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Olathe, Kansas 66062
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03-Feb-26

Manufacturer: Garmin International, Inc.
Address: 1200 E. 151st St.
Olathe, KS 66062-3426
U.S.A.
Chile Representative: Matías Rodríguez Correa
Rosario Norte 660 piso 24, Las Condes Santiago
Province CP 7550083, Chile
Contact Email: matias.rodriguez@garmin.com
Subject: SUBTEL, Chile (Resolution 737) Certification Compliance 2026
Commercial Name: Venu Sq 2

	Información (Information)
Tipo de equipo (Equipment type)	Portable Digital Transceiver
Marca (Brand)	Garmin 
Modelo (Model)	AA4390
Tecnología o modulación (Technology or modulation)	ASK for NFC / GFSK for ANT/ GFSK for BLE
Frecuencias (Frequencies)	13.56 MHz / 2402-2480 MHz / 2402-2480 MHz
Ganancia de antena (dBi) (Antenna gain (dBi))	ANT -2.08 dBi / 802.15.1 -2.08 dBi / 802.15.1 -2.08 dBi
P.i.r.e. (E.I R P.)	-50.02 dBm, 0.00 mW / 0.58 dBm, 1.14 mW / 0.59dBm, 1.15mW /
Módulos (Modules)	NFC, ANT, BLE

As all measurements for NFC are made in radiated mode to comply with the field strength limits, gain information is not required to be noted in the reports or any additional documentation.

Declaration of Conformity Statement: the equipment previously identified complies with the provisions established in the Technical Standard for Small Range Equipment, approved by Exempt Resolution No. 1,985 of 2017, of the Undersecretary of Telecommunications.

Declaración de conformidad: El equipo anteriormente identificado cumple con las disposiciones establecidas en la Norma Técnica para Equipos de Corto Alcance, aprobada mediante la Resolución Exenta N° 1.985 de 2017, de la Subsecretaría de Telecomunicaciones.

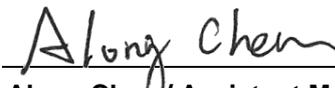
FCC Test Report

FCC ID : IPH-A4390
Equipment : Smart Watch
Model No. : AA4390
Brand Name : GARMIN
Applicant : Garmin International, Inc.
Address : 1200 E. 151st Street Olathe, KS 66062 United States
Standard : 47 CFR FCC Part 15.225
Received Date : Apr. 07, 2022
Tested Date : May 09 ~ May 10, 2022

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

Approved by:



Along Chen / Assistant Manager



Gary Chang / Manager

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APPENDIX A. 20DB AND OCCUPIED BANDWIDTH

APPENDIX B. FIELD STRENGTH OF FUNDAMENTAL EMISSIONS

APPENDIX C. UNWANTED EMISSIONS INTO RESTRICTED FREQUENCY BANDS

APPENDIX D. FIELD STRENGTH OF FUNDAMENTAL EMISSIONS

APPENDIX E. AC POWER LINE CONDUCTED EMISSIONS

Release Record

Report No.	Version	Description	Issued Date
FR240703NF	Rev. 01	Initial issue	May 30, 2022

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	[dBuV]: 0.788MHz 25.56 (Margin -20.44dB) - AV	Pass
15.225(a)~(c)	Field strength of fundamental emissions and spectrum mask	Meet the requirement of limit	Pass
15.225(d)	Field strength of any emissions appearing outside of the 13.110-14.010 MHz band	Meet the requirement of limit	Pass
15.225(e)	Frequency tolerance	Meet the requirement of limit	Pass
15.215 (c)	20dB bandwidth	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	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:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information			
Frequency Range (MHz)	Modulation	Ch. Frequency (MHz)	Channel Number
13.553 – 13.567	ASK	13.56	1

1.1.2 Antenna Details

Ant. No.	Brand	Model	Type	Connector	Gain (dBi)	Remarks
1	INPAQ TECH CO LTD	NF-C-F9-R0-120	Loop	No	---	---

1.1.3 EUT Operational Condition

Power Type	5Vdc from adapter 3.87Vdc from battery		
Operational Voltage	<input checked="" type="checkbox"/> Vnom (3.87 V)	<input checked="" type="checkbox"/> Vmax (4.37 V)	<input checked="" type="checkbox"/> Vmin (3.60 V)
Operational Climatic	<input checked="" type="checkbox"/> Tnom (20°C)	<input checked="" type="checkbox"/> Tmax (55°C)	<input checked="" type="checkbox"/> Tmin (-20°C)

1.1.4 Accessories

No.	Equipment	Description
1	Battery	Brand: Garmin Model: 361-00136-20 Power Rating: 3.87V, 205mAh
2	USB cable	Brand: GARMIN Model: 320-01069-10 Power line: 0.52m shielded without core

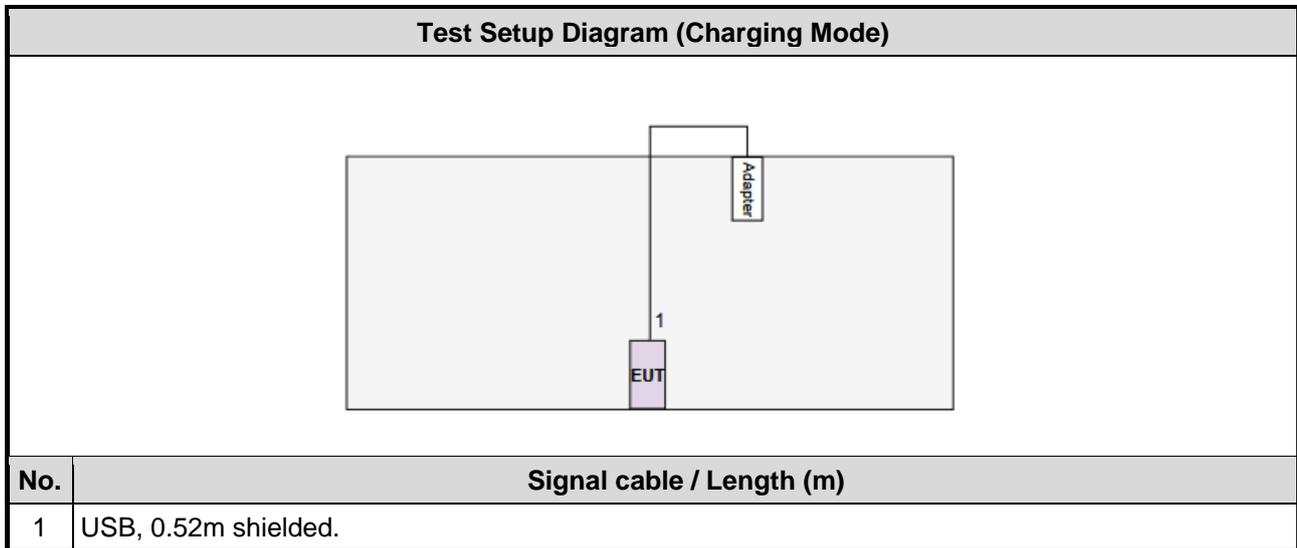
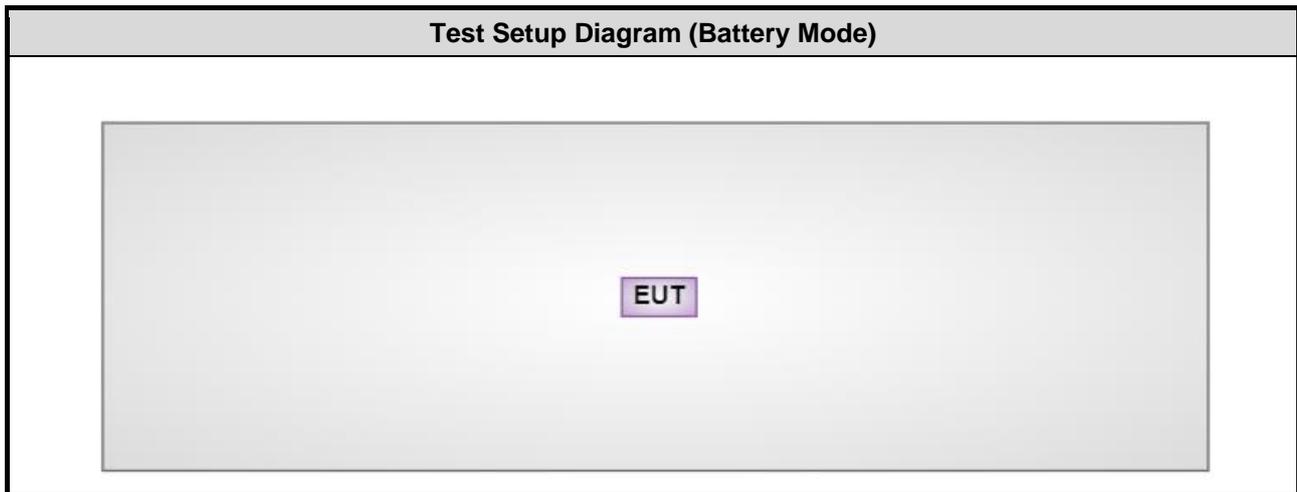
1.1.5 Test Tool and Power Index

Test Tool	Garmin USB Monitor, Version: 3.0
Power Index	Default

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Adapter	samsung	ETA-U90JWS	---	---

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	May 09, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 16, 2022	Feb. 15, 2023
LISN	R&S	ENV216	101579	Apr. 21, 2022	Apr. 20, 2023
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127667	Jan .07, 2022	Jan .06, 2023
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 19, 2021	Oct. 18, 2022
50 ohm terminal (Support Unit)	NA	50	04	May 25, 2021	May 24, 2022
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	May 09, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Mar. 15, 2022	Mar. 14, 2023
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 08, 2021	Nov. 07, 2022
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jun. 30, 2021	Jun. 29, 2022
Preamplifier	EMC	EMC02325	980225	Jun. 29, 2021	Jun. 28, 2022
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 05, 2021	Oct. 04, 2022
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 05, 2021	Oct. 04, 2022
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 05, 2021	Oct. 04, 2022
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 05, 2021	Oct. 04, 2022
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	May 10, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101910	Apr. 18, 2022	Apr. 17, 2023
Power Meter	Anritsu	ML2495A	1241002	Nov. 07, 2021	Nov. 06, 2022
Power Sensor	Anritsu	MA2411B	1207366	Nov. 07, 2021	Nov. 06, 2022
DC POWER SOURCE	GW INSTEK	GPC-6030D	GES855395	Nov. 08, 2021	Nov. 07, 2022
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	May 25, 2021	May 24, 2022
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

