Certificate #6613.01

EMC TEST REPORT

Applicant:	Cohda Wireless Pty Ltd.
Address:	27 Greenhill Road Wayville SA 5034 Australia

Manufacturer or Supplier:	Cohda Wireless Pty Ltd.
Address:	27 Greenhill Road Wayville SA 5034 Australia
Product:	Road-Side (Transceiver) Unit for infrastructure.
Brand Name:	Cohda Wireless
Model Name:	MK6 RSU
Series Model	MK6 RSU
FCC ID:	2AEGPMK6RSU
Date of tests:	Jun. 26, 2023 ~ Nov. 03, 2023

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

☐ **FCC Part 15, Subpart B, Class A**
☒ **FCC Part 15, Subpart B, Class B**
☒ **ANSI C63.4:2014**

CONCLUSION: The submitted sample was found to <u>COMPLY</u> with the test requirement

Prepared by Chao Wu Engineer / Mobile Department	Approved by Peibo Sun Manager / Mobile Department
Chao Wu Date: Nov. 03, 2023	Sun Peibo Date: Nov. 03, 2023

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-QSU2306260109EM01	Original release	Nov. 03, 2023

1 GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

PRODUCT*	Road-Side (Transceiver) Unit for infrastructure.	
BRAND NAME*	Cohda Wireless	
MODEL NAME*	MK6 RSU	
SERIES MODEL*	MK6 RSU	
NOMINAL VOLTAGE*	48Vdc(POE Adapter)	
MODULATION TYPE*	**BT_LE**	GFSK
	Bluetooth	GFSK, π/4-DQPSK, 8DPSK
	WLAN	DSSS, OFDM
	GPS/GALILEO/GLONASS/BDS	BPSK
	GSM/GPRS/EDGE	GMSK, 8PSK
	WCDMA	HSDPA/HSUPA/ HSUPA+/DC-HSDPA
	LTE	QPSK/16QAM/64QAM
	5G NR	DFT-s-OFMA(Pi/2BPSK,QPSK,16QAM,64QAM,256QAM); CP-OFMA(QPSK,16QAM,64QAM,256QAM);
	DSRC	BPSK,QPSK,16QAM,64QAM
OPERATING FREQUENCY	**Bluetooth/BT_LE**	2402MHz ~ 2480MHz
	WLAN	2412 ~ 2462MHz for 11b/g/n(HT20/40) 5180 ~ 5240MHz, 5260~5320 MHz, 5500~5720 MHz , 5745 ~ 5825 MHz for 11a/ n(HT20)/ n(HT40) / ac(VHT20)/ ac(VHT40) / ac(VHT80)
	GPS/GALILEO/GLONASS/BDS	1559MHz ~ 1610MHz
	GSM/GPRS/EDGE	1850.2MHz ~ 1909.8MHz (FOR GSM 1900)
	WCDMA	1852.4MHz ~ 1907.6MHz(FOR WCDMA Band 2) 1712.4MHz ~ 1752.6MHz(FOR WCDMA Band 4) 826.4MHz ~ 846.6MHz (FOR WCDMA Band 5)
	LTE	1850.7MHz ~ 1909.3MHz (FOR LTE Band2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 824.7MHz ~ 848.3MHz (FOR LTE Band5) 2502.5MHz ~ 2567.5MHz (FOR LTE Band7) 699.7MHz ~ 715.3MHz (FOR LTE Band12) 706.5MHz ~ 713.5MHz (FOR LTE Band17) 1850.7MHz ~ 1914.3 MHz (FOR LTE Band25)

		DL:717MHz ~ 728MHz (FOR LTE Band29) DL:2307.5MHz ~ 2312.5MHz (FOR LTE Band30) 2498.5MHz~ 2687.5MHz (FOR LTE Band41) 1710.7MHz ~ 1779.3MHz (FOR LTE Band66) 665.5MHz ~695.5MHz (FOR LTE Band71)
	5G NR	SA: N2 (1852.5MHz ~1907.5MHz) N5 (826.5MHz ~ 846.5MHz) N25 (1852.5MHz ~ 1912.5MHz) N66 (1712.5 ~ 1777.5MHz) N71 (665.5 ~ 695.5MHz) N77(Part27Q)(3460.02MHz ~ 3540MHz) N77(Part27O)(3710.01MHz ~ 3969.99MHz) n78(Part27Q)(3460.02 ~ 3540MHz) n78(Part27O)(3710.01 ~ 3789.99MHz) NSA： DC_2A-n77A(Part 27Q) (3460.02MHz ~ 3540MHz) DC_2A-n77A(Part 27O) (3710.01MHz ~ 3969.99MHz) DC_5A-n77A(Part 27Q) (3460.02MHz ~ 3540MHz) DC_5A-n77A(Part 27O) (3710.01MHz ~ 3969.99MHz) DC_7A-n77A(Part 27Q) (3460.02MHz ~ 3540MHz) DC_7A-n77A(Part 27O) (3710.01MHz ~ 3969.99MHz) DC_12A-n77A(Part 27Q) (3460.02MHz ~ 3540MHz) DC_12A-n77A(Part 27O) (3710.01MHz ~ 3969.99MHz) DC_66A-n77A(Part 27Q) (3460.02MHz ~ 3540MHz) DC_66A-n77A(Part 27O) (3710.01MHz ~ 3969.99MHz) DC_2A-n78A(Part 27Q) (3460.02MHz ~ 3540MHz) DC_2A-n78A(Part 27O) (3710.01MHz ~ 3789.99MHz) DC_5A-n78A(Part 27Q) (3460.02MHz ~ 3540MHz) DC_5A-n78A(Part 27O) (3710.01MHz ~ 3789.99MHz) DC_7A-n78A(Part 27Q) (3460.02MHz ~ 3540MHz) DC_7A-n78A(Part 27O) (3710.01MHz ~ 3789.99MHz) DC_12A-n78A(Part 27Q) (3460.02MHz ~ 3540MHz) DC_12A-n78A(Part 27O) (3710.01MHz ~ 3789.99MHz) DC_66A-n78A(Part 27Q) (3460.02MHz ~ 3540MHz) DC_66A-n78A(Part 27O) (3710.01MHz ~ 3789.99MHz)
	DSRC	5855 MHz – 5925 MHz
HIGHEST FREQUENCY	5925MHz	
HW VERSION*	Rev 1.0	
SW VERSION*	19.Release.134186	
I/O PORTS*	Refer to user's manual	

