FCC EMC TEST REPORT

Name of Sample:	**Mobile Cellular Phone**
Model of Sample:	**XT2409-2**
Applicant:	**Motorola Mobility LLC**
Issued Date:	**2024-07-11**

ADR TEST AND CERTIFICATION CENTER

Motorola Mobility LLC, a Lenovo Company

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Name of Client	**Motorola Mobility LLC**		
Address of Client	**222 W, Merchandise Mart Plaza, Chicago IL 60654 USA**		
Trademark	**Motorola**	**Type Name or ID**	**IHDT56AS7**
Applicant No.	**RF178846**	**Sample No.**	**SN: N74R240204**
Delivering Date	**2024-05-30**	**Test Date(s)**	**2024-06-18 to 2024-06-20**
Sample Illustration	**None**		
Standard	**47 CFR FCC PART 15 Subpart B** **ANSI C63.4-2014**		
Conclusion	**PASS**		
Remarks	**None**		

Editor: Chuan Sun **Auditor: Jianfeng Wen** **Approver: Huangsheng Lin**

Chuan Sun Jianfeng Wen Huangsheng Lin

Matters Needing Attention

a) The electronic report shall be valid after encryption.

b) The paper report shall be valid after being stamped with the official seal of the company.

c) The report is invalid without the signature of the Editor, Auditor and Approver.

d) The test report is invalid if there is any evidence of erasure and/or falsification.

e) If there is any dissidence for the test report, please file objection to the lab within 15 days from the date of receiving the test report.

f) The test report is only responsible for the tested model/sample， the sample(s) presented in the report are provided by the Client.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
24ADRTCC5039	Rev. 01	Initial issue of report	2024-06-28
24ADRTCC5039	Rev. 02	Update accessory information	2024-07-11

Catalogue

1. Information Of Equipment Under Test(EUT)

Product Name:		Mobile Cellular Phone
Brand Name:		Motorola
Model Name:		XT2409-2
FCC ID:		IHDT56AS7
Software Version:		UUI34.32
Hardware Version:		DVT2
IMEI Code:		Conduction: 350074740015079 / 350074740015087 for Sample 1 Radiation: 350074740015079 / 350074740015087 for Sample 1
Supports Radio application in this standard:		
GSM/WCDMA/LTE/5G NR/WLAN/BLUETOOTH/GNSS/NFC/WPT		
Accessory		
Product	**Brand**	**model**
AC Adapter 1(US)	Motorola (Chenyang)	MC-681N
AC Adapter 1(EU)	Motorola (Chenyang)	MC-682N
AC Adapter 1(UK)	Motorola (Chenyang)	MC-683N
AC Adapter 1(AU)	Motorola (Chenyang)	MC-685N
AC Adapter 1(BR)	Motorola (Chenyang)	MC-687N
AC Adapter 2(US)	Motorola (Acbel)	MC-681N
AC Adapter 2(EU)	Motorola (Acbel)	MC-682N
AC Adapter 2(UK)	Motorola (Acbel)	MC-683N
AC Adapter 2(AU)	Motorola (Acbel)	MC-685N
AC Adapter 2(BR)	Motorola (Acbel)	MC-687N
Battery 1	Motorola (ATL)	QV43
USB Cable 1	Motorola (Hexin)	S928E28748
USB Cable 2	Motorola (Juwei)	S928E28749
USB Cable 3	Motorola (Saibao)	S928E38943
Wireless Earphones	Motorola	XT2441-1

Remark:

1. The EUT's information was declared by manufacturer. Please refer to the manufacturer's specifications or user's manual for more detailed description.

2. Details Of Test

2.1 Applicant

Applicant Name:	Motorola Mobility LLC
Address:	222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

2.2 Location of Test

Test Site 1:	ADR TEST AND CERTIFICATION CENTER
Address:	NO.19, Gao Xin 4th Road, Wuhan, 430205, P.R China

2.3 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

47 CFR FCC PART 15 Subpart B

ANSI C63.4-2014

3. Result Summary

Test Items	Test Standard	Limit	Result (PASS/FAIL)	Site
Radiated emissions	ANSI C63.4-2014	15.109 Class B	PASS	Site 1
Conducted emissions	ANSI C63.4-2014	15.107 Class B	PASS	Site 1
decision rules: Statements of conformity (e.g. Pass/Fail) to specifications are made in this report without taking measurement uncertainty into account except when requested by the customer. Where statements of conformity are made in this report, the following decision rules are applied: PASS- Results within limits/specifications FAIL- Results exceed limits/specifications				

Remark: For the test result, the EUT had been tested with all test modes. But only the worst case was shown in test report.

