horn Antenna	Com-Power	AH-840	101100	2021.10.04	2022.10.03
X	Pre-Amplifier	SGH	0301	20211007-7	2022.02.22	2023.02.21
X	Pre-Amplifier	EMCI	EMC051835SE	980313	2021.11.24	2022.11.23
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2021.07.07	2022.07.06
	Pre-Amplifier	EMCI	EMC184045SE	980369		
	Coaxial Cable	EMCI	EMC102-KM-KM-600	1160314	2021.04.27	2022.04.26
	Coaxial Cable	EMCI	EMC102-KM-KM-7000	170242		
X	Filter	MICRO	BRM50702	G251	2021.09.16	2022.09.15
	Filter	MICRO	BRM50716	G188	2021.09.16	2022.09.15
X	EMI Test Receiver	R&S	ESR	102793	2021.12.15	2022.12.14
X	Spectrum Analyzer	R&S	FSV3044	101113	2022.01.25	2023.02.24
	Coaxial Cable	SGH	HA800	GD20110222-3		
	Coaxial Cable	SGH	SGH18	20110223-1		
	Coaxial Cable	SGH	SGH18	2021005-3		
	Coaxial Cable	SGH	SGH18	2021001-18		

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : AUDIX e3 V9

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

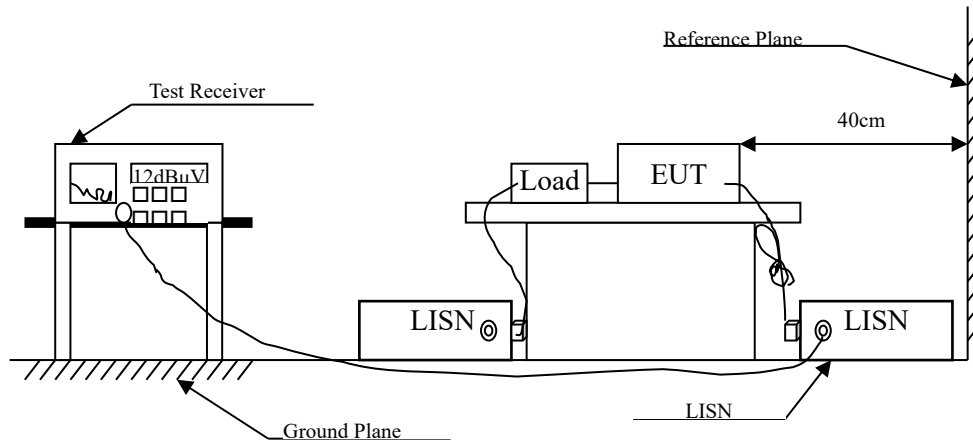
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

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.

Test item	Uncertainty	
Conducted Emission	± 3.42 dB	
Radiated Emission	Under 1GHz ± 4.06 dB	Above 1GHz ± 3.73 dB
Band Edge	Under 1GHz ± 4.06 dB	Above 1GHz ± 3.73 dB
Duty Cycle	± 2.31 ms	

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB μ V) Limit		
Frequency MHz	Limits	
	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.

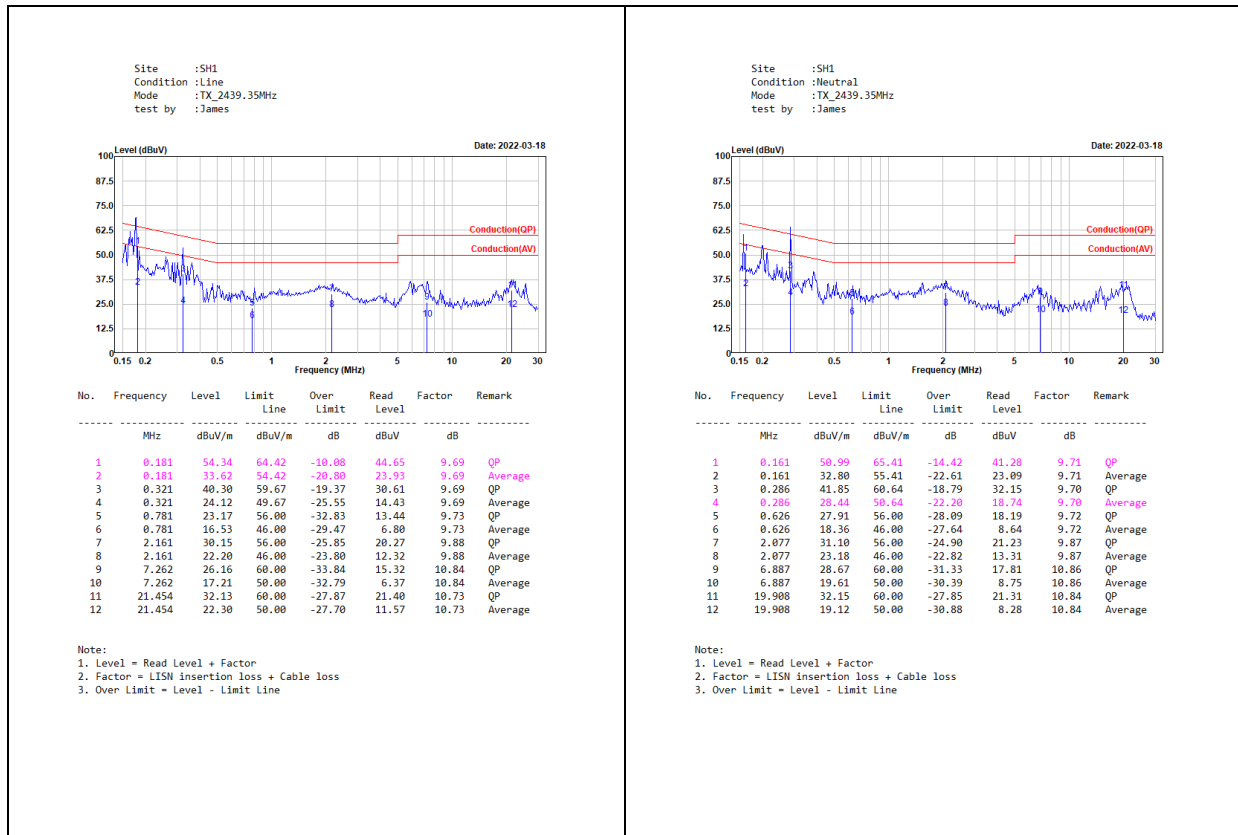
2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

