

VARINAT EMC TEST REPORT

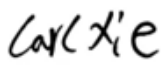
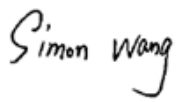
Applicant:	BARTEC
Address:	Max-Eyth-Str.16 , 97980 Bad Mergentheim, Germany

Manufacturer or Supplier:	BARTEC
Address:	Max-Eyth-Str.16 , 97980 Bad Mergentheim, Germany
Product:	Smartscanner / Smartphone
Brand Name:	BARTEC
Model Name:	SP9EX1/SC9EX1/SP9EX2/SC9EX2
FCC ID:	TBUSX9EX
Date of tests:	Dec. 20, 2025 ~ Jan. 05, 2026

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 COMPLY with the test requirement

Prepared by Carl Xie Engineer / Mobile Department	Approved by Simon Wang Manager / Mobile Department
	
Date: Jan. 05, 2026	Date: Jan. 05, 2026

BOOMWAVE TEST (SHENZHEN) CO., LTD. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report. The results documented in this report apply only the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility assure that additional production units of the model are manufactured with identical electrical and mechanical components. All sample tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise. Without written approval of BOOMWAVE TEST (SHENZHEN) CO., LTD., the test report shall not be reproduced except in full.

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Test Report No.: PSZ-QSZ2510291415EM03

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-QSU2312140113EM01	Original release	Jul. 26, 2024
PSZ-QSZ2510291415EM01	Based on the original report, new product update HW, for specific changes please refer to the Product ASSY release notes document provided by the applicant. In this report verify and replace CE, RE worst case.	Jan. 05, 2026

1 GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Smartscanner / Smartphone	
BRAND NAME	BARTEC	
MODEL NAME	SP9EX1/SC9EX1/SP9EX2/SC9EX2	
NOMINAL VOLTAGE	5.0V/9.0V/12.0Vdc (adapter) 3.2V/3.8V/4.2V/dc (battery)	
MODULATION TYPE	BT_LE	GFSK
	Bluetooth	GFSK, $\pi/4$ -DQPSK, 8DPSK
	NFC	ASK
	WLAN	DSSS, OFDM, OFDMA
	GPS/GALILEO/G LONASS/BDS	BPSK
	GSM/GPRS/EDGE	GMSK, 8PSK
	WCDMA	QPSK/16QAM
	LTE	QPSK/16QAM/64QAM/256QAM
	5G NR	DFT-s-OFDM($\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM); CP-OFDM(QPSK, 16QAM, 64QAM, 256QAM);
OPERATING FREQUENCY	Bluetooth/ BT_LE	2402MHz ~ 2480MHz
	NFC	13.56 MHz
	WLAN	2412 ~ 2462MHz for 11b/g/n(HT20/40)/ax(20/40)/ax(20M RU26/52/106/242)/ax(40M RU26/52/106/242/484) 5180 ~ 5240MHz, 5260 ~ 5320 MHz, 5500 ~ 5720MHz, 5745 ~ 5825 MHz for 11a/ n(HT20)/ n(HT40) / ac(VHT20)/ ac(VHT40) / ac(VHT80)/ ac(VHT160)/ax(20/40/80/160)/ ax(20M RU26/52/106/242)/ ax(40M RU26/52/106/242/484)/ ax(80M RU26/52/106/242/484/996)/ ax(160M RU26/52/106/242/484/996/1992)
	GPS/GALILEO/G LONASS/BDS	1559MHz ~ 1610MHz 1164MHz to 1215MHz
	GSM	824.2MHz ~ 848.8MHz (FOR GSM 850) 1850.2MHz ~ 1909.8MHz (FOR GSM 1900)

OPERATING FREQUENCY	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) 779.5MHz ~ 784.5MHz (FOR LTE Band13) 706.5MHz ~ 713.5MHz (FOR LTE Band17) 2572.5MHz ~ 2617.5MHz (FOR LTE Band38) 2498.5MHz ~2687.5MHz (FOR LTE Band41) 3552.5MHz ~3697.5MHz (FOR LTE Band48) 1710.7MHz ~ 1779.3MHz (FOR LTE Band66) 665.5MHz ~ 695.5MHz (FOR LTE Band71) The following only support downlink: CA_2A-2A CA_2A-4A CA_2A-5A CA_2A-12A CA_2A-17A CA_2A-48A CA_2A-66A CA_2A-71A CA_2C CA_4A-4A CA_4A-5A CA_4A-12A CA_4A-17A CA_4A-48A CA_4A-71A CA_5A-48A CA_5A-66A CA_5B CA_7C CA_12A-66A CA_13A-48A CA_13A-66A CA_48A-48A CA_48A-66A CA_48C CA_66A-66A CA_66A-71A CA_66B CA_66C CA_2A-2A-4A CA_2A-2A-5A CA_2A-2A-12A CA_2A-2A-13A CA_2A-2A-66A

		CA_2A-2A-71A
		CA_2A-4A-4A
		CA_2A-4A-5A
		CA_2A-4A-12A
		CA_2A-4A-13A
		CA_2A-4A-71A
		CA_2A-5A-48A
		CA_2A-5A-66A
		CA_2A-12A-66A
		CA_2A-13A-48A
		CA_2A-13A-66A
		CA_2A-48A-48A
		CA_2A-48A-66A
		CA_2A-48C
		CA_2A-66A-66A
		CA_2A-66A-71A
		CA_2A-66B
		CA_2A-66C
		CA_2C-66A
		CA_4A-4A-5A
		CA_4A-4A-12A
		CA_4A-4A-13A
		CA_4A-4A-71A
		CA_5A-48A-66A
		CA_5A-48C
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		CA_5A-66B
		CA_5A-66C
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		CA_13A-48C
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		CA_13A-66C
		CA_48A-48A-66A
		CA_48A-48C
		CA_48A-66A-66A
		CA_48A-66B
		CA_48A-66C
		CA_48C-66A
		CA_48D
		CA_66A-66A-66A
		CA_66A-66A-71A
		CA_66A-66C
		CA_66C-71A
		CA_66D
		CA_4A-48C
		CA_13A-48A-66B
		CA_13A-48A-66C
		CA_13A-48C-66A
		CA_13A-48D