CABLE SUPPLIED*	N/A
ACCESSORY DEVICES*	Refer to note as below

NOTE:

1. ***Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information , Test Lab is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.

2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

List of Accessory:

ACCESSORIES	MANUFACTURER	MODEL
2x Antenna for LTE/2G/3G/CDMA	Taoglas	TG.80.4H31
1x Antenna for WLAN/BT	HUBER+SUHNER	1399.17.0224
1x Antenna for WLAN	HUBER+SUHNER	1399.17.0224
2x Antenna for DSRC	Taoglas	TD.80.6H31
1x Antenna for GNSS	Taoglas	TLS.40.1F11
1xM12 field attachable connector	Amphenol	MSXS-08BMMD-SL8001

1.2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart B			
Standard Section	**Test Item**	**Result**	**Test lab***
FCC Part 15, Subpart B, Class B ANSI C63.4:2014	Conducted Test	Compliance	A
	Radiated Emission Test (30MHz ~ 1GHz)	Compliance	A
	Radiated Emission Test (Above 1GHz)	Compliance	A

***Test Lab Information Reference**

Lab A:

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

Lab Address:

Tower N, Innovation Center, 88 Zhuyi Road, High-tech District, Suzhou City, Anhui Province

Accredited Test Lab Cert 6613.01

The FCC Site Registration No. is 434559; The Designation No. is CN1325.

1.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	±2.70dB
Radiated emissions	30MHz~1GMHz	±4.98dB
	1GMHz ~6GMHz	±4.70dB
	6GMHz ~18GMHz	±4.60dB

1.4 DESCRIPTION OF TEST MODES

Test Mode	Test Condition
Radiated emission test	
1	GSM1900 idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
2	WCDMA B2 idle + POE + Glonass RX + BT idle + WIFI idle (5G) + SIM
3	WCDMA B4 idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM
4	WCDMA B5 idle + POE + Galileo RX + BT idle + WIFI idle (5G) + SIM
5	LTE B2 idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
6	LTE B4 idle + POE + Glonass RX + BT idle + WIFI idle (5G) + SIM
7	LTE B5 idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM
8	LTE B7 idle + POE + Galileo RX + BT idle + WIFI idle (5G) + SIM
9	LTE B12 idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
10	LTE B17 idle + POE + Galileo RX + BT idle + WIFI idle (5G) + C-V2X + SIM
11	LTE B25 idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + storage card + SIM
12	LTE B29 idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM
13	LTE B30 idle + POE + Galileo RX + BT idle + WIFI idle (5G) + SIM
14	LTE B41 idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
15	LTE B66 idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM
16	LTE B71 idle + POE + Galileo RX + BT idle + WIFI idle (5G) + SIM
17	5G N2 Idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
18	5G N5 Idle + POE + Glonass RX + BT idle + WIFI idle (5G) + SIM
19	5G N25 Idle + POE + Beidou RX + BT Idle + WIFI idle (2.4G) + storage card + SIM
20	5G N66 Idle + POE + Galileo RX + BT Idle + WIFI idle (5G) + storage card + SIM
21	5G N71 Idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
22	5G N77 Idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
23	5G N78 Idle + POE + Glonass RX + BT idle + WIFI idle (5G) + SIM
24	DC_2A-n78A Idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM
25	DC_5A-n78A Idle + POE + Galileo RX + BT idle + WIFI idle (5G) + SIM
26	DC_7A-n78A Idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
27	DC_12A-n78A Idle + POE + Glonass RX + BT idle + WIFI idle (5G) + SIM
28	DC_66A-n78A Idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM

