

EMC TEST REPORT

Report Number	BWTR-2217-FCC15B
FCC ID	APYHRO00307
Applicant	Sharp Corporation
Product Name	Mobile Phone
Marketing Name	N/A
Brand Name	SHARP
Product ID	AEF002 AEF003
Serial Number	No.1 (1 st Source): 004401230772366 No.2 (2 nd Source): 004401230771491 No.3 (3 rd Source): 004401230772515
Test Standard	FCC 47 CFR Part 15 Subpart B
Tested Date	Mar. 01, 2022 - Mar. 03, 2022

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Revision History

Revision	Description	Issued Date
A	Initial issue of report	2022/03/24

1 Summary of Test Result

Report Section	FCC Section	Description	Result
3.1	15.107	Conducted Emission	Pass
3.2	15.109	Radiated Emission	Pass

We, Beijing Boomwave Test Service Co. Ltd., would like to declare that the tested sample has been evaluated and in compliance with the requirements of applicable standards.

Prepared by:

高爽

2022.03.24
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Reviewed by:

陈锐

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Approved by:

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Rationale:

The test results in this report apply exclusively to the tested model / sample.

The electrical copy of test report is invalid without the signatures. The hard copy is invalid without seal.

The test report shall not be modified, republished or copied without the written authorization of the laboratory.

2 General Information

2.1 Applicant

Sharp Corporation
1, Takumi-cho, Sakai-ku, Sakai City, Osaka, 590-8522, Japan

2.2 Manufacturer

Sharp Corporation
1, Takumi-cho, Sakai-ku, Sakai City, Osaka, 590-8522, Japan

2.3 Product Feature of Equipment Under Test

Product Name	Mobile Phone
Marketing Name	N/A
Product ID	AEF002 AEF003
Sample Status	Production
Power Supply Rating	DC 4V
Supported Function	GSM850/PCS1900 WCDMA Band II/V LTE Band 2/5/12/17/38/41 2.4GHz Bluetooth 2.4GHz WiFi 5GHz WiFi 13.56MHz NFC Wired Charging
Antenna Type	Fixed Internal
Cable	1.0m USB Cable
Hardware Version	PVT
Software Version	A2020
Sample Received Date	2022/02/26

Note: According to the declaration of applicant, the model represented with product ID AEF002 and AEF003 are all the same except for different silk printing on enclosure due to its marketing requirement. Since this case will not affect any wireless performance, all tests of this report were performed only with AEF002.

2.4 Ancillary Equipment

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

Accessory	Power Adapter
Manufacturer	DEE VAN ENTERPRISE CO., LTD
Model Name	DSA-10PF06-05 FUS 050200
Input Power	AC100-240V~50/60Hz 0.3A
Output Power	DC5V, 2.0A
Serial Number	---

Accessory	Li-Ion Battery
Manufacturer	Amperex Technology Limited
Model Name	UBATIA305AFN2
Capacity	4570mAh
Nominal Voltage	3.85V
Serial Number	---

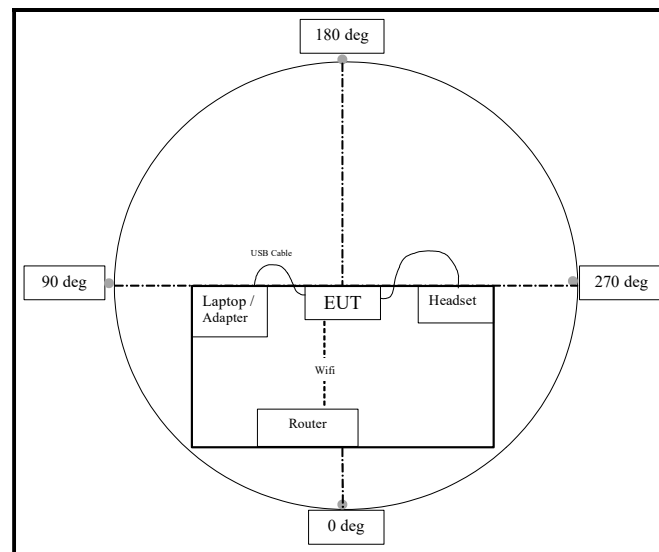
Accessory	Headset
Manufacturer	LCHSE
Model Name	MEN1032S0140
Serial Number	---

Accessory	USB Cable
Manufacturer	Kingpower
Model Name	K201-05130-00
Serial Number	---

Support Unit	Wireless Router
Manufacturer	LINKSYS
Model Name	WRT3200ACM
Serial Number	19810609704032

Support Unit	Laptop
Manufacturer	Dell
Model Name	Inspiron 5493
Serial Number	NG4DK A00

2.5 Configuration and Peripherals



2.6 Applicable Standards

Standard	Version	Title
FCC 47 CFR Part 15 Subpart B	2020	Requirements for Un-intentional Radiators
ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz

2.7 Test Facilities

Company Name: Beijing Boomwave Test Service Co. Ltd

Address: EMC Building, No.1 Wang Jing East Road, Chao Yang District Beijing, P.R. China 100102

FCC Test Firm Registration Number: 613197

ISED Canada Registration No.: 24289 (CAB Identifier: CN0010)

