

TEST REPORT FOR EMC TESTING

Report No.: SRTC2022-9004(F)-22081002(T)
Product Name: BT remote control
Applicant: Sharp Corporation
FCC ID: APYHRO00323

Reference Specification

FCC Part 15B

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30 Shixing Street, Shijingshan District, Beijing, China

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1. GENERAL INFORMATION

1.1 Notes of the test report

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1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Designation number	CN1267
Registration number	239125
Address:	15th Building, No.30 Shixing Street, Shijingshan District, Beijing P.R.China
City:	Beijing
Country or Region:	P.R.China
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Tel:	+86 10 57996183
Fax:	+86 10 57996388
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1.3 Applicant's details

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

1.4 Manufacturer's details

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

1.5 Information of EUT

1.5.1 Basic info

Testing Start Date:	2022/8/15
Testing End Date:	2022/8/26
DUT IMEI/SN:	No.1 (1st Source): 000050100005615 No.2 (2nd Source): 000050100005797
DUT H/W Version:	PVT (Remodeled to the equivalent of MP products)
DUT S/W Version:	01.00.00
Ambient Temperature:	22°C
Humidity:	35%
Note	---

Network	Mode Information
BLE	1M & 2M

1.5.2 Auxiliary equipment details

Battery	
Type	Li-ion
Manufacture	SCUD (FUJIAN) Electronics Co., Ltd.
Model	UBATIA309AFN2
Capacity	1,700mAh
Nominal voltage	3.85V

Note:

eMMC / DDR Memory, there is no difference regarding outline and functionality.

Hall IC, there is a difference in outline but Pin-Compatible and there is no difference in electrical performance and regarding functionality.

		Memory(ROM)	Memory(RAM)	Hall IC
Function	Explanation	16GB(eMMC)	2GB(LPDDR4)	Hall sensor
	Pin assign	Pin-Compatible	Pin-Compatible	Pin-Compatible
	Outline	Same	Same	Not same
	Performance	Performance is the same. Different vender only.		
	Ref No.	IC 1500	IC 1550	IC 1800
	Other	There is no difference regarding outline and functionality.		
Main Supply		1st Samsung	1st Samsung	1st ABLIC
Secondary Supply		2nd SK Hynix	2nd SK Hynix	2nd TI

Manufacturer's statement that all of the above memory and storage combinations from different vendors will not affect RF exposure performance.

1.5.3 Operating mode

Strategy	
Step1	Pre-Scan has been performed to determine the worst combination of auxiliary among all the possibility of different suppliers when necessary.
Step2	Pre-Scan has been performed to determine the worst operating mode for different test cases.
Step3	Based on the worst cases determined above, Then perform the following measurement.

Mode No.	Operating mode	Measurement case(worst mode)
1	Data Transformation with BLE function + DC Charging jig	RE
2	Data Transformation with BLE function + AC ADAPTOR	CE,RE

Note: The EUT has two sources whose difference is only the component supplier. Pre-Scan has been conducted to determine the worst-case mode: EUT No.1 (1st Source).

1.6 Reference specification

Specification	Version	Title
FCC Part 15B	2022	Unintentional 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 9 KHz To 40 GHz


1.7 Abbreviation

Abbreviation	Meaning
CT	Performance criteria for Continuous phenomena applied to Transmitters
TT	Performance criteria for Transient phenomena applied to Transmitters
CR	Performance criteria for Continuous phenomena applied to Receiver
TR	Performance criteria for Transient phenomena applied to Receiver
CE	Conducted Emission
RE	Radiated emission

2. TEST INFORMATION

2.1 Summary of the test results

Test Case	Class	Verdict
Conducted Emission	B	Pass
Radiated emission	B	Pass

This Test Report Is Approved by: Mr. Peng Zhen 	Review by: Mr. Li Bin 
Tested and issued by: Mr. Chang Tianyu 	Approved date: 2022/08/29

2.2 Item description

Conducted Emission

Refer to FCC Part15.107

Criteria:

Frequency Range(MHz)	Detector Type/Bandwidth	Class B limit(dB μ V)
0.15 to 0.5	Quasi Peak/9kHz	66 to 56
0.5 to 5		56
5 to 30		60
0.15 to 0.5	Average/9kHz	56 to 46
0.5 to 5		46
5 to 30		50

Setup:

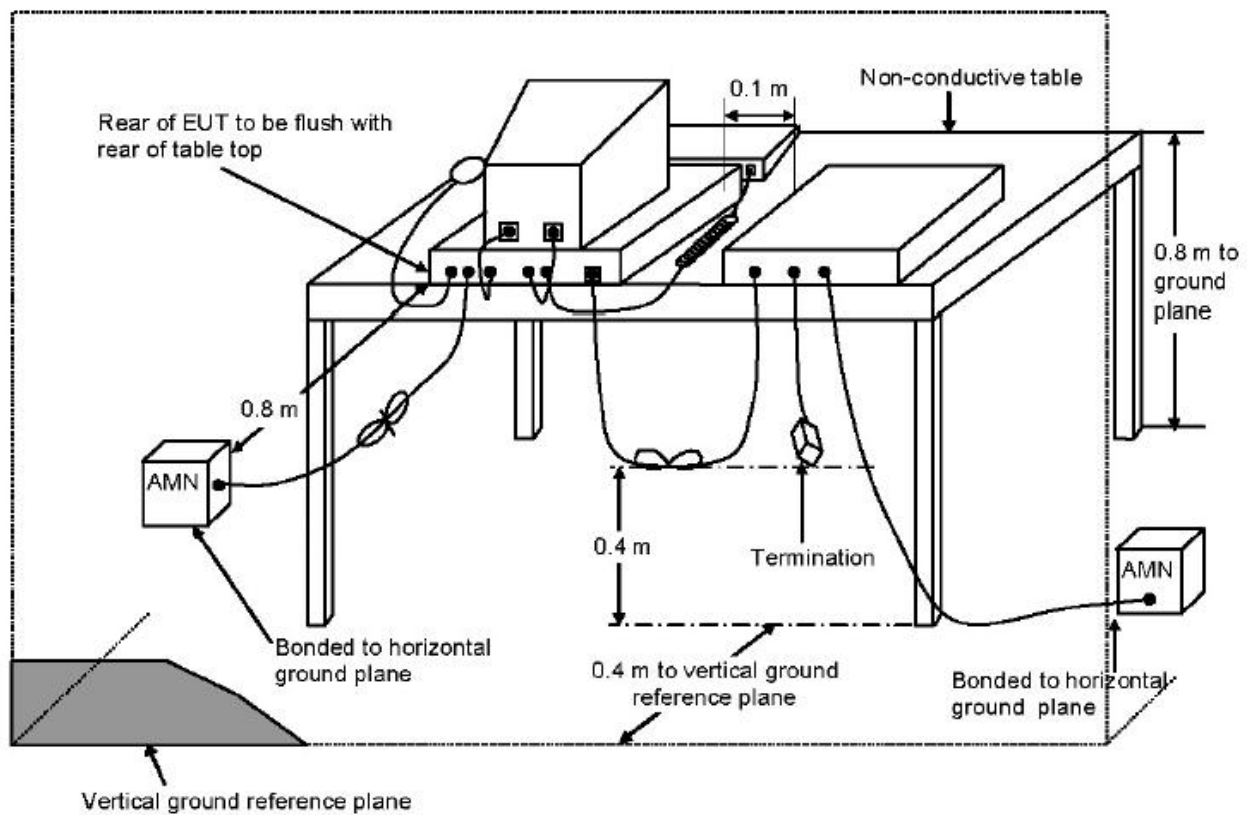


Figure. CE

Test Procedure:

Step	Description
1	The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter conducting wall of the shielding room and it was kept at least 0.8 meter from any other grounded conducting surface.
2	Connect EUT to the power mains through a line impedance stabilization network (LISN)
3	All the support units are connected to the other LISN.
4	The frequency range from 150 kHz to 30 searched.
5	Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6	6 frequency points closest to the limit of each line shall be performed the final measurement by Quasi Peak detector.

Radiated emission

Refer to FCC Part15.109

Criteria:

Frequency (MHz)	Class B limits(dBuV/m)		Measurement distance(m)
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Note: The table above according to part 15.109, more conservative than ISED(230-960MHz with 47 $\text{dB}\mu\text{V/m}$).

Frequency	Class B limits(dBuV/m)		Measurement distance(m)
	peak	average	
At and above 1 GHz	74	54	3

Note: The table above according to part ICES-003.

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.

Note: The table above according to part 15.33.

Setup:

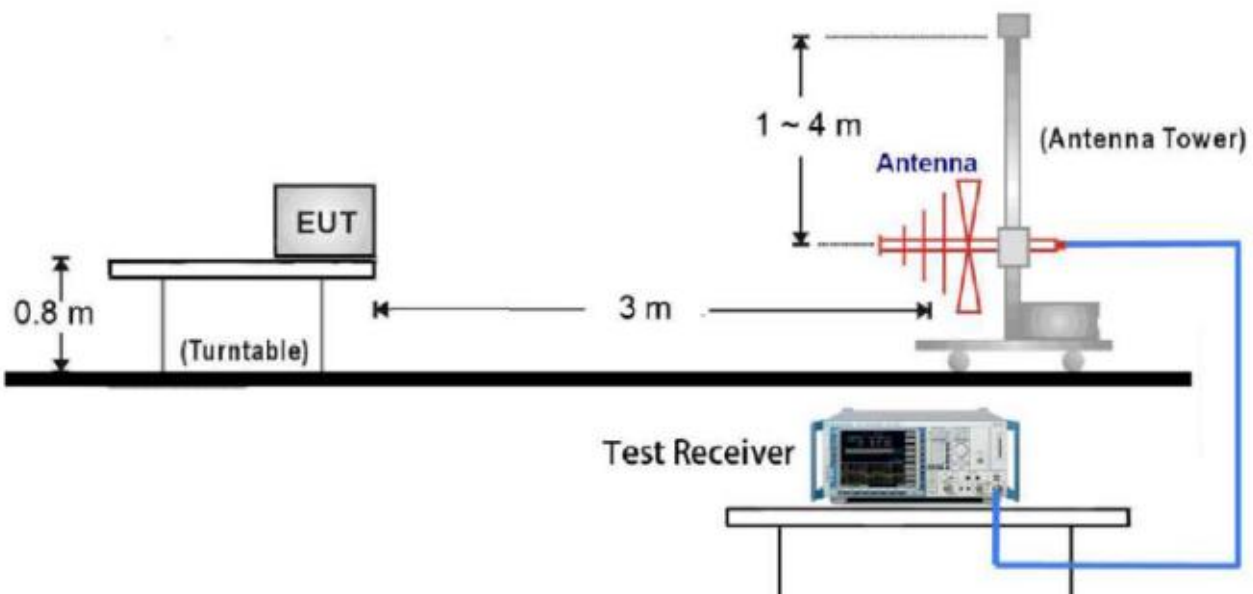


Figure. RE 30MHz-1GHz

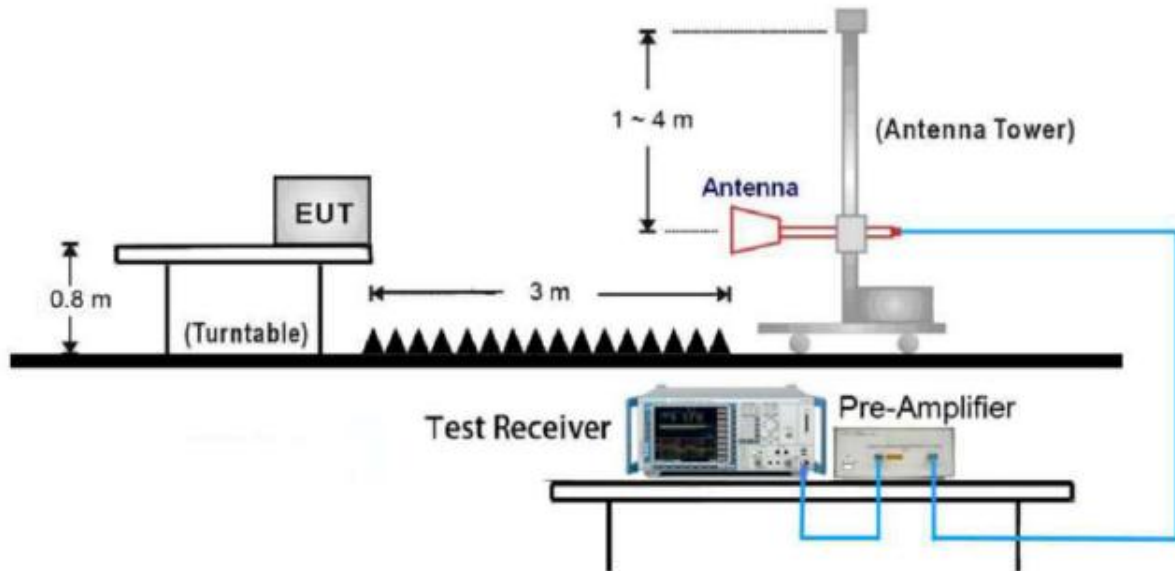


Figure. RE Above 1GHz

Test Procedure:

Step	Description
1	The EUT was placed on a rotatable tabletop 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 to determine the position of the highest radiation.
4	The antenna is hybrid antenna and its height are varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the 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.