47 CFR FCC Part 15.225
ANSI C63.10-2013

1.6 Deviation from Test Standard and Measurement Procedure

None

1.7 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	±34.130 Hz
Radiated emission ≤ 30MHz	±2.3 dB
Radiated emission ≤ 1GHz	±3.41 dB
Temperature	±0.4 °C
AC conducted emission	±2.92 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-WS, 03CH01-WS, TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807C
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Test Configuration
AC Power Line Conducted Emissions	NFC	13.56	2
Field strength of fundamental emissions	NFC	13.56	2
Unwanted Emissions into Restricted Frequency Bands < 30MHz	NFC	13.56	2
Unwanted Emissions into Restricted Frequency Bands > 30MHz	NFC	13.56	2
	Charging	---	1
Frequency tolerance	NFC	13.56	2
20dB bandwidth	NFC	13.56	2
AC Power Line Conducted Emissions	Charging	---	1

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.
2. The EUT had been tested by following test configurations.
 - 1) Configuration 1: Charging mode
 - 2) Configuration 2: Battery mode

3 Transmitter Test Results

3.1 20dB and Occupied Bandwidth

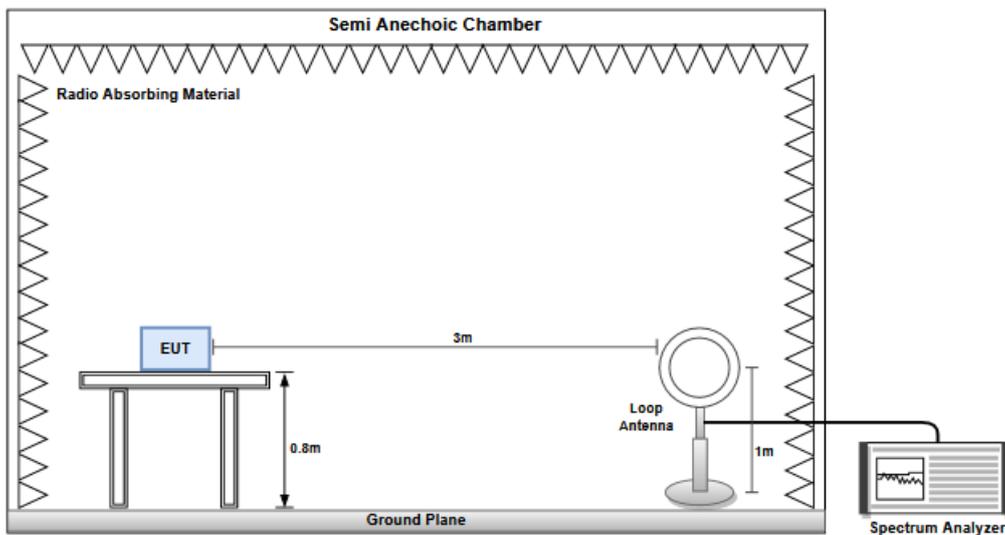
3.1.1 Limit of 20dB Bandwidth

The upper and lower frequency of the 20dB bandwidth shall within 13.553~13.567 MHz

3.1.2 Test Procedures

1. Set resolution bandwidth (RBW) = 1 kHz, Video bandwidth = 3 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20dB relative to the maximum level measured in the fundamental emission.

3.1.3 Test Setup



3.1.4 Test Result

Ambient Condition	24°C / 65%	Tested By	Roger Lu
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Refer to Appendix A.

3.2 Field Strength of Fundamental Emissions

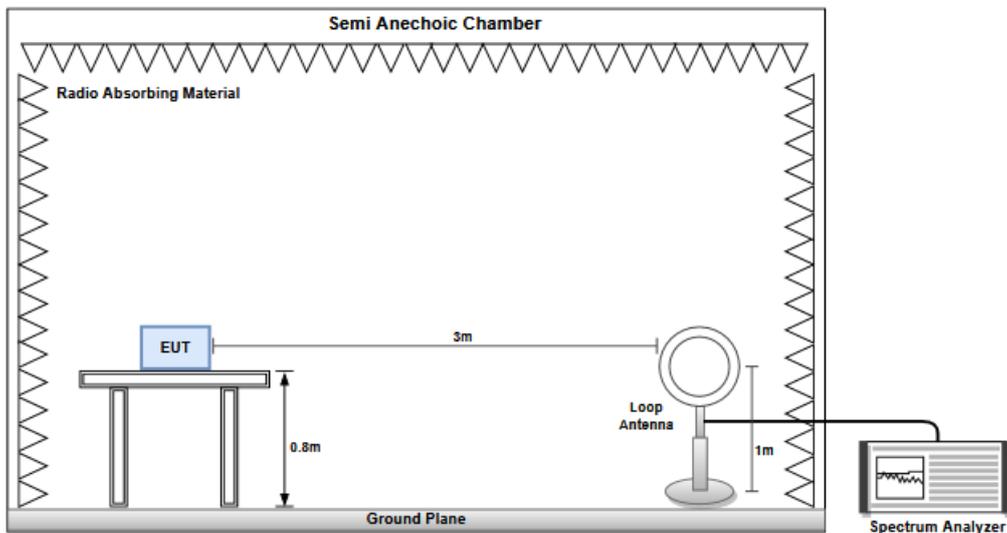
3.2.1 Field Strength of Fundamental Emissions

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

3.2.2 Test Procedures

1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at a height of 0.8 m test table above the ground plane.
2. Measurement is made with the antenna positioned in both the open and close planes of polarization. . Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, and the antenna rotated to repeat the measurements for both the open and close antenna polarizations.

3.2.3 Test Setup



3.2.4 Test Result

Ambient Condition	24°C / 65%	Tested By	Roger Lu
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Refer to Appendix B.

3.3 Unwanted Emissions into Restricted Frequency Bands

3.3.1 Limit of Unwanted Emissions into Restricted Frequency Bands

- 1) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- 2) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- 3) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in below table

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

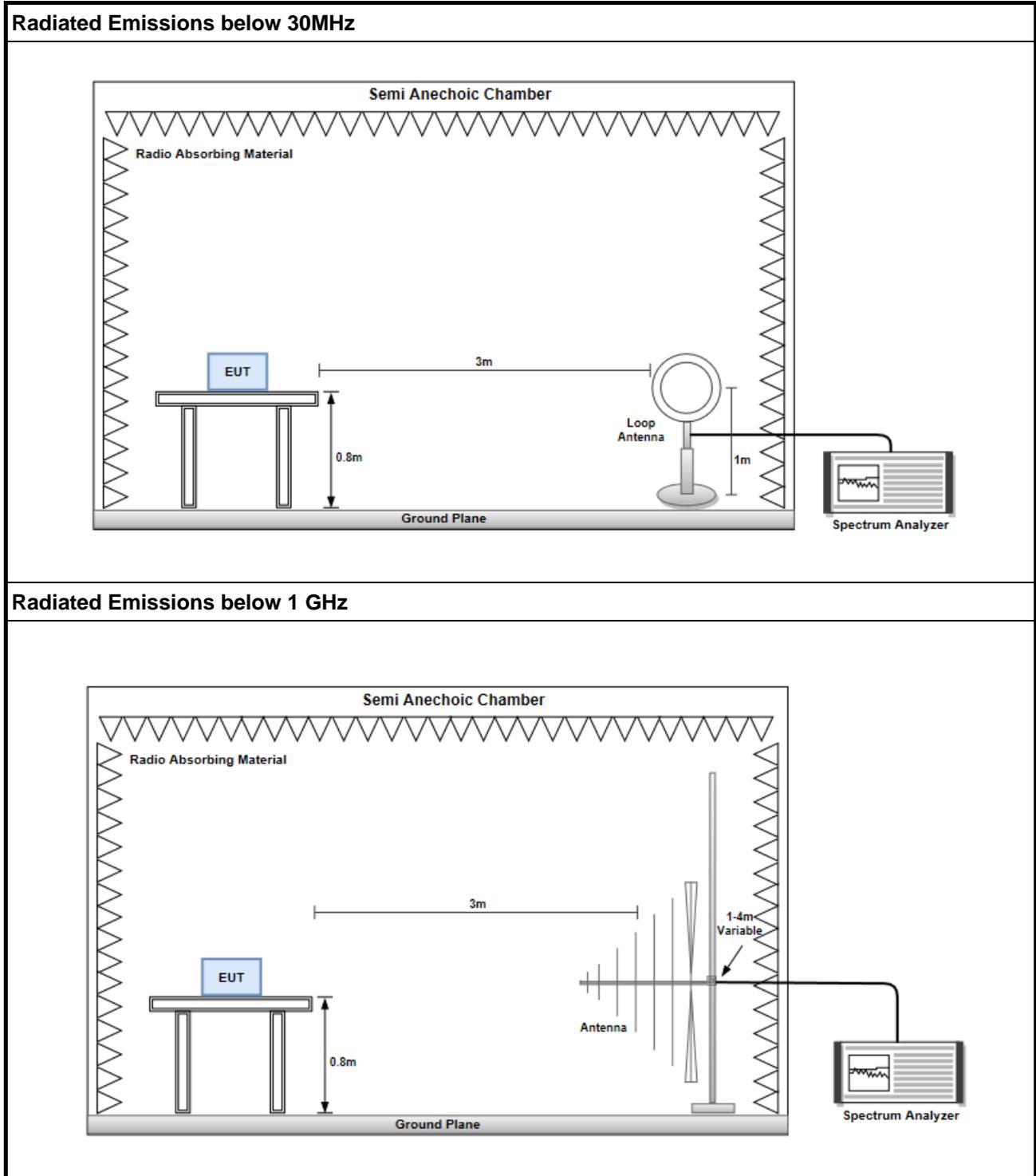
3.3.2 Test Procedures

4. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at a height of 0.8 m test table above the ground plane.
5. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
6. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.

