


FCC Co-location Test Report

FCC ID : APYHRO00322
Equipment : Mobile Router
Brand Name : SHARP
Applicant : SHARP CORPORATION
1 Takumi-cho, Sakai-ku, Sakai City,
Osaka 590-8522, Japan
Manufacturer : SHARP CORPORATION
1 Takumi-cho, Sakai-ku, Sakai City,
Osaka 590-8522, Japan
Standard : 47 CFR Part 22(H), 27

The product was received on Nov. 24, 2022, and testing was started from Nov. 24, 2022 and completed on Nov. 24, 2022. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI/TIA-603-E-2016 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Hsinhua Laboratory, the test report shall not be reproduced except in full.


Approved by: Jordan Hsiao

SPORTON INTERNATIONAL INC. Hsinhua Laboratory

No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



Table of Contents

HISTORY OF THIS TEST REPORT	3
SUMMARY OF TEST RESULT	4
1.1 Testing Applied Standards	5
1.2 Testing Location Information	5
1.3 Measurement Uncertainty	5
2 TEST CONFIGURATION OF EUT.....	6
2.1 The Worst Case Measurement Configuration.....	6
2.2 Accessories	6
2.3 Support Equipment.....	6
2.4 Test Setup Diagram	7
3 CO-LOCATION TEST RESULT	8
3.1 Radiated Spurious Emission Measurement	8
4 TEST EQUIPMENT AND CALIBRATION DATA	10
APPENDIX A. TEST RESULTS OF RADIATED EMISSION CO-LOCATION	



History of this test report

Report No.	Version	Description	Issued Date
FG262909-04CO	01	Initial issue of report	Nov. 28, 2022

Summary of Test Result

Report Clause	Ref. Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3	2.1053 22.917(a) 27.53(g) 27.53(m)(4)	Radiated Spurious Emission	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and explanations:

None

Reviewed by: Ryan Hsiao

Report Producer: Debby Hung

1.1 Testing 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
- ♦ ANSI/TIA-603-E-2016

1.2 Testing Location Information

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
<input checked="" type="checkbox"/> Hsinhua (TAF: 3785)	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)			
	TEL: 886-3-327-3456		FAX: 886-3-327-0973	
Test site Designation No. TW3785 with FCC.				
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
Radiated	03CH03-HY	Lego Lin	21.9~22.4°C / 48~57%	24/Nov/2022
<input type="checkbox"/> Wen 33rd.St. (TAF: 3785)	ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)			
	TEL: 886-3-318-0787		FAX: 886-3-318-0287	
Test site Designation No. TW0008 with FCC.				

1.3 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Test Items	Uncertainty	Remark
Emissions in Restricted Frequency Bands	4.8 dB	Confidence levels of 95%
Temperature	0.41 °C	Confidence levels of 95%
Humidity	3.4 %	Confidence levels of 95%

Table for Permissive Change




This product is an extension of original one reported under Sporton project number: FG262909-02CO

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. LCM power supply changed from LDO to PMIC; 2. BackLight DC-DC convertor and peripheral componets changed materials, but footprint no changed; 3. SAR chipset peripheral componets changed to no assembled; 4. Main & MIMO2 antenna diplexer changed material, but footprint no changed; 5. Antenna report changed from V1.4 to V1.5B	Radiated Spurious Emission was evaluated

2 Test Configuration of EUT

2.1 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests			
Tests Item	Emissions in Restricted Frequency Bands		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
Operating Mode	Normal Link		
1	Adapter Mode		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			
Worst Planes of EUT			V

2.2 Accessories

Accessories				
USB TYPE C to Ethernet Dongle	Brand Name	-	Model Name	-
	Manufacturer	PAN-INTL	SN	9.HB393A.0022BK
	Signal Line	0.2 meter, non-shielded cable, w/o ferrite core		

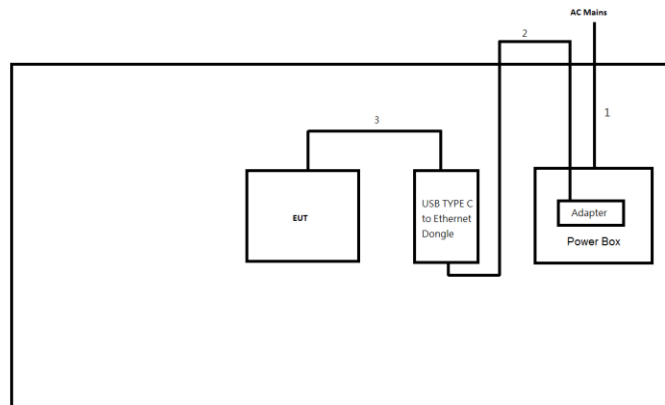
Reminder: Regarding to more detail and other information, please refer to user manual.