Test Mode	Test Condition
Conducted emission test	
1	GSM1900 idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
2	WCDMA B2 idle + POE + Glonass RX + BT idle + WIFI idle (5G) + SIM
3	WCDMA B4 idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM
4	WCDMA B5 idle + POE + Galileo RX + BT idle + WIFI idle (5G) + SIM
5	LTE B2 idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
6	LTE B4 idle + POE + Glonass RX + BT idle + WIFI idle (5G) + SIM
7	LTE B5 idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM
8	LTE B7 idle + POE + Galileo RX + BT idle + WIFI idle (5G) + SIM
9	LTE B12 idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
10	LTE B17 idle + POE + Galileo RX + BT idle + WIFI idle (5G) + C-V2X + SIM
11	LTE B25 idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + storage card + SIM
12	LTE B29 idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM
13	LTE B30 idle + POE + Galileo RX + BT idle + WIFI idle (5G) + SIM
14	LTE B41 idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
15	LTE B66 idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM
16	LTE B71 idle + POE + Galileo RX + BT idle + WIFI idle (5G) + SIM
17	5G N2 Idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
18	5G N5 Idle + POE + Glonass RX + BT idle + WIFI idle (5G) + SIM
19	5G N25 Idle + POE + Beidou RX + BT Idle + WIFI idle (2.4G) + storage card + SIM
20	5G N66 Idle + POE + Galileo RX + BT Idle + WIFI idle (5G) + storage card + SIM
21	5G N71 Idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
22	5G N77 Idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
23	5G N78 Idle + POE + Glonass RX + BT idle + WIFI idle (5G) + SIM
24	DC_2A-n78A Idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM
25	DC_5A-n78A Idle + POE + Galileo RX + BT idle + WIFI idle (5G) + SIM
26	DC_7A-n78A Idle + POE + GPS RX + BT idle + WIFI idle (2.4G) + SIM
27	DC_12A-n78A Idle + POE + Glonass RX + BT idle + WIFI idle (5G) + SIM
28	DC_66A-n78A Idle + POE + Beidou RX + BT idle + WIFI idle (2.4G) + SIM

NOTE:

1. For radiated emission test, test mode 14 was the verification case and only this mode was presented in this report
2. For conducted emission test, test mode 1 was the verification case and only this mode was presented in this report

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

FOR All TESTS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	Thinkpad E14	SL10W47313	N/A
2	Micro SD	SAM SUNG	N/A	N/A	N/A
3	Bluetooth	Rohde&Schwarz	SMBV100B	102176	N/A
4	GPS Simulator+Antenna	Rohde&Schwarz	SMBV100A	261436	N/A
5	Universal radio communication tester	Rohde&Schwarz	CMW500	169399	N/A
6	WIFI Router	HUAWEI	N/A	N/A	N/A
7	POE Adapter	N/A	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	USB Line: Shielded, Detachable 1m;

2 EMISSION TEST

2.1 CONDUCTED EMISSION MEASUREMENT

2.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107 a CLASS B)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107 b CLASS A)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

NOTE: 1.The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

2.1.2 TEST INSTRUMENTS

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date
WIDEBANDRADIO COMMUNICATION TESTER	Rohde&Schwarz	CMW500	169399	Jun.27,22	Jun.26,24
EMI Test Receiver	Rohde&Schwarz	ESR3	102749	Feb.25,22	Feb.24,24
ELEKTRA test software	Rohde&Schwarz	ELEKTRA	NA	N/A	N/A
LISN network	Rohde&Schwarz	ENV216	102640	Feb.17,22	Feb.16,24
CABLE	Rohde&Schwarz	W61.01	N/A	Apr.28,23	Oct.27,23
CABLE	Rohde&Schwarz	W61.01	N/A	Oct.27,23	Apr.26,24
CABLE	Rohde&Schwarz	W601	N/A	Apr.28,23	Oct.27,23
CABLE	Rohde&Schwarz	W601	N/A	Oct.27,23	Apr.26,24

NOTE: 1. The test was performed in CE shielded room.

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2.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

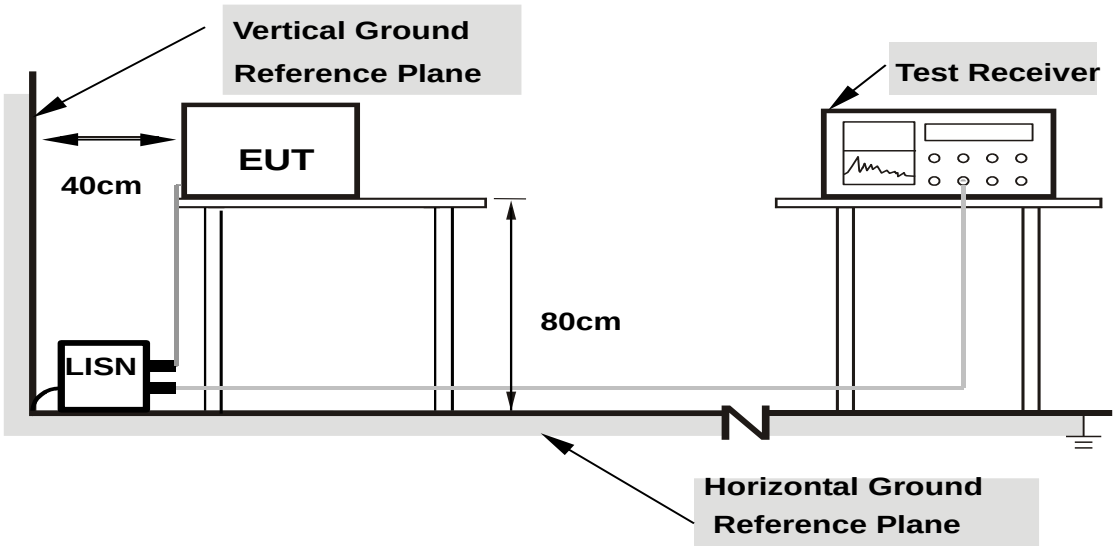
c. The frequency range from 150 kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

2.1.4 DEVIATION FROM TEST STANDARD

No deviation.