		CA_2A-12A-66A-66A CA_2A-12A-66C CA_2A-13A-48C CA_2A-13A-66A-66A CA_2A-13A-66B CA_2A-13A-66C CA_2A-2A-12A-66A CA_2A-2A-13A-66A CA_2A-2A-4A-4A CA_2A-2A-4A-5A CA_2A-2A-4A-71A CA_2A-2A-5A-66A CA_2A-2A-66A-66A CA_2A-2A-66A-71A CA_2A-2A-66B CA_2A-2A-66C CA_2A-48C-66A CA_2A-48D CA_2A-4A-4A-5A CA_2A-5A-48C CA_2A-5A-66A-66A CA_2A-5A-66B CA_2A-5A-66C CA_2A-5B-66A CA_2A-66A-66A-66A CA_2A-66A-66A-71A CA_2A-66C-71A CA_2C-66A-66A CA_48C-66A-66A CA_48C-66B CA_48C-66C CA_48D-66A CA_48E CA_4A-48D CA_5A-48C-66A CA_5A-48D CA_5B-66A-66A
	5G NR	SA/NSA: n2 (1852.5MHz ~ 1907.5MHz) n5(826.5MHz ~ 846.5MHz) n7(2502.5MHz ~ 2567.5MHz) n25(1852.5MHz ~ 1912.5MHz) n38(2575MHz ~ 2615MHz) n41(2501.01 ~ 2685MHz) n48(3555 ~ 3694.98MHz) n66(1712.5 ~ 1777.5MHz) n71(665.5 ~ 695.5MHz) n77(Part27Q)(3460.02 ~ 3540MHz) n77(Part27O)(3710.01 ~ 3969.99MHz) n78(Part27Q)(3460.02 ~ 3540MHz)

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		n78(Part27O)(3710.01 ~ 3789.99MHz) ENDC: DC_2A_n5A DC_2A_n71A DC_5A_n66A DC_7A_n78A DC_13A_n66A DC_66A_n5A DC_66A_n71A DC_2A-66A_n41A DC_2A-66A_n71A CA_n66A-n71A CA_n66(2A)
HW VERSION	F	
SW VERSION	AWG1.250822.030 15030	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	USB cable: non-shielded cable, with w/o ferrite core, 0.8 meter	
ACCESSORY DEVICES	Refer to note as below	

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- For the test results, the EUT had been tested with all conditions. But only the worst case was shown in the test report.

3. List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
Display(AMOLED)	EDO	Everdisplay Optronics Co., Ltd.	E611FCC74.A	N/A
Back cover	IV Techmould	N/A	N/A	N/A
Bezel	IV Techmould	N/A	N/A	N/A
Photo/Video Camera 1	Sunny Optical	N/A	F48N03A (Auto focus)	N/A
Photo/Video Camera 2	TrulyOpto	N/A	CSF208-B8BF-E(Fix focus)	N/A
CPU	Qualcomm	N/A	QCM6490	N/A
UFS	Kioxia	N/A	THGJFAT0T44BAIL	N/A
BT/WLAN Module	Murata	N/A	LBEE5QG2CX-830	N/A
NFC chipset	NXP	N/A	SN110TUK1	N/A
Battery	BARTEC	N/A	17-S1Z0-0020/****	4300 mAh, 3.68V
USB-C Cable	BARTEC	N/A	G7-A0Z0-0010	Length: 0.8m

1.2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

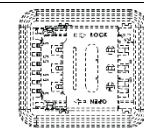
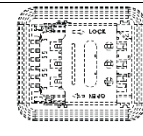
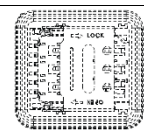
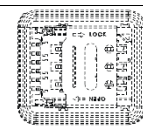
APPLIED STANDARD: FCC Part 15, Subpart B			
Standard Section	Test Item	Result	Test lab*
FCC Part 15, Subpart B, Class B ANSI C63.4:2014	Conducted Test	Compliance	A
	Radiated Emission Test (30MHz ~ 1GHz)	Compliance	A
	Radiated Emission Test (Above 1GHz)	Compliance	A

NOTE:

1. In this report, for specific changes please refer to the documentation provided by the applicant (REV_F SC9EX1_SP9EX1_SC9EX2_SP9EX2 PCBA HW release notes (Ver. 6.0), REV_F SC9EX1_SP9EX1_SC9EX2_SP9EX2 Product ASSY release notes (Ver. 1.0) and SC9EX1_SP9EX1_SC9EX2_SP9EX2 SW release notes (Ver. 6.0)).
2. The differences between SC9EX1 and SP9EX1 the presence of the barcode scanner module and the "bump" on the back cover that model SC9EX1 incorporates the barcode scanner module, no differences on the PCBA between the variants(model:SP9EX1). We verified the CE, RE, ESD, RS, CS worst case on parent product SC9EX1 and SP9EX1 variant, only the worst-case(SC9EX1) results are shown in the report.

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3. The devices BARTEC SP9EX1 Smartphone and BARTEC SP9EX2 Smartphone share the same hardware and software. The same applies for the devices BARTEC SC9EX1 Smartscanner and BARTEC SC9EX2 Smartscanner. The only difference are the hazardous area marking of the devices, see table for clarification.