Summary of Environment Condition, Test Date and Test Engineer for all Test Items

Test items	Ambient Temperature (℃)	Relative Humidity (%)	Atmospheric Pressure （kPa）	Test Date	Test Engineer
Radiated emissions	24~25	52~55	/	Jun.18,2024~ Jun.20-2024	Man Cao Mingzhu Li Rencong Liu Chuanghui Xiao
Conducted emissions	24~25	53~55	/	Jun.18,2024~ Jun.20-2024	Man Cao Chuanghui Xiao

4. Tests Configuration Of EUT

4.1 EUT Test Modes

All the test modes were carried out with the EUT under the normal operation, which were shown in this test report and defined as below:

Test Items	configuration
Radiated Emissions	Mode 1: GSM 850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + USB Cable 1(Charging from Adapter 1) + SIM for Sample 1 Mode 2: GSM1900 Idle + Bluetooth Earphone Idle + WLAN (2.4G) Idle + Camera (Rear) + USB Cable 2(Charging from Adapter 2) + E-SIM for Sample 1 Mode 3: WCDMA Band V Idle + Bluetooth Idle + WLAN(5G)Idle + USB Cable 3(Charging from Adapter 2) + SIM for Sample 1 Mode 4: LTE Band 5 Idle + Bluetooth Earphone Idle + WLAN(2.4G)Idle + NFC On + USB Cable 3(Charging from Adapter 1） + SIM for Sample 1 Mode 5: LTE Band 12 Idle + Bluetooth Idle + WLAN(5G)Idle + MPEG4(Run Color Bar) + USB Cable 1(Charging from Adapter 2) + SIM for Sample 1 Mode 6: LTE Band 13 Idle + Bluetooth Earphone Idle + WLAN(2.4G)Idle + GNSS On + USB Cable 1(Data Link with Notebook) + EUT(eMMC)USB Data Link to NB + SIM for Sample 1 Mode 7: LTE Band 26 Idle + Bluetooth Idle + WLAN(5G)Idle + Camera(Front) + USB Cable 2(Data Link with Notebook) + NB USB Data Link to EUT(eMMC) + SIM for Sample 1 Mode 8: n2 Idle+ Bluetooth Idle + WLAN (2.4G) Idle + Camera (Front) + Earphone + SIM for Sample 1 Mode 9: LTE Band 25 Idle + Bluetooth Idle + WLAN (2.4G) Idle + USB Cable 1(EUT Charging from Wireless charger) Adapter 1 Connect to Wireless charger + SIM for Sample 1 Mode 10: LTE Band 2 Idle + Bluetooth Idle + WLAN (2.4G) Idle + GNSS On + USB Cable 3(Data Link with Notebook) + EUT (eMMC)USB Data Link to NB + SIM for Sample 1 Mode 11: GSM 850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + Camera (Rear) + Earphone + SIM for Sample 1
AC	Mode 1: GSM 850 Idle + Bluetooth Idle + WLAN (2.4G) Idle + Camera (Rear) + USB Cable 1(Charging from Adapter 1) + SIM for Sample 1 Mode 2: GSM1900 Idle + Bluetooth Earphone Idle + WLAN Idle + Camera (Rear) + USB Cable 2(Charging from Adapter 2) + E-SIM for Sample 1 Mode 3: WCDMA Band V Idle + Bluetooth Idle + WLAN(5G) Idle + USB Cable 3(Charging from Adapter 1) + SIM for Sample 1 Mode 4: LTE Band 5 Idle + Bluetooth Idle + WLAN (2.4G) Idle + NFC On + USB Cable 3(Charging from Adapter 2) + SIM for Sample 1 Mode 5: LTE Band 12 Idle + Bluetooth Earphone Idle + WLAN(5G) Idle + MPEG4 (Run Color Bar) + USB Cable 2(Charging from Adapter 1) + SIM for Sample 1 Mode 6: LTE Band 13 Idle + Bluetooth Idle + WLAN(2.4G)Idle + GNSS On +

