FCC Test Report

Product Name	:	peplink PEPWAVE Wireless Product
Brand Name	:	PEPWAVE / peplink
Model No.	:	MAX Transit Pro E, MAX-TST-PROE-DUO-LTEA-Q-T-PRM
FCC ID	:	U8G-P1AX09
Applicant	:	PISMO LABS TECHNOLOGY LIMITED
Address	:	A8, 5/F, HK Spinners Industrial Building, Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Hong Kong
Date of Receipt	:	Jul. 06, 2022
Issued Date	:	Sep. 26, 2022
Report No.	:	2270145R-RFUSWL2V01-A
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.
The test report shall not be reproduced except in full without the written approval of DEKRA Testing and Certification Co., Ltd.

Product Name	:	peplink PEPWAVE Wireless Product
Applicant	:	PISMO LABS TECHNOLOGY LIMITED
Address	:	A8, 5/F, HK Spinners Industrial Building, Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Hong Kong
Manufacturer	:	PISMO LABS TECHNOLOGY LIMITED
Address	:	A8, 5/F, HK Spinners Industrial Building, Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Hong Kong
Brand Name	:	PEPWAVE / peplink
Model No.	:	MAX Transit Pro E, MAX-TST-PROE-DUO-LTEA-Q-T-PRM
FCC ID	:	U8G-P1AX09
EUT Voltage	:	DC 12V for power port (adapter) DC 12~56V for terminal block port
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 : Hailey Peng

(Hailey Peng / Senior Engineer)

Approved By : Rueyyan.Lin

(Rueyyan Lin / Supervisor)

The test results relate only to the samples tested.

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Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Sep. 26, 2022

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1. General Information

1.1. EUT Description

Product Name	peplink PEPWAVE Wireless Product	
Brand Name	PEPWAVE / peplink	
Model No.	MAX Transit Pro E, MAX-TST-PROE-DUO-LTEA-Q-T-PRM	
Frequency Range / Channel Number	IEEE 802.11b/g	2412 ~ 2462 MHz / 11 Channels
	IEEE 802.11n/ac/ax (20 MHz)	2412 ~ 2462 MHz / 11 Channels
	IEEE 802.11n/ac/ax (40 MHz)	2422 ~ 2452 MHz / 7 Channels
Type of Modulation	IEEE 802.11b	DSSS
	IEEE 802.11g/n/ac	OFDM
	IEEE 802.11ax	OFDMA
Data Rate	IEEE 802.11b	1, 2, 5.5, 11 Mbps
	IEEE 802.11g	6, 9, 12, 18, 24, 36, 48, 54 Mbps
	IEEE 802.11n	Support a subset of the combination of GI, MCS 0 ~ MCS 15 and bandwidth defined in 802.11n
	IEEE 802.11ac	Support a subset of the combination of GI, MCS 0 ~ MCS 9 and bandwidth defined in 802.11ac
	IEEE 802.11ax	Support a subset of the combination of GI, MCS 0 ~ MCS 11 and bandwidth defined in 802.11ax

Accessories Information				
No.	Equipment Name	Brand Name	Model No.	Rating
1	Adapter	DVE	DSA-24PFS-12 FUS 120200	INPUT: 100~240Vac, 50/60Hz, 0.8A OUTPUT: +12.0Vdc, 2.0A, 24.0W

The brand name/model number in the following table are all refer to the identical product.

Brand Name	Description
PEPWAVE	There is nothing different of two models, just for different marketing use.
peplink	
Model No.	
MAX Transit Pro E	
MAX-TST-PROE-DUO-LTEA-Q-T-PRM	

From the above models, model: MAX Transit Pro E was selected as representative model for the test and its data was recorded in this report.

Antenna Information				
Ant.	Brand Name	Model No.	Type	Antenna Gain (dBi)
0	Master Wave	98614PRSX000	Omni-directional	2.44
1	Master Wave	98614PRSX000	Omni-directional	2.44

For IEEE 802.11b/g/n/ac/ax Mode: (2TX, 2RX)

All of the antenna No. can be used as transmitting/receiving antennas, and them can transmit/receive signal simultaneously.

EUT Operational Condition		
Testing Voltage	Power by adapter	AC 120V/60Hz
	Power by DC-Powered	DC 12V

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

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 (40 MHz)

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. Regards to the frequency band operation; the lowest、middle and highest frequency of channel were selected to perform the test, and then shown on this report.
2. The above EUT information is declared by the manufacturer.

1.2. Test Mode

DEKRA has verified the construction and function in typical operation. The preliminary tests were performed in different data rate, and to find the worst condition, which was shown in this test report. The following table is the final test mode.

Test Mode	Mode 1: Transmit

Test Items	Test Mode	Modulation	Channel	Antenna	Result
AC Power Line Conducted Emission	Mode 1	11g	1	0+1	Pass
Maximum Conducted Output Power	Mode 1	11b	1/6/11	0+1	Pass
		11g	1/6/11	0+1	Pass
		11n (20 MHz)	1/6/11	0+1	Pass
		11ac (20 MHz)	1/6/11	0+1	Pass
		11ax (20 MHz)	1/6/11	0+1	Pass
		11n (40 MHz)	3/6/9	0+1	Pass
		11ac (40 MHz)	3/6/9	0+1	Pass
		11ax (40 MHz)	3/6/9	0+1	Pass
Radiated Emission Below 1 GHz	Mode 1	11g	1	0+1	Pass
Radiated Emission Above 1 GHz	Mode 1	11b	1/6/11	0+1	Pass
		11g	1/6/11	0+1	Pass
		11ax (20 MHz)	1/6/11	0+1	Pass
		11ax (40 MHz)	3/6/9	0+1	Pass
Antenna Port Conducted Emission	Mode 1	11b	1/6/11	0+1	Pass
		11g	1/6/11	0+1	Pass
		11ax (20 MHz)	1/6/11	0+1	Pass
		11ax (40 MHz)	3/6/9	0+1	Pass
Radiated Emission Band Edge	Mode 1	11b	1/6/11	0+1	Pass
		11g	1/6/11	0+1	Pass
		11ax (20 MHz)	1/6/11	0+1	Pass
		11ax (40 MHz)	3/6/9	0+1	Pass
Occupied Bandwidth & DTS Bandwidth	Mode 1	11b	1/6/11	0+1	Pass
		11g	1/6/11	0+1	Pass
		11ax (20 MHz)	1/6/11	0+1	Pass
		11ax (40 MHz)	3/6/9	0+1	Pass
Maximum Power Spectral Density	Mode 1	11b	1/6/11	0+1	Pass
		11g	1/6/11	0+1	Pass
		11ax (20 MHz)	1/6/11	0+1	Pass
		11ax (40 MHz)	3/6/9	0+1	Pass

Note:

1. Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. The worst case of data rate for 802.11b is 1 Mbps, for 802.11g is 6 Mbps, for 802.11ax (20 MHz)/802.11ax (40 MHz) are MCS 0, Nss1.