2.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

2.1.6 EUT OPERATING CONDITIONS

a. Turned on the power and connected of all equipment.
b. EUT was operated according to the use type described in the manufacturer's specifications or the user's manual.

2.1.7 TEST RESULTS

Worst case data:

TEST VOLTAGE	DC 48V	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	**TESTED BY**	Chao Wu

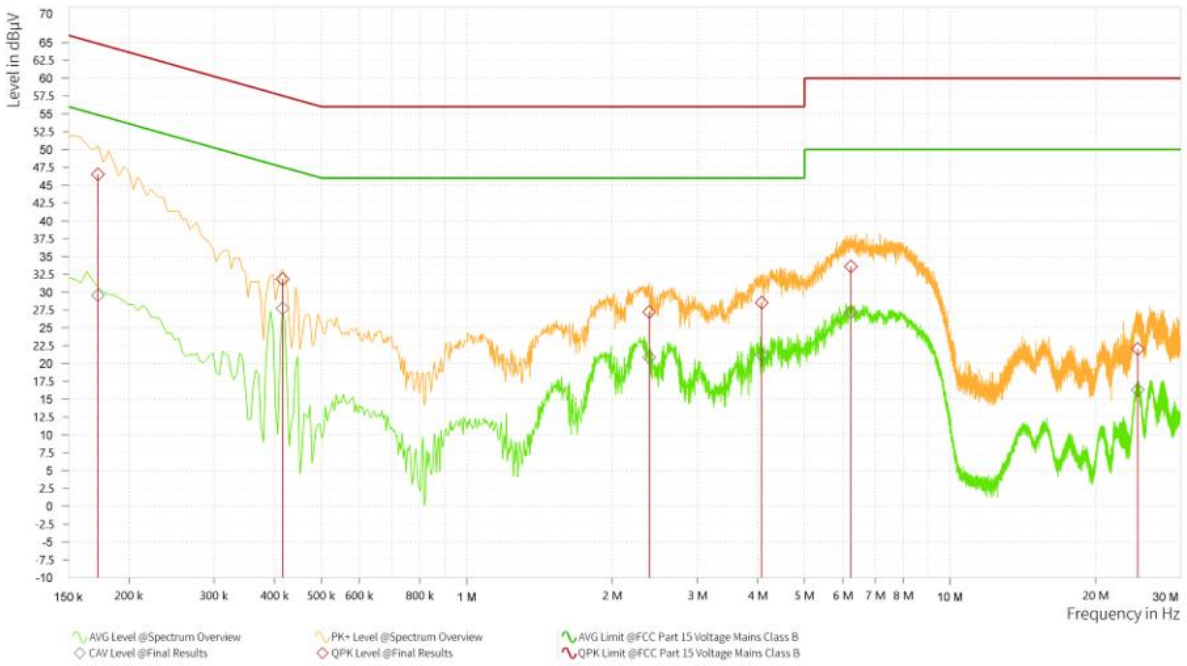
Rg	Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]
1	0.164	48.35	65.28	16.93	31.91	55.28	23.38	9.54	L1	9.000
1	0.389	32.87	58.10	25.23	26.77	48.10	21.32	9.57	L1	9.000
1	2.319	26.38	56.00	29.62	21.06	46.00	24.94	9.60	L1	9.000
1	6.419	33.18	60.00	26.82	26.44	50.00	23.56	9.73	L1	9.000
1	8.192	31.67	60.00	28.33	25.47	50.00	24.53	9.77	L1	9.000
1	26.205	22.91	60.00	37.09	17.16	50.00	32.84	9.94	L1	9.000

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Limit value- Emission level
4. Correction factor = Insertion loss + Cable loss + Attenuate
5. Emission Level = Correction Factor + Reading Value.

TEST VOLTAGE	DC 48V	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	**TESTED BY**	Chao Wu

Rg	Frequency [MHz]	QPK Level [dBµV]	QPK Limit [dBµV]	QPK Margin [dB]	CAV Level [dBµV]	CAV: AVG Limit [dBµV]	CAV Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]
1	0.173	46.50	64.84	18.34	29.56	54.84	25.28	9.57	N	9.000
1	0.416	31.85	57.54	25.69	27.75	47.54	19.79	9.59	N	9.000
1	2.387	27.21	56.00	28.79	20.84	46.00	25.16	9.67	N	9.000
1	4.079	28.53	56.00	27.47	21.18	46.00	24.82	9.74	N	9.000
1	6.239	33.62	60.00	26.38	27.23	50.00	22.77	9.80	N	9.000
1	24.468	22.06	60.00	37.94	16.32	50.00	33.68	9.97	N	9.000

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Limit value- Emission level
4. Correction factor = Insertion loss + Cable loss + Attenuate
5. Emission Level = Correction Factor + Reading Value.



2.2 RADIATED EMISSION MEASUREMENT

2.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.109)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 3 meters (dBμV/m)		
Frequencies (MHz)	**FCC 15B Class A**	**FCC 15B Class B**
30-88	49	40
88-216	53.5	43.5
216-960	56	46
960-1000	59.5	54
Above 1000	Avg: 59.5 Peak: 79.5	Avg: 54 Peak: 74

Frequency Range (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5^{th} harmonic of the highest frequency or 40GHz, whichever is lower

NOTE: 1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
4. QP detector shall be applied if not specified.