Conducted Emission	USB Cable 1(Data Link with Notebook) + EUT(eMMC)USB Data Link to NB + SIM for Sample 1 Mode 7: LTE Band 25 Idle + Bluetooth Earphone Idle + WLAN(5G) Idle + Camera (Rear) + USB Cable 2(Data Link with Notebook) + NB USB Data Link to EUT (eMMC) + SIM for Sample 1 Mode 8: n2 Idle + Bluetooth Idle + WLAN (2.4G) Idle + Camera (Front) + USB Cable 1(Charging from Adapter 2) + SIM for Sample 1 Mode 9: LTE Band 17 Idle + Bluetooth Idle + WLAN (2.4G) Idle + USB Cable 1(EUT Charging from Wireless charger) Adapter 1 Connect to Wireless charger + SIM for Sample 1 Mode 10: LTE Band 26 Idle + Bluetooth Idle + WLAN (2.4G) Idle + GNSS On + USB Cable 3(Data Link with Notebook) + EUT (eMMC)USB Data Link to NB + SIM for Sample 1

Remark:

1. If there is over one kind of accessories, each one should be applied in the alltest modes. However, only the worst case will be recorded in this report.
2. If EUT has more than one typical operation, only the worst case will be recorded in this report.

Link Mode:

When the EUT state is switched on and worked.

Idle Mode:

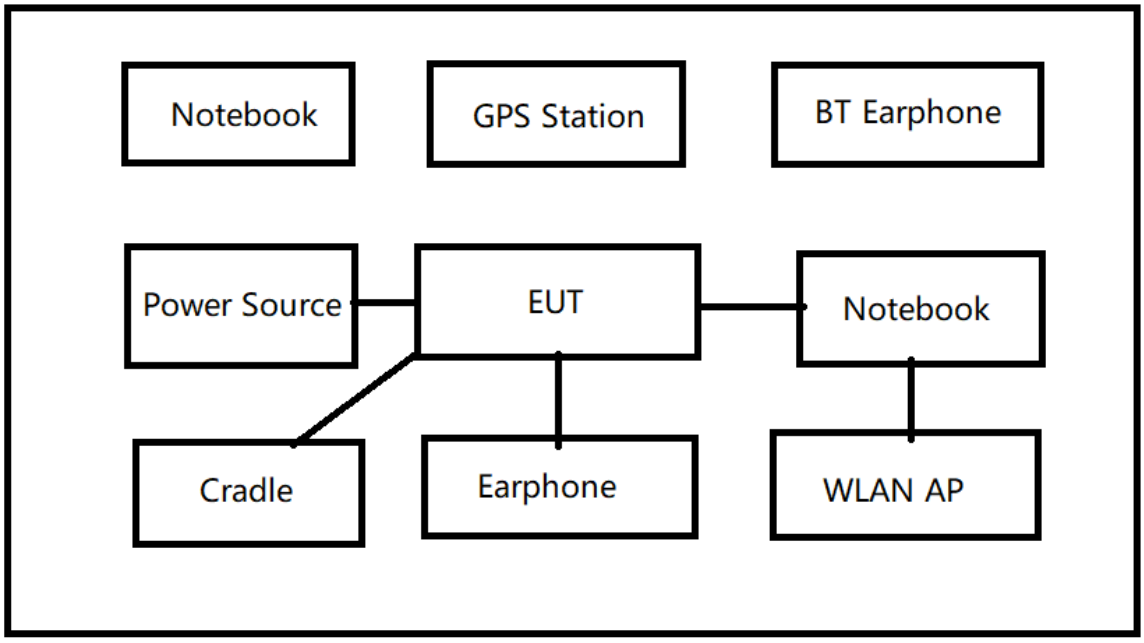
When the EUT state is switch on but without Radio Resource Control (RRC) connection.

Worst mode of all test items listed in section 4.1

Test items	Worst mode
Radiated Emission	9
Conducted Emission	10

Remark: Only data of worst mode (if test item has) was reported in test result.

4.2 Configuration Of Test System



This example is connection diagram of EUT test configurations.
For detail, please refer to test mode configuration and setup photographs for each test item.