BARTEC SP9EX1 Smartphone	BARTEC SP9EX2 Smartphone
BARTEC SP9EX1 Type: 17-S19P-****/***** Mfr: BARTEC GmbH Max-Eyth-Straße 16 97980 Bad Mergentheim, DE www.bartec.com    UL 24 ATEX 3153X Ex II 1G Ex ia IIC T4 Ga Ex II 2D Ex ia IIC T135°C Db IP64 IECEx UL 24.0004X Class I, Div 1, Groups A, B, C and D; Class II, Div 1, Groups E, F and G; Class III, T4 Zone 0, AEx ia IIC T4 Ga Zone 21, AEx ia IIC T135°C Db Zone 0, Ex ia IIC T4 Ga Zone 21, Ex ia IIC T135°C Db -20° < Ta < +55°C QR-code S/N: TTTTYYSSSSSS MFD: MONTHYY reserved for logos of country approvals USB port: USB-PD compatible – 5-20 Vdc / max 3 A DC-In port: 12 Vdc / max 1.5 A USB Um = 20 V / DCin Um = 12 V WARNING/ATTENTION: Use only replaceable battery pack BARTEC GmbH type: 17-S1Z0-0020/**** Utiliser uniquement la batterie BARTEC GmbH type: 17-S1Z0-0020/**** INTRINSICALLY SAFE/SECURITE INTRINSEQUE Warning - Substitution of components may impair intrinsic safety. Avertissement - La substitution des composants peut nuire à la sécurité intrinsèque.	BARTEC SP9EX2 Type: B7-S29P-****/***** Mfr: BARTEC GmbH Max-Eyth-Straße 16 97980 Bad Mergentheim, DE www.bartec.com    UL 24 ATEX xxxxx Ex II 3G Ex ic IIC T4 Gc Ex II 3D Ex ic IIC T135°C Dc IP64 IECEx UL 24.xxxxx Class I, Div 2, Groups A, B, C and D; Class II, Div 2, Groups E, F and G; Class III, T4 Zone 2, AEx ic IIC T4 Gc Zone 22, AEx ic IIC T135°C Dc Zone 2, Ex ic IIC T4 Gc Zone 22, Ex ic IIC T135°C Dc -20° < Ta < +55°C QR-code S/N: TTTTYYSSSSSS MFD: MONTHYY reserved for logos of country approvals USB port: USB-PD compatible – 5-20 Vdc / max 3 A DC-In port: 12 Vdc / max 1.5 A USB Um = 20 V / DCin Um = 12 V WARNING/ATTENTION: Use only replaceable battery pack BARTEC GmbH type: B7-A2Z0-0098/**** Utiliser uniquement la batterie BARTEC GmbH type: B7-A2Z0-0098/**** INTRINSICALLY SAFE/SECURITE INTRINSEQUE Warning - Substitution of components may impair intrinsic safety. Avertissement - La substitution des composants peut nuire à la sécurité intrinsèque.
BARTEC SC9EX1 Smartscanner	BARTEC SC9EX2 Smartscanner
BARTEC SC9EX1 Type: 17-S19C-****/***** Mfr: BARTEC GmbH Max-Eyth-Straße 16 97980 Bad Mergentheim, DE www.bartec.com    UL 24 ATEX 3153X Ex II 1G Ex ia op is IIC T4 Ga Ex II 2D Ex ia op is IIC T135°C Db IP64 IECEx UL 24.0004X Class I, Div 1, Groups A, B, C and D; Class II, Div 1, Groups E, F and G; Class III, T4 Zone 0, AEx ia op is IIC T4 Ga Zone 21, AEx ia op is IIC T135°C Db Zone 0, Ex ia op is IIC T4 Ga Zone 21, Ex ia op is IIC T135°C Db -20° < Ta < +55°C QR-code S/N: TTTTYYSSSSSS MFD: MONTHYY reserved for logos of country approvals USB port: USB-PD compatible – 5-20 Vdc / max 3 A DC-In port: 12 Vdc / max 1.5 A USB Um = 20 V / DCin Um = 12 V WARNING/ATTENTION: Use only replaceable battery pack BARTEC GmbH type: 17-S1Z0-0020/**** Utiliser uniquement la batterie BARTEC GmbH type: 17-S1Z0-0020/**** INTRINSICALLY SAFE/SECURITE INTRINSEQUE Warning - Substitution of components may impair intrinsic safety. Avertissement - La substitution des composants peut nuire à la sécurité intrinsèque.	BARTEC SC9EX2 Type: B7-S29C-****/***** Mfr: BARTEC GmbH Max-Eyth-Straße 16 97980 Bad Mergentheim, DE www.bartec.com    UL 24 ATEX xxxxx Ex II 3G Ex ic op is IIC T4 Gc Ex II 3D Ex ic op is IIC T135°C Dc IP64 IECEx UL 24.xxxxx Class I, Div 2, Groups A, B, C and D; Class II, Div 2, Groups E, F and G; Class III, T4 Zone 2, AEx ic op is IIC T4 Gc Zone 22, AEx ic op is IIC T135°C Dc Zone 2, Ex ic op is IIC T4 Gc Zone 22, Ex ic op is IIC T135°C Dc -20° < Ta < +55°C QR-code S/N: TTTTYYSSSSSS MFD: MONTHYY reserved for logos of country approvals USB port: USB-PD compatible – 5-20 Vdc / max 3 A DC-In port: 12 Vdc / max 1.5 A USB Um = 20 V / DCin Um = 12 V WARNING/ATTENTION: Use only replaceable battery pack BARTEC GmbH type: B7-A2Z0-0098/**** Utiliser uniquement la batterie BARTEC GmbH type: B7-A2Z0-0098/**** INTRINSICALLY SAFE/SECURITE INTRINSEQUE Warning - Substitution of components may impair intrinsic safety. Avertissement - La substitution des composants peut nuire à la sécurité intrinsèque.

*Test Lab Information Reference

Lab A:

Boomwave Test (Shenzhen) Co., Ltd.