3. The modulation and bandwidth are similar for 802.11n mode for HT20/HT40, 802.11ac mode for VHT20/VHT40 and 802.11ax mode for HE20/HE40, therefore investigated worst case to representative mode in test report. (Please refer to the test result of RF output power for detail.)
4. There are two modes of EUT, one is power by adapter, and the other is power by DC-Powered.
   (1) For radiated emission below 1 GHz test: Both power by adapter, and power by DC-Powered were to test and record in this test report.
   (2) For AC power line conducted emission test: The power by adapter was to test and record in this test report, and the power by DC-Powered is not necessary to apply to AC power line conducted emission test.
   (3) For other test: Power by adapter generated the worst test result for radiated emission below 1 GHz test, thus the measurement for other test will follow this same test configuration.
5. For radiated emission below 1 GHz and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
6. The EUT could be applied with 1. WiFi 2.4 GHz function + WiFi 5 GHz function + WWAN WCDMA function and 2. WiFi 2.4 GHz function + WiFi 5 GHz function + WWAN LTE function; therefore Co-location Maximum Permissible Exposure (Please refer to DEKRA Report No.: 2270145R-RFUSMPEV02-A) and Radiated Emission Co-location (Please refer to Appendix A) tests are added for simultaneously transmit with 1. WiFi 2.4 GHz function + WiFi 5 GHz function + WWAN WCDMA function and 2. WiFi 2.4 GHz function + WiFi 5 GHz function + WWAN LTE function.
7. The EUT contains two of the same WWAN modules (brand name: Telit, model: LN920A12-WW, FCC ID: RI7LN920).

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.

<Power by adapter>

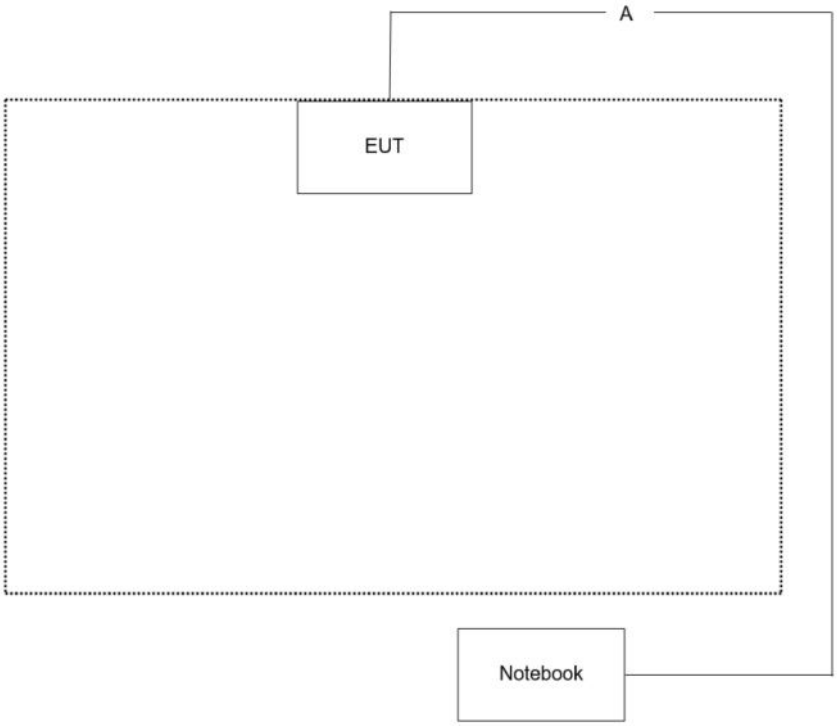
	Product	Manufacturer	Model No.	Serial No.
1	Notebook	Lenovo	Ideapad 110 15IBR	PF0MEEB0

<Power by DC-Powered>

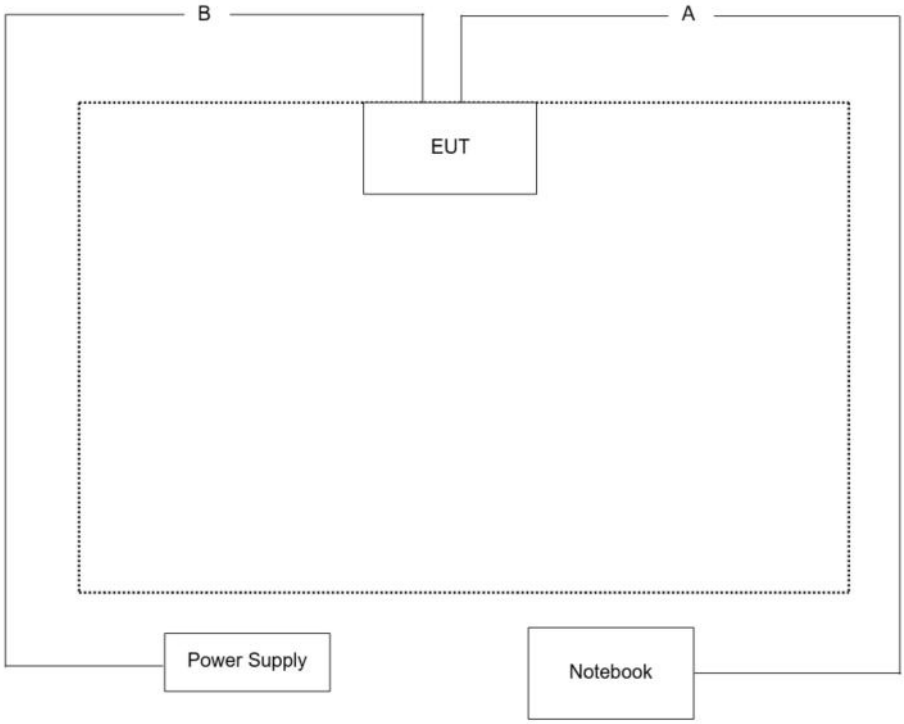
	Product	Manufacturer	Model No.	Serial No.
1	Notebook	Lenovo	Ideapad 110 15IBR	PF0MEEB0
2	Power Supply	Topward	6303D	8095908

1.5. Configuration of Tested System

Connection Diagram - Power by adapter



	Signal Cable Type	Signal cable Description
A	Ethernet Cable	Non-Shielded, 10m

Connection Diagram - Power by DC-Powered


Signal Cable Type		Signal cable Description
A	Ethernet Cable*1	Non-Shielded, 10m
B	DC Cable*2	Non-Shielded, 10m

1.6. EUT Operation of during Test

1	Execute control command by software “QSPR v5.0-00197”.
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)	AC Power Line Conducted Emission	24.1	Ling Chen	2022/08/11	HC-SR02
Humidity (%RH)		66			
Temperature (°C)	Maximum Conducted Output Power	21 ~ 25.6	Scott Chang Clemens Fang	2022/07/20 ~ 2022/08/03	HC-SR12
Humidity (%RH)		61			
Temperature (°C)	Radiated Emission	22 ~ 24	Cyril Chen	2022/07/28 ~ 2022/08/10	HC-CB04
Humidity (%RH)		59 ~ 61			
Temperature (°C)	Antenna Port Conducted Emission	21	Clemens Fang	2022/08/03	HC-SR12
Humidity (%RH)		67			
Temperature (°C)	Radiated Emission Band Edge	24	Cyril Chen	2022/07/28	HC-CB04
Humidity (%RH)		61			
Temperature (°C)	Occupied Bandwidth & DTS Bandwidth	21	Clemens Fang	2022/08/03	HC-SR12
Humidity (%RH)		67			
Temperature (°C)	Maximum Power Spectral Density	21	Clemens Fang	2022/08/03	HC-SR12
Humidity (%RH)		67			

Note: Test site information refers to 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
E mail 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, SR10-H and HC-SR12.	