4.3 Support Unit For Test

Name	Model Name	Manufacturer	S/N
System Simulator	CMW500	R&S	141518
System Simulator	CMW500	R&S	171184
System Simulator	CMX500	R&S	101840
Vector Signal Generator	SMBV100A	R&S	258462
WLAN AP	TP-Link-8342	TP-Link	NA
WLAN AP	H3C Magic NX54	H3C	NA
Notebook	YOGA Pro 14s	Lenovo	PF48HYHV
Bluetooth Earphone	TR6	SOA/Y	NA
Bluetooth Earphone	Earbuds X2	COSONIC	NA
SD Card	128 PRO Plus	Samsung	NA
U disk	L7C	Lenovo	NA
Wireless charger	MW-03	Motorola	SA18D71288
Earphone	-	Motorola	MI181C

5. Test Result

5.1 Radiated Emissions

5.1.1 Limit

Frequency range MHz	Quasi-peak limits dB (μV/m)		RBW kHz
30 to 88	40		120
88 to 216	43.5		120
216 to 960	46		120
960 to 1000	54		120
Frequency range MHz	**Peak limits** dB (μV/m)	**Average limits** dB (μV/m)	**RBW** MHz
Above 1000	74	54	1
At transitional frequencies the lower limit applies.			

5.1.2 Test Procedure

1. The test site, test set-up and test methods were according to ANSI C63.4-2014.
2. The EUT was placed on a non-metallic table 0.8m above the reference ground plane. The table was rotated 360 degrees to determine the position of the highest radiation.
3. The EUT was set 3m from the receiving antenna, which was mounted on a variable height antenna tower. The height range of tower was 1m to 4m.
4. A preliminary scan and a final scan of the emissions were made by using test script of software; The emissions were measured using quasi-peak detector (30M~1000MHz) and PK/AV detector (above 1GHz).
5. The maximal emission was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup.
6. The EUT was configured in the typical operating mode.
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported for frequency range below 1GHz.
8. If emission level of the EUT in Peak measurement mode is 20dB lower than Peak limit line (that means the emission level in Peak measurement mode complies with both Peak and Average limit lines), then only Peak measurement result is reported. Otherwise, emissions in Average measurement mode shall be measured and reported above 1GHz.

5.1.3 Test Set-up

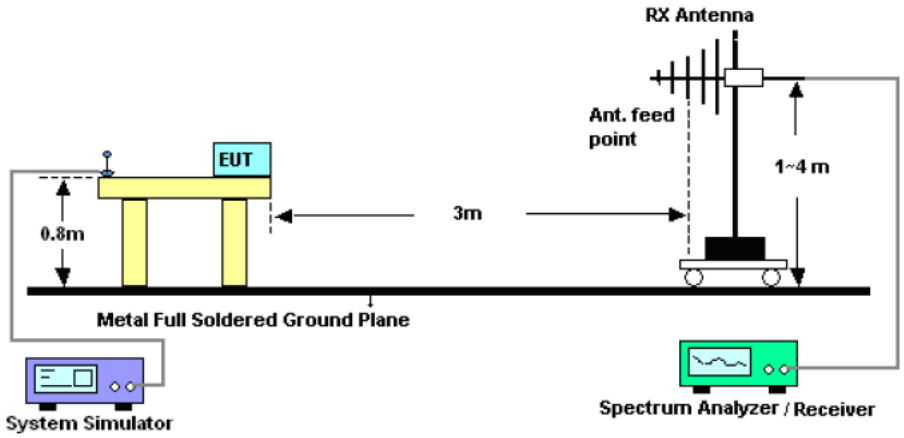


Figure.1 Test set-up of radiated emissions (30MHz~1000MHz)