3. TEST RESULT

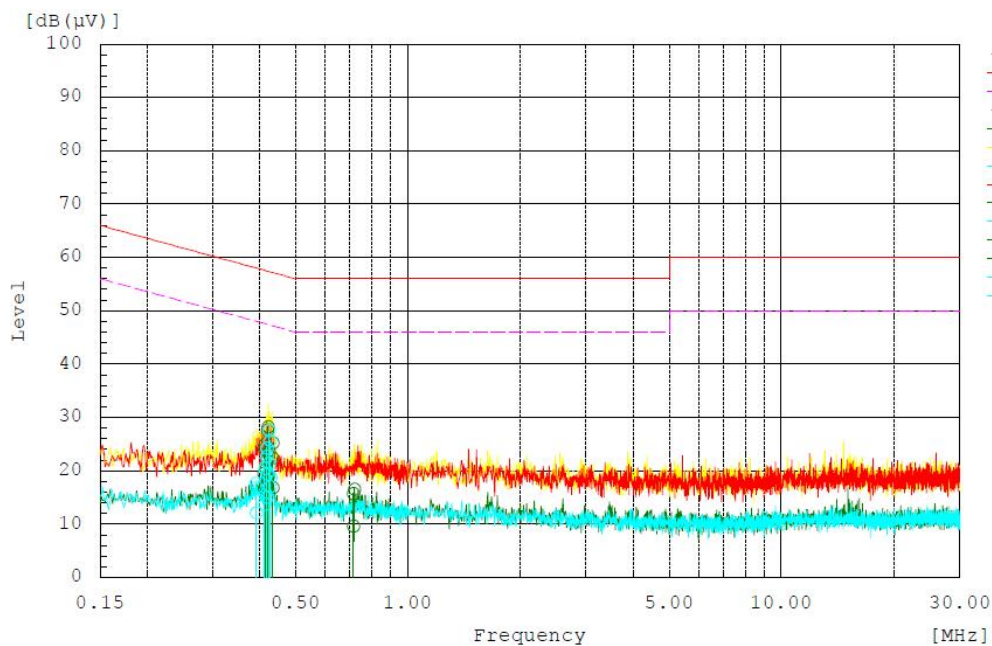
3.1 Conducted emission

AC mains input/output port, Wired network port, DC power input/output port (Test position depend on DUT and auxiliary, necessary result mentioned below)

Noise	NOTE
0.15MHz -30MHz	The background noise of test environment is clear, There were no emission below 30MHz. test result was not reported.

AC 100V Mode2

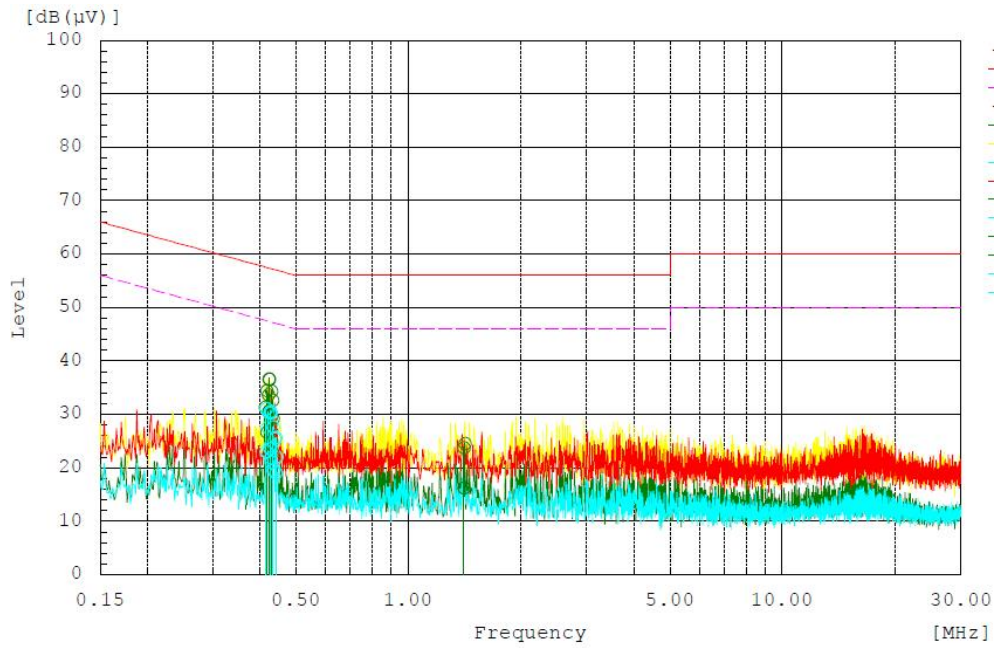
Frequency (MHz)	Line	Reading QuasiPeak (dBμV)	Reading Average (dBμV)	Correction factor (dB)	Corrected QuasiPeak (dBμV)	Corrected Average (dBμV)	Limit QuasiPeak (dBμV)	Limit Average (dBμV)	Margin QuasiPeak (dBμV)	Margin Average (dBμV)	Verdict
0.393	N	6.9	2.1	10.1	17.0	12.2	58.0	48.0	41.0	35.8	Pass
0.413	N	10.4	3.6	10.1	20.5	13.7	57.6	47.6	37.1	33.9	Pass
0.419	N	14.1	9.3	10.1	24.2	19.4	57.5	47.5	33.3	28.1	Pass
0.419	N	12.7	4.9	10.1	22.8	15.0	57.5	47.5	34.7	32.5	Pass
0.428	N	15.6	6.9	10.1	25.7	17.0	57.3	47.3	31.6	30.3	Pass
0.424	N	17.4	11.4	10.1	27.5	21.5	57.4	47.4	29.9	25.9	Pass
0.413	L	13.9	6.7	10.1	24.0	16.8	57.6	47.6	33.6	30.8	Pass
0.416	L	14.9	7.2	10.1	25.0	17.3	57.5	47.5	32.5	30.2	Pass
0.421	L	18.2	8.9	10.1	28.3	19.0	57.4	47.4	29.1	28.4	Pass
0.420	L	17.6	8.4	10.1	27.7	18.5	57.4	47.4	29.7	28.9	Pass
0.435	L	15.2	6.8	10.1	25.3	16.9	57.2	47.2	31.9	30.3	Pass
0.714	L	5.8	-0.3	10.0	15.8	9.7	56.0	46.0	40.2	36.3	Pass