1.8. List of Test Equipment

HC-SR02

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2021/12/27	2022/12/26
EMI Test Receiver	R&S	ESR3	102608	2022/05/30	2023/05/29
LISN	R&S	ENV216	100092	2022/04/29	2023/04/28
Coaxial Cable(9m)	Harbour	RG-400	HC-SR02	2021/08/15	2022/08/14
DEKRA Testing System	DEKRA	Version 2.0	HC-SR02	N/A	N/A

HC-SR12

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2021/11/12	2022/11/11
Pulse Power Sensor	Anritsu	MA2411B	1531043	2021/11/12	2022/11/11
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2022/01/07	2023/01/06
Pulse Power Sensor	Anritsu	MA2411B	1531044	2021/11/12	2022/11/11
Signal and Spectrum Analyzer	R&S	FSVA40	101435	2022/05/30	2023/05/29

HC-CB04

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2021/10/22	2022/10/21
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2022/01/07	2023/01/06
Trilog Broadband Antenna	Schwarzbeck	VULB 9168	1209	2022/06/14	2023/06/13
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	2021/12/24	2022/12/23
EMI Test Receiver	R&S	ESR7	102260	2021/12/22	2022/12/21
Magnetic Loop Antenna	Teseq	HLA 6121	44287	2021/09/06	2022/09/05
Coaxial Cable(10m)	Suhner	SF102_SF104	HC-CB04	2021/08/09	2022/08/08
Coaxial Cable(10m)	Suhner	SF102_SF104	HC-CB04	2022/08/08	2023/08/07
Coaxial Cable(3m)	Suhner,Rosnol	SF102_Rosnol	HC-CB04_1	2021/08/17	2022/08/16
Radiated Software	AUDIX	e3 V9	HC-CB04_1	N/A	N/A

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

1.9. Measurement Uncertainty

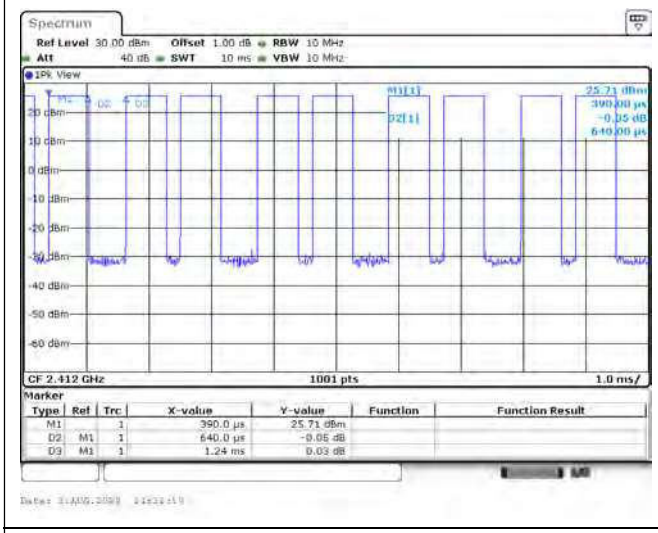
Uncertainties have been calculated according to the DEKRA internal document with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2).

Test Item	Uncertainty
AC Power Line Conducted Emission	± 2.10 dB
Maximum Conducted Output Power	± 1.16 dB
Radiated Emission	± 3.25 dB below 1 GHz ± 3.32 dB above 1 GHz
Antenna Port Conducted Emission	± 1.60 dB
Radiated Emission Band Edge	± 3.32 dB above 1GHz
DTS Bandwidth	± 282.55 Hz
Occupied Bandwidth	± 282.55 Hz
Maximum Power Spectral Density	± 1.60 dB

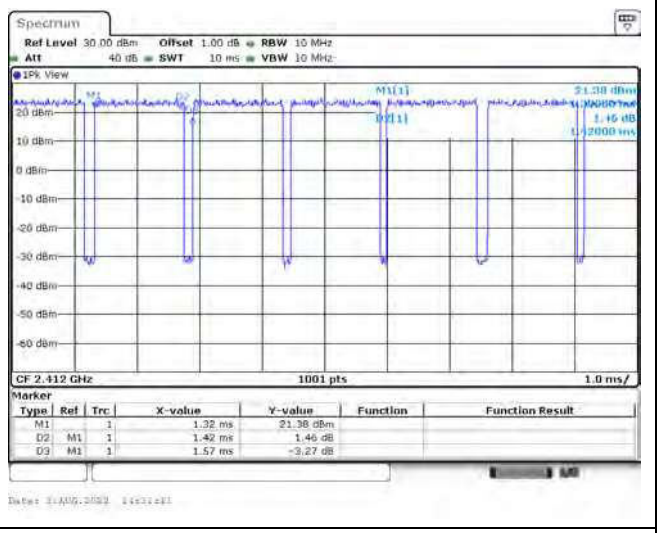
1.10. Duty Cycle

Modulation	On Times (ms)	On+Off Times (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11b	0.640	1.240	51.61	2.872	1.563
802.11g	1.420	1.570	90.45	0.436	0.704
802.11ax (20 MHz)	5.440	5.780	94.12	0.263	0.184
802.11ax (40 MHz)	5.440	5.720	95.10	0.218	0.184

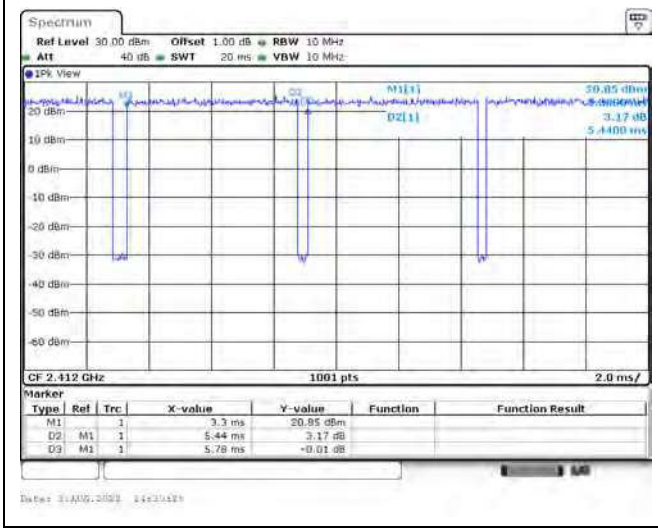
802.11b



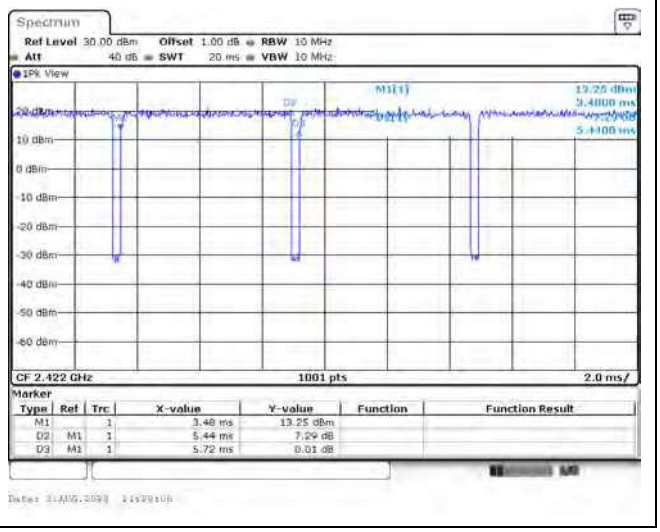
802.11g



802.11ax (20 MHz)