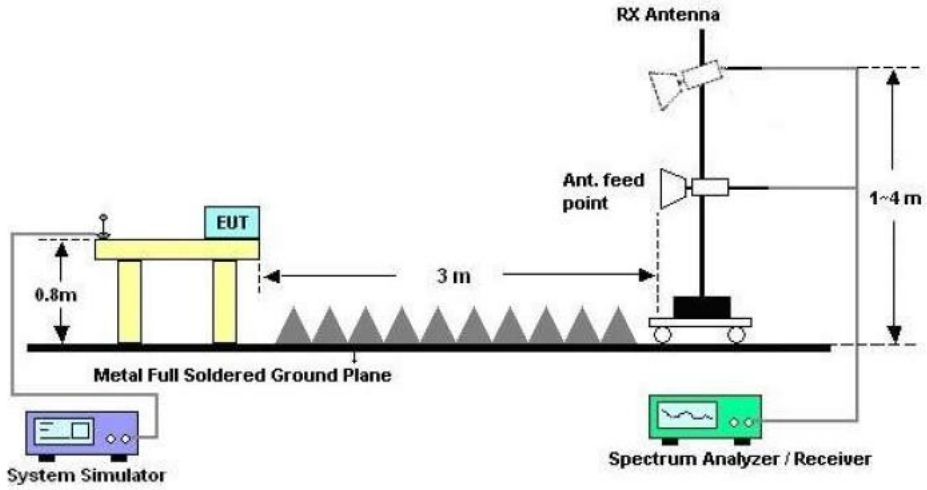


Figure.2 Test set-up of radiated emissions (above 1GHz)

5.1.4 Test Results

The EUT has met the requirements for Radiated Emissions.
Test data refer to the section 8.1 of this report.
Only the worst test result was shown in this report.

5.2 Conducted Emissions

5.2.1 Limit

Frequency range MHz	Class B Limits dB (μV)		RBW kHz
	Quasi-peak	Average	
0.15 to 0.50	66 to 56	56 to 46	9
0.50 to 5	56	46	9
5 to 30	60	50	9
NOTE 1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz. NOTE 2: The lower limit is applicable at the transition frequency.			

5.2.2 Test Procedure

1. The test site, test set-up and test methods were according to ANSI C63.4-2014.
2. The EUT was placed on a non-metallic table 0.8m above the reference ground plane.
3. The EUT was connected to LISN and LISN was connected to the reference ground plane. EUT was 80cm away from LISN.
4. A preliminary scan and a final scan of the emissions were made by using test script of software; the emissions were measured using quasi-peak and average detector.
5. Conducted Emission at AC port measurements were undertaken on the L and N lines.
6. The EUT was configured in the typical operating mode.

5.2.3 Test Set-up

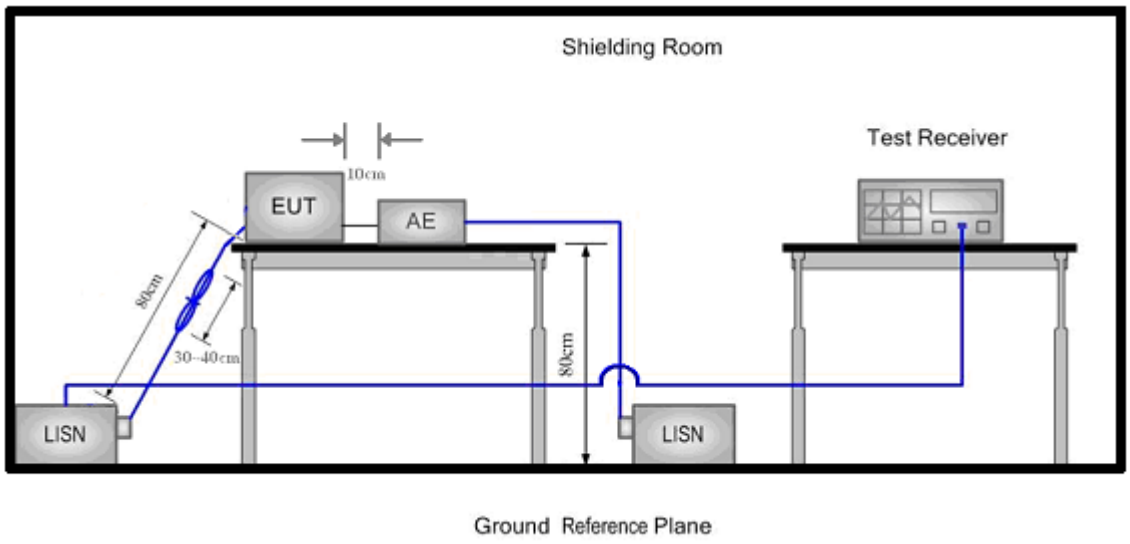


Figure.3 Test set-up of conducted emissions

5.2.4 Test Results

The EUT has met the requirements for Conducted Emissions.
Test data refer to the section 8.2 of this report.
Only the worst test result was shown in this report.