3.3.3 Test Setup



3.3.4 Test Results

Refer to Appendix C.

3.4 Frequency Stability

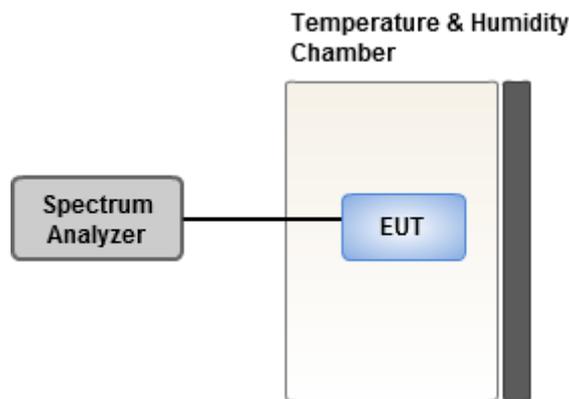
3.4.1 Frequency Stability Limit

Carrier frequency stability shall be maintained to $\pm 0.01\%$ (± 100 ppm).

3.4.2 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.8 for frequency stability tests
<input checked="" type="checkbox"/>	Frequency stability with respect to ambient temperature
<input checked="" type="checkbox"/>	Frequency stability when varying supply voltage
<input type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.

3.4.3 Test Setup



3.4.4 Test Result

Ambient Condition	24°C / 65%	Tested By	Roger Lu
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Refer to Appendix D.

3.5 AC Power Line Conducted Emissions

3.5.1 Limit of AC Power Line Conducted Emissions

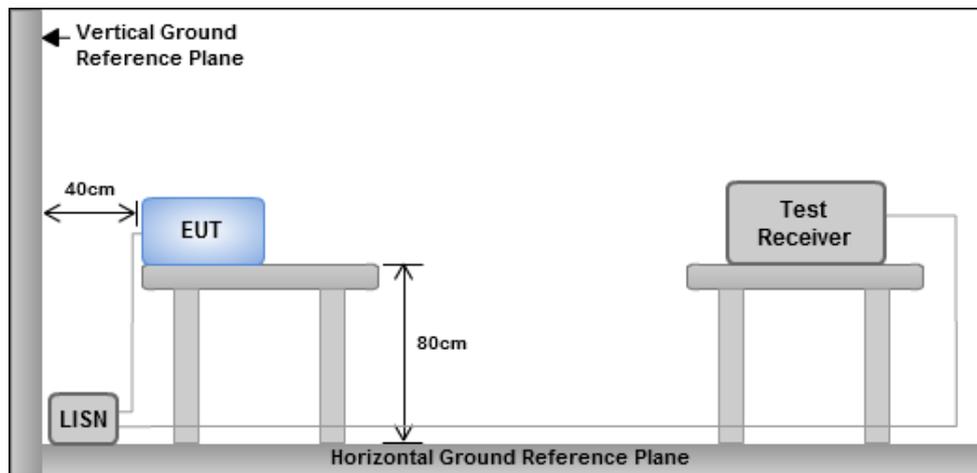
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

3.5.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

3.5.3 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 cm from other units and other metal planes

3.5.4 Test Result

Refer to Appendix E.

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

Tel: 886-2-2601-1640

No.30-2, Ding Fwu Tsuen, Lin Kou
District, New Taipei City, Taiwan
(R.O.C.)

Kwei Shan

Tel: 886-3-271-8666

No.3-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

Kwei Shan Site II

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 333, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666

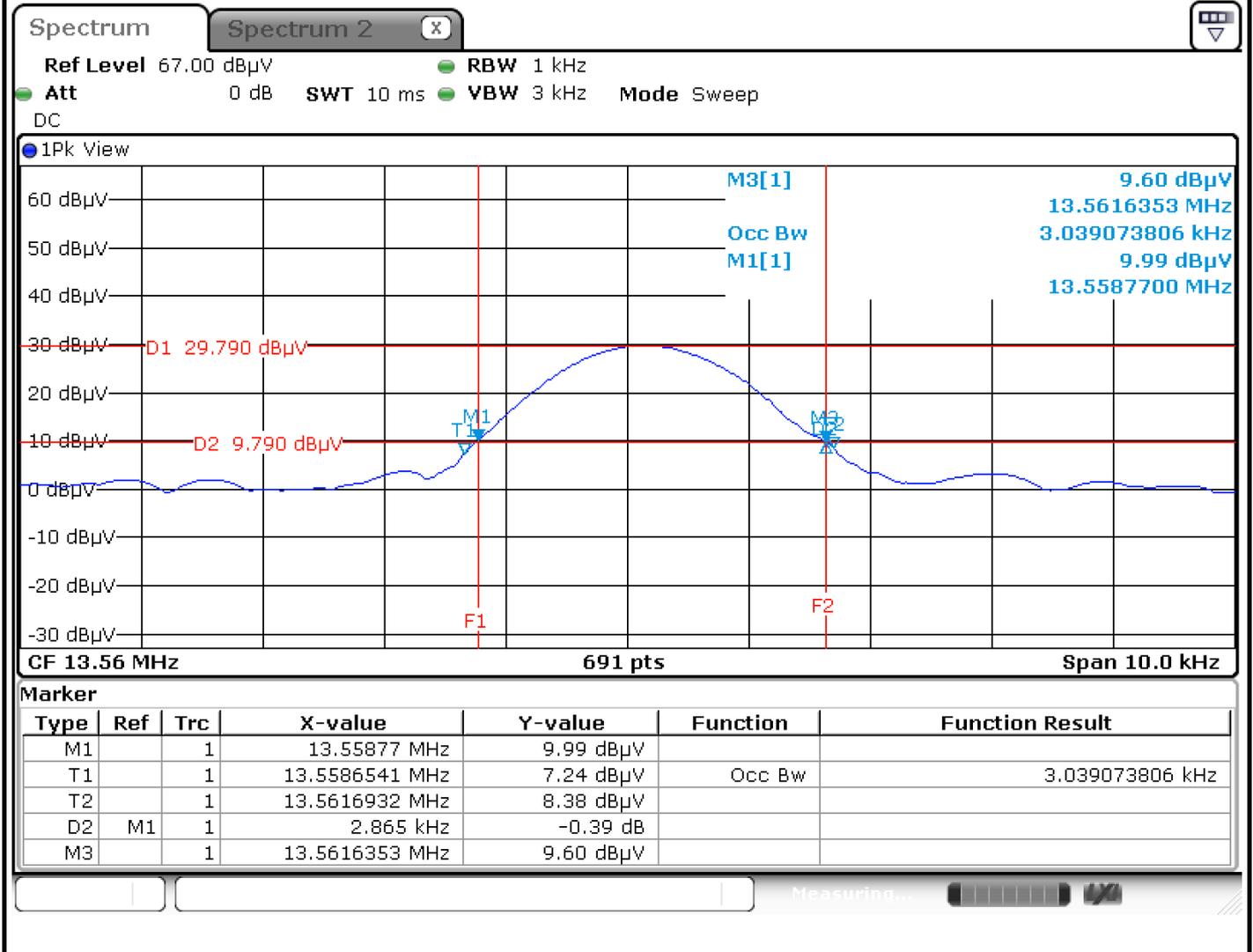
Fax: 886-3-318-0345

Email: ICC_Service@icertifi.com.tw

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Modulation Mode	Freq. (MHz)	20dB Bandwidth (kHz)	F _L at 20dB BW (MHz)	F _H at 20dB BW (MHz)	99% Bandwidth (kHz)
NFC	13.56	2.865	13.55877	13.561635	3.039073806
Limit		N/A	13.553	13.567	N/A





Field Strength of Fundamental Emissions Result							
Polarization	Emission Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
Open	13.56	45.03	105.39	-60.36	20.65	24.38	QP

Field Strength of Fundamental Emissions Result							
Polarization	Emission Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor	Remark
Close	13.56	40.96	105.39	-64.43	16.58	24.38	QP

Note: Emission level = SA reading + Factor



Unwanted Emissions (Below 30MHz)

Field Strength of Fundamental Emissions Result							
Polarization	Emission Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor(dB)	Remark
Open	13.41	36.35	62	-25.65	12.01	24.34	QP
Open	13.553	37.26	71.87	-34.61	12.88	24.38	QP
Open	13.567	37.3	71.86	-34.56	12.92	24.38	QP
Open	13.71	36.57	61.81	-25.24	12.15	24.42	QP
Open	27.12	29.08	49.54	-20.46	9.25	19.83	QP

Field Strength of Fundamental Emissions Result							
Polarization	Emission Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	SA Reading (dBuV)	Factor(dB)	Remark
Close	13.41	35.49	62	-26.51	11.15	24.34	QP
Close	13.553	37.1	71.87	-34.77	12.72	24.38	QP
Close	13.567	36.94	71.86	-34.92	12.56	24.38	QP
Close	13.71	35.64	61.81	-26.17	11.22	24.42	QP
Close	27.12	28.83	49.54	-20.71	9	19.83	QP

Note: Emission level = SA reading + Factor



Unwanted Emissions (Above 30MHz)

Configuration 1: Charging mode

Polarization	Charging	Test Freq. (MHz)	---						
Test By :Roger Lu		Temperature(°C):24		Humidity(%):65					
<p>The graph plots Level (dBuV/m) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (30 to 1000). A red step function represents the CLASS-B limit, starting at 40 dBuV/m from 30 MHz, rising to 43.5 dBuV/m at 100 MHz, 46 dBuV/m at 200 MHz, and 55 dBuV/m at 900 MHz. Six blue vertical lines represent emission peaks at 35.82, 149.31, 207.51, 281.23, 424.79, and 531.49 MHz.</p>									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg
1	35.82	23.84	40.00	-16.16	33.27	-9.43	Peak	---	---
2	149.31	23.19	43.50	-20.31	32.24	-9.05	Peak	---	---
3	207.51	25.19	43.50	-18.31	37.15	-11.96	Peak	---	---
4	281.23	22.74	46.00	-23.26	31.39	-8.65	Peak	---	---
5	424.79	26.86	46.00	-19.14	31.88	-5.02	Peak	---	---
6	531.49	27.89	46.00	-18.11	30.73	-2.84	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