VCCI Registration No.: R-20062, G-20063, C-20050, T-20049

Test Site	Description	Dimension	Ground Plane Size
☐ SAC10	10m semi-anechoic chamber	19.5m×12.9m×8.6m	4m×4m
☒ SAC3	3m semi-anechoic chamber	9.6m×6.4m×6.0m	9.6m×6.4m
☒ SR#1	Shielding Room for EMS test	8.1m×4.05m×2.755m	8.1m×4.05m
☐ SR#2	Shielding Room for RF test	8.1m×4.05m×2.755m	---

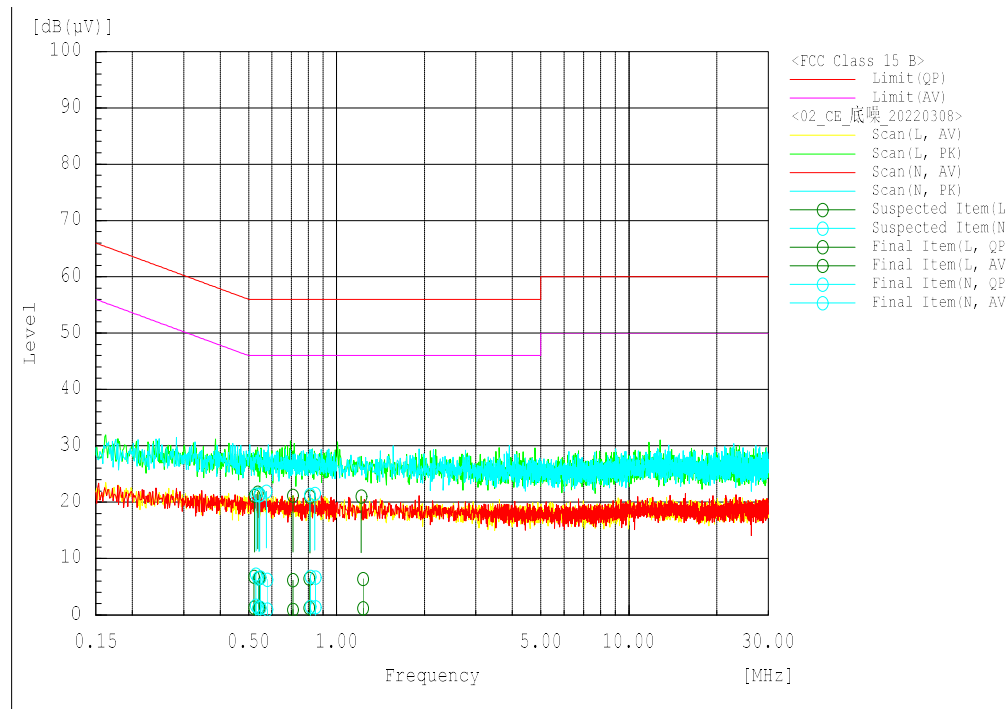
2.8 EUT Operation Mode

Mode No.	Mode	Description
Mode 1	GSM850/PCS1900 + BT + 5GHz WiFi + GPS + Playing MP4 (SD card) + NFC + Headset + USB Cable + Power Adapter	Multimedia Playing (EUT + Power Adapter)
Mode 2	WCDMA + BT + 5GHz WiFi + GPS + Playing MP4 (SD card) + NFC + Headset + USB Cable + Power Adapter	
Mode 3	LTE + BT + 5GHz WiFi + GPS + Playing MP4 (SD card) + NFC + Headset + USB Cable + Power Adapter	
Mode 4	GSM850/PCS1900 + BT + 5GHz WiFi + GPS + Camera + NFC + Headset + USB Cable connected with Laptop	Data Transferring (EUT + Laptop)
Mode 5	WCDMA + BT + 5GHz WiFi + GPS + Camera + NFC + Headset + USB Cable connected with Laptop	
Mode 6	LTE + BT + 5GHz WiFi + GPS + Camera + NFC + Headset + USB Cable connected with Laptop	

Note: The EUT has three sources whose difference is only the component supplier. Pre-Scan has been conducted to determine the worst-case mode: Mode 2 and Mode 5 of EUT No.3 (3rd Source).