Lab Address:

Rm B38, Warehouse A5(Chiwan #1), #3 Chiwan 4th Rd, Chiwan Comm, Zhaoshang St, Nanshan Dist, Shenzhen, Guangdong, Shenzhen, China

Accredited Test Lab Cert 7607.01

The FCC Site Registration No. is 646781; The Designation No. is CN1429.

Boomwave Test (Shenzhen)
Co., Ltd.

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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	$\pm 2.70\text{dB}$
Radiated emissions	30MHz~1GHz	$\pm 4.98\text{dB}$
	1GHz ~6GHz	$\pm 4.70\text{dB}$
	6GHz ~18GHz	$\pm 4.60\text{dB}$
	18GHz ~40GHz	$\pm 4.12\text{dB}$

1.4 DESCRIPTION OF TEST MODES

Test Mode	Test Condition
Radiated emission test	
1	GSM850 Idle + Adapter + USB cable + BT Idle + WIFI Idle (2.4G) + Front Camera On + SIM
2	WCDMA B5 Idle + Adapter + USB cable + BT Idle + WIFI Idle (5G) + Back Camera On + SIM
3	LTE B5 Idle + Adapter + USB cable + BT Idle + WIFI Idle (2.4G) + flashlight on + SIM
4	LTE B12 Idle + Adapter + USB cable + BT Idle + WIFI Idle (5G) + MPG4 + SIM
5	LTE B13 Idle + Adapter + USB cable + BT Idle + WIFI Idle (2.4G) + NFC + SIM
6	LTE B17 Idle + Adapter + USB cable + BT Idle + WIFI Idle (5G) + Scanning + SIM
7	LTE B71 Idle + USB Link + Data Transmission + BT Idle + WIFI Idle (2.4G) + Notebook to EUT + Earphone + SIM
8	DC_B12_N5 Link + Adapter + USB cable + BT Idle + WIFI Idle (5G) + SIM
9	Powered by battery + BT Idle + WIFI Idle (5G) + MPG4 + SIM

Test Mode	Test Condition
Conducted emission test	
1	GSM850 Idle + Adapter + USB cable + BT Idle + WIFI Idle (2.4G) + Front Camera On + SIM
2	WCDMA B5 Idle + Adapter + USB cable + BT Idle + WIFI Idle (5G) + Back Camera On + SIM
3	LTE B5 Idle + Adapter + USB cable + BT Idle + WIFI Idle (2.4G) + flashlight on + SIM
4	LTE B12 Idle + Adapter + USB cable + BT Idle + WIFI Idle (5G) + MPG4 + SIM
5	LTE B13 Idle + Adapter + USB cable + BT Idle + WIFI Idle (2.4G) + NFC + SIM
6	LTE B17 Idle + Adapter + USB cable + BT Idle + WIFI Idle (5G) + Scanning + SIM
7	LTE B71 Idle + USB Link + Data Transmission + USB cable + BT Idle + WIFI Idle (2.4G) + Notebook to EUT + SIM
8	DC_B12_N5 Link + Adapter + USB cable + BT Idle + WIFI Idle (5G) + SIM
NOTE: - For radiated emission test, Pre-scan all mode, test mode 6 was the worst case and only this mode was presented in this report - For conducted emission test, Pre-scan all mode, mode 4 was the worst 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	Bluetooth	Rohde&Schwarz	SMBV100B	102176	N/A
3	Universal radio communication tester	Rohde&Schwarz	CMW500	169399	N/A
4	Radio Communication Tester	Rohde&Schwarz	CMX500	101446	N/A
5	WIFI Router	HUAWEI	N/A	N/A	N/A
6	Adapter	N/A	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
2	USB Line: non-shielded, Detachable 0.8m;

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

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Pulse limiter	SCHWARZBECK	VTSD 9561F	01579	2025/7/22	2026/7/21
ESR.EMI TEST RECEIVER	Rohde&SCHWARZ	ESR	101405	2025/6/30	2026/6/29
LISN	SCHWARZBECK	NSLK 8127	01216	2025/8/27	2026/8/26
Cable	Tonscend	/	/	2025/7/22	2026/7/21

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

2.1.3 TEST PROCEDURES

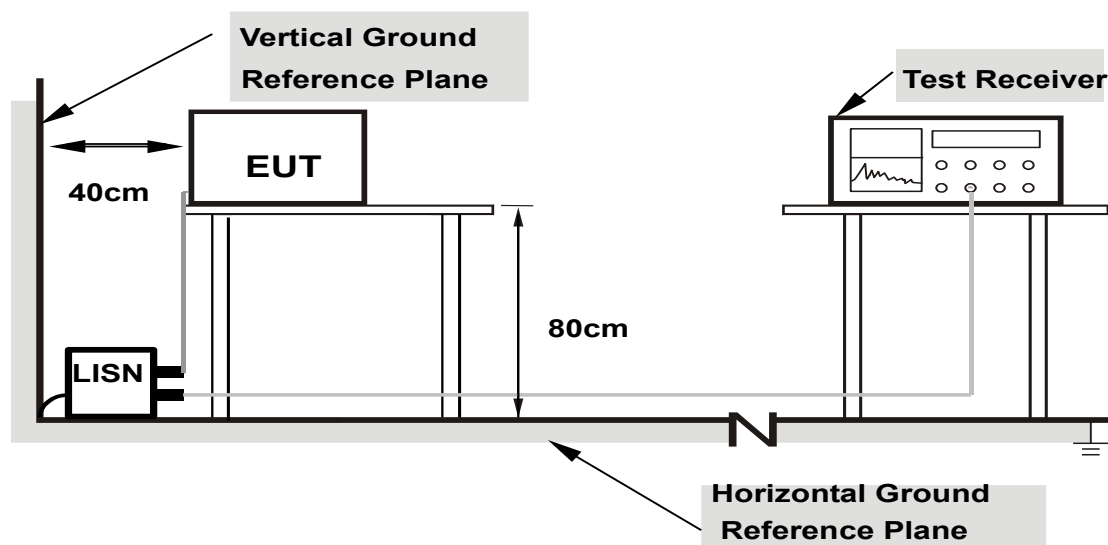
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