6. Test Equipment And Software

Main Test Equipments						
Test items	**Instrument**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration interval (year)**
RE	Double Ridged Horde Antenna	R&S	HF907	100545	2022/02/23	3
	Log-per.-Antenna	R&S	VULB9163	9163-893	2024/01/19	2
	broadband Antenna	R&S	QWH-SL-18-40-K-SG	12004	2022/01/20	3
	EMI Test Receiver (30M~1GHz)	R&S	ESR7	101188	2023/07/14	1
	Signal Analyzer (Above 1GHz)	R&S	FSV40	100956	2023/11/17	1
CE	LISN	R&S	ENV216	101223	2023/07/14	1
	EMI Test Receiver	R&S	ESR7	101188	2023/07/14	1

Software Information		
Test Item	**Software Name**	**Version**
RE	EMC32	V 10.40.10
CE	EMC32	V 10.40.10

7. System Measurement Uncertainty

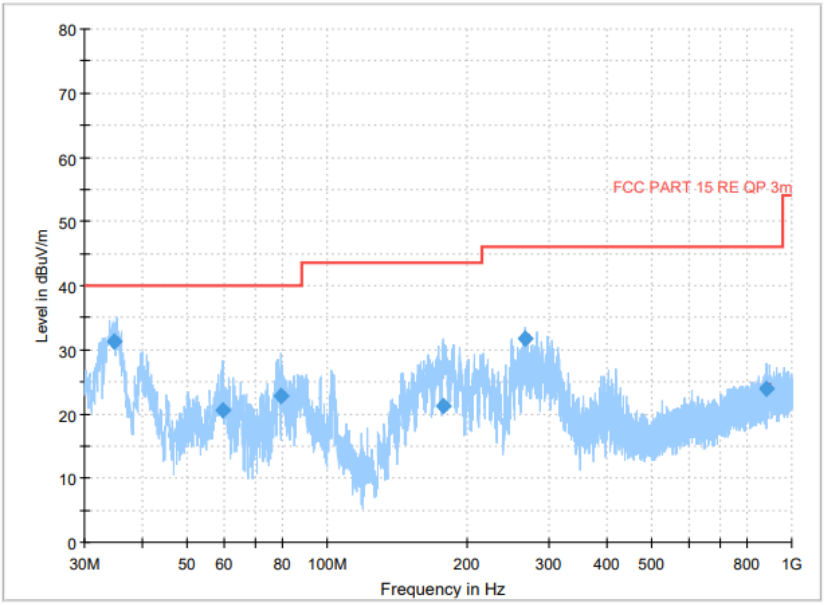
For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Measurement Uncertainty		
Items		**Extended Uncertainty**
RE(30MHz~1GHz)	Field strength(dBμV/m)	U=5.8dB; k=2
RE(1GHz~18GHz)	Field strength(dBμV/m)	U=4.9dB; k=2
RE(18GHz-40GHz)	Field strength(dBμV/m)	U=5.1dB; k=2
CE(150kHz~30MHz)	Voltage(dBμV)	U=3.3dB; k=2