2.2.2 TEST INSTRUMENTS

Frequency range below 1GHz

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date
WIDEBANDRADIO COMMUNICATION TESTER	Rohde&Schwarz	CMW500	169399	Jun.27,22	Jun.26,24
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.24,22	Nov.23,25
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.28,22	Feb.27,24
EMI Test Receiver	R&S	ESW44	101973	Feb.25,22	Feb.24,24
Measurement Software	R&S	ELEKTRA	N/A	N/A	N/A
Pre-Amplifier	R&S	SCU08F1	101028	Sep.16,22	Sep.15,24
CABLE	R&S	W13.01	N/A	Apr.28,23	Oct.27,23
CABLE	R&S	W13.01	N/A	Oct.27,23	Apr.26,23
CABLE	R&S	W13.02	N/A	Apr.28,23	Oct.27,23
CABLE	R&S	W13.02	N/A	Oct.27,23	Apr.26,23
CABLE	R&S	W12.14	N/A	Apr.28,23	Oct.27,23
CABLE	R&S	W12.14	N/A	Oct.27,23	Apr.26,23

Frequency range above 1GHz

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date
WIDEBANDRADIO COMMUNICATION TESTER	Rohde&Schwarz	CMW500	169399	Jun.27,22	Jun.26,24
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.24,22	Nov.23,25
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,22	Aug.21,24
EMI Test Receiver	R&S	ESW44	101973	Feb.25,22	Feb.24,24
Pre-Amplifier	R&S	SCU08F1	101028	Sep.16,22	Sep.15,24
Measurement Software	R&S	ELEKTRA	N/A	N/A	N/A
CABLE	R&S	W13.01	N/A	Apr.28,23	Oct.27,23
CABLE	R&S	W13.01	N/A	Oct.27,23	Apr.26,23
CABLE	R&S	W13.02	N/A	Apr.28,23	Oct.27,23
CABLE	R&S	W13.02	N/A	Oct.27,23	Apr.26,23
CABLE	R&S	W12.14	N/A	Apr.28,23	Oct.27,23
CABLE	R&S	W12.14	N/A	Oct.27,23	Apr.26,23

NOTE: 1. The calibration interval of the above test instruments is 6 months or 24 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Chamber.

2.2.3 TEST PROCEDURE

<Frequency Range below 1GHz>

The basic test procedure was in accordance with ANSI C63.4:2014 (section 12).

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
5. Margin value = Limit value -Emission level.

<Frequency Range above 1GHz>

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter fully-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. The bore sight should be used during the test above 1GHz.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz

NOTE:

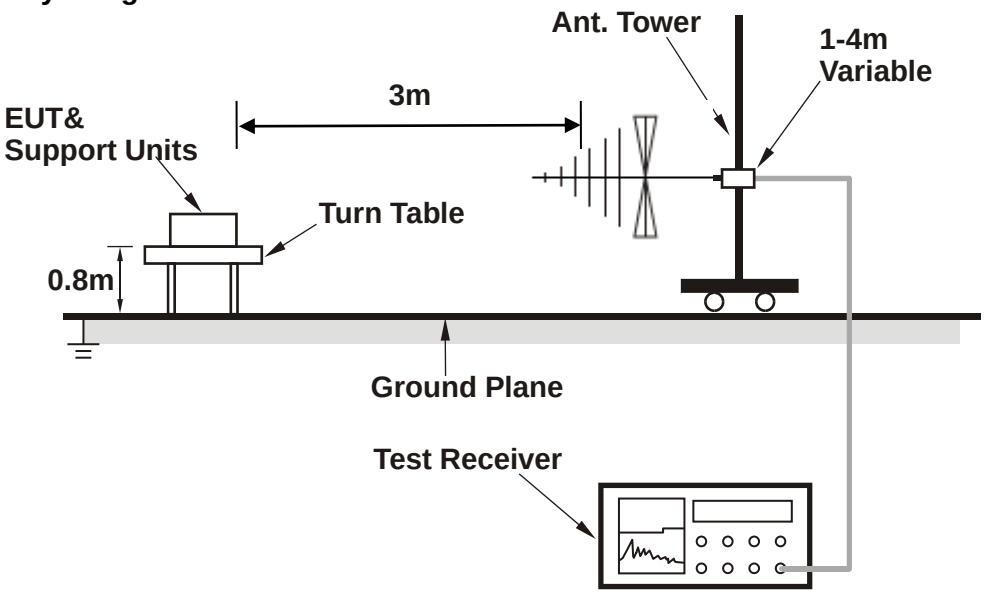
1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth of test receiver/spectrum analyzer is 1Hz for Average detection (AV) at frequency above 1GHz.
3. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
4. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
5. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
6. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier)
7. Margin value = Limit value- Emission level.