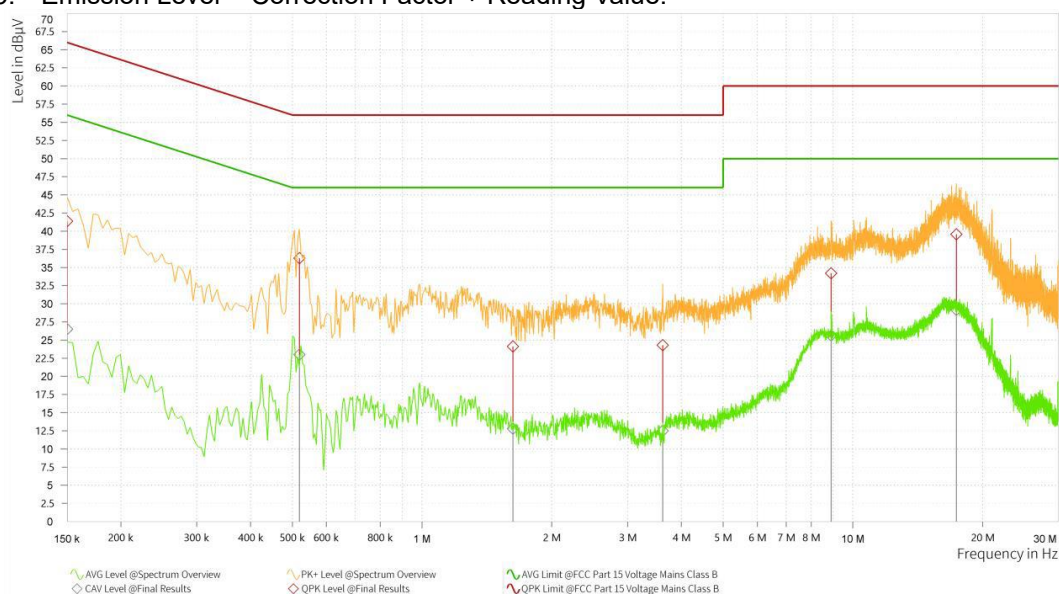
2.1.7 TEST RESULTS

TEST VOLTAGE	Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	TESTED BY	Carl Xie

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	0.150	41.37	66.00	24.63	26.51	56.00	29.49	9.80	L1	9.000
1	0.519	36.28	56.00	19.72	23.01	46.00	22.99	9.75	L1	9.000
1	1.626	24.13	56.00	31.87	12.80	46.00	33.20	9.80	L1	9.000
1	3.620	24.29	56.00	31.71	12.50	46.00	33.50	10.01	L1	9.000
1	8.907	34.20	60.00	25.80	25.63	50.00	24.37	10.79	L1	9.000
1	17.390	39.58	60.00	20.42	29.15	50.00	20.85	12.86	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.

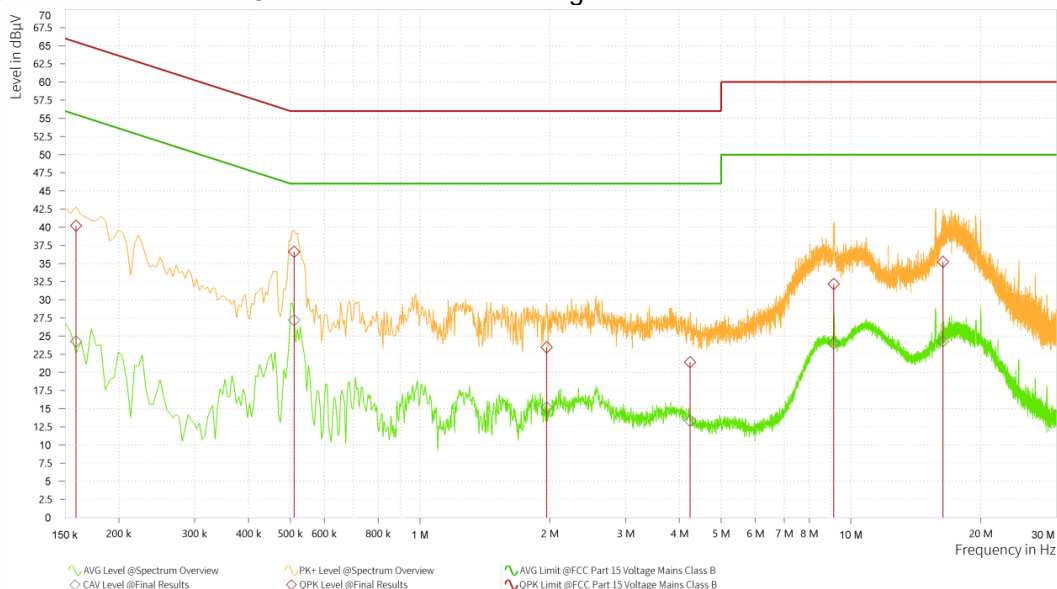


TEST VOLTAGE	Input 120 Vac, 60 Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	TESTED BY	Carl Xie

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	0.159	40.21	65.52	25.31	24.26	55.52	31.26	9.79	N	9.000
1	0.510	36.62	56.00	19.38	27.21	46.00	18.79	9.75	N	9.000
1	1.968	23.45	56.00	32.55	15.14	46.00	30.86	9.81	N	9.000
1	4.236	21.39	56.00	34.61	13.34	46.00	32.66	10.07	N	9.000
1	9.128	32.17	60.00	27.83	23.96	50.00	26.04	10.83	N	9.000
1	16.355	35.23	60.00	24.77	24.28	50.00	25.72	12.56	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 (dB μ V/m)		
Frequencies (MHz)	FCC 15B Class A	FCC 15B Class B
30-88	49.54	40
88-216	53.98	43.5
216-960	56.9	46
960-1000	60	54
Above 1000	Avg: 60 Peak: 80	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 (dB μ V/m) = 20 log Emission level (μ V/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