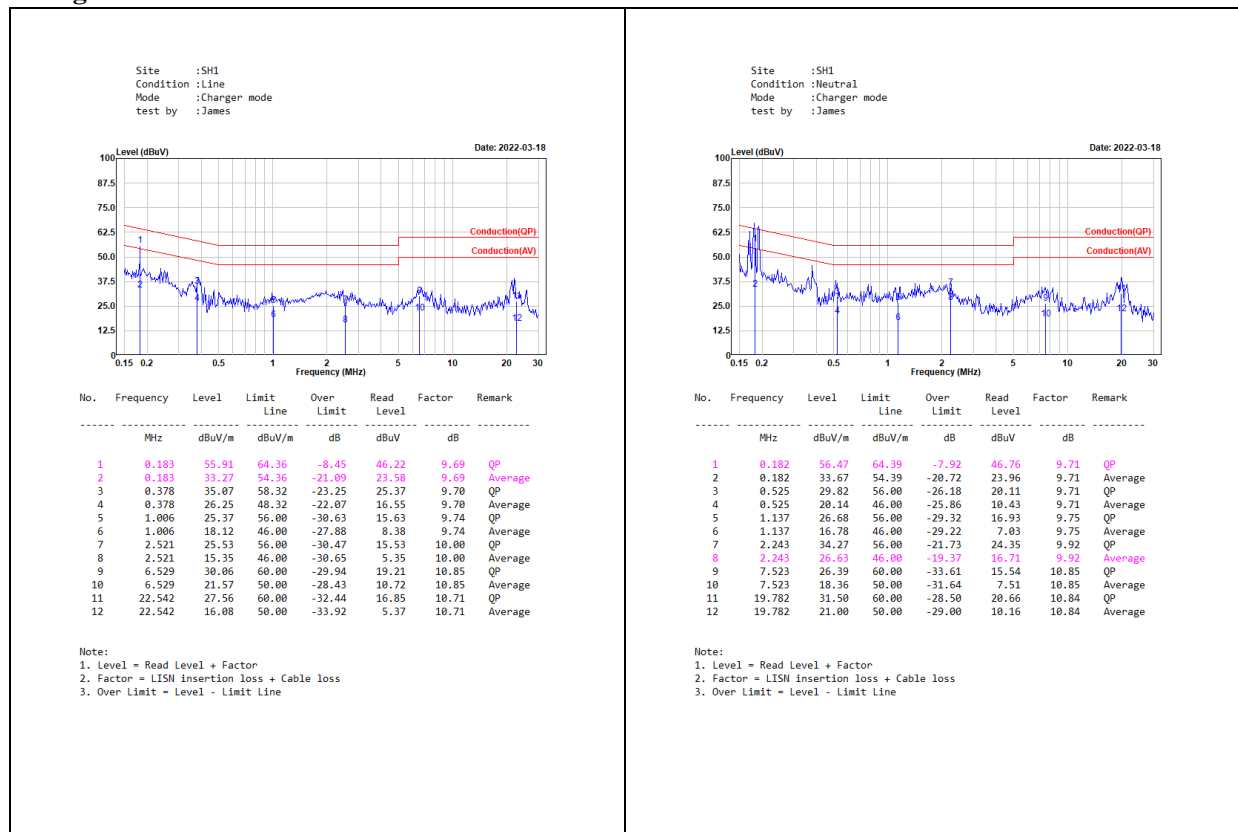
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