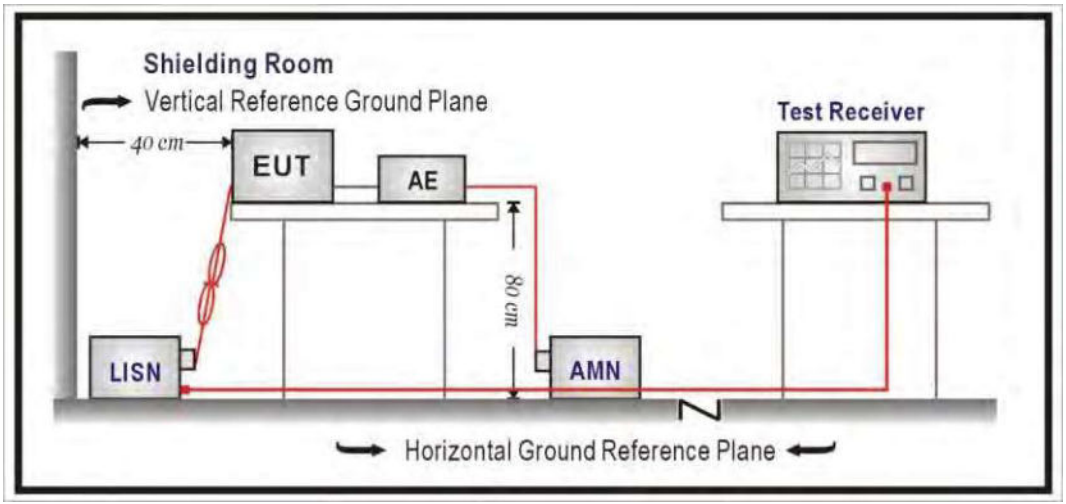


802.11ax (40 MHz)



2. AC Power Line Conducted Emission

2.1. Test Setup



2.2. Test Limit

Frequency (MHz)	QP (dBuV)	AV (dBuV)
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 /50 uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm/50 uH coupling impedance with 50 ohm termination. (Please refer 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 C63.10: 2013 on conducted measurement.

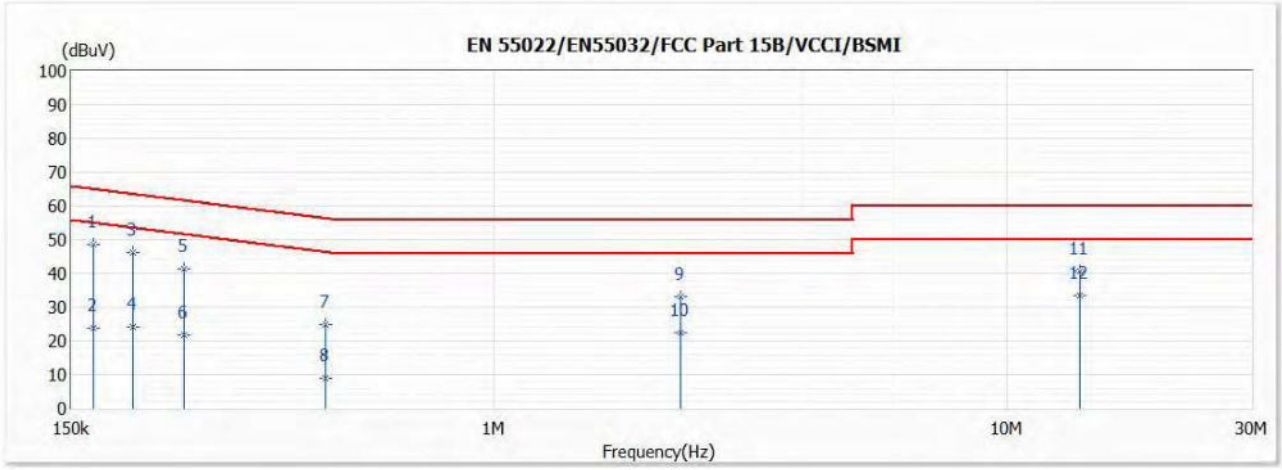
AC Power Line Conducted Emissions were invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz.

2.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

2.5. Test Result of AC Power Line Conducted Emission

Test Condition	802.11g / Ant. 0 + Ant. 1 / 2412 MHz	Phase	Line

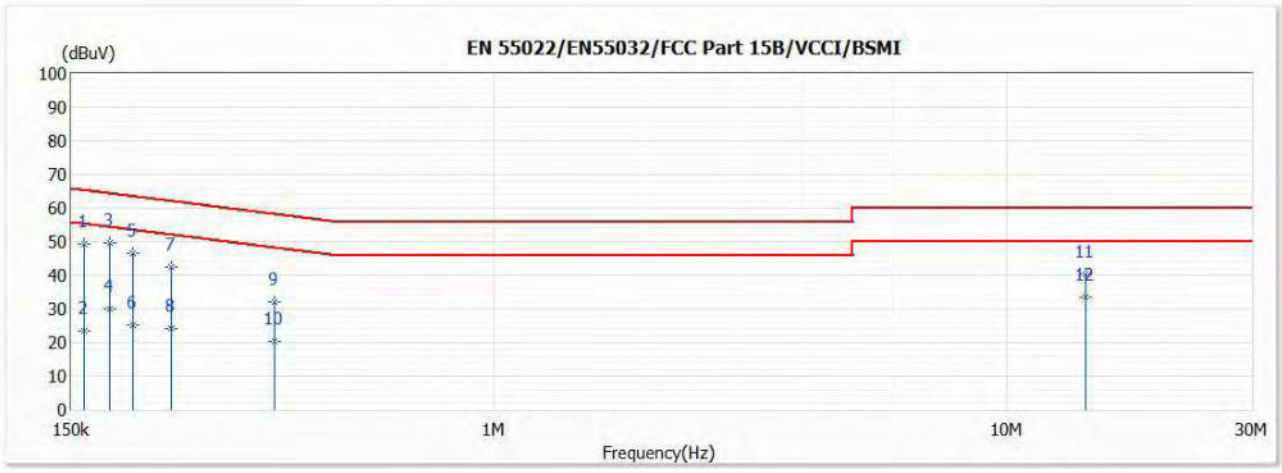


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.166	48.48	65.16	-16.68	38.86	9.62	QP
2	0.166	23.68	55.16	-31.48	14.06	9.62	AV
3	0.198	46.17	63.70	-17.53	36.56	9.61	QP
4	0.198	24.18	53.70	-29.52	14.57	9.61	AV
5	0.249	41.42	61.79	-20.37	31.80	9.62	QP
6	0.249	21.81	51.79	-29.98	12.19	9.62	AV
7	0.470	24.96	56.52	-31.56	15.31	9.65	QP
8	0.470	8.83	46.52	-37.69	-0.82	9.65	AV
9	2.312	33.17	56.00	-22.83	23.41	9.76	QP
10	2.312	22.52	46.00	-23.48	12.76	9.76	AV
11	13.895	40.78	60.00	-19.22	30.58	10.20	QP
*12	13.895	33.50	50.00	-16.50	23.30	10.20	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Test Condition	802.11g / Ant. 0 + Ant. 1 / 2412 MHz	Phase	Neutral