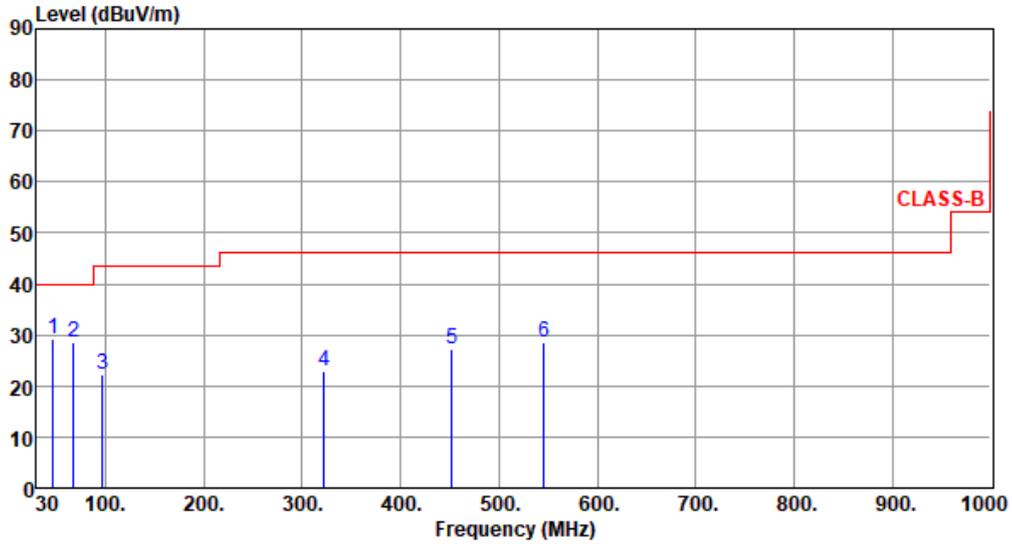
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Polarization	Charging	Test Freq. (MHz)	---
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Test By :Roger Lu Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	46.49	29.37	40.00	-10.63	37.86	-8.49	Peak	---	---
2	67.83	28.72	40.00	-11.28	38.88	-10.16	Peak	---	---
3	96.93	22.30	43.50	-21.20	36.10	-13.80	Peak	---	---
4	321.97	22.89	46.00	-23.11	30.35	-7.46	Peak	---	---
5	451.95	27.07	46.00	-18.93	31.26	-4.19	Peak	---	---
6	546.04	28.71	46.00	-17.29	31.34	-2.63	Peak	---	---

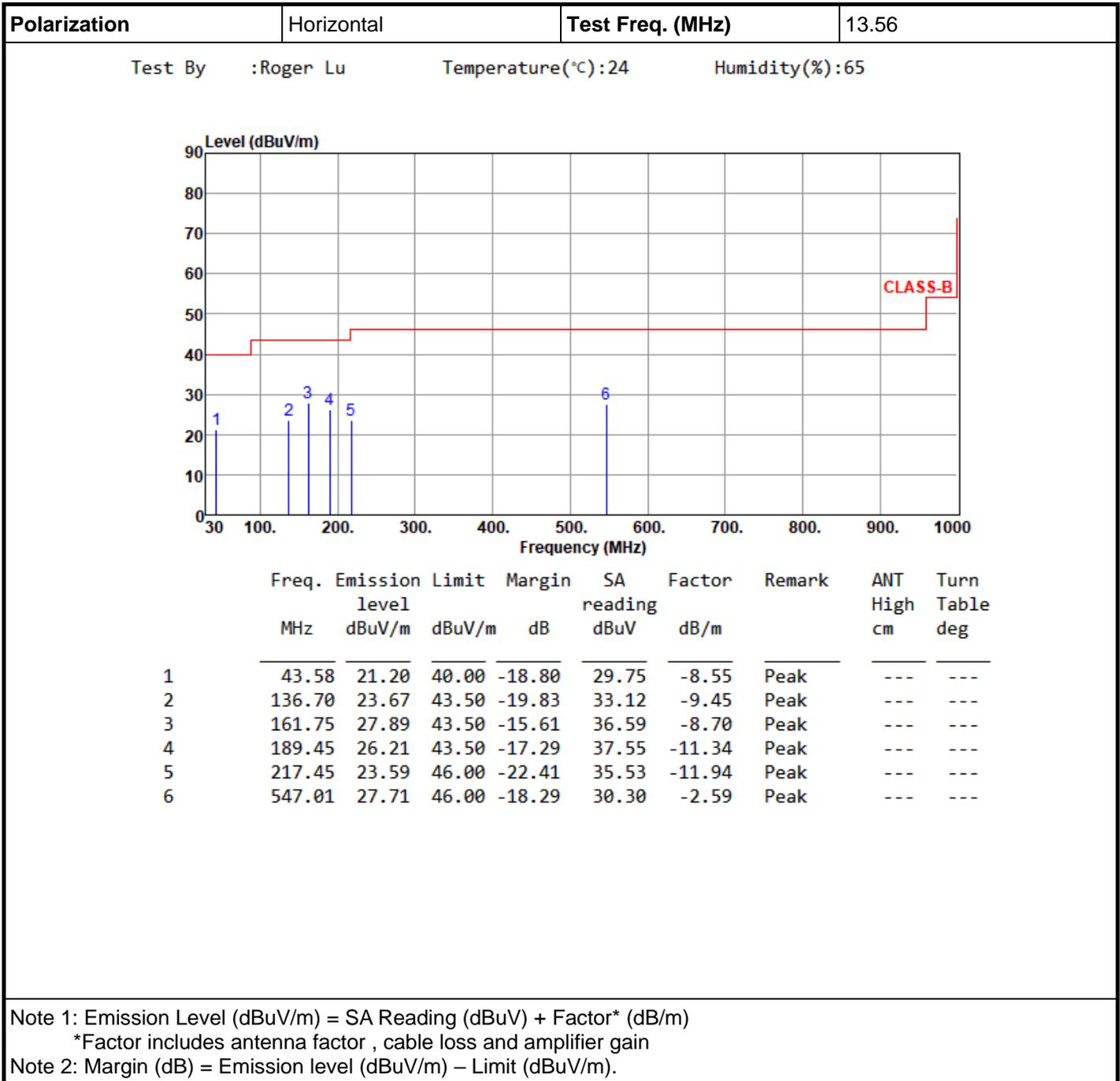
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



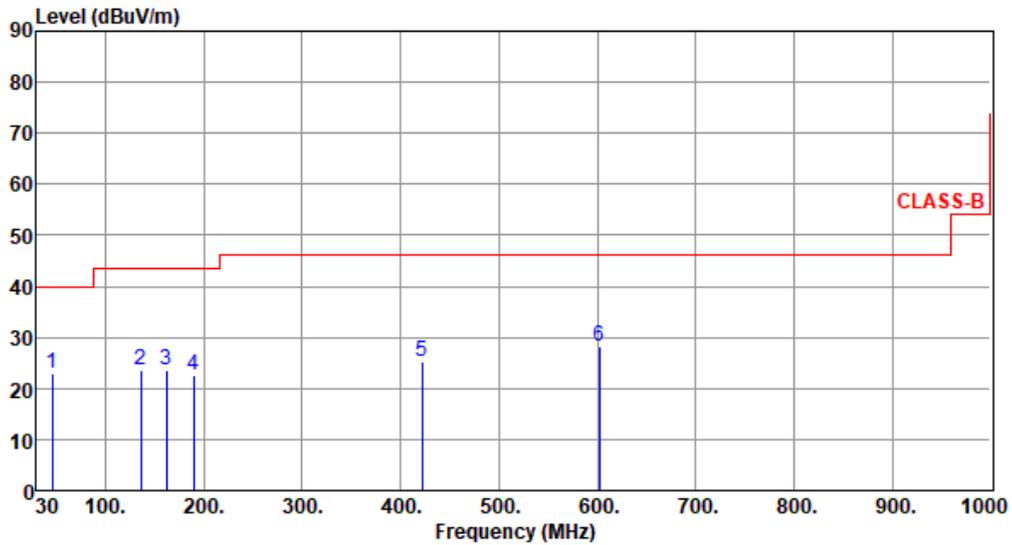
Configuration 2: Battery mode





Polarization	Vertical	Test Freq. (MHz)	13.56
---------------------	----------	-------------------------	-------

Test By :Roger Lu Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	45.52	23.05	40.00	-16.95	31.55	-8.50	Peak	---	---
2	135.89	23.56	43.50	-19.94	33.01	-9.45	Peak	---	---
3	161.82	23.46	43.50	-20.04	32.16	-8.70	Peak	---	---
4	189.45	22.59	43.50	-20.91	33.93	-11.34	Peak	---	---
5	421.88	25.26	46.00	-20.74	30.34	-5.08	Peak	---	---
6	602.30	28.21	46.00	-17.79	29.22	-1.01	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