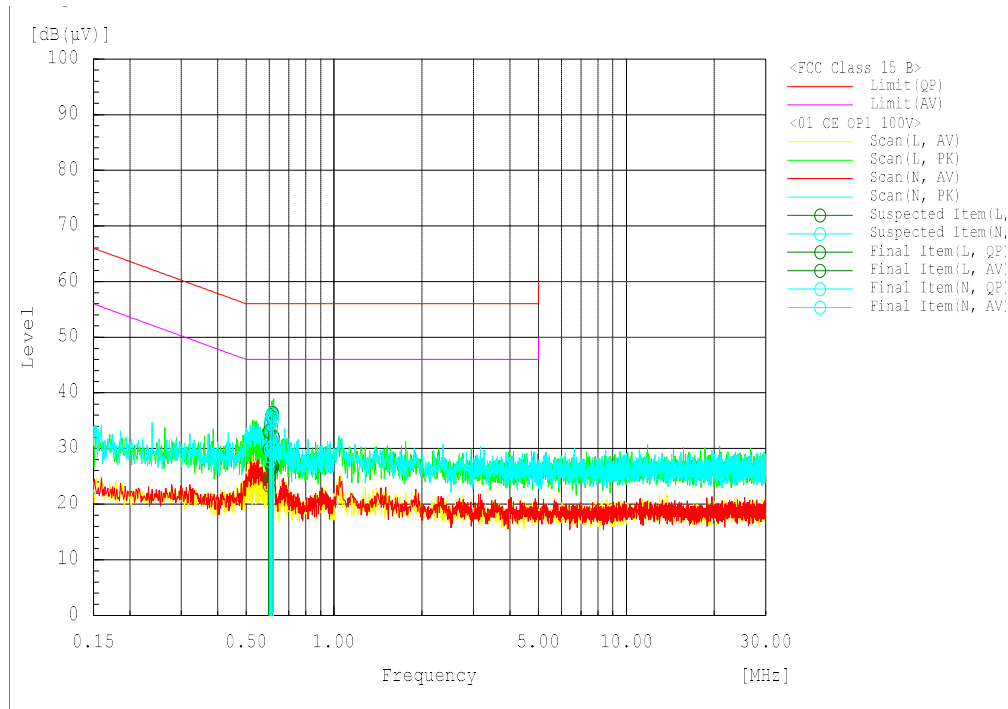
3.1.4. Test Result

Test Mode	Noise	Test Date	2022.03.01
Test Frequency	0.15MHz ~ 30MHz	Test Engineer	Cai Zengchen
Serial Number	---	Temp, Humidity	22.3°C, 48.9%



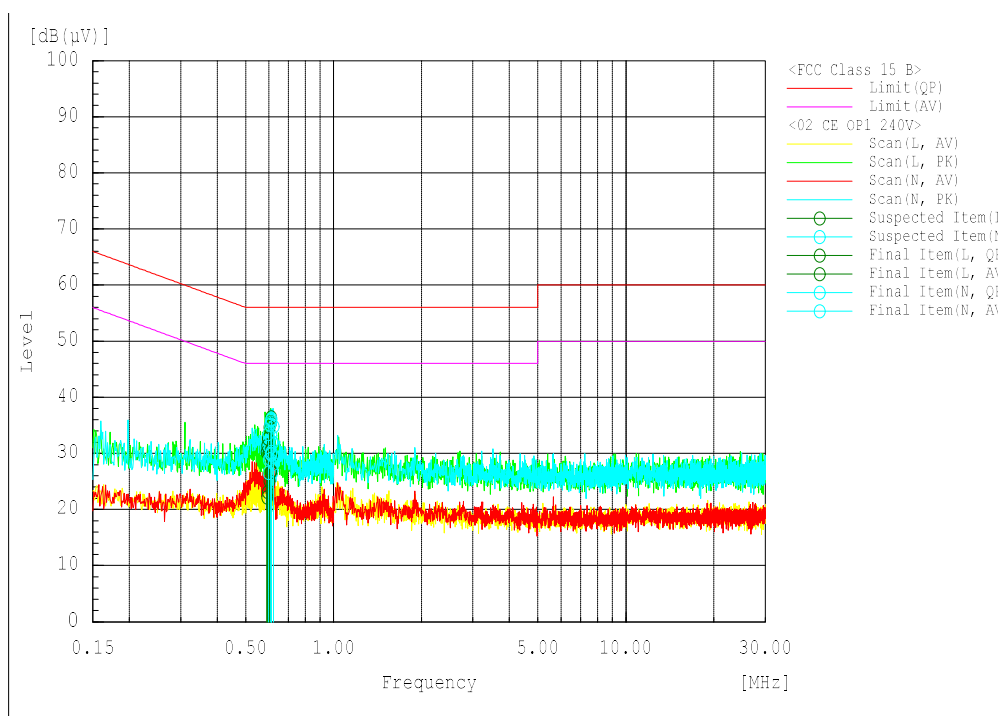
Frequency MHz	Line	Reading dB(μV)		Factor dB	Level dB(μV)		Limit dB(μV)		Margin dB		Pass/Fail
		QP	AV		QP	AV	QP	AV	QP	AV	
0.504	N	-0.5	-2.3	19.9	19.4	17.6	56.0	46.0	36.6	28.4	Pass
0.517	N	-0.6	-2.4	19.9	19.3	17.5	56.0	46.0	36.7	28.5	Pass
0.536	N	-0.7	-2.5	19.9	19.2	17.4	56.0	46.0	36.8	28.6	Pass
0.636	N	-1.3	-2.9	19.9	18.6	17.0	56.0	46.0	37.4	29.0	Pass
0.767	N	-1.7	-3.5	19.8	18.1	16.3	56.0	46.0	37.9	29.7	Pass
0.777	N	-2.0	-3.6	19.8	17.8	16.2	56.0	46.0	38.2	29.8	Pass
0.45	L	-0.2	-2.1	19.9	19.7	17.8	56.9	46.9	37.2	29.1	Pass
0.496	L	-0.5	-2.3	19.9	19.4	17.6	56.1	46.1	36.7	28.5	Pass
0.516	L	-0.8	-2.5	19.9	19.1	17.4	56.0	46.0	36.9	28.6	Pass
0.546	L	-0.9	-2.6	19.9	19.0	17.3	56.0	46.0	37.0	28.7	Pass
0.58	L	-1.1	-2.7	19.9	18.8	17.2	56.0	46.0	37.2	28.8	Pass
0.682	L	-1.6	-3.2	19.9	18.3	16.7	56.0	46.0	37.7	29.3	Pass

Test Mode	Mode 2 - AC 100V	Test Date	2022.03.01
Test Frequency	0.15MHz ~ 30MHz	Test Engineer	Cai Zengchen
Serial Number	004401230772515	Temp, Humidity	22.3°C, 48.9%