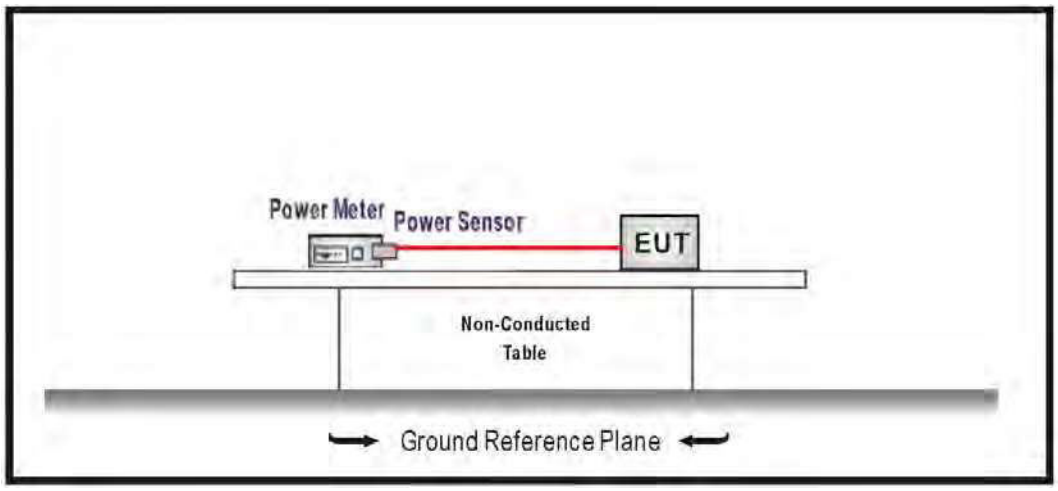
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.159	49.22	65.52	-16.30	39.60	9.62	QP
2	0.159	23.35	55.52	-32.17	13.73	9.62	AV
*3	0.178	49.53	64.56	-15.03	39.92	9.61	QP
4	0.178	29.84	54.56	-24.72	20.23	9.61	AV
5	0.197	46.45	63.72	-17.27	36.84	9.61	QP
6	0.197	25.25	53.72	-28.47	15.64	9.61	AV
7	0.234	42.39	62.29	-19.90	32.77	9.62	QP
8	0.234	24.07	52.29	-28.22	14.45	9.62	AV
9	0.374	31.92	58.42	-26.50	22.29	9.63	QP
10	0.374	20.45	48.42	-27.97	10.82	9.63	AV
11	14.215	40.18	60.00	-19.82	29.87	10.31	QP
12	14.215	33.40	50.00	-16.60	23.09	10.31	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3. Maximum Conducted Output Power

3.1. Test Setup



3.2. Test Limit

The maximum conducted output power shall be less 30 dBm (1 Watt).

3.3. 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.

3.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

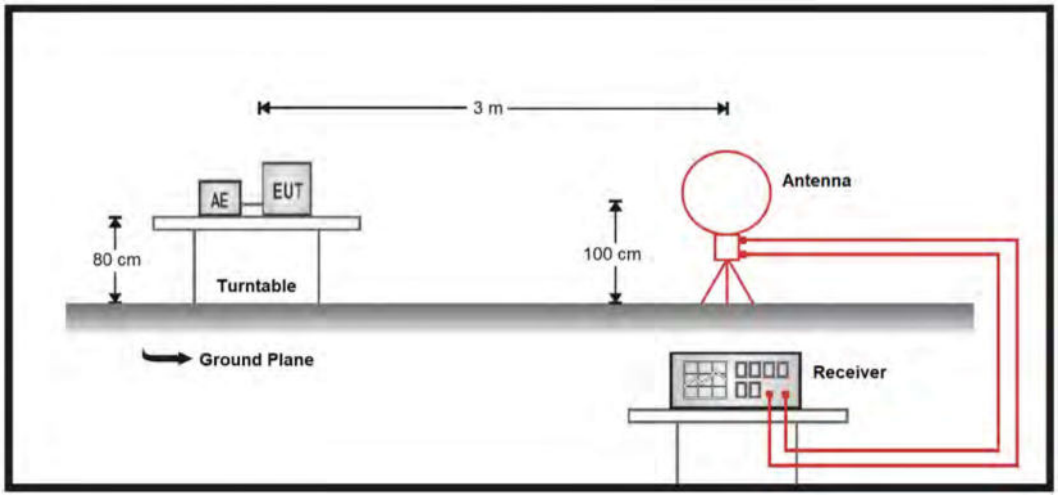
3.5. Test Result of Maximum Conducted Output Power

Modulation	Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)			Limit (dBm)	Result
			Ant. 0	Ant. 1	Total		
802.11b	1	2412	22.47	22.80	25.65	≦30.00	Pass
	6	2437	22.42	22.94	25.70	≦30.00	Pass
	11	2462	22.37	22.79	25.60	≦30.00	Pass
802.11g	1	2412	22.54	22.78	25.67	≦30.00	Pass
	6	2437	22.55	22.85	25.71	≦30.00	Pass
	11	2462	20.22	20.41	23.33	≦30.00	Pass
802.11n (20 MHz)	1	2412	22.17	22.40	25.30	≦30.00	Pass
	6	2437	22.51	22.63	25.58	≦30.00	Pass
	11	2462	19.14	19.27	22.22	≦30.00	Pass
802.11ac (20 MHz)	1	2412	22.12	22.35	25.25	≦30.00	Pass
	6	2437	22.94	22.10	25.55	≦30.00	Pass
	11	2462	19.25	19.31	22.29	≦30.00	Pass
802.11ax (20 MHz)	1	2412	22.25	22.46	25.37	≦30.00	Pass
	6	2437	22.54	22.68	25.62	≦30.00	Pass
	11	2462	19.18	19.43	22.32	≦30.00	Pass
802.11n (40 MHz)	3	2422	21.38	21.67	24.54	≦30.00	Pass
	6	2437	21.72	21.81	24.78	≦30.00	Pass
	9	2452	17.19	17.82	20.53	≦30.00	Pass
802.11ac (40 MHz)	3	2422	21.34	21.62	24.49	≦30.00	Pass
	6	2437	21.68	21.77	24.74	≦30.00	Pass
	9	2452	17.16	17.81	20.51	≦30.00	Pass
802.11ax (40 MHz)	3	2422	21.47	21.73	24.61	≦30.00	Pass
	6	2437	21.76	21.88	24.83	≦30.00	Pass
	9	2452	17.42	17.83	20.64	≦30.00	Pass