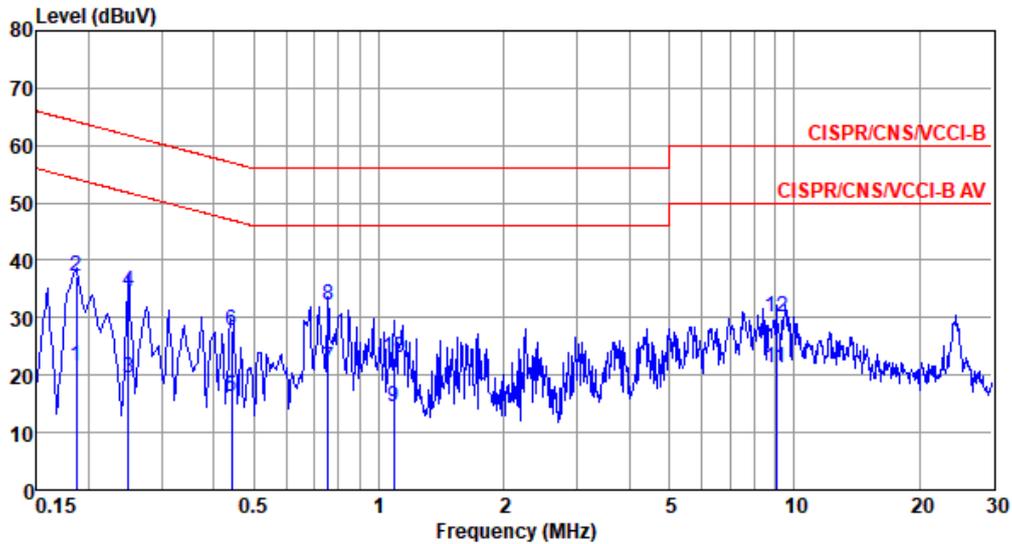


Frequency: 13.56 MHz	Frequency Drift (ppm)			
	0 minute	2 minutes	5 minutes	10 minutes
T20°C Vmax	9.59	10.32	9.59	10.32
T20°C Vmin	10.32	10.32	9.59	9.59
T55°C Vnom	6.42	7.37	8.11	5.90
T50°C Vnom	8.11	8.85	9.59	7.37
T40°C Vnom	11.06	10.32	11.06	9.59
T30°C Vnom	10.69	10.69	11.06	11.06
T20°C Vnom	12.54	11.80	11.06	11.06
T10°C Vnom	12.54	14.01	13.27	14.01
T0°C Vnom	14.01	14.01	13.27	14.75
T-10°C Vnom	14.97	14.97	14.01	16.22
T-20°C Vnom	14.75	14.75	16.22	16.96
Vnom [V]: 3.87	Vmax [V]: 4.37		Vmin [V]: 3.60	
Tnom [°C]: 20	Tmax [°C]: 55		Tmin [°C]: -20	



Modulation	Charging
Power Phase	Line

Test by : Joe Liao Temperature: 22°C Humidity: 61%



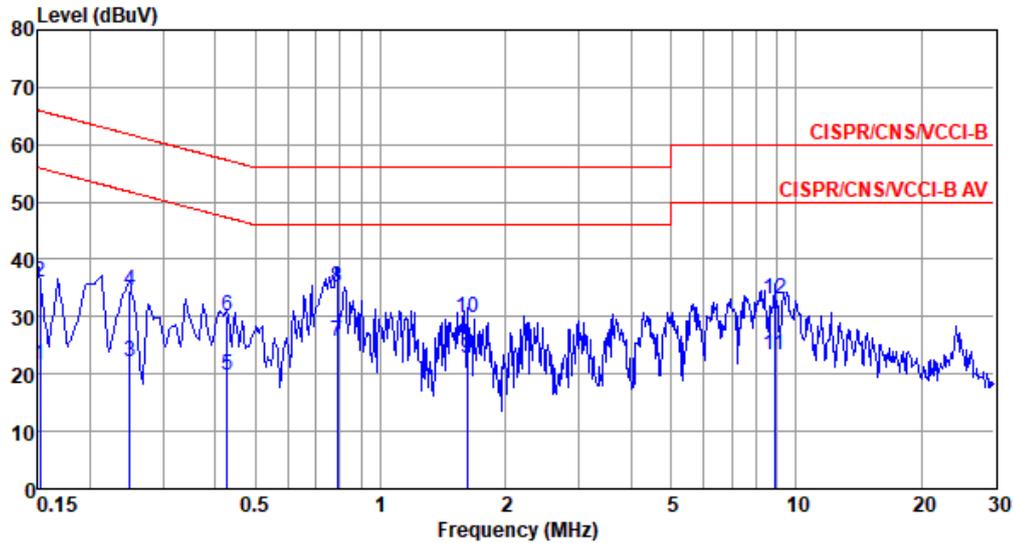
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.186	21.67	54.20	-32.53	11.70	9.68	0.08	0.21	Average
2	0.186	37.13	64.20	-27.07	27.16	9.68	0.08	0.21	QP
3	0.249	19.60	51.78	-32.18	9.58	9.68	0.08	0.26	Average
4	0.249	34.62	61.78	-27.16	24.60	9.68	0.08	0.26	QP
5	0.442	16.10	47.02	-30.92	5.98	9.67	0.09	0.36	Average
6	0.442	27.74	57.02	-29.28	17.62	9.67	0.09	0.36	QP
7	0.755	21.35	46.00	-24.65	11.16	9.68	0.14	0.37	Average
8*	0.755	32.20	56.00	-23.80	22.01	9.68	0.14	0.37	QP
9	1.088	14.56	46.00	-31.44	4.35	9.68	0.16	0.37	Average
10	1.088	23.10	56.00	-32.90	12.89	9.68	0.16	0.37	QP
11	9.059	21.32	50.00	-28.68	10.72	9.74	0.42	0.44	Average
12	9.059	30.03	60.00	-29.97	19.43	9.74	0.42	0.44	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).
 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).



Modulation	Charging
Power Phase	Neutral

Test by : Joe Liao Temperature: 22°C Humidity: 61%



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.152	21.51	55.91	-34.40	11.66	9.61	0.08	0.16	Average
2	0.152	36.02	65.91	-29.89	26.17	9.61	0.08	0.16	QP
3	0.249	22.19	51.78	-29.59	12.32	9.61	0.08	0.18	Average
4	0.249	34.44	61.78	-27.34	24.57	9.61	0.08	0.18	QP
5	0.428	19.77	47.29	-27.52	9.87	9.61	0.09	0.20	Average
6	0.428	30.12	57.29	-27.17	20.22	9.61	0.09	0.20	QP
7*	0.788	25.56	46.00	-20.44	15.55	9.61	0.14	0.26	Average
8	0.788	35.19	56.00	-20.81	25.18	9.61	0.14	0.26	QP
9	1.619	22.74	46.00	-23.26	12.64	9.62	0.19	0.29	Average
10	1.619	29.75	56.00	-26.25	19.65	9.62	0.19	0.29	QP
11	8.869	23.46	50.00	-26.54	13.00	9.68	0.42	0.36	Average
12	8.869	32.95	60.00	-27.05	22.49	9.68	0.42	0.36	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).
 Note 2: Over Limit (dB) = Level (dBuV) - Limit Line (dBuV).

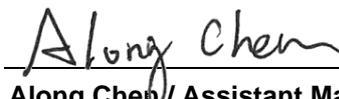
FCC Test Report

FCC ID : IPH-A4390
Equipment : Smart Watch
Model No. : AA4390
Brand Name : GARMIN
Applicant : Garmin International, Inc.
Address : 1200 E. 151st Street Olathe, KS 66062 United States
Standard : 47 CFR FCC Part 15.249
Received Date : Apr. 07, 2022
Tested Date : May. 05 ~ May. 09, 2022

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

Approved by:



Along Chen / Assistant Manager



Gary Chang / Manager

Table of Contents

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APPENDIX A. RADIATED EMISSION		
APPENDIX B. 20DB AND OCCUPIED BANDWIDTH		
APPENDIX C. AC POWER LINE CONDUCTED EMISSIONS		

Release Record

Report No.	Version	Description	Issued Date
FR240703AF	Rev. 01	Initial issue	May 30, 2022

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	[dBuV]: 0.788MHz 25.56 (Margin -20.44dB) - AV	Pass
15.249(a)	Field Strength of Fundamental	Meet the requirement of limit	Pass
15.249(a)(d)	Field Strength of Harmonics and Emissions Radiated outside of the Specified Frequency Bands	Meet the requirement of limit	Pass
15.215(c)	20dB bandwidth	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	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:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information				
Frequency Range (MHz)	Modulation	Ch. Freq. (MHz)	Channel Number	Data Rate
2402-2480	GFSK	2402-2480	1-79 [79]	1 Mbps

1.1.2 Antenna Details

Ant. No.	Brand	Model	Type	Connector	Gain (dBi)
1	Garmin	117-01806-0X	PIFA	No	-2.08

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Type	5Vdc from adapter 3.87Vdc from battery
-------------------	---

1.1.4 Accessories

No.	Equipment	Description
1	Battery	Brand: Garmin Model: 361-00136-20 Power Rating: 3.87V, 205mAh
2	USB cable	Brand: GARMIN Model: 320-01069-10 Power line: 0.52m shielded without core

1.1.5 Channel List

Frequency band (MHz)				2400~2483.5			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	21	2422	41	2442	61	2462
2	2403	22	2423	42	2443	62	2463
3	2404	23	2424	43	2444	63	2464
4	2405	24	2425	44	2445	64	2465
5	2406	25	2426	45	2446	65	2466
6	2407	26	2427	46	2447	66	2467
7	2408	27	2428	47	2448	67	2468
8	2409	28	2429	48	2449	68	2469
9	2410	29	2430	49	2450	69	2470
10	2411	30	2431	50	2451	70	2471
11	2412	31	2432	51	2452	71	2472
12	2413	32	2433	52	2453	72	2473
13	2414	33	2434	53	2454	73	2474
14	2415	34	2435	54	2455	74	2475
15	2416	35	2436	55	2456	75	2476
16	2417	36	2437	56	2457	76	2477
17	2418	37	2438	57	2458	77	2478
18	2419	38	2439	58	2459	78	2479
19	2420	39	2440	59	2460	79	2480
20	2421	40	2441	60	2461	---	---

1.1.6 Test Tool and Duty Cycle

Test Tool	ANT Tests, Version: V97.26	
Duty Cycle and Duty Factor	Duty Cycle (%)	Duty Factor (dB)
	64.35%	1.91