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

2.4. Test Result of Conducted Emission



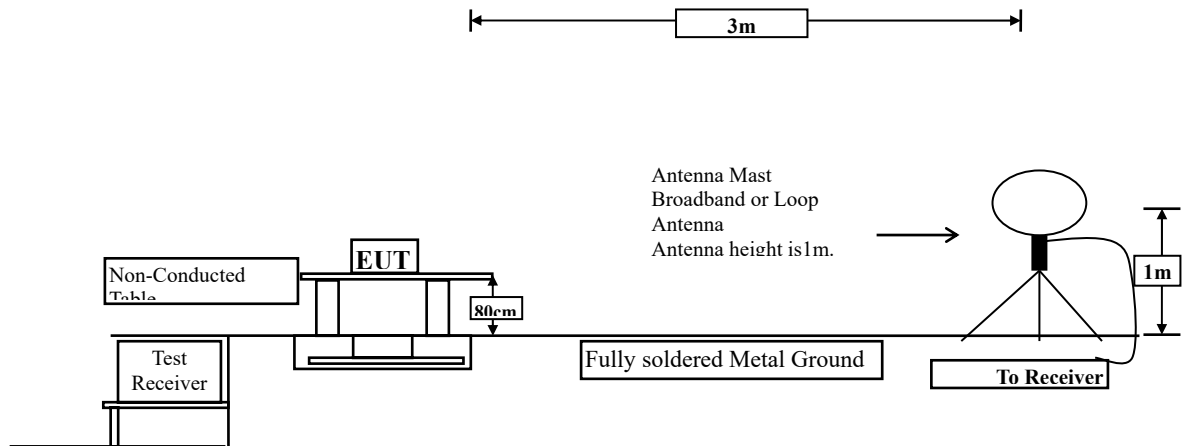
Charge Mode



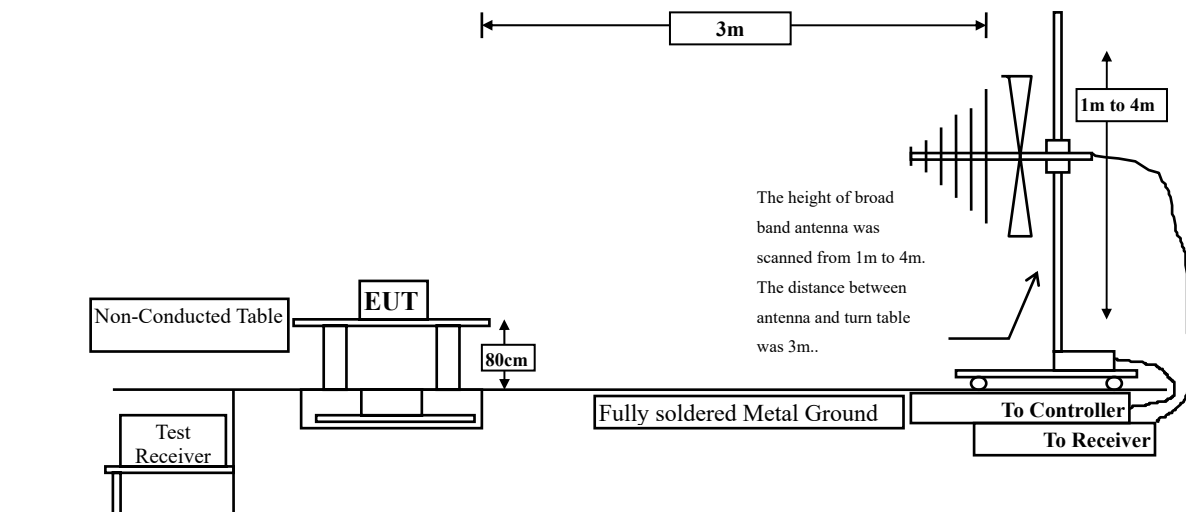
3. Radiated Emission

3.1. Test Setup

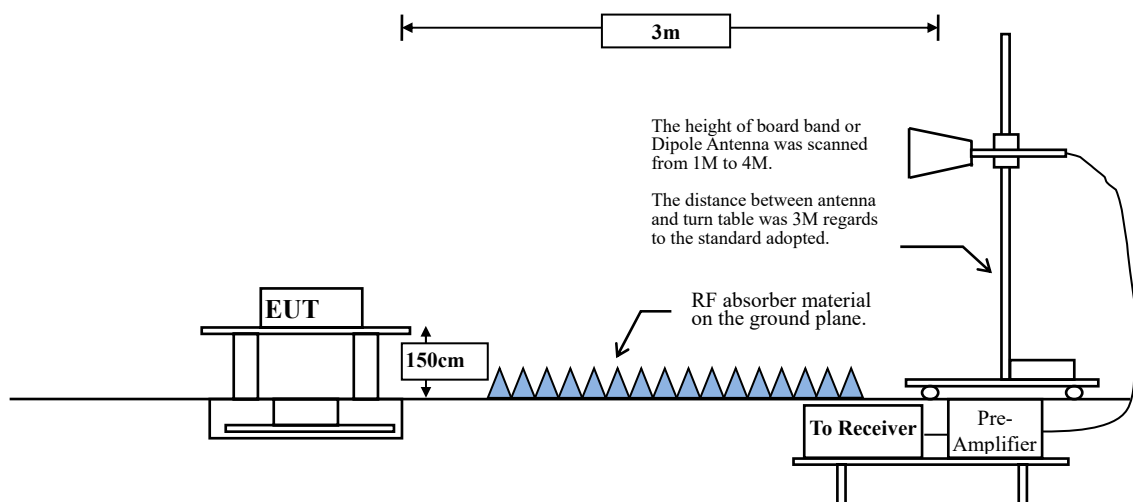
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dBμV /m @3m)	(uV/m @3m)	(dBμV /m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54
24000-24250	250	108	2500	68

Remarks : 1. RF Voltage (dBμV /m) = 20 log RF Voltage (uV/m)
 2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB 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(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.249 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 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 is scanned between 1 meter and 4 meters to find out the maximum emission level.

This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

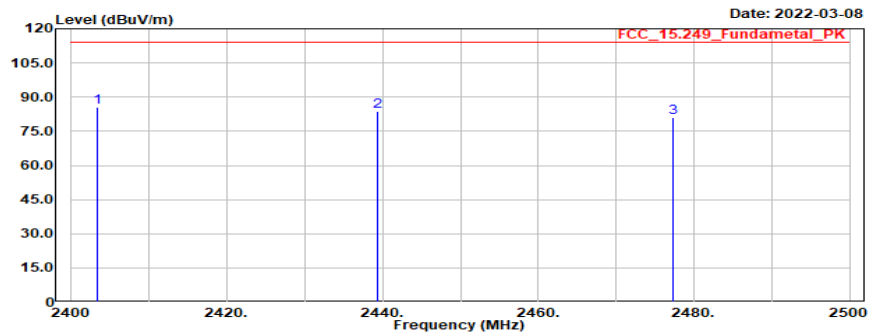
The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

3.4. Test Result of Radiated Emission

Site :966-3
 Condition :3m ,Horizontal
 Mode :TX_Fundamental_X
 Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
			dBuV/m	dB	dBuV	dB	
1	2403.350	85.63	113.97	-28.34	72.65	12.98	Peak
2	2439.350	83.88	113.97	-30.09	70.85	13.03	Peak
3	2477.350	81.23	113.97	-32.74	68.16	13.07	Peak

Note:

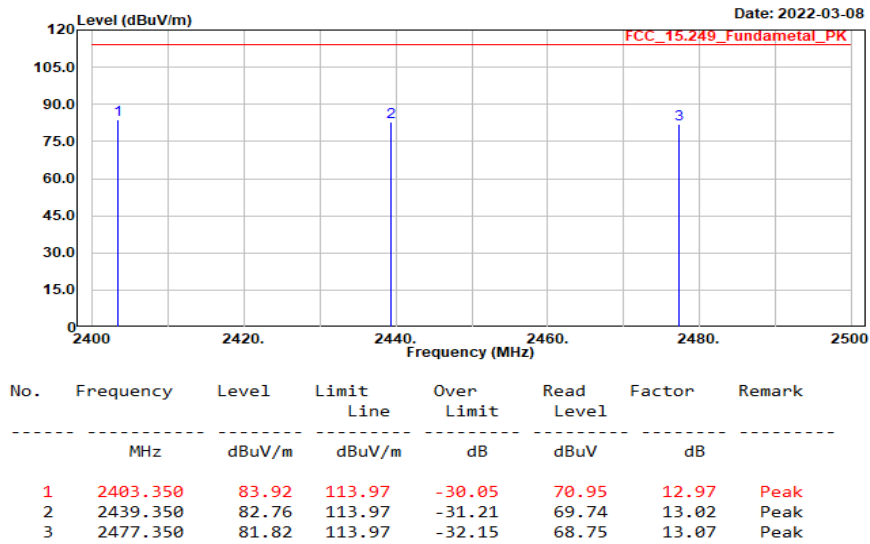
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2403.350	85.630	-32.980	52.650	-41.320	94.000
2439.350	83.880	-32.980	50.900	-43.070	94.000
2477.350	81.230	-32.980	48.250	-45.720	94.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Site :966-3
 Condition :3m ,Vertical
 Mode :TX_Fundamental_X
 Test BY :Jing Chang



Note:

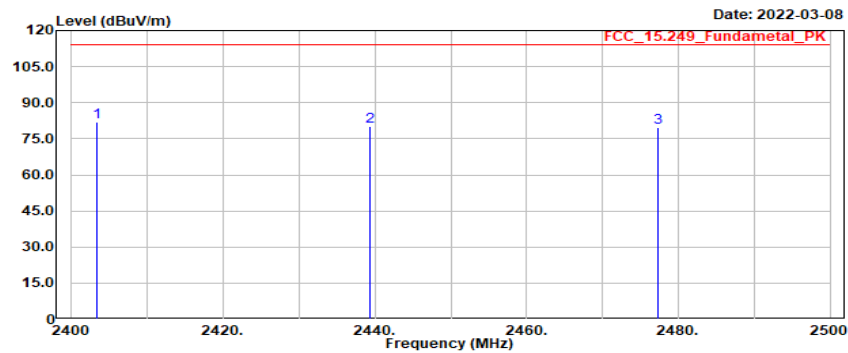
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2403.350	83.920	-32.980	50.940	-43.030	94.000
2439.350	82.760	-32.980	49.780	-44.190	94.000
2477.350	81.820	-32.980	48.840	-45.130	94.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Site :966-3
 Condition :3m ,Horizontal
 Mode :TX_Fundamental_Y
 Test BY :Jing Chang



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2403.350	82.17	113.97	-31.80	69.19	12.98	Peak
2	2439.350	80.36	113.97	-33.61	67.33	13.03	Peak
3	2477.350	79.77	113.97	-34.20	66.70	13.07	Peak

Note:

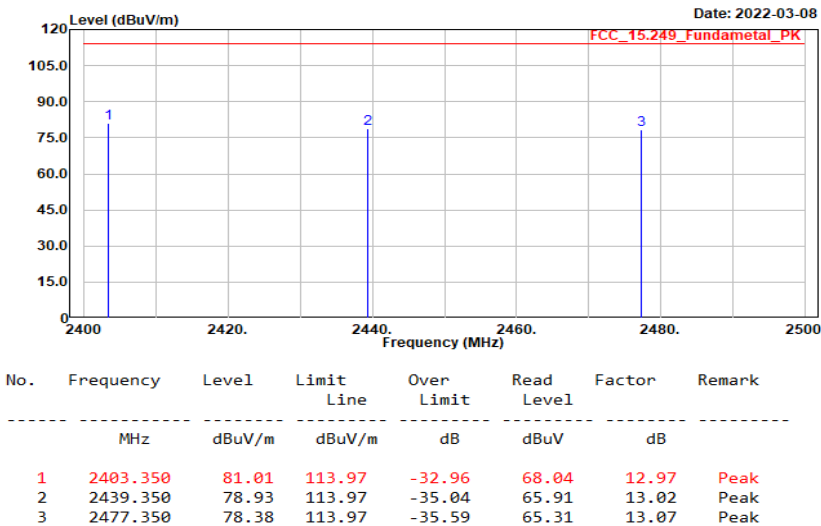
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2403.350	82.170	-32.980	49.190	-44.780	94.000
2439.350	80.360	-32.980	47.380	-46.590	94.000
2477.350	79.770	-32.980	46.790	-47.180	94.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Site :966-3
Condition :3m ,Vertical
Mode :TX_Fundamental_Y
Test BY :Jing Chang

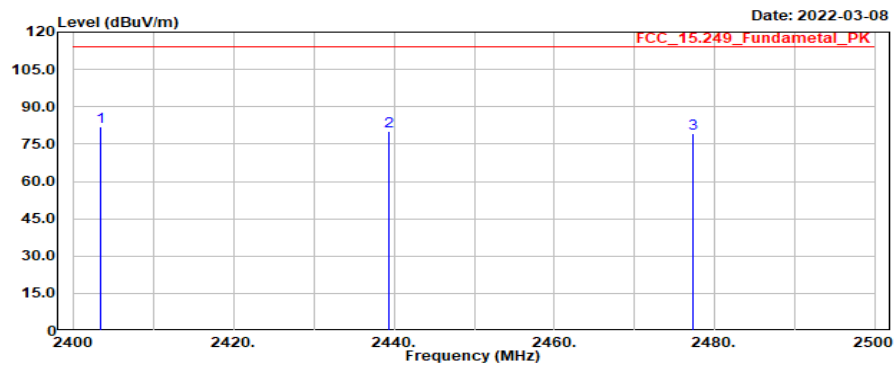


Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2403.350	81.010	-32.980	48.030	-45.940	94.000
2439.350	78.930	-32.980	45.950	-48.020	94.000
2477.350	78.380	-32.980	45.400	-48.570	94.000