AC 240V

Mode2

Frequency (MHz)	Line	Reading QuasiPeak (dBμV)	Reading Average (dBμV)	Correction factor (dB)	Corrected QuasiPeak (dBμV)	Corrected Average (dBμV)	Limit QuasiPeak (dBμV)	Limit Average (dBμV)	Margin QuasiPeak (dBμV)	Margin Average (dBμV)	Verdict
0.417	N	21.0	12.9	10.1	31.1	23.0	57.5	47.5	26.4	24.5	Pass
0.426	N	20.1	13.4	10.1	30.2	23.5	57.3	47.3	27.1	23.8	Pass
0.428	N	20.5	11.7	10.1	30.6	21.8	57.3	47.3	26.7	25.5	Pass
0.429	N	20.4	11.0	10.1	30.5	21.1	57.3	47.3	26.8	26.2	Pass
0.435	N	17.6	9.5	10.1	27.7	19.6	57.2	47.2	29.5	27.6	Pass
0.443	N	15.6	9.0	10.1	25.7	19.1	57.0	47.0	31.3	27.9	Pass
0.417	L	24.4	16.6	10.1	34.5	26.7	57.5	47.5	23.0	20.8	Pass
0.425	L	26.5	20.3	10.1	36.6	30.4	57.4	47.4	20.8	17.0	Pass
0.424	L	26.6	20.6	10.1	36.7	30.7	57.4	47.4	20.7	16.7	Pass
0.430	L	24.3	14.9	10.1	34.4	25.0	57.3	47.3	22.9	22.3	Pass
0.433	L	22.6	12.8	10.1	32.7	22.9	57.2	47.2	24.5	24.3	Pass
1.408	L	13.8	6.3	10.0	23.8	16.3	56.0	46.0	32.2	29.7	Pass

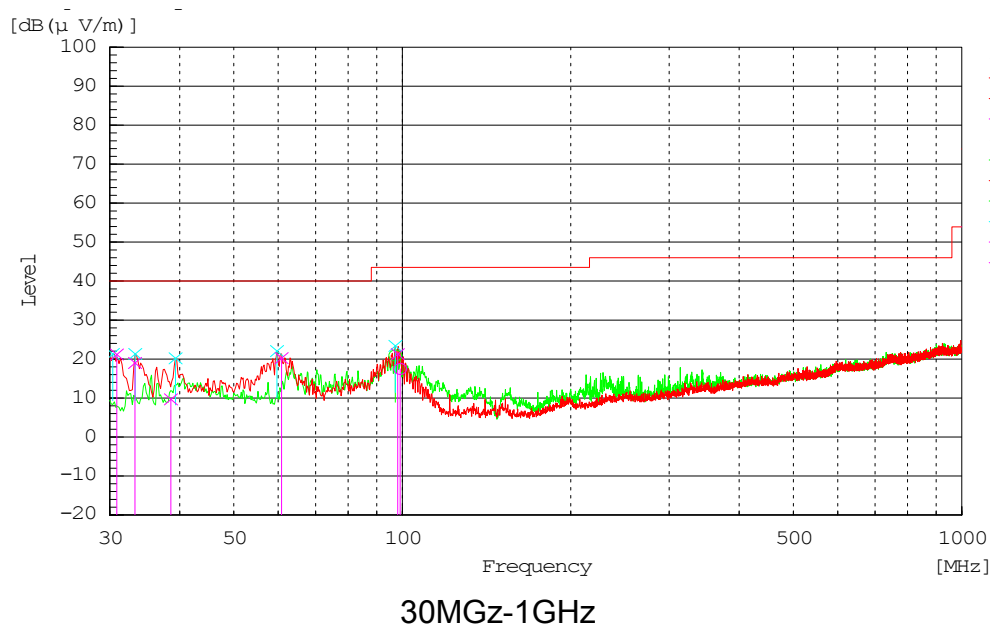


3.2 Radiated emission

Enclosure port of ancillary equipment (Test position depend on DUT and auxiliary, necessary result mentioned below)