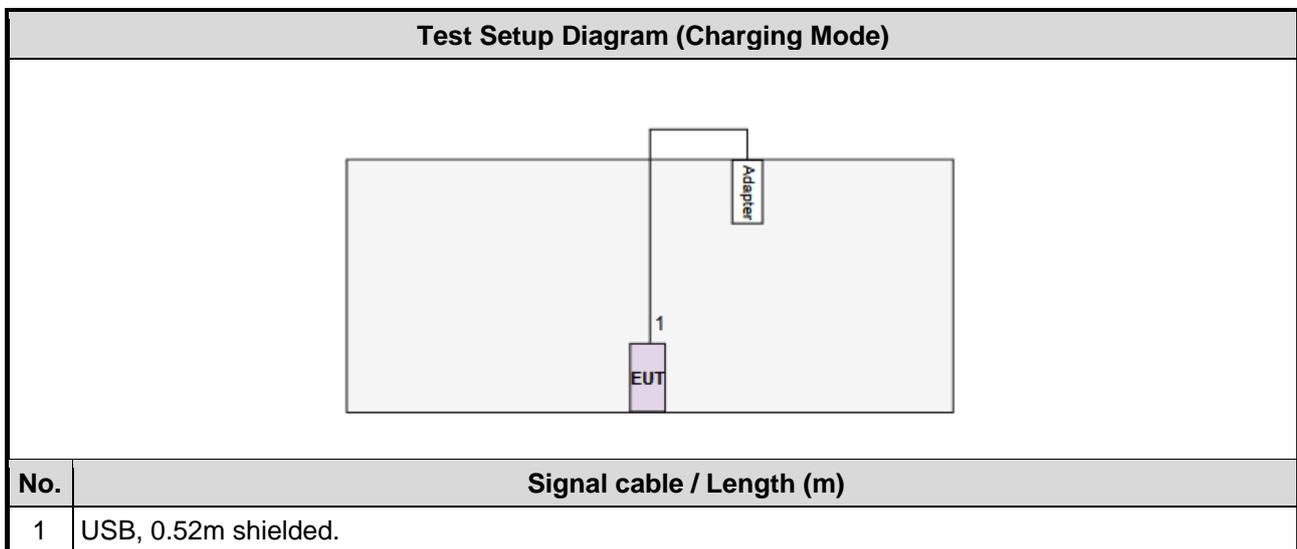
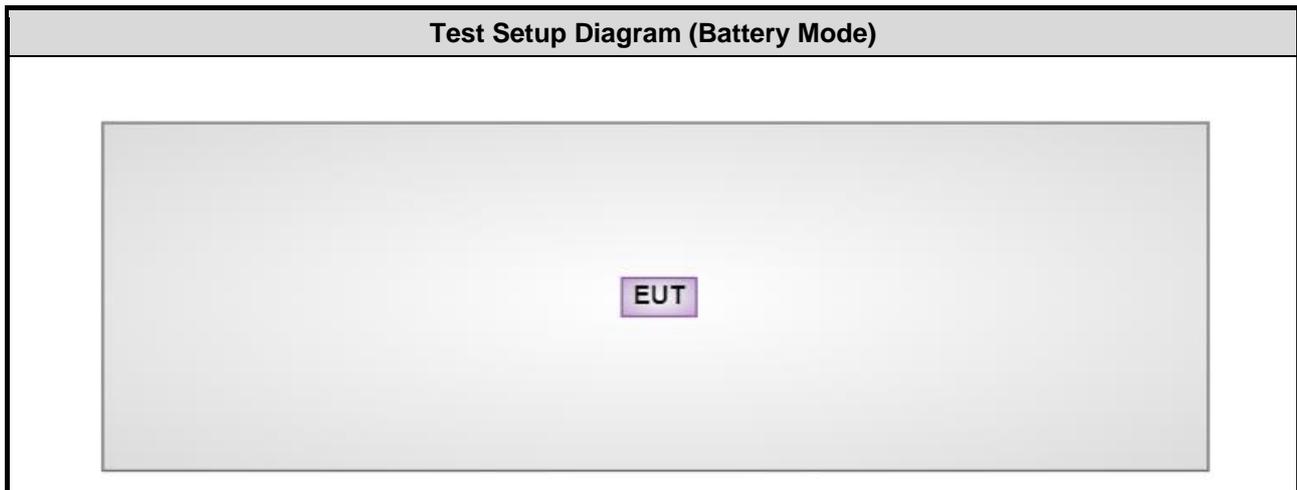
1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)		
	2402	2442	2480
ANT+	Default	Default	Default

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Adapter	samsung	ETA-U90JWS	---	---

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	May 09, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 16, 2022	Feb. 15, 2023
LISN	R&S	ENV216	101579	Apr. 21, 2022	Apr. 20, 2023
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127667	Jan .07, 2022	Jan .06, 2023
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 19, 2021	Oct. 18, 2022
50 ohm terminal (Support Unit)	NA	50	04	May 25, 2021	May 24, 2022
Measurement Software	AUDIX	e3	6.120210k	NA	NA

Note: Calibration Interval of instruments listed above is one year.

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	May 05 ~ May 09, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Mar. 15, 2022	Mar. 14, 2023
Spectrum Analyzer	R&S	FSV40	101498	Nov. 29, 2021	Nov. 28, 2022
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 08, 2021	Nov. 07, 2022
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jun. 30, 2021	Jun. 29, 2022
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 03, 2021	Dec. 02, 2022
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170508	Jan. 11, 2022	Jan. 10, 2023
Preamplifier	EMC	EMC02325	980225	Jun. 29, 2021	Jun. 28, 2022
Preamplifier	Agilent	83017A	MY39501308	Sep. 28, 2021	Sep. 27, 2022
Preamplifier	EMC	EMC184045B	980192	Jul. 14, 2021	Jul. 13, 2022
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 05, 2021	Oct. 04, 2022
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 05, 2021	Oct. 04, 2022
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 05, 2021	Oct. 04, 2022
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 05, 2021	Oct. 04, 2022
RF Cable	EMC	EMC104-35M-35M-8000	210920	Oct. 05, 2021	Oct. 04, 2022
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 05, 2021	Oct. 04, 2022
Measurement Software	AUDIX	e3	6.120210g	NA	NA

Note: Calibration Interval of instruments listed above is one year.

1.5 Test Standards

47 CFR FCC Part 15.249
ANSI C63.10-2013

1.6 Deviation from Test Standard and Measurement Procedure

None

1.7 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	± 34.130 Hz
AC conducted emission	± 2.92 dB
Radiated emission ≤ 1 GHz	± 3.41 dB
Radiated emission > 1 GHz	± 4.59 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-WS, 03CH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Data Rate	Test Configuration
AC Power Line Conducted Emissions	Charging	---	---	1
Field Strength of Fundamental	GFSK	2402, 2442, 2480	1 Mbps	2
Radiated Emissions ≤ 1GHz	GFSK	2402	1 Mbps	2
	Charging	---	---	1
Radiated Emissions > 1GHz	GFSK	2402, 2442, 2480	1 Mbps	2
20dB bandwidth	GFSK	2402, 2442, 2480	1 Mbps	2

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** result was found as the worst case and was shown in this report.
2. The test configurations are listed as follows:
 - 1) Configuration 1: Charging mode
 - 2) Configuration 2: Battery mode

3 Transmitter Test Results

3.1 Radiated Emission

This section includes field strength of fundamental, field strength of harmonics and emissions radiated outside of the operating frequency bands.

3.1.1 Limit of field strength of fundamental and field strength of harmonics

Fundamental Frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
2400–2483.5 MHz	50	500

3.1.2 Limit of Unwanted Emissions

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in below table, whichever is the lesser attenuation.

Radiated emission limits			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:

Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.1.3 Test Procedures

1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

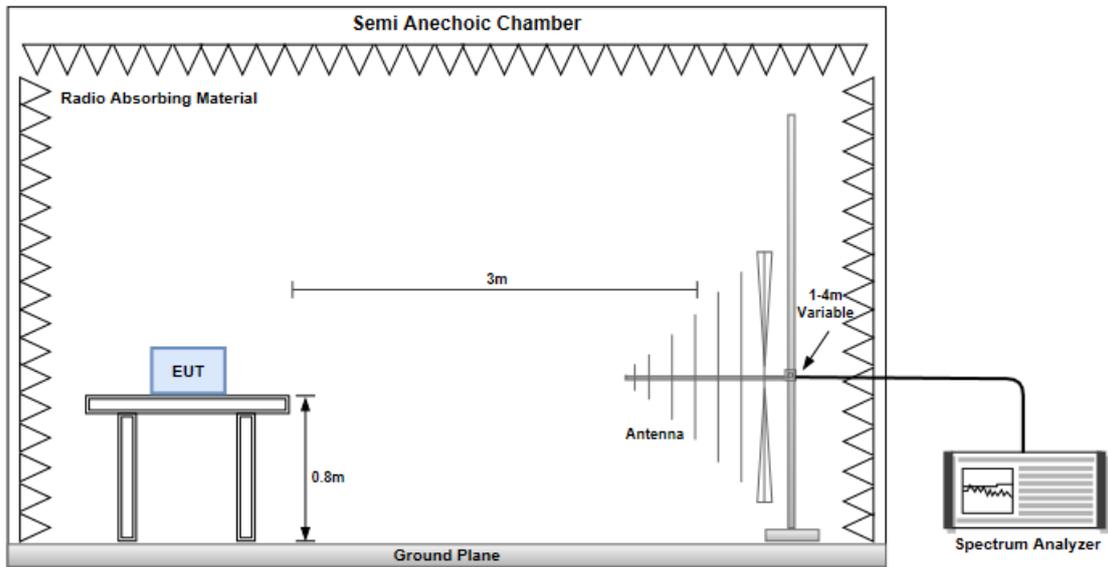
1. Radiated emission below 1GHz
120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission
2. Radiated emission above 1GHz / Peak value except fundamental
RBW=1MHz, VBW=3MHz and Peak detector
3. Radiated emission above 1GHz / Average value for field strength of fundamental and harmonics
The average value is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

$$20\log (\text{Duty cycle}) = 20\log \frac{0.20058 \times 1\text{ms}}{100 \text{ ms}} = -53.95\text{dB}$$