2.2.4 DEVIATION FROM TEST STANDARD

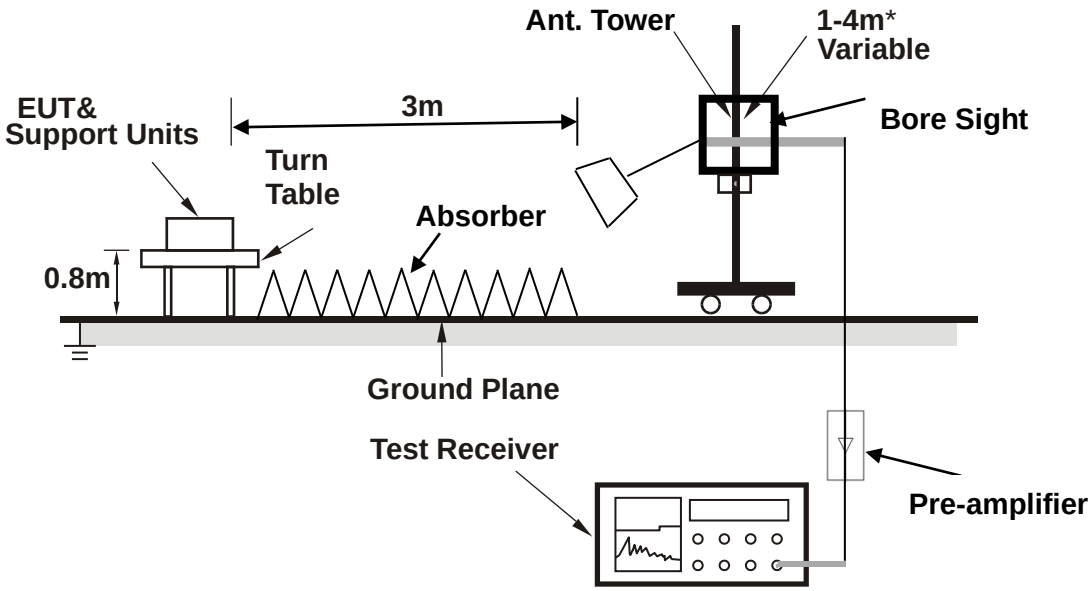
No deviation.

2.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

depends on the EUT height and the antenna 3dB bandwidth both, refer to section 7.3 of CISPR 16-2-3.

2.2.6 EUT OPERATING CONDITIONS

Same as item 2.1.6.

2.2.7 TEST RESULTS

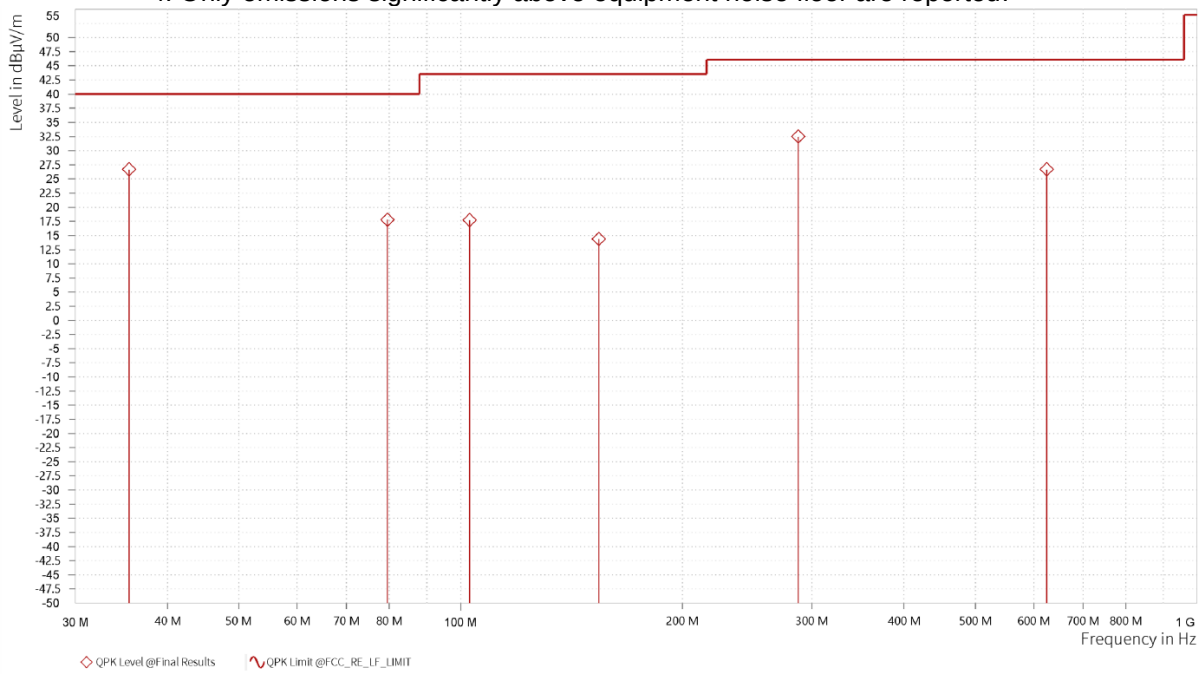
Worst case:

TEST VOLTAGE	DC 48V	**FREQUENCY RANGE**	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Quasi-Peak, 120 kHz
TESTED BY	Chao Wu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]
1	35.481	26.66	40.00	13.34	-12.72	H	89.2	2	120.000
1	79.616	17.77	40.00	22.23	-16.87	H	226.6	2	120.000
1	102.896	17.67	43.50	25.83	-12.50	H	270.7	1	120.000
1	154.112	14.36	43.50	29.14	-15.38	H	89.2	2	120.000
1	287.341	32.46	46.00	13.54	-8.27	H	270.7	1	120.000
1	624.998	26.66	46.00	19.34	-3.80	H	226.6	2	120.000

REMARKS:
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 30MHz to 1000MHz.
4. Only emissions significantly above equipment noise floor are reported.