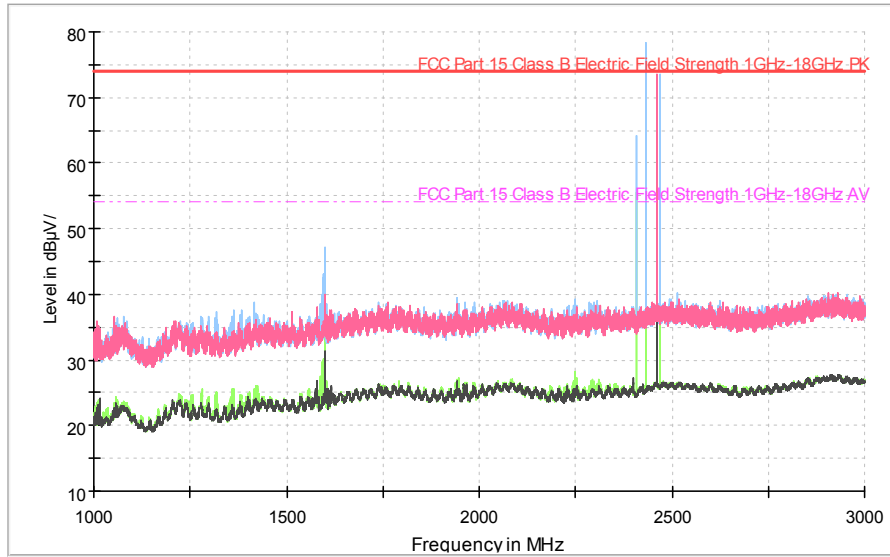
Mode1

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)
30.892	45.20	21.20	40.00	18.80	1000.00	120.00	106.0	V	308.3	-24.00
33.270	43.10	19.00	40.00	21.00	1000.00	120.00	106.0	V	3.6	-24.10
38.577	32.40	9.70	40.00	30.30	1000.00	120.00	278.0	V	298.2	-22.70
60.863	42.70	20.30	40.00	19.70	1000.00	120.00	102.0	V	0.0	-22.40
98.120	43.80	21.30	43.50	22.20	1000.00	120.00	106.0	V	44.8	-22.50
99.108	39.80	17.50	43.50	26.00	1000.00	120.00	307.0	H	356.5	-22.30



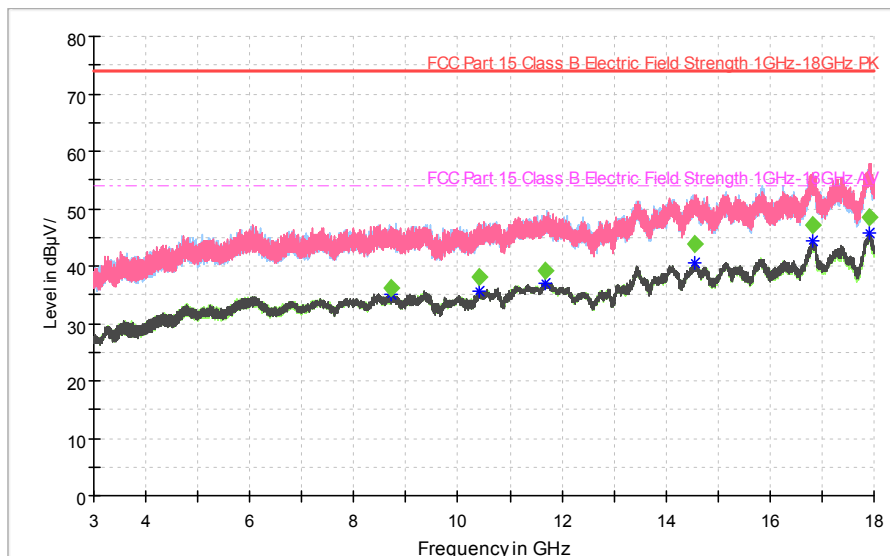
Frequency (MHz)	Reading MaxPeak (dBuV/m)	Reading Average (dBuV/m)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
8718.500	---	56.59	---	36.29	54.00	17.71	1000.0	1000.0	124.9	H	25.0	-20.3
10412.000	---	56.81	---	38.01	54.00	15.99	1000.0	1000.0	99.9	V	19.0	-18.8
11681.500	---	55.67	---	39.07	54.00	14.93	1000.0	1000.0	100.9	V	157.0	-16.6
14559.500	---	57.16	---	43.76	54.00	10.24	1000.0	1000.0	124.9	H	190.0	-13.4
16830.500	---	59.55	---	47.15	54.00	6.85	1000.0	1000.0	124.9	V	155.0	-12.4
17905.500	---	58.36	---	48.46	54.00	5.54	1000.0	1000.0	101.0	V	-16.0	-9.9