2.3 Support Equipment

Support Equipment – Radiated					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	Adapter	APPLE	A1385	-	-
2	Type-C cable	Sporton	Sporton	-	-

2.4 Test Setup Diagram

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power cable	No	1.8	-
2	Type-C cable	No	1.0	-
3	USB TYPE C to Ethernet Dongle	No	0.2	-

3 Co-location Test Result

3.1 Radiated Spurious Emission Measurement

Radiated Spurious Emission	
The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.	
<input checked="" type="checkbox"/> LTE Band 38 <input checked="" type="checkbox"/> LTE Band 41	The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.
<input checked="" type="checkbox"/> LTE Band 12	Emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.1.1 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.2 Test Procedures

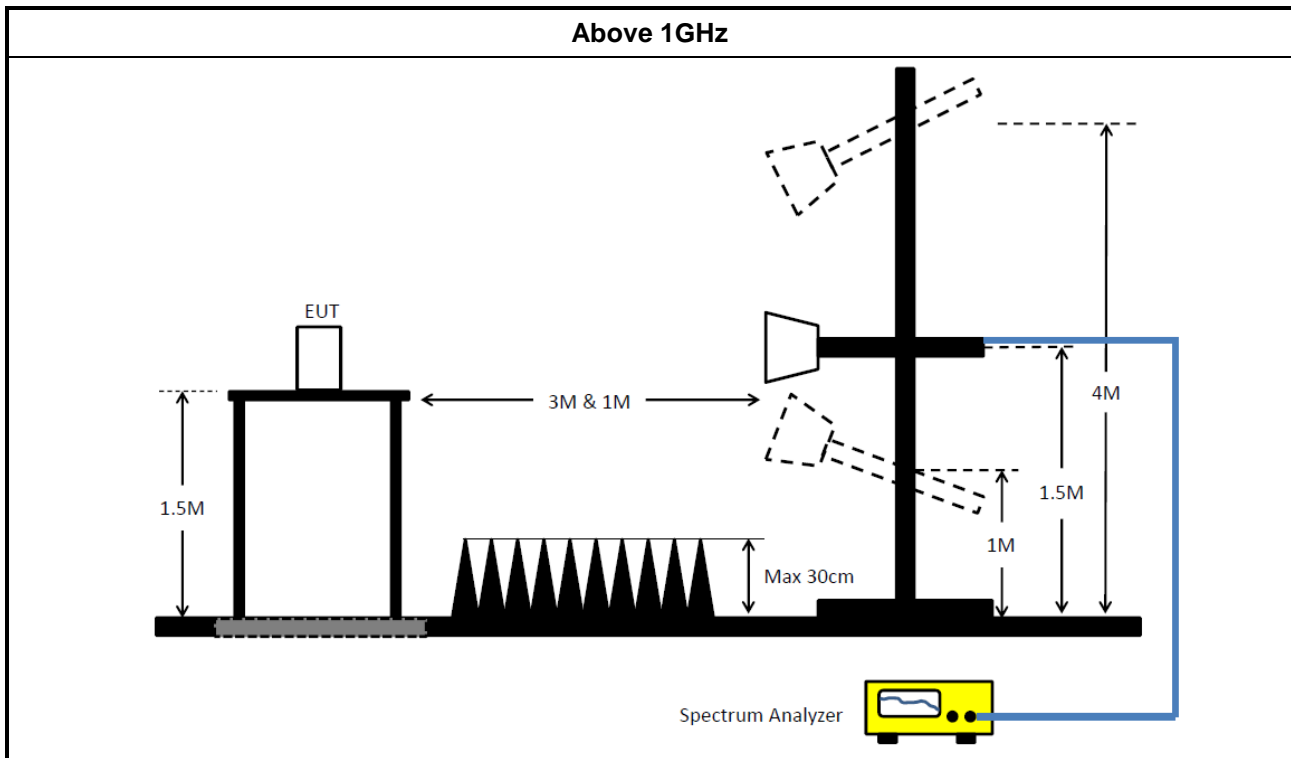
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.1.3 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamplifier Factor)