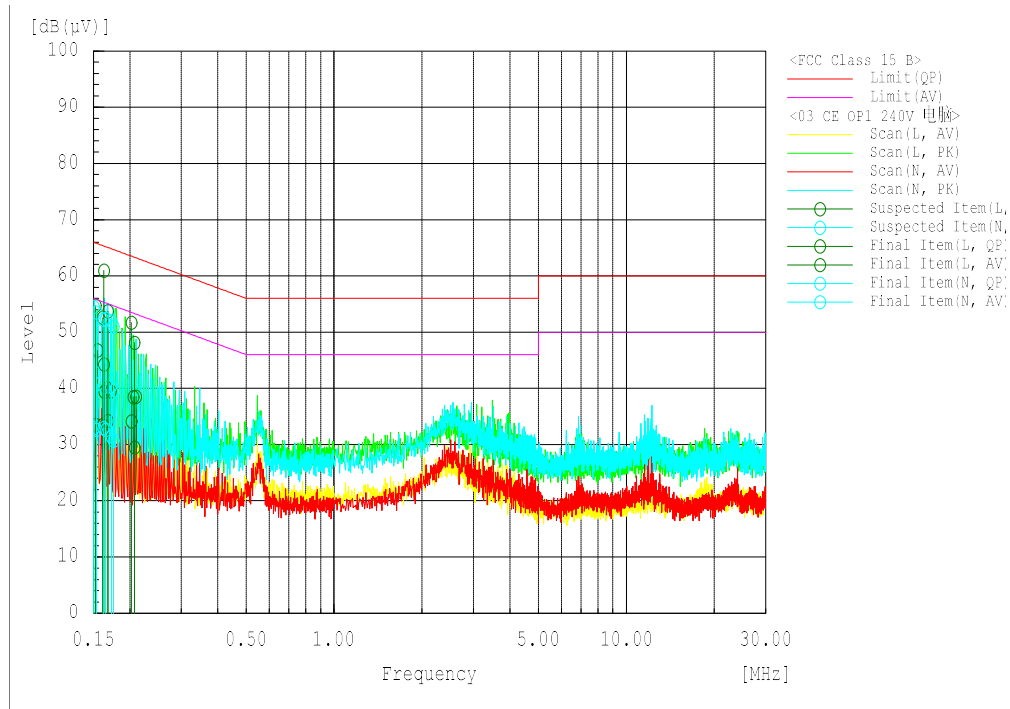
Frequency MHz	Line	Reading dB(μV)		Factor dB	Level dB(μV)		Limit dB(μV)		Margin dB		Pass/Fail
		QP	AV		QP	AV	QP	AV	QP	AV	
0.61	N	14.7	8.7	19.9	34.6	28.6	56	46	21.4	17.4	Pass
0.6	N	15.3	7.9	19.9	35.2	27.8	56	46	20.8	18.2	Pass
0.61	N	16	10	19.9	35.9	30.2	56	46	20.1	15.8	Pass
0.61	N	16.4	11	19.9	36.3	30.4	56	46	19.7	15.6	Pass
0.62	N	16	10	19.9	35.9	29.9	56	46	20.1	16.1	Pass
0.62	N	15.4	9.2	19.9	35.3	29.1	56	46	20.7	16.9	Pass
0.6	L	13.1	3.5	19.9	33	23.4	56	46	23	22.6	Pass
0.6	L	14.7	5	19.9	34.6	24.9	56	46	21.4	21.1	Pass
0.61	L	15.9	6.6	19.9	35.8	26.5	56	46	20.2	19.5	Pass
0.61	L	16.1	6.8	19.9	36	26.7	56	46	20	19.3	Pass
0.62	L	16.5	7.1	19.9	36.4	27	56	46	19.6	19	Pass
0.62	L	16.3	6.7	19.9	36.2	26.6	56	46	19.8	19.4	Pass

Test Mode	Mode 2 - AC 240V	Test Date	2022.03.01
Test Frequency	0.15MHz ~ 30MHz	Test Engineer	Cai Zengchen
Serial Number	004401230772515	Temp, Humidity	22.3°C, 48.9%



Frequency MHz	Line	Reading dB(μV)		Factor dB	Level dB(μV)		Limit dB(μV)		Margin dB		Pass/Fail
		QP	AV		QP	AV	QP	AV	QP	AV	
0.59	L	11.5	2.3	19.9	31.4	22.2	56	46	24.6	23.8	Pass
0.6	L	12.8	3.2	19.9	32.7	23.1	56	46	23.3	22.9	Pass
0.6	L	14.8	5.2	19.9	34.7	25.1	56	46	21.3	20.9	Pass
0.61	L	15.5	6.8	19.9	35.4	26.7	56	46	20.6	19.3	Pass
0.61	L	16.5	6.9	19.9	36.4	26.8	56	46	19.6	19.2	Pass
0.61	L	15.7	6.9	19.9	35.6	26.8	56	46	20.4	19.2	Pass
0.6	N	13.6	6.7	19.9	33.5	26.6	56	46	22.5	19.4	Pass
0.61	N	15.2	9.1	19.9	35.1	29	56	46	20.9	17	Pass
0.61	N	16.1	9.9	19.9	36	29.8	56	46	20	16.2	Pass
0.61	N	16.3	10	19.9	36.2	30.3	56	46	19.8	15.7	Pass
0.61	N	15.6	10	19.9	35.5	30	56	46	20.5	16	Pass
0.62	N	14.9	8.3	19.9	34.8	28.2	56	46	21.2	17.8	Pass