Full Spectrum



1GHz-6GHz

Full Spectrum

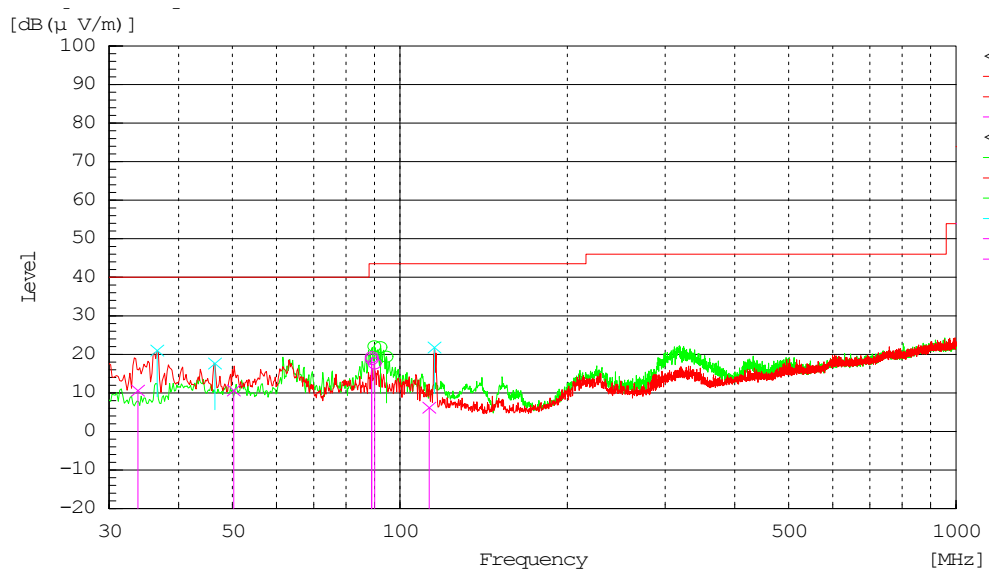


6GHz-18GHz

Frequency range	NOTE
18000MHz -40000MHz	There were no emission above 18GHz found within 20db of the limit. Thus, test result was not reported according to part 15.31(o)

Mode2

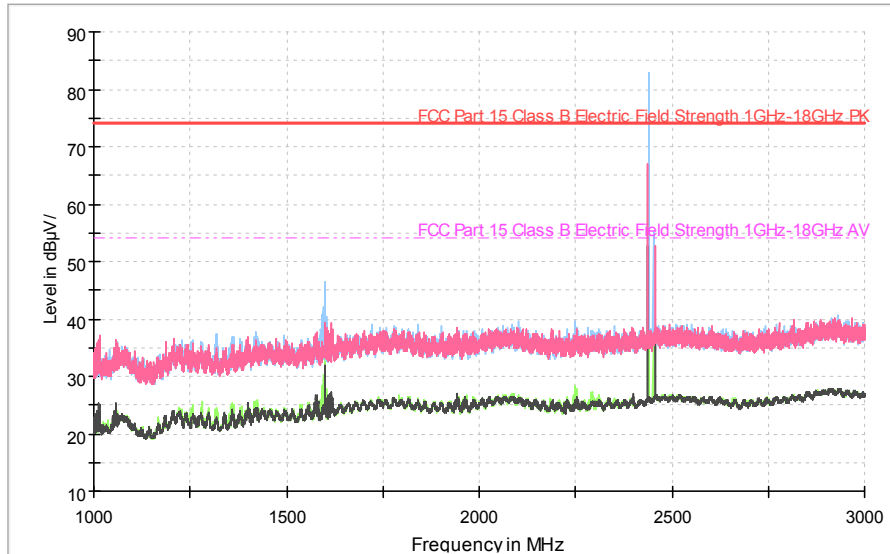
Frequency (MHz)	Reading (dBuV/m)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.811	34.50	10.60	40.00	29.40	1000.0	120.0	104.0	V	232.6	-23.9
88.964	43.80	18.80	43.50	24.70	1000.0	120.0	211.0	H	31.0	-25.0
112.881	29.50	6.20	43.50	37.30	1000.0	120.0	131.0	V	309.7	-23.3
50.289	31.70	10.70	40.00	29.30	1000.0	120.0	105.0	V	207.7	-21.0
88.968	44.30	19.30	43.50	24.20	1000.0	120.0	322.0	H	239.3	-25.0
90.065	42.30	17.70	43.50	25.80	1000.0	120.0	178.0	H	68.5	-24.6