3.1.4 Test Setup



3.1.5 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix A

4 Test Equipment and Calibration Data

Instrument for Radiated Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz~18GHz 3m	02/Aug/2022	01/Aug/2023
Signal Analyzer	R&S	FSV40	101500	10Hz~40GHz	26/Oct/2022	25/Oct/2023
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	02267	1GHz ~18GHz	27/Sep/2022	26/Sep/2023
RF CABLE 5+6m	HUBER+SUHNER	SUOFLEX 104	03CH03-cable-01	1GHz~40GHz	27/Jul/2022	26/Jul/2023
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	15GHz~40GHz	18/Mar/2022	17/Mar/2023
Microwave Premplifier	Agilent	8449B	3008A02326	1GHz~26.5GHz	14/Jul/2022	13/Jul/2023
Microwave Premplifier	EMC INSTRUMENTS	EM18G40G	060604	18GHz ~ 40GHz	08/Mar/2022	07/Mar/2023
SENSE-EMI	Sporton	V5.10.8.6	N/A	N/A	N/A	N/A



Radiated Emissions above 1GHz

Appendix A

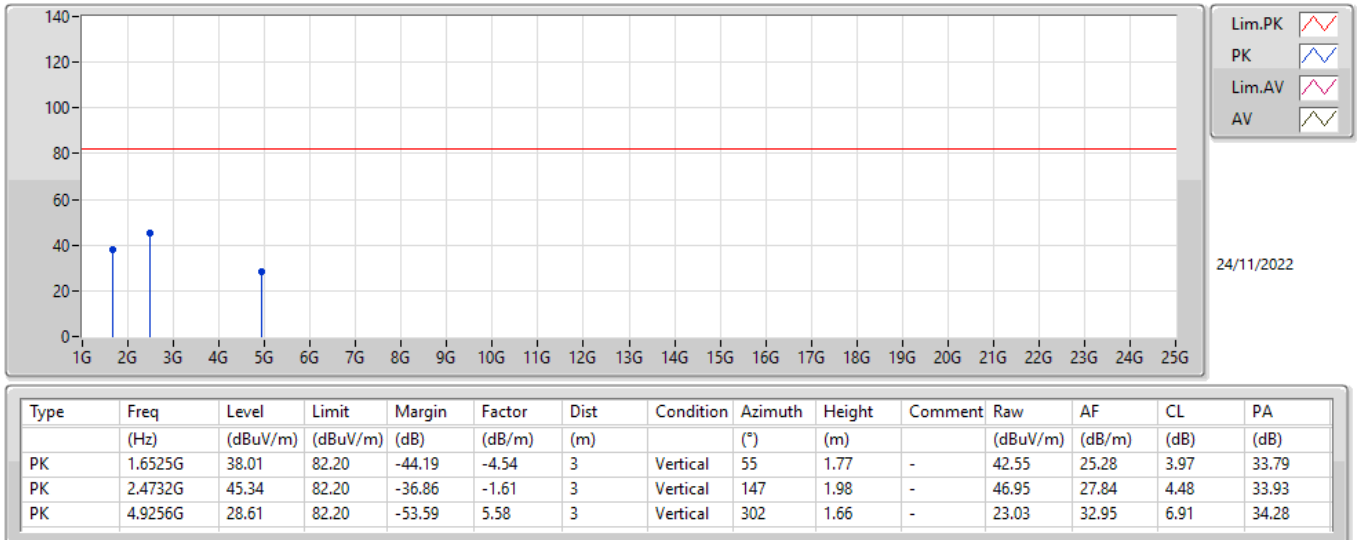
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
Mode 1	Pass	PK	2.47365G	50.51	82.20	-31.69	3	Horizontal	245	1.75	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
Mode 1	Pass	PK	1.6525G	38.01	82.20	-44.19	3	Vertical	55	1.77	-
Mode 1	Pass	PK	2.4732G	45.34	82.20	-36.86	3	Vertical	147	1.98	-
Mode 1	Pass	PK	4.9256G	28.61	82.20	-53.59	3	Vertical	302	1.66	-
Mode 1	Pass	PK	1.6509G	40.26	82.20	-41.94	3	Horizontal	321	1.60	-
Mode 1	Pass	PK	2.47365G	50.51	82.20	-31.69	3	Horizontal	245	1.75	-
Mode 1	Pass	PK	4.9242G	28.92	82.20	-53.28	3	Horizontal	266	1.72	-

Radiated Emissions above 1GHz_Mode 1



Radiated Emissions above 1GHz_Mode 1