Test Mode	Mode 5	Test Date	2022.03.01
Test Frequency	0.15MHz ~ 30MHz	Test Engineer	Cai Zengchen
Serial Number	004401230772515	Temp, Humidity	22.3°C, 48.9%



Frequency MHz	Line	Reading dB(μV)		Factor dB	Level dB(μV)		Limit dB(μV)		Margin dB		Pass/Fail
		QP	AV		QP	AV	QP	AV	QP	AV	
0.15	N	33.5	13	20	53.5	32.7	65.8	55.8	12.3	23.1	Pass
0.15	N	34.5	13	20	54.5	32.9	66	56	11.5	23.1	Pass
0.16	N	32.2	13	20	52.2	32.9	65.3	55.3	13.1	22.4	Pass
0.17	N	32.4	13	20	52.4	32.7	65.2	55.2	12.8	22.5	Pass
0.17	N	31.9	11	20	51.9	31.4	64.8	54.8	12.9	23.4	Pass
0.18	N	31	11	20	51	30.7	64.7	54.7	13.7	24	Pass
0.15	L	34.7	14	20	54.7	33.5	65.8	55.8	11.1	22.3	Pass
0.16	L	32.5	14	20	52.5	33.5	65.4	55.4	12.9	21.9	Pass
0.16	L	41	24	20	61	44.3	65.3	55.3	4.3	11	Pass
0.17	L	33.7	14	20	53.7	34.2	65	55	11.3	20.8	Pass
0.2	L	31.8	14	19.9	51.7	34.1	63.5	53.5	11.8	19.4	Pass
0.21	L	28.2	9.6	19.9	48.1	29.5	63.3	53.3	15.2	23.8	Pass

3.1.5. Uncertainty

$$U_{lab}=3\text{dB} (U_{Cispr}=3.44\text{dB})$$

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of 2 which gives a level of confidence of approximately 95%.

3.2 Radiated Emission

3.2.1. Limit

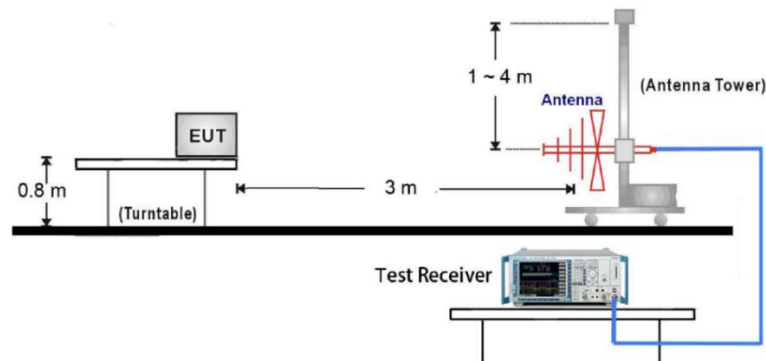
FCC 47 CFR Part 15 Subpart B - §15.109 (a)

Frequency (MHz)	Field Strength		Measurement Distance (meters)
	uV/m	dBuV/m	
30 - 88	100	40.0	3
88 - 216	150	43.5	3
216 - 960	200	46.0	3
Above 960	500	54.0	3

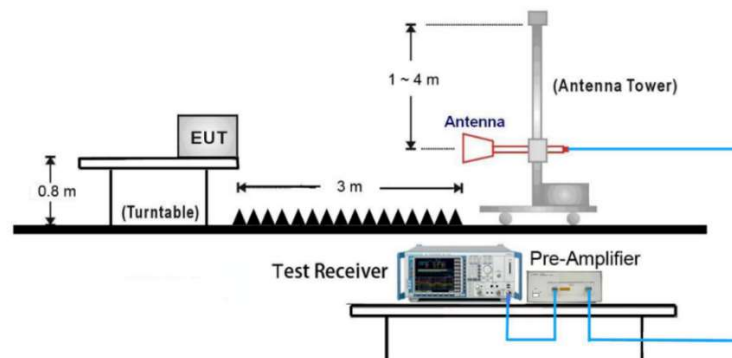
Frequency (MHz)	Class B Limits dBuV/m		Measurement Distance (meters)
	Peak	Average	
Above 1000	74	54	3

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	5th harmonic of the highest frequency or 40 GHz, whichever is lower