Note:
1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Site :966-3
 Condition :3m ,Horizontal
 Mode :TX_Fundamental_Z
 Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
			dBuV/m	dB	dBuV	dB	
1	2403.350	81.75	113.97	-32.22	68.77	12.98	Peak
2	2439.350	80.08	113.97	-33.89	67.05	13.03	Peak
3	2477.350	79.11	113.97	-34.86	66.04	13.07	Peak

Note:

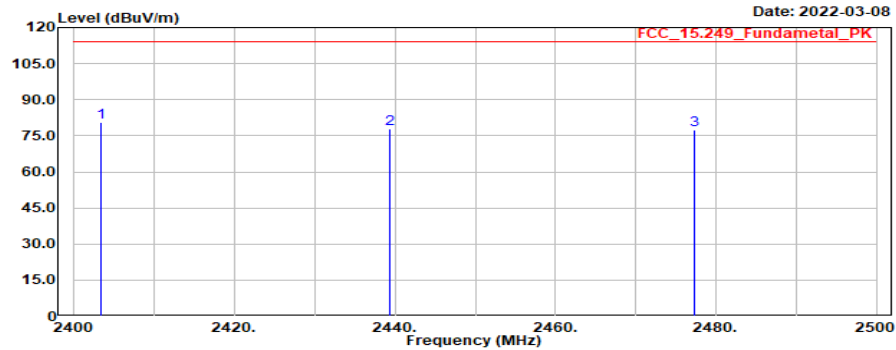
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2403.350	81.750	-32.980	48.770	-45.200	94.000
2439.350	80.080	-32.980	47.100	-46.870	94.000
2477.350	79.110	-32.980	46.130	-47.840	94.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Site :966-3
 Condition :3m ,Vertical
 Mode :TX_Fundamental_Z
 Test BY :Jing Chang



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2403.350	80.46	113.97	-33.51	67.49	12.97	Peak
2	2439.350	77.69	113.97	-36.28	64.67	13.02	Peak
3	2477.350	77.43	113.97	-36.54	64.36	13.07	Peak

Note:

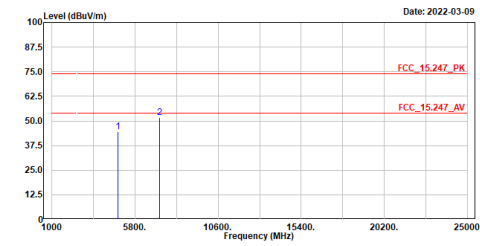
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2403.350	80.460	-32.980	47.480	-46.490	94.000
2439.350	77.690	-32.980	44.710	-49.260	94.000
2477.350	77.430	-32.980	44.450	-49.520	94.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

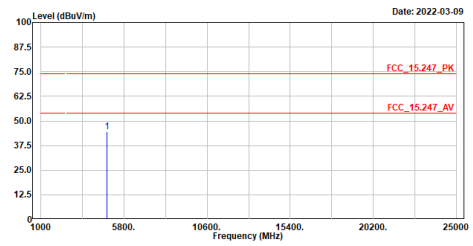
Site :966-3
Condition :3m ,HORIZONTAL
Mode :TX_2403.35MHz
Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
			dBuV/m	dB	dBuV	dB	
1	4806.700	44.70	74.00	-29.30	43.80	0.90	Peak
2	7210.050	51.86	74.00	-22.14	47.93	3.93	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

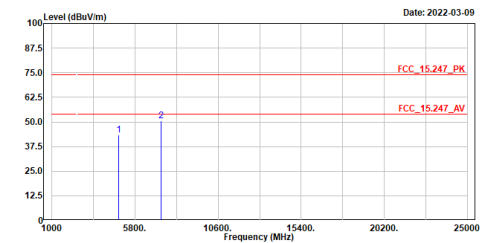
Site :966-3
Condition :3m ,VERTICAL
Mode :TX_2403.35MHz
Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
			dBuV/m	dB	dBuV	dB	
1	4806.700	44.35	74.00	-29.65	43.45	0.90	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

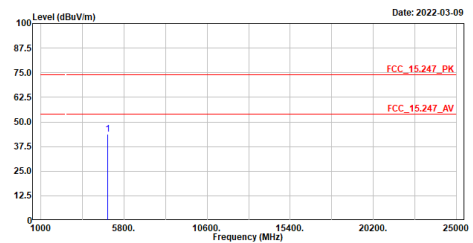
Site :966-3
Condition :3m ,HORIZONTAL
Mode :TX_2439.35MHz
Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
			dBuV/m	dB	dBuV	dB	
1	4878.700	43.22	74.00	-30.78	42.32	0.90	Peak
2	7318.050	50.64	74.00	-23.36	46.68	3.96	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

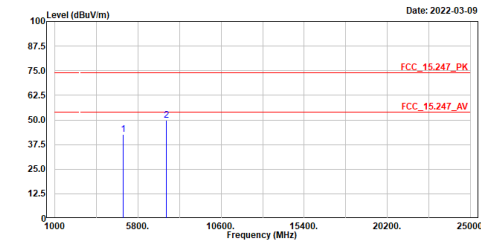
Site :966-3
Condition :3m ,VERTICAL
Mode :TX_2439.35MHz
Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
			dBuV/m	dB	dBuV	dB	
1	4878.700	43.86	74.00	-30.14	42.96	0.90	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-3
Condition :3m ,HORIZONTAL
Mode :TX_2477.35MHz
Test BY :Jing Chang