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
BiConiLog Antenna	ETS-LINDGREN	3143B	161965	2025/7/17	2026/7/16
Preamplifier	Tonscend	TPA001330	806JSAPO40804251015	2025/6/30	2026/6/29
Attenuator 6DB	SHX	TS2-6-6-A	230927166	2025/6/30	2026/6/29
Cable 1	N/A	N/A	N/A	N/A	N/A
MXE EMI Receiver	keysight	N9038B	MY50018017	2025/6/31	2026/6/30
Active Receive Loop Antenna	SCHWARZBECK	FMZB 1519 B	00173	2025/11/29	2026/11/28

Frequency range above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	SCHWARZBECK	BBHA9120D	3297	2025/9/27	2026/9/26
Horn Antenna	STEATITE	QWH-SL-18-40-K-SG QMS-00361	15433	2025/7/19	2026/7/18
Preamplifier	Tonscend	TPA184045	'AP24L8060388	2025/7/3	2026/7/2
Preamplifier	Tonscend	TPA011845	'AP24L8060392	2025/6/30	2026/6/29
MXE EMI Receiver	keysight	N9038B	MY50018017	2025/7/1	2026/6/30
Attenuator 6DB	SHX	TS2-6-6-A	230927166	2025/6/30	2026/6/29
HIGH pass FILTER_1-18	EWT	EWT-57-0222	EWT-57-0222	2025/6/30	2026/6/29
HIGH pass FILTER_7-18	EWT	EWT-57-0223	EWT-57-0223	2025/6/30	2026/6/29
HIGH pass FILTER_3-18	EWT	EWT-57-0221	EWT-57-0221	2025/6/30	2026/6/29
DC~1GHz Lowpass Filter	EWT	EWT-56-0649	EWT-56-0649	2025/7/3	2026/7/2
Cable 2	N/A	N/A	N/A	2025/9/28	2026/9/27
Cable 3	N/A	N/A	N/A	2025/9/28	2026/9/27

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GREGT/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. $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
3. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$ (if the raw value not contains the amplifier);
4. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$ (if the raw value contains the amplifier).
5. $\text{Margin value} = \text{Limit value} - \text{Emission level}$.

<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:

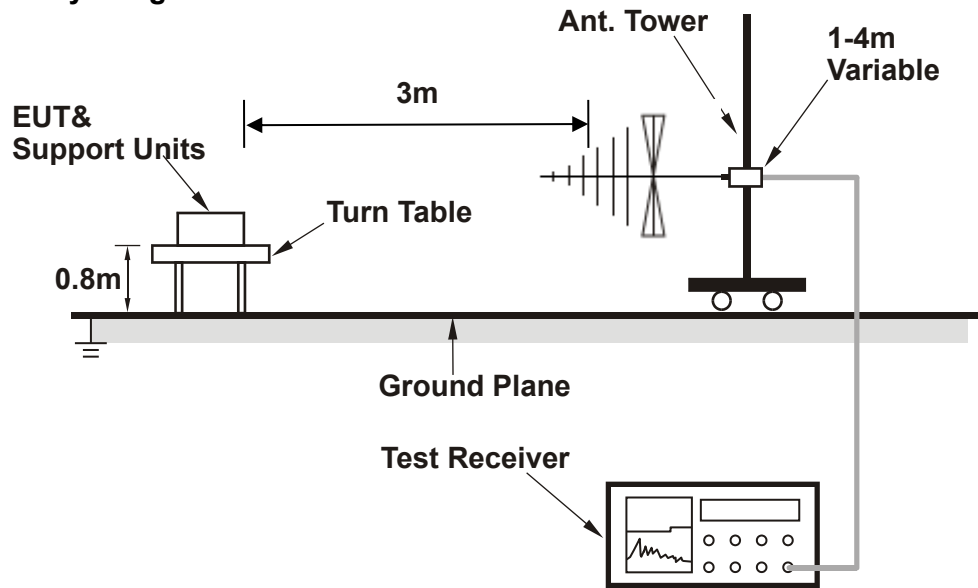
1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test 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. $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
5. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$ (if the raw value not contains the amplifier);
6. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$ (if the raw value contains the amplifier)
7. $\text{Margin value} = \text{Limit value} - \text{Emission level}$.

2.2.4 DEVIATION FROM TEST STANDARD

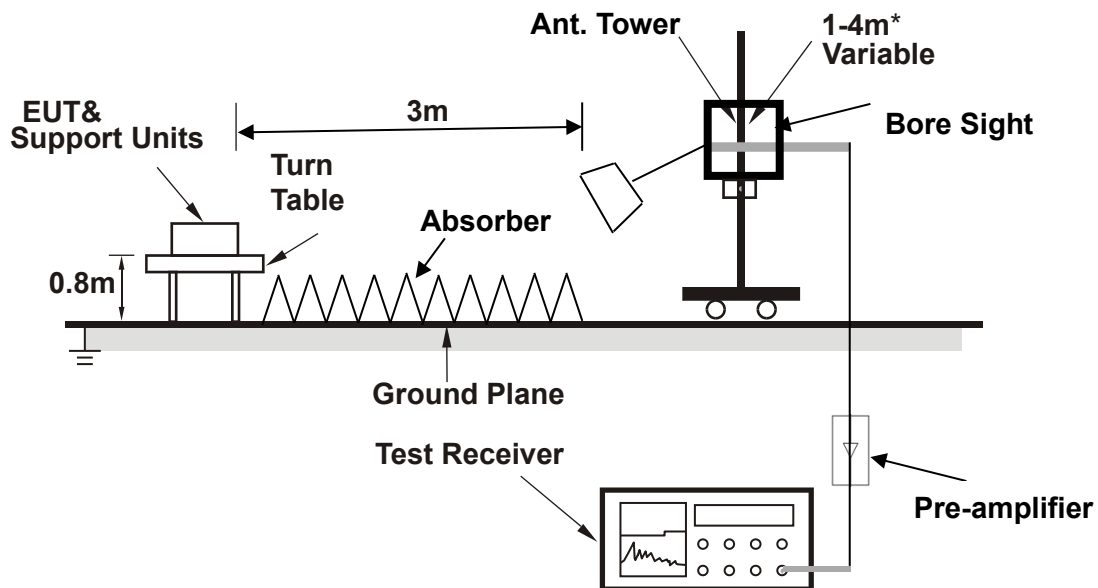
No deviation.