3.2.2. Typical Test Setup Layout and Connection



30MHz- 1GHz Test Setup



Above 1GHz Test Setup

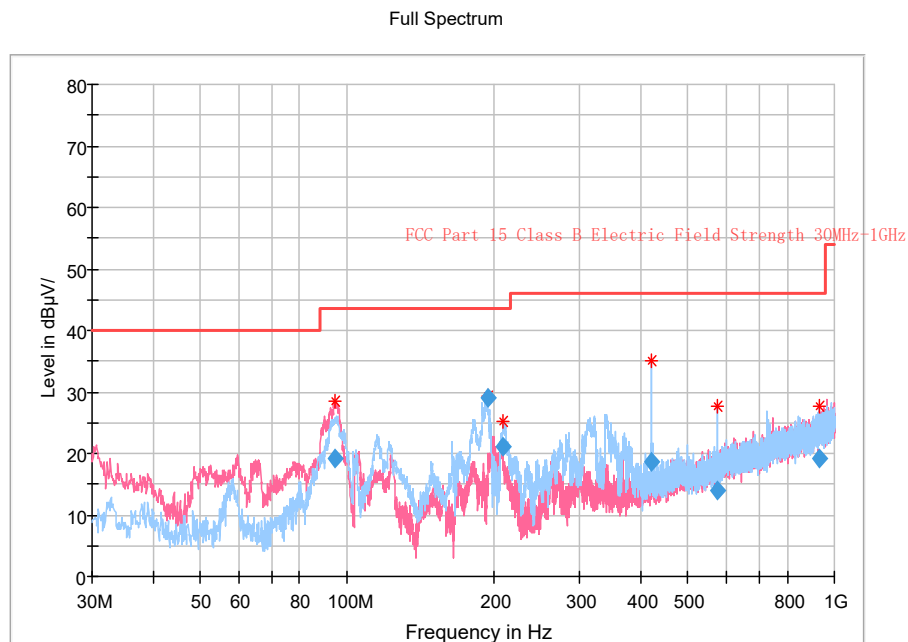
3.2.3. Test Procedures

30MHz - 1GHz & Above 1GHz:

- 1) The EUT was placed on a rotatable table top 0.8 meter above ground.
- 2) The EUT was set 3 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- 3) The table was rotated 360 degrees to determine the position of the highest radiation.
- 4) The elevation of the antenna varies from 1 m to 4 m above the ground to find the maximum field strength. The horizontal polarization and vertical polarization of the antenna are set for measurement.
- 5) For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 to 4 meters) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- 6) Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode; Then the quasi-peak or average scan is carried out at points with relatively high peak value.
- 7) Reading(dBuV/m) = QuasiPeak(dBuV/m) or MaxPeak(dBuV/m) or Average(dBuV/m) - Corr.(dB)

3.2.4. Test Result

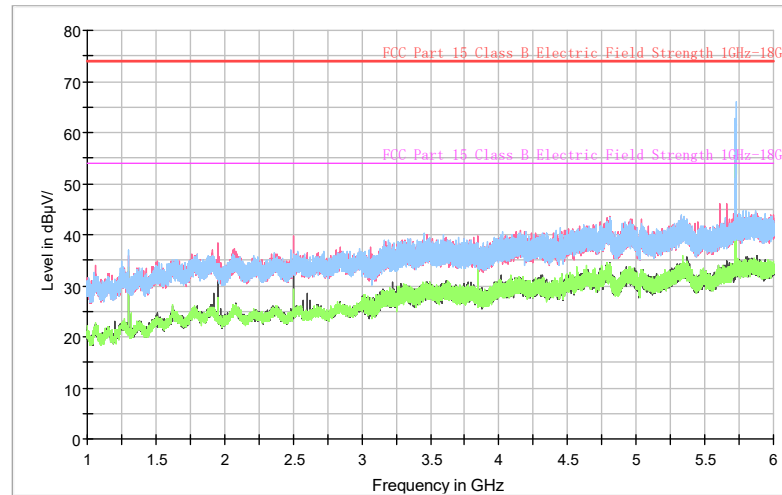
Test Mode	Mode 2	Test Date	2022.03.03
Test Frequency	30 MHz ~ 1000 MHz	Test Engineer	Gao Shuang
Serial Number	004401230772515	Temp, Humidity	24.3°C, 53.2%



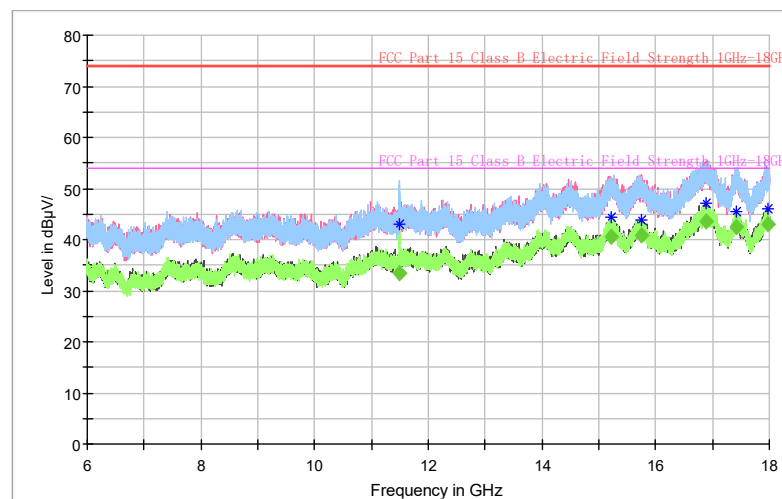
Frequency (MHz)	Reading (dBuV/m)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
94.505000	41.07	19.27	43.50	24.23	1000.0	120.000	112.6	V	74.0	-21.8
194.221000	49.22	29.12	43.50	14.38	1000.0	120.000	100.8	H	247.0	-20.1
208.771000	41.36	20.96	43.50	22.54	1000.0	120.000	119.3	H	290.0	-20.4
422.365000	31.58	18.58	46.00	27.42	1000.0	120.000	124.4	H	199.0	-13.0
576.207000	23.60	14.00	46.00	32.00	1000.0	120.000	124.3	H	190.0	-9.6
930.354000	21.89	19.29	46.00	26.71	1000.0	120.000	212.4	H	295.0	-2.6