8. Test Data

8.1 Radiated Emissions

30MHz~1GHz

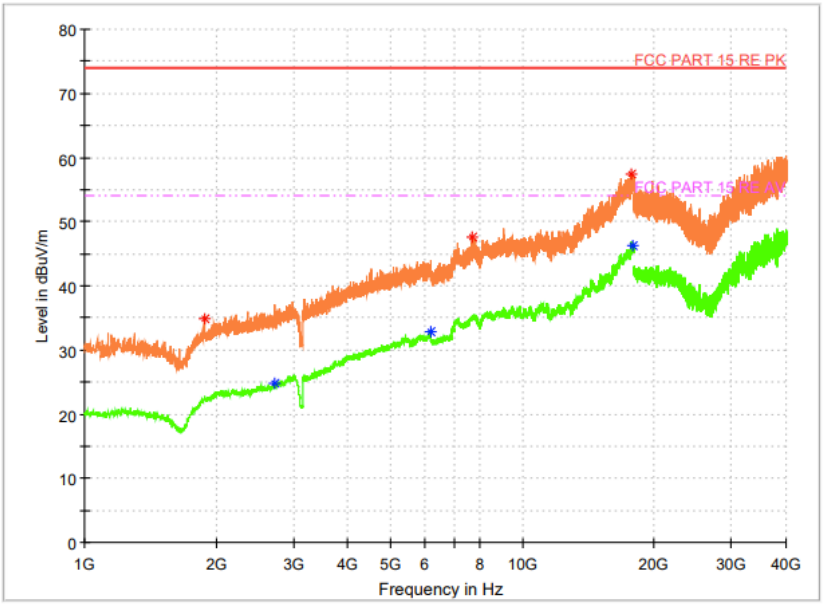


Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)
34.684111	31.21	40.00	8.79	120.000	H	315.0	12.2
59.696334	20.61	40.00	19.39	120.000	H	225.0	13.4
79.624778	22.75	40.00	17.25	120.000	H	225.0	7.6
177.786111	21.22	43.50	22.28	120.000	V	57.0	10.4
265.810444	31.77	46.00	14.23	120.000	V	90.0	14.3
879.194277	23.99	46.00	22.01	120.000	H	61.0	24.3

Note:
Level =Reading level by receiver + Corr. (Antenna factor + cable loss – preamplifier gain)
The reading level is calculated by software which is not shown in the sheet.

1GHz~40GHz



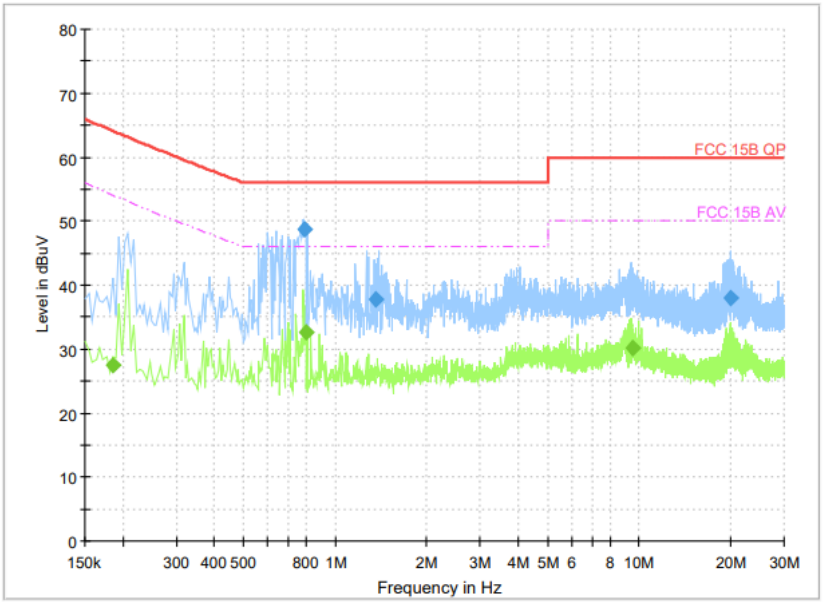
Critical_Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)
1877.200000	34.76	---	74.00	39.24	---	H	135.0	-10.4
2722.100000	---	24.86	54.00	29.14	---	V	0.0	-7.3
6157.800000	---	32.95	54.00	21.05	---	H	45.0	0.9
7684.400000	47.67	---	74.00	26.33	---	H	315.0	2.5
17807.900000	57.54	---	74.00	16.46	---	H	225.0	14.2
17862.300000	---	46.19	54.00	7.81	---	V	315.0	14.3

Level =Reading level by receiver + Corr. (Antenna factor + cable loss – preamplifier gain)
The reading level is calculated by software which is not shown in the sheet.

8.2 Conducted Emissions

AC Port Test Data



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.186000	---	27.53	54.07	26.53	9.000	L1	ON	9.9
0.793704	48.78	---	56.00	7.22	9.000	N	ON	9.8
0.805704	---	32.62	46.00	13.38	9.000	N	ON	9.8
1.367750	37.68	---	56.00	18.32	9.000	N	ON	9.9
9.523773	---	30.06	50.00	19.94	9.000	L1	ON	10.2
19.992682	37.98	---	60.00	22.02	9.000	L1	ON	10.2

Note:

Level =Reading level by receiver + Corr. (cable loss+ insertion loss)

The reading level is calculated by software which is not shown in the sheet.