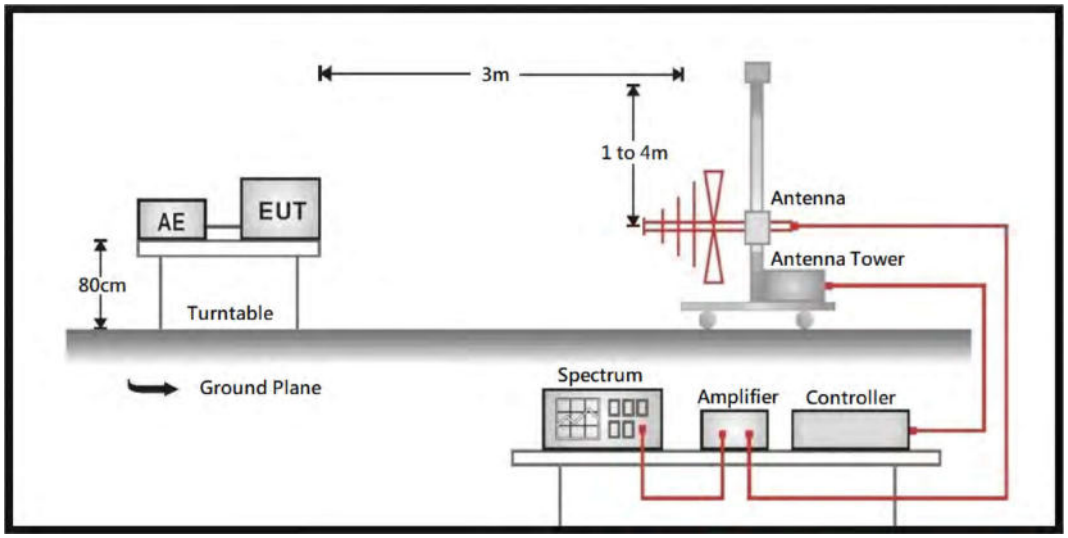
4. Radiated Emission

4.1. Test Setup

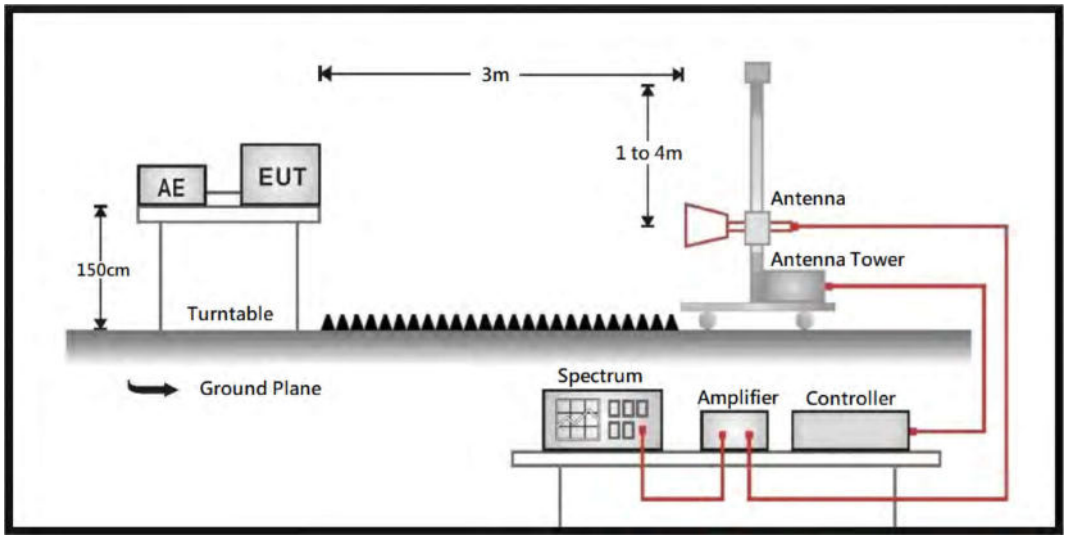
9 kHz ~ 30 MHz



30 MHz ~ 1 GHz



Above 1 GHz



4.2. Test Limit

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 30dB 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

4.3. 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 1 MHz.

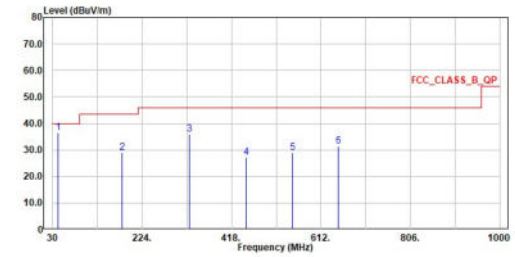
4.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

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

<Power by adapter>

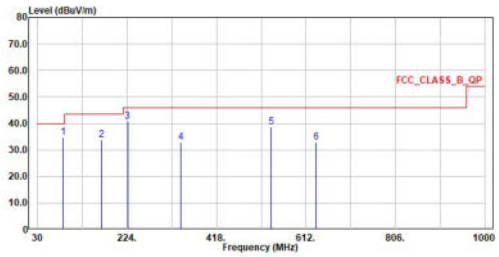
Site :HC-CB04
Condition :3m Horizontal
Mode :11g_TX_2412MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	41.737	36.44	40.00	-3.56	38.66	-2.22	QP
2	181.514	29.10	43.50	-14.40	33.62	-4.52	QP
3	326.917	35.81	46.00	-10.19	37.30	-1.49	QP
4	450.010	27.25	46.00	-18.75	25.40	1.85	QP
5	550.017	28.97	46.00	-17.03	25.36	3.61	QP
6	650.024	31.42	46.00	-14.58	25.33	6.09	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-CB04
Condition :3m Vertical
Mode :11g_TX_2412MHz
Test By :Cyril

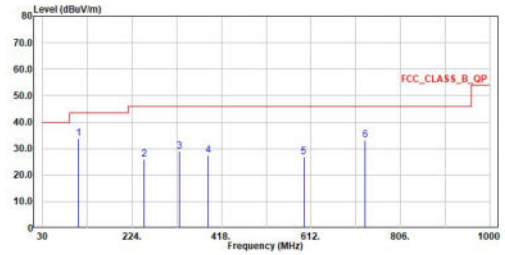


No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	85.387	34.62	40.00	-5.38	42.80	-8.18	QP
2	168.613	33.93	43.50	-9.57	37.18	-3.25	QP
3	225.067	40.75	46.00	-5.25	46.80	-6.05	QP
4	340.885	33.04	46.00	-12.96	34.31	-1.27	QP
5	536.437	38.58	46.00	-7.42	35.10	3.48	QP
6	633.922	32.99	46.00	-13.01	27.18	5.81	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.