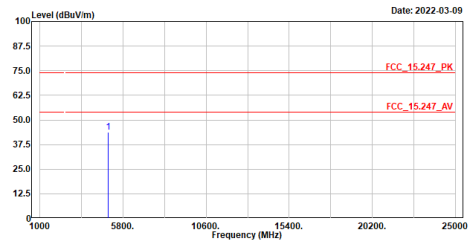


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	4954.700	42.83	74.00	-31.17	41.78	1.05	Peak
2	7432.050	49.98	74.00	-24.02	45.91	4.07	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-3
Condition :3m ,VERTICAL
Mode :TX_2477.35MHz
Test BY :Jing Chang

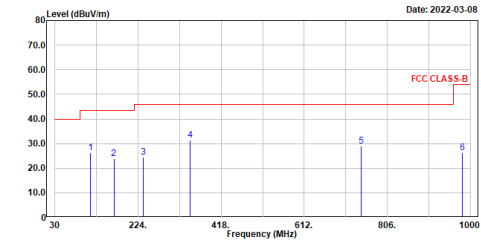


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	4954.700	43.64	74.00	-30.36	42.59	1.05	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-3
Condition :3m ,HORIZONTAL
Mode :TX_2439.35MHz
Test BY :Jing Chang

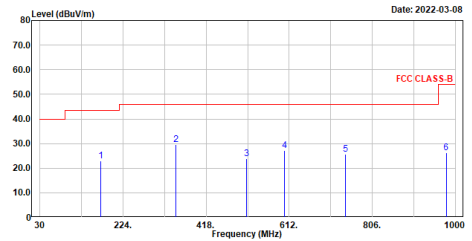


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	113.420	26.28	43.50	-17.22	53.13	-26.85	QP
2	167.740	23.83	43.50	-19.67	47.97	-24.14	QP
3	235.640	24.32	46.00	-21.68	49.84	-25.52	QP
4	346.220	31.33	46.00	-14.67	53.55	-22.22	QP
5	744.890	28.84	46.00	-17.16	42.54	-13.70	QP
6	981.570	26.36	54.00	-27.64	37.61	-11.25	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.

Site :966-3
Condition :3m ,VERTICAL
Mode :TX_2439.35MHz
Test BY :Jing Chang



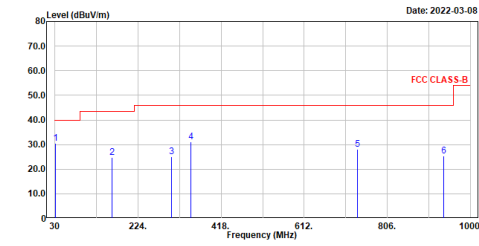
No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	171.620	22.95	43.50	-20.55	47.31	-24.36	QP
2	347.190	29.71	46.00	-16.29	51.93	-22.22	QP
3	513.060	23.99	46.00	-22.01	42.06	-18.07	QP
4	600.360	27.27	46.00	-18.73	43.13	-15.86	QP
5	742.950	25.53	46.00	-20.47	39.31	-13.78	QP
6	978.660	26.39	54.00	-27.61	37.64	-11.25	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.

Charge Mode

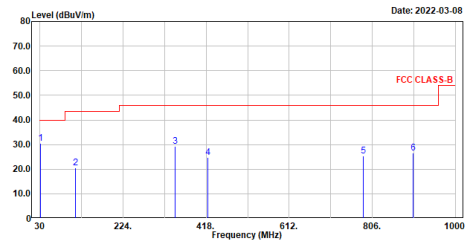
Site :966-3
Condition :3m ,HORIZONTAL
Mode :Charge
Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	31.940	30.52	40.00	-9.48	55.65	-25.13	QP
2	163.860	24.77	43.50	-18.73	48.67	-23.90	QP
3	302.570	24.94	46.00	-21.06	48.30	-23.36	QP
4	348.160	31.24	46.00	-14.76	53.45	-22.21	QP
5	737.130	28.02	46.00	-17.98	41.92	-13.90	QP
6	937.920	25.48	46.00	-20.52	37.22	-11.74	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.

Site :966-3
Condition :3m ,VERTICAL
Mode :Charge
Test BY :Jing Chang



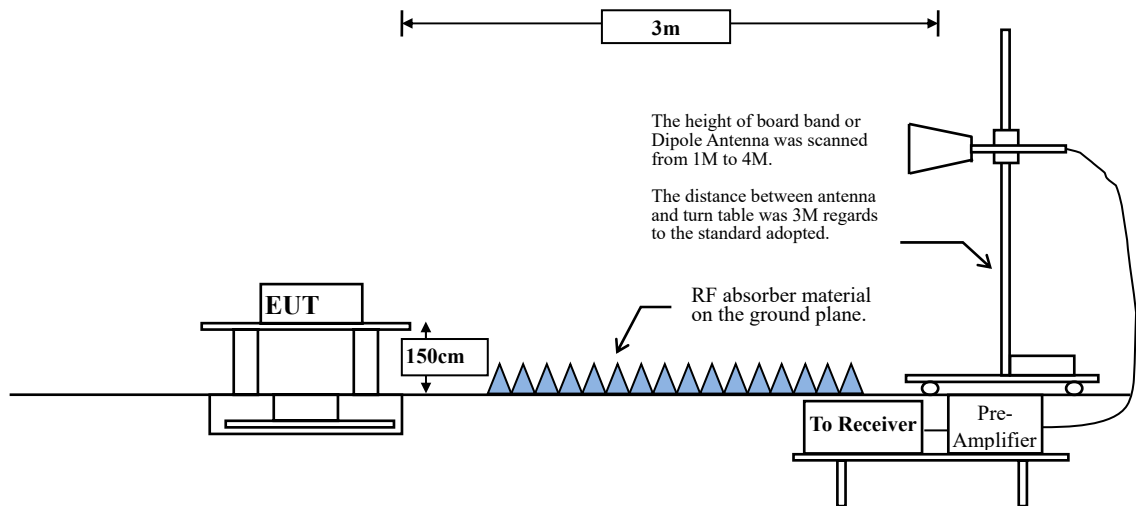
No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	31.940	30.56	40.00	-9.44	55.69	-25.13	QP
2	113.420	20.62	43.50	-22.88	47.47	-26.85	QP
3	346.220	29.19	46.00	-16.81	51.41	-22.22	QP
4	422.850	24.65	46.00	-21.35	44.95	-20.30	QP
5	784.660	25.22	46.00	-20.78	38.53	-13.31	QP
6	901.060	26.42	46.00	-19.58	38.53	-12.11	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.