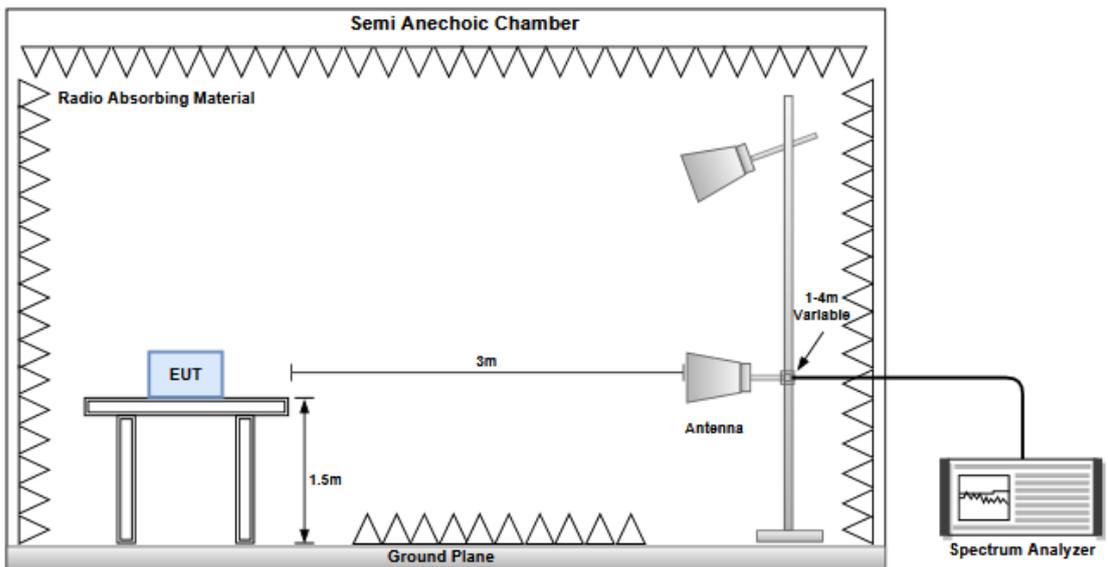
4. Radiated emission above 1GHz / Average value for other emissions
RBW=1MHz, VBW=1/T and Peak detector
5. Radiated emission Peak value for fundamental
RBW=2MHz, VBW=10MHz and Peak detector

3.1.4 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



3.1.5 Test Results

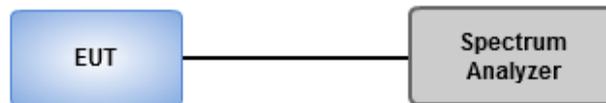
Refer to Appendix A.

3.2 20dB and Occupied Bandwidth

3.2.1 Test Procedures

1. Set resolution bandwidth (RBW) = 20 kHz, Video bandwidth = 100 kHz.
2. Detector = Peak(20 dB bandwidth) / Sample(Occupied bandwidth), Trace mode = max hold
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20dB relative to the maximum level measured in the fundamental emission.
5. Use the occupied measurement function of spectrum analyzer to measure 99% occupied bandwidth.

3.2.2 Test Setup



3.2.3 Test Results

Ambient Condition	23°C / 67%	Tested By	Akun Chung
--------------------------	------------	------------------	------------

Refer to Appendix B.

3.3 AC Power Line Conducted Emissions

3.3.1 Limit of AC Power Line Conducted Emissions

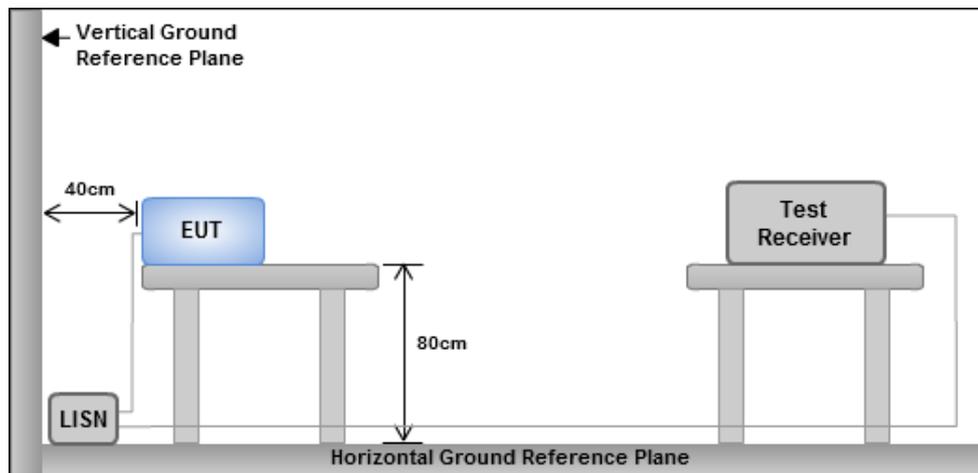
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

3.3.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

3.3.3 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 cm from other units and other metal planes

3.3.4 Test Results

Refer to Appendix C.

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

Tel: 886-2-2601-1640

No.30-2, Ding Fwu Tsuen, Lin Kou
District, New Taipei City, Taiwan
(R.O.C.)

Kwei Shan

Tel: 886-3-271-8666

No.3-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

Kwei Shan Site II

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 333, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666

Fax: 886-3-318-0345

Email: ICC_Service@icertifi.com.tw

==END==

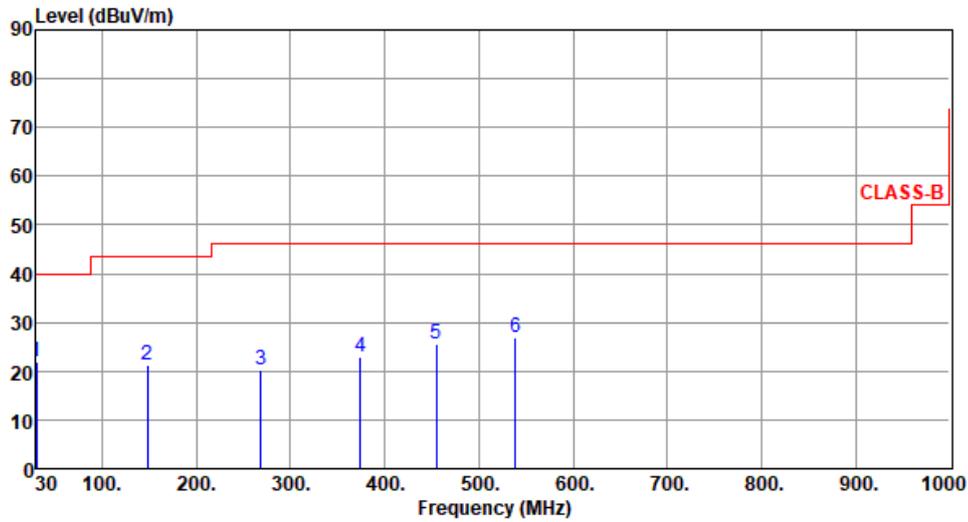


Configuration 2: Battery mode

Unwanted Emissions (Below 1GHz)

Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Horizontal		

Test By :Roger Lu Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	30.00	22.08	40.00	-17.92	32.02	-9.94	Peak	---	---
2	148.34	21.27	43.50	-22.23	30.25	-8.98	Peak	---	---
3	268.62	20.39	46.00	-25.61	29.58	-9.19	Peak	---	---
4	374.35	22.88	46.00	-23.12	29.22	-6.34	Peak	---	---
5	454.86	25.68	46.00	-20.32	29.81	-4.13	Peak	---	---
6	539.25	26.90	46.00	-19.10	29.61	-2.71	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

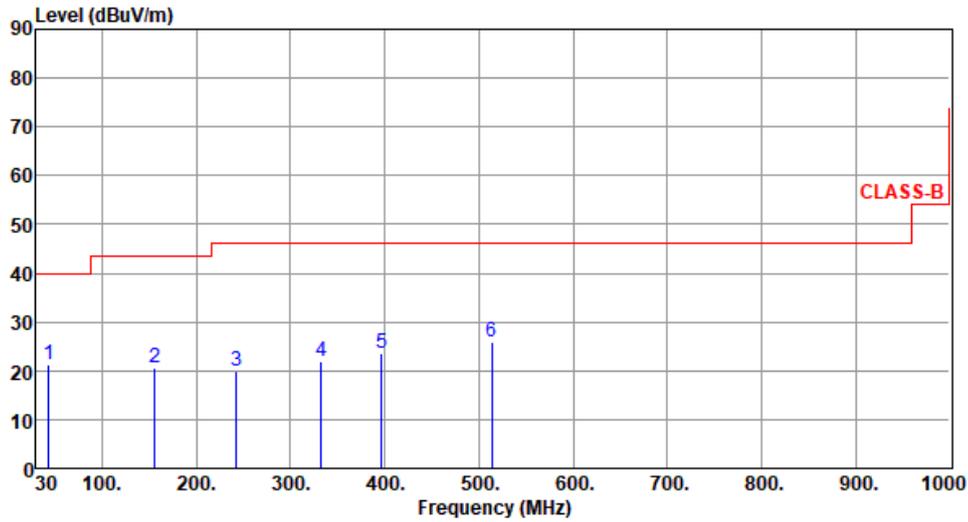
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Vertical		

Test By : Roger Lu Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	43.58	21.41	40.00	-18.59	29.96	-8.55	Peak	---	---
2	156.10	20.45	43.50	-23.05	29.15	-8.70	Peak	---	---
3	242.43	19.79	46.00	-26.21	30.07	-10.28	Peak	---	---
4	332.64	21.78	46.00	-24.22	29.16	-7.38	Peak	---	---
5	396.66	23.62	46.00	-22.38	29.48	-5.86	Peak	---	---
6	514.03	25.87	46.00	-20.13	28.84	-2.97	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



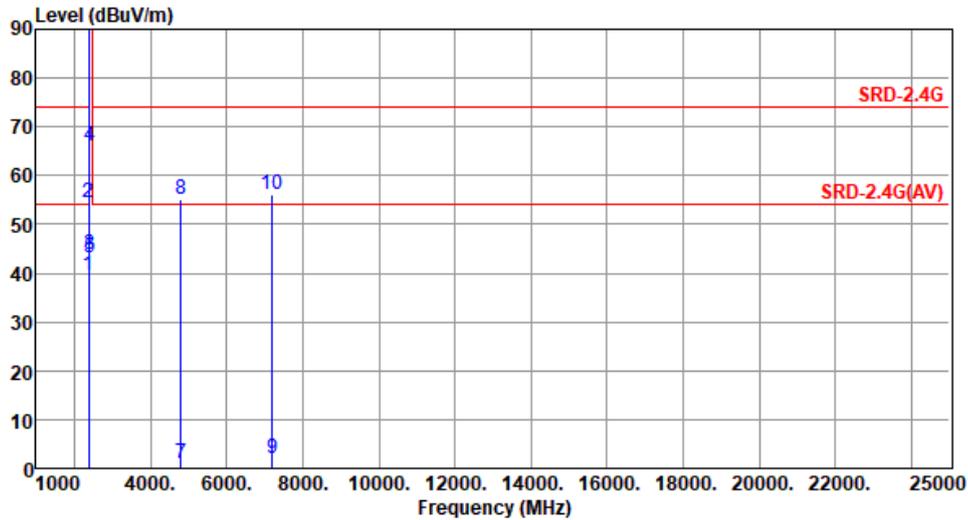
Unwanted Emissions (Above 1GHz)