<Power by DC-Powered>

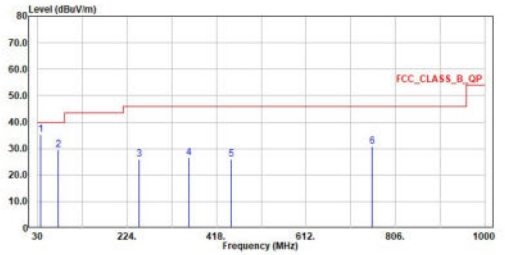
Site :HC-CB04
Condition :3m Horizontal
Mode :11g_TX_2412MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	108.667	33.75	43.50	-9.75	40.04	-6.29	QP
2	249.996	25.84	46.00	-20.16	29.99	-4.15	QP
3	327.111	29.03	46.00	-16.97	30.52	-1.49	QP
4	389.676	27.55	46.00	-18.45	27.52	0.03	QP
5	596.674	26.91	46.00	-19.09	21.74	5.17	QP
6	728.982	33.28	46.00	-12.72	26.14	7.14	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-CB04
Condition :3m Vertical
Mode :11g_TX_2412MHz
Test By :Cyril

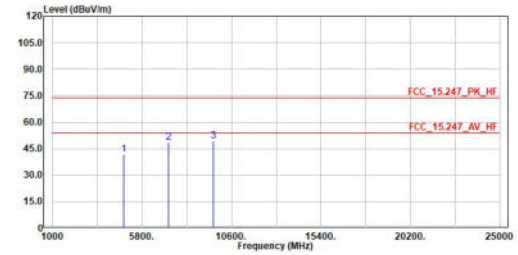


No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	36.887	35.34	40.00	-4.66	38.18	-2.84	QP
2	74.135	29.55	40.00	-10.45	35.09	-5.54	QP
3	249.996	26.05	46.00	-19.95	30.20	-4.15	QP
4	357.569	26.42	46.00	-19.58	27.37	-0.95	QP
5	450.010	26.00	46.00	-20.00	24.15	1.85	QP
6	755.269	30.73	46.00	-15.27	22.88	7.85	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.

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

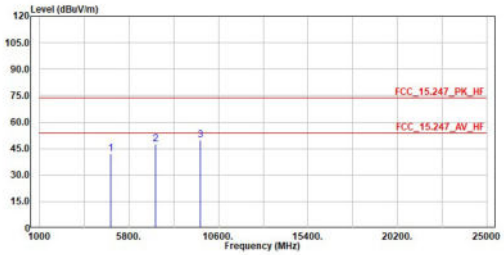
Site :HC-CB04
Condition :3m ,Horizontal
Mode :11b_TX_2412MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4824.000	41.67	74.00	-32.33	56.38	-14.71	Peak
2	7236.000	48.53	74.00	-25.47	55.29	-6.76	Peak
3	9648.000	49.37	74.00	-24.63	52.27	-2.90	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.

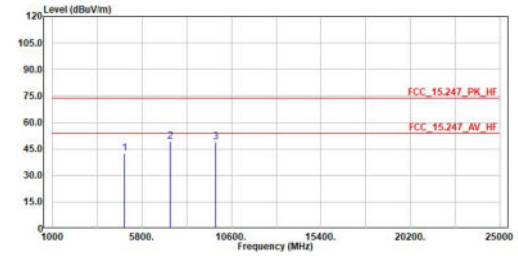
Site :HC-CB04
Condition :3m ,Vertical
Mode :11b_TX_2412MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4824.000	42.06	74.00	-31.94	56.77	-14.71	Peak
2	7236.000	47.64	74.00	-26.36	54.40	-6.76	Peak
3	9648.000	50.01	74.00	-23.99	52.91	-2.90	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.

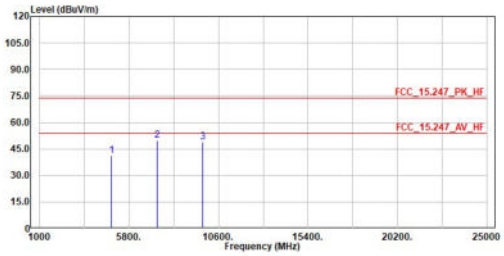
Site :HC-CB04
Condition :3m ,Horizontal
Mode :11b_TX_2437MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4874.000	42.58	74.00	-31.42	57.07	-14.49	Peak
2	7311.000	49.58	74.00	-24.42	56.09	-6.51	Peak
3	9748.000	48.89	74.00	-25.11	51.51	-2.62	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.

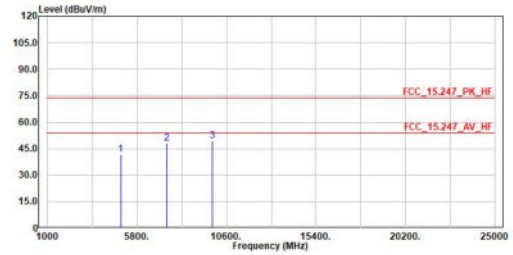
Site :HC-CB04
Condition :3m ,Vertical
Mode :11b_TX_2437MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4874.000	41.43	74.00	-32.57	55.92	-14.49	Peak
2	7311.000	49.73	74.00	-24.27	56.24	-6.51	Peak
3	9748.000	49.06	74.00	-24.94	51.68	-2.62	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.

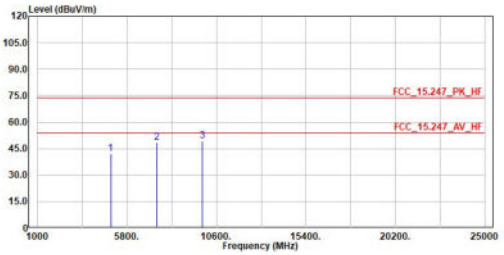
Site :HC-CB04
Condition :3m ,Horizontal
Mode :11b_TX_2462MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4924.000	41.44	74.00	-32.56	55.71	-14.27	Peak
2	7386.000	48.22	74.00	-25.78	54.47	-6.25	Peak
3	9848.000	49.22	74.00	-24.78	51.62	-2.40	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.

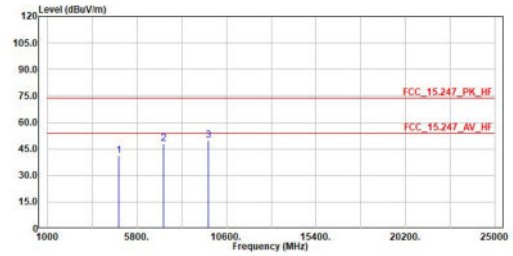
Site :HC-CB04
Condition :3m ,Vertical
Mode :11b_TX_2462MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4924.000	42.05	74.00	-31.95	56.32	-14.27	Peak
2	7386.000	48.47	74.00	-25.53	54.72	-6.25	Peak
3	9848.000	49.57	74.00	-24.43	51.97	-2.40	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.

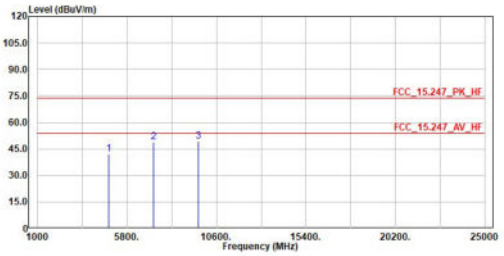
Site :HC-CB04
Condition :3m ,Horizontal
Mode :11g_TX_2412MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4824.000	41.19	74.00	-32.81	55.90	-14.71	Peak
2	7236.000	48.04	74.00	-25.96	54.80	-6.76	Peak
3	9648.000	49.73	74.00	-24.27	52.63	-2.90	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.