4. Band Edge

4.1. Test Setup

RF Radiated Measurement:



4.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB 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(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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

4.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 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.

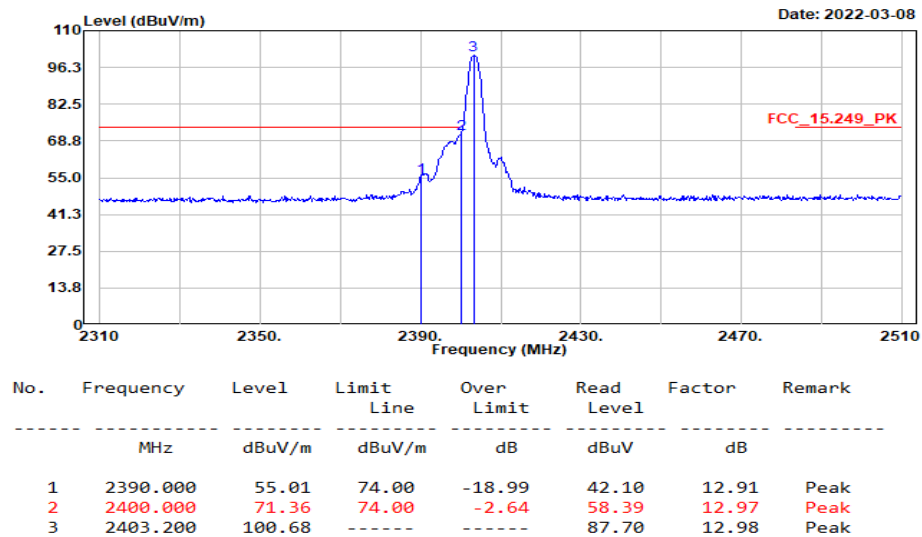
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

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 bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

4.4. Test Result of Band Edge

Site :966-3
 Condition :3m ,Horizontal
 Mode :TX_2403.35MHz
 Test BY :Jing Chang



Note:

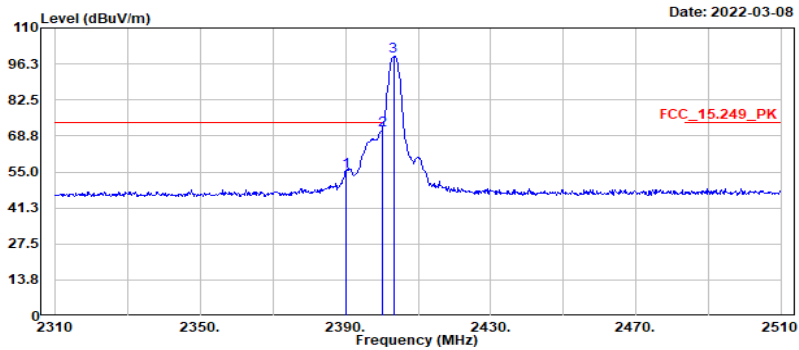
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)	Result
2390.000	55.010	-32.980	22.030	-31.970	54.000	Pass
2400.000	71.360	-32.980	38.380	-15.620	54.000	Pass
2403.200	100.680	-32.980	67.700	--	--	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 5.

Site :966-3
 Condition :3m ,Vertical
 Mode :TX_2403.35MHz
 Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	Limit	Level	dB	
1	2390.000	55.01	74.00	-18.99	42.10	12.91	Peak
2	2400.000	71.04	74.00	-2.96	58.07	12.97	Peak
3	2403.200	99.02	-----	-----	86.04	12.98	Peak

Note:

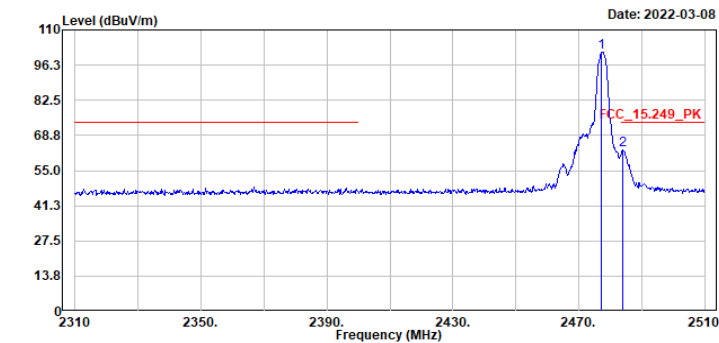
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)	Result
2390.000	55.010	-32.980	22.030	-31.970	54.000	Pass
2400.000	71.040	-32.980	38.060	-15.940	54.000	Pass
2403.200	99.020	-32.980	66.040	--	--	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 5.