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

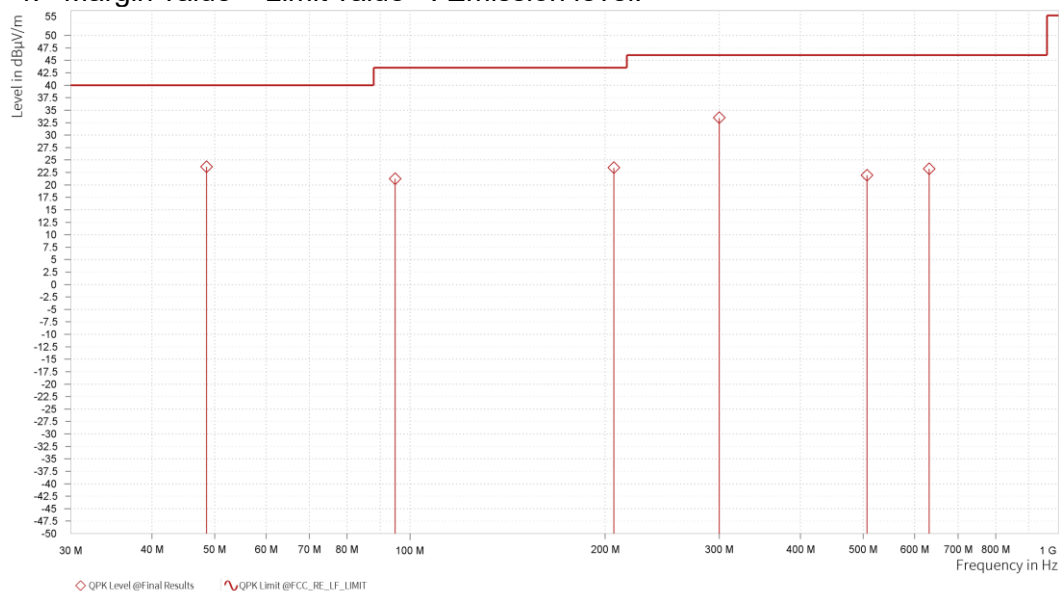
TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Carl Xie		

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	48.592	23.62	40.00	16.38	-10.06	H	355.1	2.00	120.000
1	94.882	21.23	43.50	22.27	-13.07	H	286.6	2.00	120.000
1	206.163	23.42	43.50	20.08	-11.44	H	134.8	2.00	120.000
1	299.714	33.47	46.00	12.53	-7.36	H	227.4	1.00	120.000
1	506.809	21.94	46.00	24.06	-3.66	H	73.3	1.00	120.000
1	631.723	23.21	46.00	22.79	-2.34	H	227.4	1.00	120.000

REMARKS:

- Emission level(dBuV/m)=Read Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) -Amplifier Gain
- The other emission levels were very low against the limit.
- Margin value = Limit value -. Emission level.



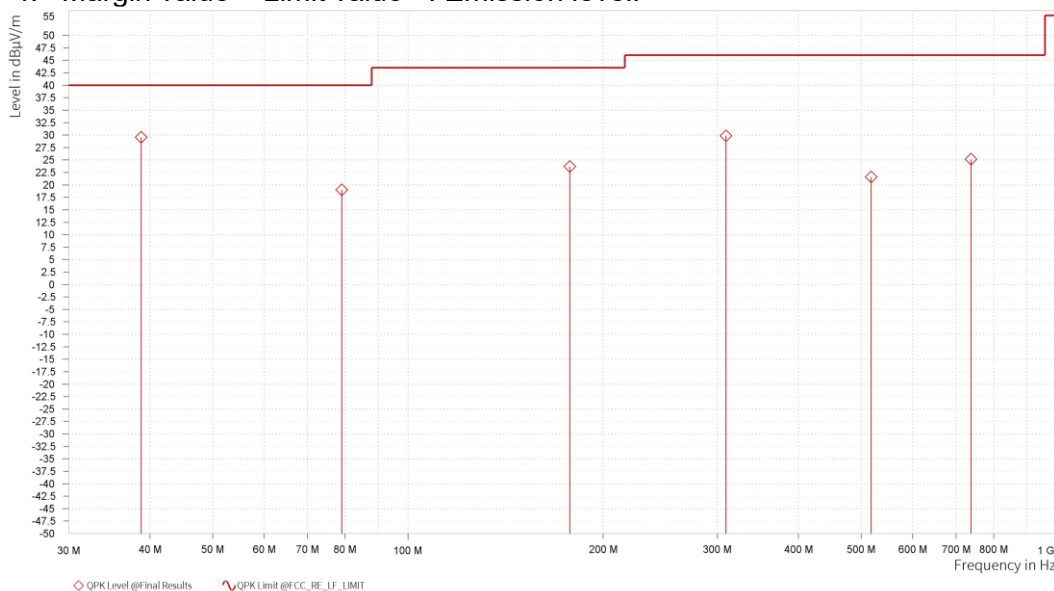
TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Carl Xie		

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	38.784	29.56	40.00	10.44	-11.51	V	209	2.00	120.000
1	79.039	19.00	40.00	21.00	-16.59	V	209	2.00	120.000
1	177.709	23.70	43.50	19.80	-13.47	V	302.7	1.00	120.000
1	309.252	29.84	46.00	16.16	-7.34	V	55.9	2.00	120.000
1	517.533	21.55	46.00	24.45	-3.67	V	302.7	1.00	120.000
1	738.208	25.14	46.00	20.86	-0.55	V	302.7	1.00	120.000

REMARKS:

- Emission level(dBuV/m)=Read Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) -Amplifier Gain
- The other emission levels were very low against the limit.
- Margin value = Limit value –. Emission level.