Test Mode	Mode 2	Test Date	2022.03.03
Test Frequency	1000 MHz ~ 18000 MHz	Test Engineer	Gao Shuang
Serial Number	004401230772515	Temp, Humidity	24.3°C, 53.2%

Full Spectrum



Full Spectrum



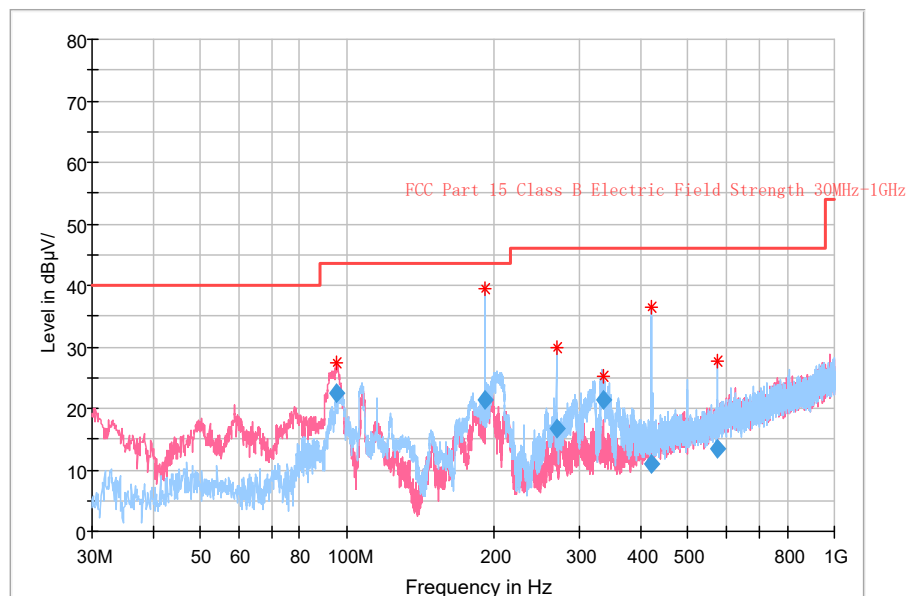
Frequency (MHz)	Reading MaxPeak (dBuV/m)	Reading Average (dBuV/m)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
11491.200000	---	50.44	---	33.54	54.00	20.46	1000.0	1000.000	224.8	H	295.0	-16.9
15225.200000	---	54.45	---	40.45	54.00	13.55	1000.0	1000.000	181.6	H	110.0	-14.0
15757.200000	---	55.28	---	40.88	54.00	13.12	1000.0	1000.000	99.9	H	278.0	-14.4
16897.200000	---	56.65	---	43.65	54.00	10.35	1000.0	1000.000	193.1	V	89.0	-13.0
17421.200000	---	54.51	---	42.41	54.00	11.59	1000.0	1000.000	224.8	H	110.0	-12.1
17981.600000	---	52.96	---	42.96	54.00	11.04	1000.0	1000.000	99.9	V	66.0	-10.0

Test Mode	Mode 2	Test Date	2022.03.03
Test Frequency	18000 MHz ~ 40000 MHz	Test Engineer	Gao Shuang
Serial Number	004401230772515	Temp, Humidity	24.3°C, 53.2%

There were no emissions above 18GHz found within 20dB of the limit. Thus, the test result was not reported according to §15.31 (o)

Test Mode	Mode 5	Test Date	2022.03.03
Test Frequency	30 MHz ~ 1000 MHz	Test Engineer	Gao Shuang
Serial Number	004401230772515	Temp, Humidity	24.3°C, 53.2%