Site :966-3
Condition :3m ,Horizontal
Mode :TX_2477.35MHz
Test BY :Jing Chang



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
			dBuV/m	dB	dBuV	dB	
1	2477.200	101.19	-----	-----	88.12	13.07	Peak
2	2484.000	62.97	74.00	-11.03	49.89	13.08	Peak

Note:

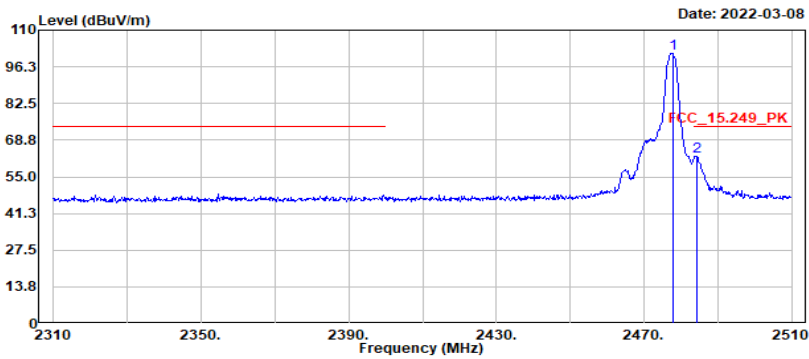
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)	Result
2477.200	101.190	-32.980	68.210	--	--	Pass
2484.000	62.970	-32.980	29.990	-24.010	54.000	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 5.

Site :966-3
 Condition :3m ,Vertical
 Mode :TX_2477.35MHz
 Test BY :Jing Chang



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2477.800	101.11	-----	-----	88.04	13.07	Peak
2	2484.200	62.81	74.00	-11.19	49.73	13.08	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

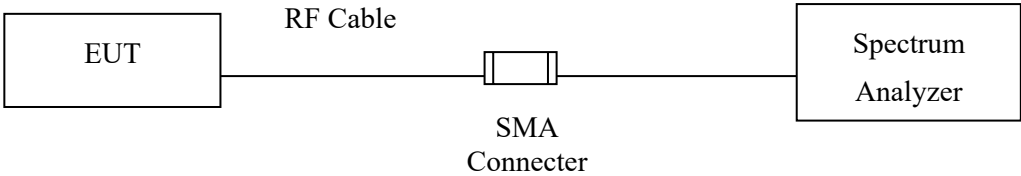
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)	Result
2477.800	101.110	-32.980	68.130	--	--	Pass
2484.200	62.810	-32.980	29.830	-24.170	54.000	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 5.

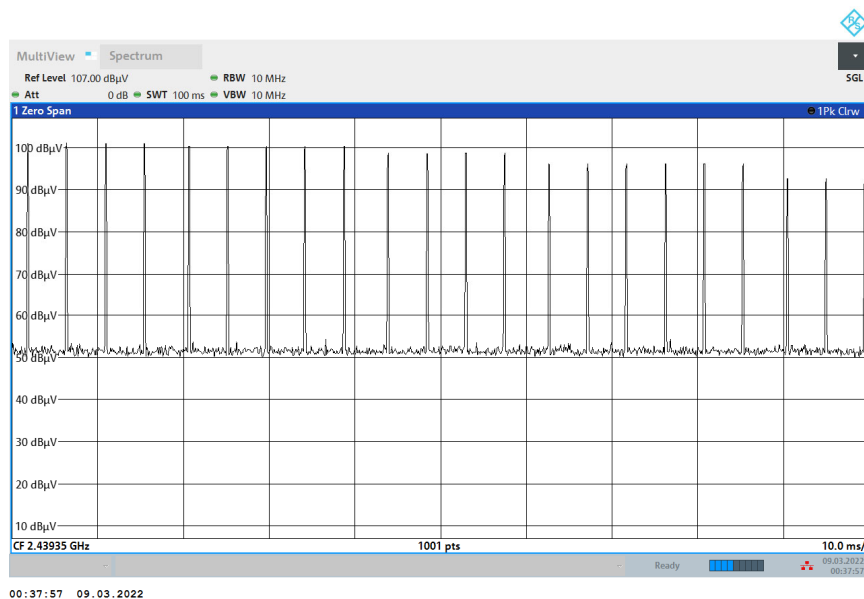
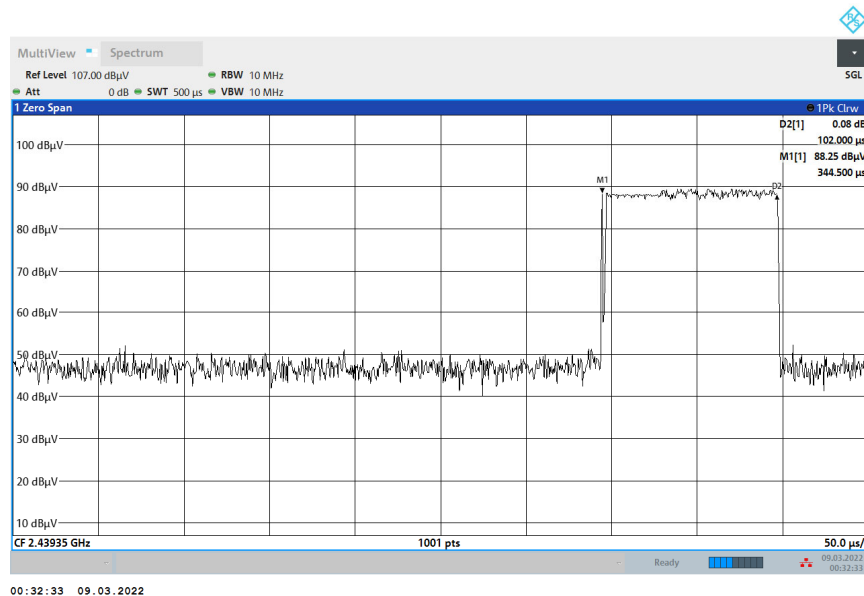
5. Duty Cycle

5.1. Test Setup



5.2. Test Result of Duty Cycle

Product : Wireless Headset
 Test Item : Duty Cycle Data
 Test Mode : Mode 3: Normal Mode



Time on of 100ms= $102\mu s \times 22 = 2.244\text{ms}$

Duty Cycle= $2.244\text{ms} / 100\text{ms} = 0.02244$

Duty Cycle correction factor= $20 \text{ LOG } 0.02244 = -32.98 \text{ dB}$

Duty Cycle correction factor	-32.98 dB
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6. EMI Reduction Method During Compliance Testing

No modification was made during testing.