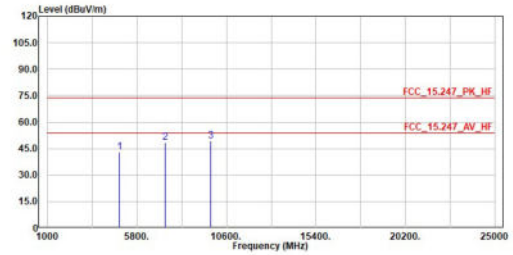
Site :HC-CB04
Condition :3m ,Vertical
Mode :11g_TX_2412MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4824.000	42.02	74.00	-31.98	56.73	-14.71	Peak
2	7236.000	48.82	74.00	-25.18	55.58	-6.76	Peak
3	9648.000	49.40	74.00	-24.60	52.30	-2.90	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.

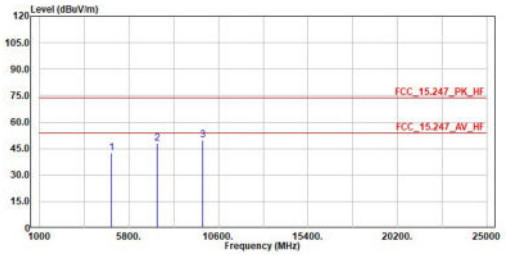
Site :HC-CB04
Condition :3m ,Horizontal
Mode :11g_TX_2437MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4874.000	42.97	74.00	-31.03	57.46	-14.49	Peak
2	7311.000	48.62	74.00	-25.38	55.13	-6.51	Peak
3	9748.000	49.50	74.00	-24.50	52.12	-2.62	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.

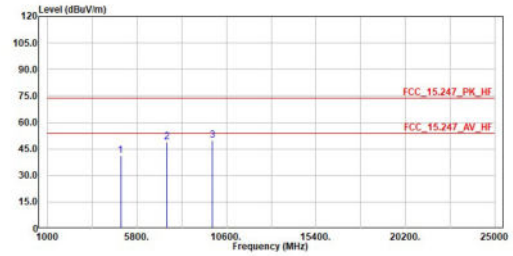
Site :HC-CB04
Condition :3m ,Vertical
Mode :11g_TX_2437MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4874.000	42.70	74.00	-31.30	57.19	-14.49	Peak
2	7311.000	48.03	74.00	-25.97	54.54	-6.51	Peak
3	9748.000	49.70	74.00	-24.30	52.32	-2.62	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.

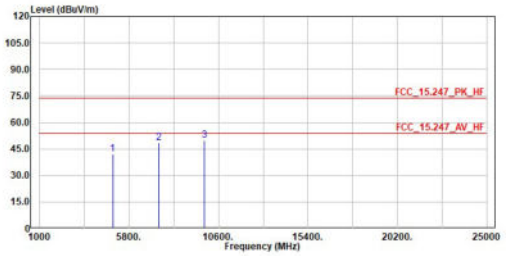
Site :HC-CB04
Condition :3m ,Horizontal
Mode :11g_TX_2462MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4924.000	41.25	74.00	-32.75	55.52	-14.27	Peak
2	7386.000	48.77	74.00	-25.23	55.02	-6.25	Peak
3	9848.000	49.91	74.00	-24.09	52.31	-2.40	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.

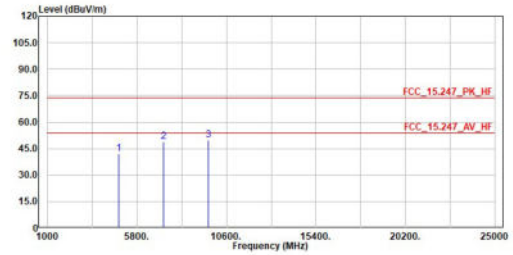
Site :HC-CB04
Condition :3m ,Vertical
Mode :11g_TX_2462MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4924.000	41.93	74.00	-32.07	56.20	-14.27	Peak
2	7386.000	48.59	74.00	-25.41	54.84	-6.25	Peak
3	9848.000	49.79	74.00	-24.21	52.19	-2.40	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.

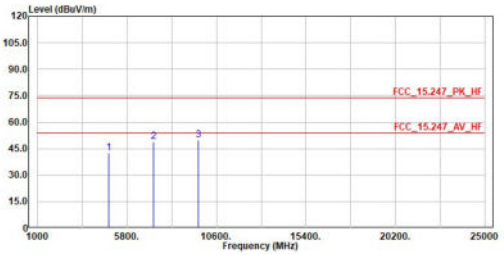
Site :HC-CB04
Condition :3m ,Horizontal
Mode :11ax20_TX_2412MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4824.000	42.13	74.00	-31.87	56.84	-14.71	Peak
2	7236.000	48.93	74.00	-25.07	55.69	-6.76	Peak
3	9648.000	49.66	74.00	-24.34	52.56	-2.90	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.

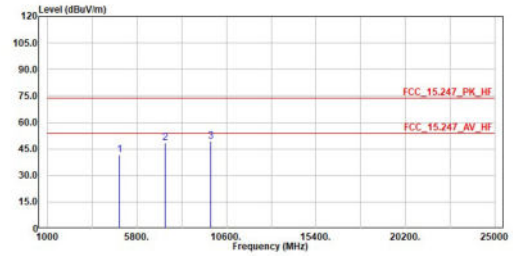
Site :HC-CB04
Condition :3m ,Vertical
Mode :11ax20_TX_2412MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4824.000	42.36	74.00	-31.64	57.07	-14.71	Peak
2	7236.000	48.71	74.00	-25.29	55.47	-6.76	Peak
3	9648.000	49.90	74.00	-24.10	52.80	-2.90	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.

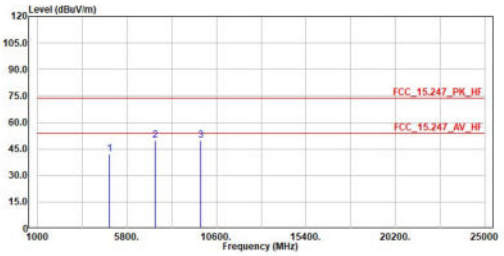
Site :HC-CB04
Condition :3m ,Horizontal
Mode :11ax20_TX_2437MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4874.000	41.82	74.00	-32.18	56.31	-14.49	Peak
2	7311.000	48.49	74.00	-25.51	55.00	-6.51	Peak
3	9748.000	49.16	74.00	-24.84	51.78	-2.62	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.

Site :HC-CB04
Condition :3m ,Vertical
Mode :11ax20_TX_2437MHz
Test By :Cyril



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4874.000	41.99	74.00	-32.01	56.48	-14.49	Peak
2	7311.000	49.63	74.00	-24.37	56.14	-6.51	Peak
3	9748.000	50.04	74.00	-23.96	52.66	-2.62	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.