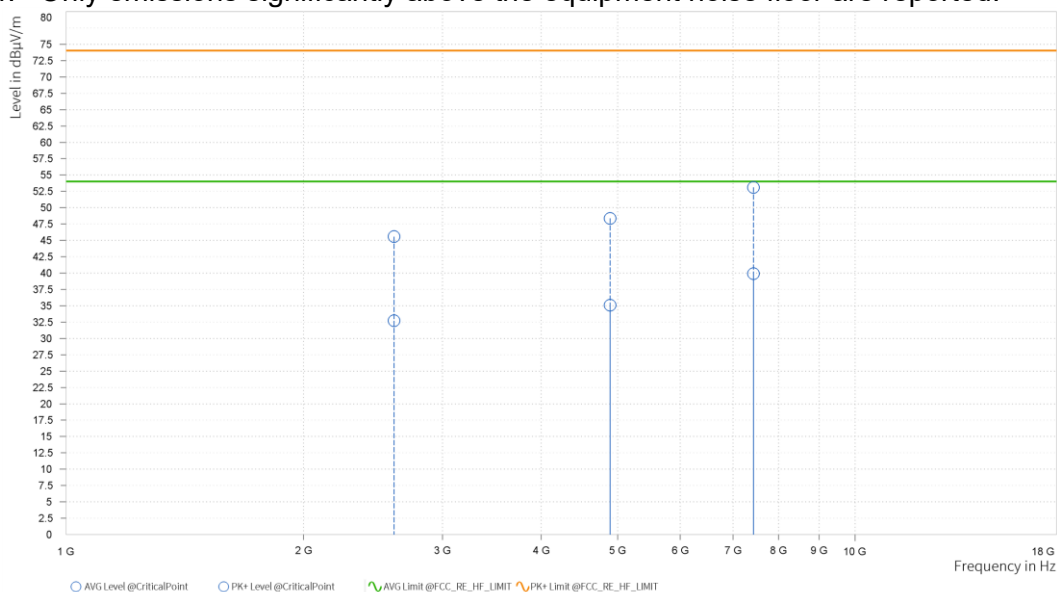
TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Carl Xie		

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]
1	2,603.500	45.58	74.00	28.42	32.71	54.00	21.29	7.40	H	0.9	2.00
1	4,890.500	48.37	74.00	25.63	35.07	54.00	18.93	11.61	H	194.6	2.00
1	7,430.500	53.10	74.00	20.90	39.92	54.00	14.08	16.21	H	1	1.00

REMARKS:

1. Peak detector quick scan is shown 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 the equipment noise floor are reported.



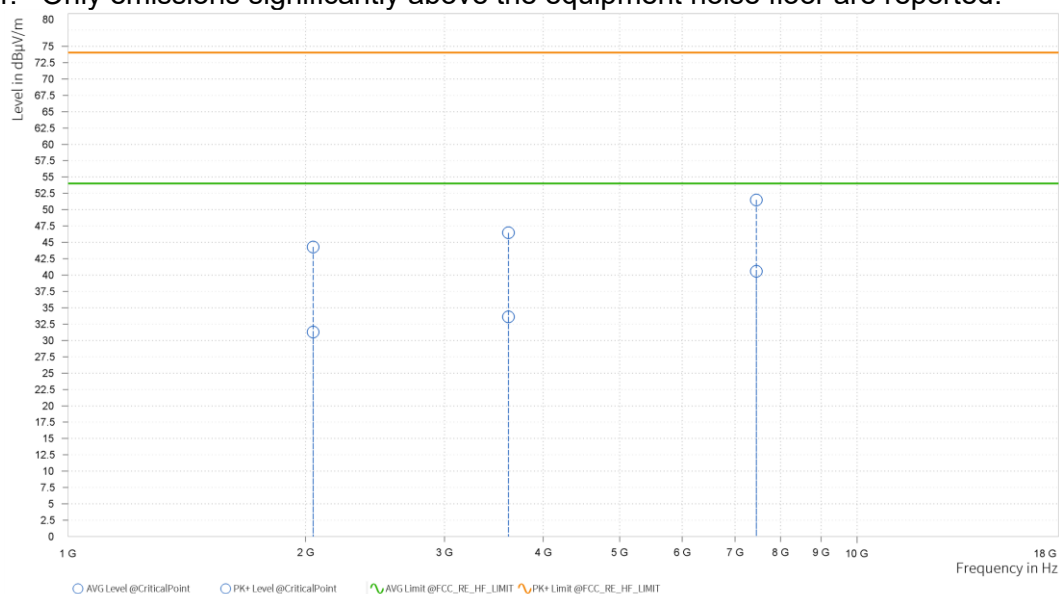
TEST VOLTAGE	Input 120 Vac, 60 Hz	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Carl Xie		

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]
1	2,044.000	44.30	74.00	29.70	31.29	54.00	22.71	6.07	V	192.2	2.00
1	3,615.000	46.47	74.00	27.53	33.62	54.00	20.38	8.74	V	192.2	2.00
1	7,452.000	51.49	74.00	22.51	40.59	54.00	13.41	16.21	V	300.4	1.00

REMARKS:

1. Peak detector quick scan is shown 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 the equipment noise floor are reported.





Test Report No.: PSZ-QSZ2510291415EM03

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---