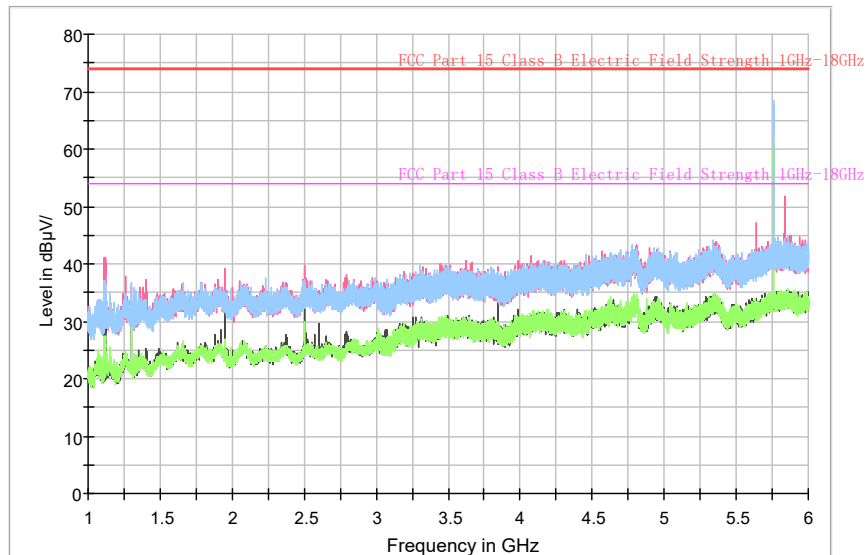
Full Spectrum



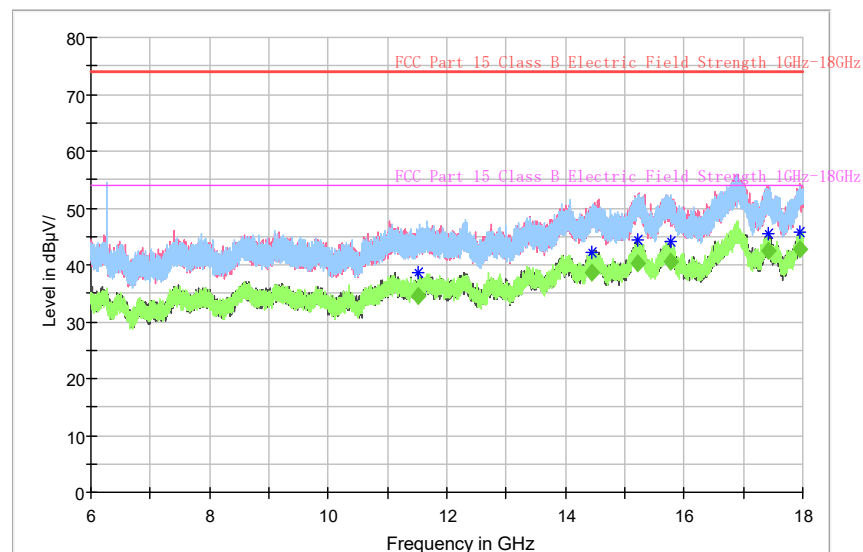
Frequency (MHz)	Reading (dBuV/m)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
95.475000	44.03	22.43	43.50	21.07	1000.0	120.000	101.1	V	156.0	-21.6
191.796000	41.91	21.31	43.50	22.19	1000.0	120.000	199.3	H	247.0	-20.6
268.911000	34.70	16.70	46.00	29.30	1000.0	120.000	223.4	H	268.0	-18.0
334.968000	36.99	21.39	46.00	24.61	1000.0	120.000	99.8	H	-16.0	-15.6
422.462000	23.88	10.88	46.00	35.12	1000.0	120.000	108.6	H	205.0	-13.0
576.013000	23.24	13.54	46.00	32.46	1000.0	120.000	124.3	H	160.0	-9.7

Test Mode	Mode 5	Test Date	2022.03.03
Test Frequency	1000 MHz ~ 18000 MHz	Test Engineer	Gao Shuang
Serial Number	004401230772515	Temp, Humidity	24.3°C, 53.2%

Full Spectrum



Full Spectrum



Frequency (MHz)	Reading MaxPeak (dBuV/m)	Reading Average (dBuV/m)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
11506.800000	---	51.45	---	34.55	54.00	19.45	1000.0	1000.000	124.9	V	165.0	-16.9
14448.800000	---	52.78	---	38.68	54.00	15.32	1000.0	1000.000	107.4	V	205.0	-14.1
15209.200000	---	54.40	---	40.40	54.00	13.60	1000.0	1000.000	181.8	V	66.0	-14.0
15781.200000	---	55.18	---	40.68	54.00	13.32	1000.0	1000.000	175.9	V	155.0	-14.5
17413.200000	---	54.59	---	42.49	54.00	11.51	1000.0	1000.000	113.3	V	25.0	-12.1
17952.400000	---	52.98	---	42.78	54.00	11.22	1000.0	1000.000	224.8	H	288.0	-10.2

Test Mode	Mode 5	Test Date	2022.03.03
Test Frequency	18000 MHz ~ 40000 MHz	Test Engineer	Gao Shuang
Serial Number	004401230772515	Temp, Humidity	24.3°C, 53.2%

There were no emissions above 18GHz found within 20dB of the limit. Thus, the test result was not reported according to §15.31 (o)

3.2.5. Uncertainty

Radiated Test				
Frequency	Antenna Polarization	Distance	U_{lab}	k
30MHz-200MHz	Horizontal	3m	4.58 dB	2
	Vertical	3m	4.73 dB	2
200MHz-1GHz	Horizontal	3m	4.90 dB	2
	Vertical	3m	4.93 dB	2
1GHz-6GHz	---	3m	4.66 dB	2
6GHz-18GHz	---	3m	5.14dB	2
18GHz-40GHz	---	3m	4.80dB	2

Determining compliance with the limits shall be based on the results of the compliance measurements, taking into account the considerations on measurement instrumentation uncertainty.

Because U_{lab} is equal to U_{CISPR} (as specified in CISPR16-4-2), then:

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

4 Test Instruments

Test Item	Description	Model Name	S / N	Manufacture	Next Cal Date
Radiated Emission	EMI TEST RECERVER	ESR26	101320	R&S	2023/01/11
	Pre-amplifier	PE15A1009	V00140120181115E825	Pasternack Enterprises	2023/01/11
	Hybrid Antenna	VULB9163	01266	SCHWARZBECK	2022/07/03
	Pre-amplifier	TAP-011858	AP19L806047	TONSCEND	2022/04/01
	Horn Antenna	HF907	100096	R&S	2022/04/01
	Pre-amplifier	SCU40	2046336	R&S	2022/04/01
	Broad-Band Horn Antenna	BBHA9170	797	SCHWARZBECK	2022/04/01
Conducted Emission	EMI TEST RECERVER	ESR26	101320	R&S	2023/01/11
	16 A 2-Line V-Network	ENV216	102328	R&S	2023/01/11
	Pulse Limiter	ESH3-Z2	102457	R&S	2023/01/11
Other	Wireless comprehensive test instrument	CMW500	115895	R&S	2023/01/11

--- End of Test Report ---