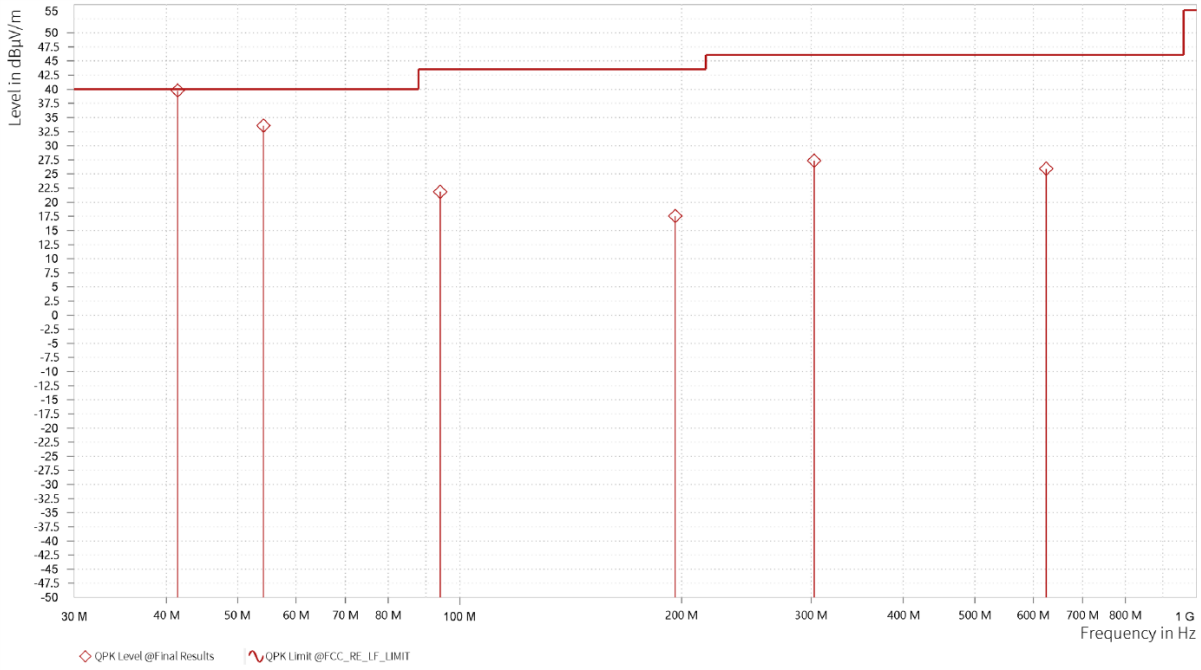


TEST VOLTAGE	DC 48V	**FREQUENCY RANGE**	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Quasi-Peak, 120 kHz
TESTED BY	Chao Wu		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]
1	41.446	39.73	40.00	0.27	-11.00	V	359.1	1	120.000
1	54.202	33.52	40.00	6.48	-10.84	V	359	1	120.000
1	94.069	21.81	43.50	21.69	-13.59	V	133.2	1	120.000
1	196.064	17.54	43.50	25.96	-11.64	V	359	1	120.000
1	302.522	27.31	46.00	18.69	-7.81	V	226.7	2	120.000
1	624.998	25.90	46.00	20.10	-3.80	V	359	1	120.000

REMARKS:
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 30MHz to 1000MHz.
4. Only emissions significantly above equipment noise floor are reported.