30MGz-1GHz

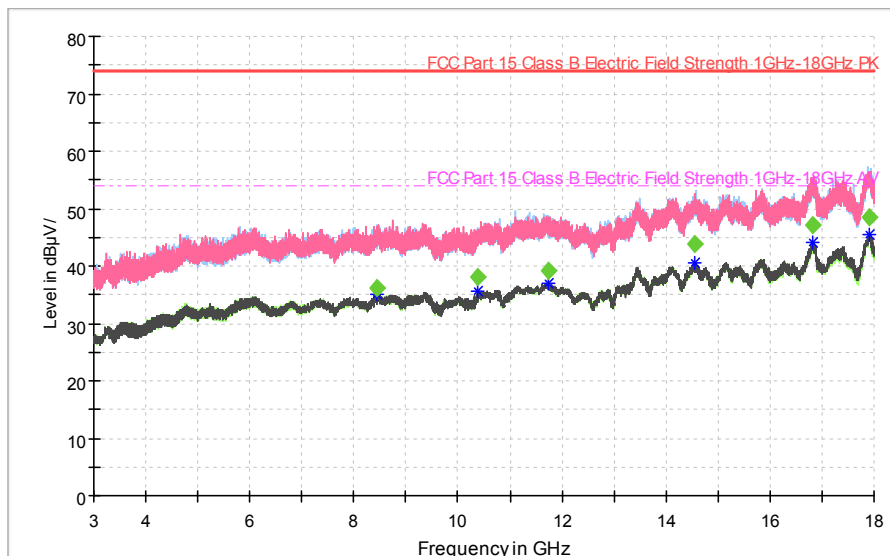
Frequency (MHz)	Reading MaxPeak (dBuV/m)	Reading Average (dBuV/m)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
8443.500	---	56.60	---	36.30	54.00	17.70	1000.0	1000.0	100.9	V	188.0	-20.3
10369.500	---	56.91	---	38.01	54.00	15.99	1000.0	1000.0	106.4	H	176.0	-18.9
11728.500	---	55.79	---	39.19	54.00	14.81	1000.0	1000.0	124.9	V	-25.0	-16.6
14563.000	---	57.14	---	43.74	54.00	10.26	1000.0	1000.0	107.9	V	-15.0	-13.4
16830.500	---	59.58	---	47.18	54.00	6.82	1000.0	1000.0	124.9	V	18.0	-12.4
17909.000	---	58.24	---	48.44	54.00	5.56	1000.0	1000.0	124.9	H	200.0	-9.8

Full Spectrum



1GHz-6GHz

Full Spectrum



6GHz-18GHz

Frequency range	NOTE
18000MHz -40000MHz	There were no emission above 18GHz found within 20db of the limit. Thus, test result was not reported according to part 15.31(o)

4. UNCERTAINTY

Test item	Description	Uncertainty
Radiated Disturbance	30MHz~100MHz	4.73dB
	100MHz~1000MHz	4.73dB
	1000MHz~40000MHz	4.58dB
Conducted Disturbance	Quasi-peak	3.92dB
	Average	3.92dB

5. EQUIPMENT LIST

Name	Model	Serial number	Calibration Date	Calibration DueDate
Shielding room	9.080m×5.255m×3.525m	---	2018/9/6	2023/9/5
Semi-Anechoic Chamber	SAC: 23.18m×16.88m×9.60m	---	2018/9/6	2023/9/5
Turn table	Diameter:5m	---	---	---
Antenna master	SAC(MA4.0)	---	---	---
EMI test receiver	ESW	101574	2022/6/20	2023/6/19
EMI test receiver	ESR 3	102361	2022/4/12	2023/4/11
Signal generator	SMB100A	109002	2022/6/21	2023/6/20
Double-Ridged Waveguide HornAntenna	HF 907	100512	2021/5/13	2023/5/12
Ultra log test antenna	VULB9163	867	2021/5/29	2023/5/28
High Gain Log-Periodic Antenna	HL046	359952/002	2021/8/20	2023/8/19
HornAntenna	9120E	391	2021/8/20	2023/8/19
ESD generator	ESS-S3011	ESS1519 973	2022/6/20	2023/6/19
Signal generator	SMY 01	100092	2022/6/20	2023/6/19
Power Amplifier	250W1000	301074	2022/6/20	2023/6/19
Power Amplifier	50S1G4A	301351	2022/6/20	2023/6/19
Power Amplifier	35S4G8	0330292	2022/6/20	2023/6/19
Power Amplifier	100A250	301408	2022/6/20	2023/6/19
AMN	ENV216	101881	2022/6/20	2023/6/19
BCI	F-120-9A	259	2022/6/20	2023/6/19
BCI	F-52	52	2022/6/20	2023/6/19
General generators	PHF4010	185108	2020/8/20	2022/8/19
Power analyzer	ACS 503	1003-01	2020/8/20	2022/8/19
AC power	IMU3000F5-S-T-D-V	105684-2008	2022/6/20	2023/6/19
Immunity test system	CDN3000A-08-32- 690	1506	2022/6/20	2023/6/19
CDN	VAR-EXT1000	1567	2022/6/20	2023/6/19
Radio tester	CMW 500	160132	2022/6/20	2023/6/19
Audio Analyzer	UPV	100597	2022/6/20	2023/6/19
Laptop	Lenovo Xiaoxinchao7000	---	---	---