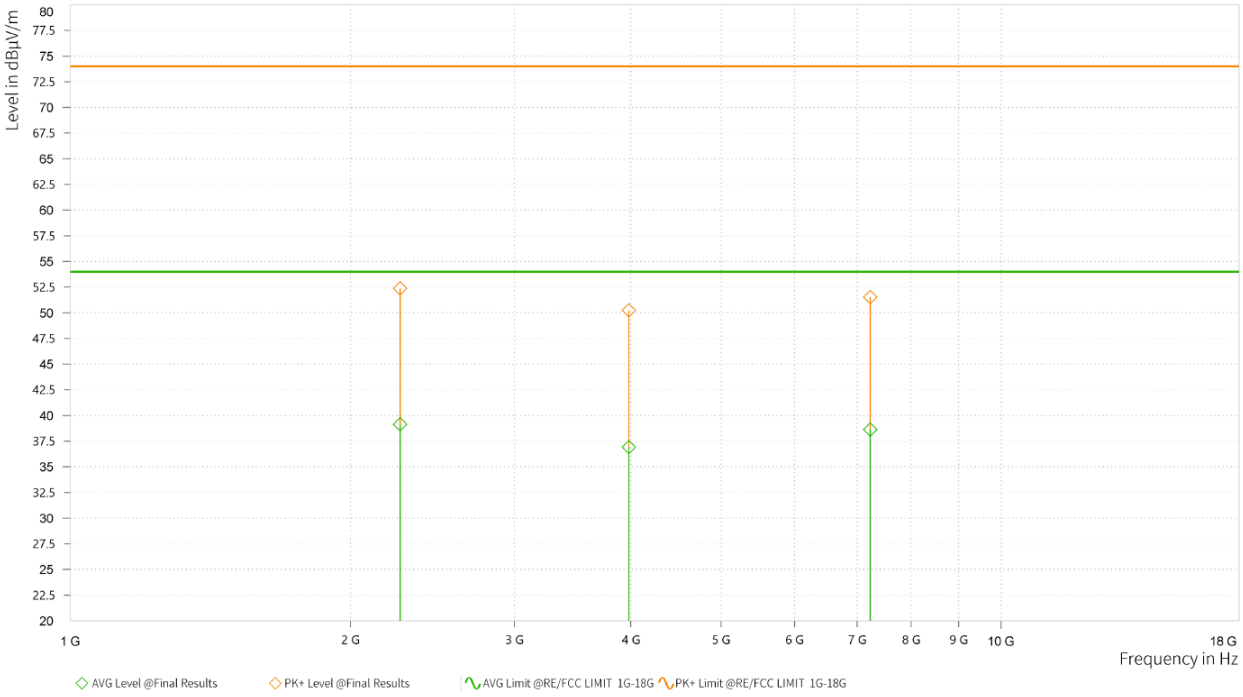


TEST VOLTAGE	DC 48V	**FREQUENCY RANGE**	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Peak/Average, 1 MHz
TESTED BY	Chao Wu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	2,261.091	52.10	74.00	21.90	40.00	54.00	14.00	13.91	H	285.5	2
4	3,982.000	50.21	74.00	23.79	37.65	54.00	16.35	14.23	H	286	1
5	7,232.025	51.73	74.00	22.27	38.94	54.00	15.06	18.06	H	1	2

REMARKS:
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 1GHz to 5th harmonic of the highest frequency or 40GHz, whichever is lower. For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.
4. Only emissions significantly above equipment noise floor are reported.

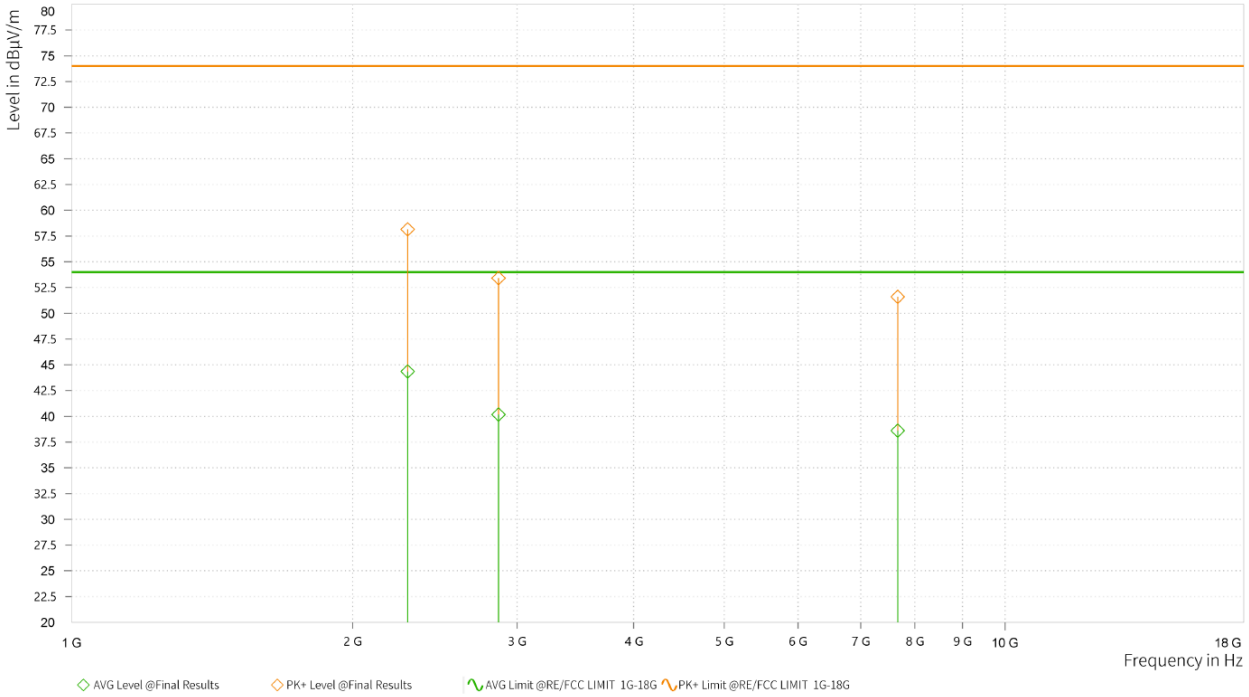


TEST VOLTAGE	DC 48V	**FREQUENCY RANGE**	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Peak/Average, 1 MHz
TESTED BY	Chao Wu		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	2,290.303	56.34	74.00	17.66	45.62	54.00	8.38	14.55	V	1	2
3	2,866.667	54.05	74.00	19.95	41.29	54.00	12.71	13.39	V	246.5	2
5	7,668.500	52.19	74.00	21.81	38.86	54.00	15.14	18.29	V	13	2

REMARKS:
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 1GHz to 5th harmonic of the highest frequency or 40GHz, whichever is lower. For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.
4. Only emissions significantly above equipment noise floor are reported.



3 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---