Modulation	GFSK	Test Freq. (MHz)	2402						
Polarization	Horizontal								
Test By :Akun Chung Temperature(°C):23 Humidity(%):67									
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	38.96	54.00	-15.04	41.71	-2.75	Average	244	166
2	2390.00	53.96	74.00	-20.04	56.71	-2.75	Peak	244	166
3	2400.00	41.74	54.00	-12.26	44.51	-2.77	Average	244	166
4	2400.00	63.34	74.00	-10.66	66.11	-2.77	Peak	244	166
5	2402.00	39.08	94.00	-54.92			Average	244	166
6	2402.00	93.03	114.00	-20.97	95.80	-2.77	Peak	244	166
7	4804.00	1.72	54.00	-52.28			Average	100	26
8	4804.00	55.67	74.00	-18.33	51.54	4.13	Peak	100	26
9	7206.00	1.80	54.00	-52.20			Average	100	30
10	7206.00	55.75	74.00	-18.25	46.69	9.06	Peak	100	30
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m). Note 3: When average value is calculated not measured, no SA reading and factor value are listed.</p>									



Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Vertical		

Test By :Akun Chung Temperature(°C):23 Humidity(%):67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	39.38	54.00	-14.62	42.13	-2.75	Average	121	190
2	2390.00	54.35	74.00	-19.65	57.10	-2.75	Peak	121	190
3	2400.00	43.77	54.00	-10.23	46.54	-2.77	Average	121	190
4	2400.00	66.09	74.00	-7.91	68.86	-2.77	Peak	121	190
5	2402.00	43.20	94.00	-50.80			Average	121	190
6	2402.00	97.15	114.00	-16.85	99.92	-2.77	Peak	121	190
7	4804.00	1.10	54.00	-52.90			Average	100	63
8	4804.00	55.05	74.00	-18.95	50.92	4.13	Peak	100	63
9	7206.00	2.06	54.00	-51.94			Average	135	182
10	7206.00	56.01	74.00	-17.99	46.95	9.06	Peak	135	182

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

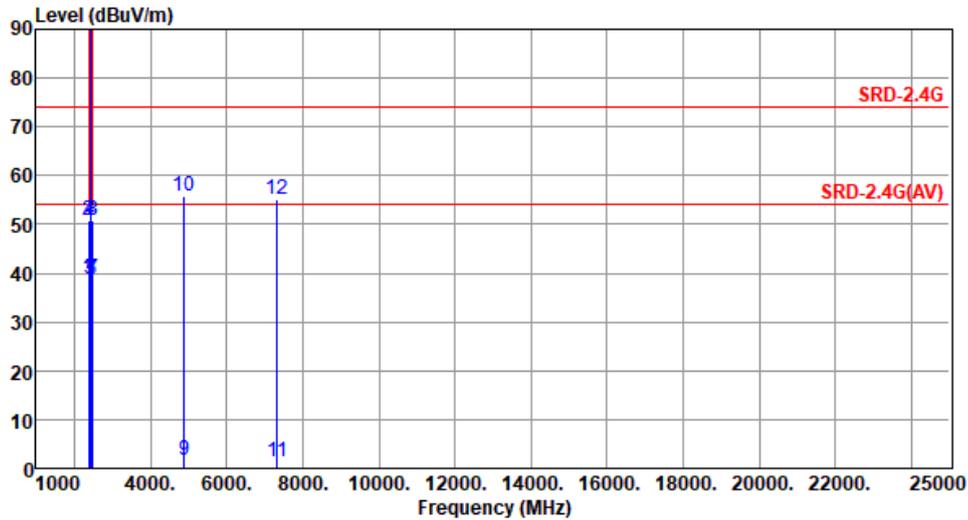
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	GFSK	Test Freq. (MHz)	2442
Polarization	Horizontal		

Test By : Akun Chung Temperature(°C): 23 Humidity(%): 67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	38.74	54.00	-15.26	41.49	-2.75	Average	238	162
2	2390.00	50.78	74.00	-23.22	53.53	-2.75	Peak	238	162
3	2400.00	38.82	54.00	-15.18	41.59	-2.77	Average	238	162
4	2400.00	50.82	74.00	-23.18	53.59	-2.77	Peak	238	162
5	2442.00	38.69	94.00	-55.31			Average	238	162
6	2442.00	92.64	114.00	-21.36	95.43	-2.79	Peak	238	162
7	2483.50	38.77	54.00	-15.23	41.47	-2.70	Average	238	162
8	2483.50	50.79	74.00	-23.21	53.49	-2.70	Peak	238	162
9	4884.00	1.73	54.00	-52.27			Average	100	29
10	4884.00	55.68	74.00	-18.32	51.57	4.11	Peak	100	29
11	7326.00	1.34	54.00	-52.66			Average	100	30
12	7326.00	55.29	74.00	-18.71	46.01	9.28	Peak	100	30

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

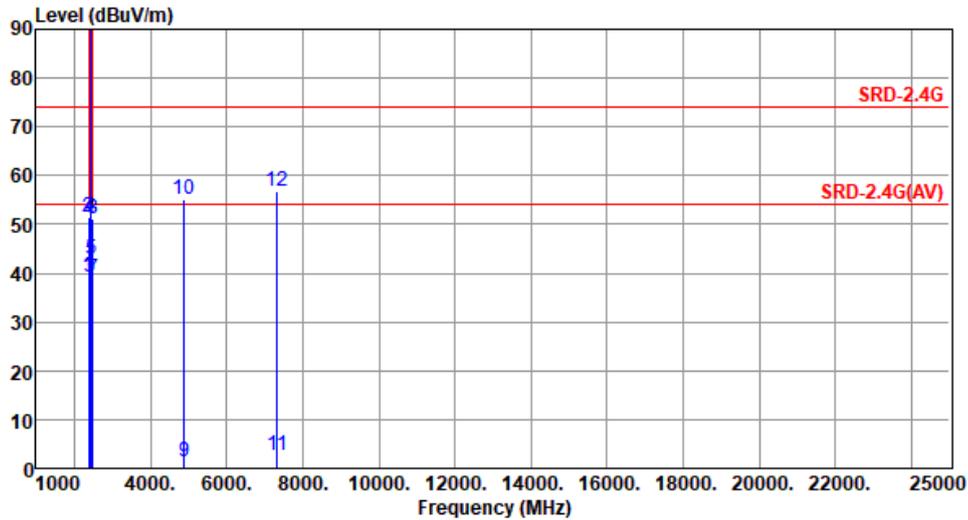
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	GFSK	Test Freq. (MHz)	2442
Polarization	Vertical		

Test By : Akun Chung Temperature(°C): 23 Humidity(%): 67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	39.16	54.00	-14.84	41.91	-2.75	Average	118	191
2	2390.00	51.45	74.00	-22.55	54.20	-2.75	Peak	118	191
3	2400.00	39.16	54.00	-14.84	41.93	-2.77	Average	118	191
4	2400.00	51.48	74.00	-22.52	54.25	-2.77	Peak	118	191
5	2442.00	42.90	94.00	-51.10	-----	-----	Average	118	191
6	2442.00	96.85	114.00	-17.15	99.64	-2.79	Peak	118	191
7	2483.50	39.00	54.00	-15.00	41.70	-2.70	Average	118	191
8	2483.50	51.29	74.00	-22.71	53.99	-2.70	Peak	118	191
9	4884.00	1.25	54.00	-52.75	-----	-----	Average	100	187
10	4884.00	55.20	74.00	-18.80	51.09	4.11	Peak	100	187
11	7326.00	2.71	54.00	-51.29	-----	-----	Average	125	182
12	7326.00	56.66	74.00	-17.34	47.38	9.28	Peak	125	182

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

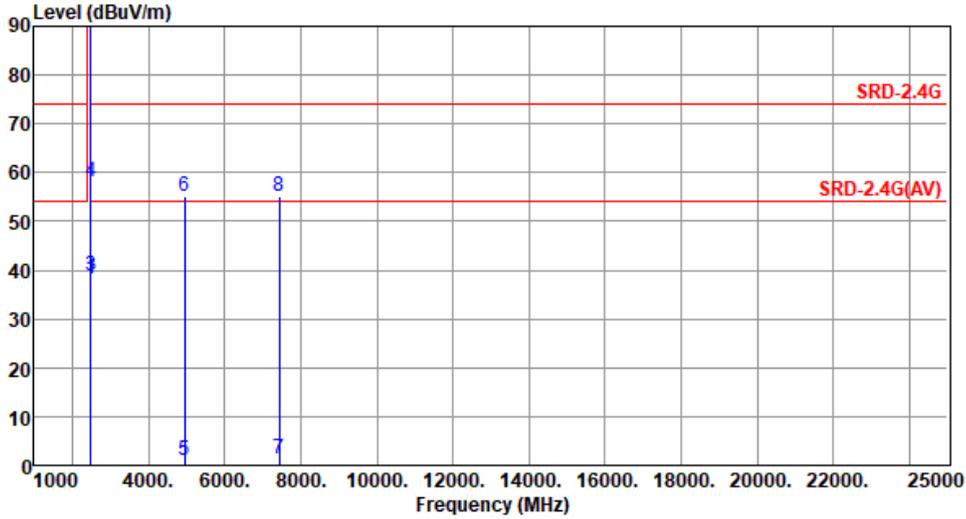
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Horizontal		

Test By : Akun Chung Temperature(°C): 23 Humidity(%): 67



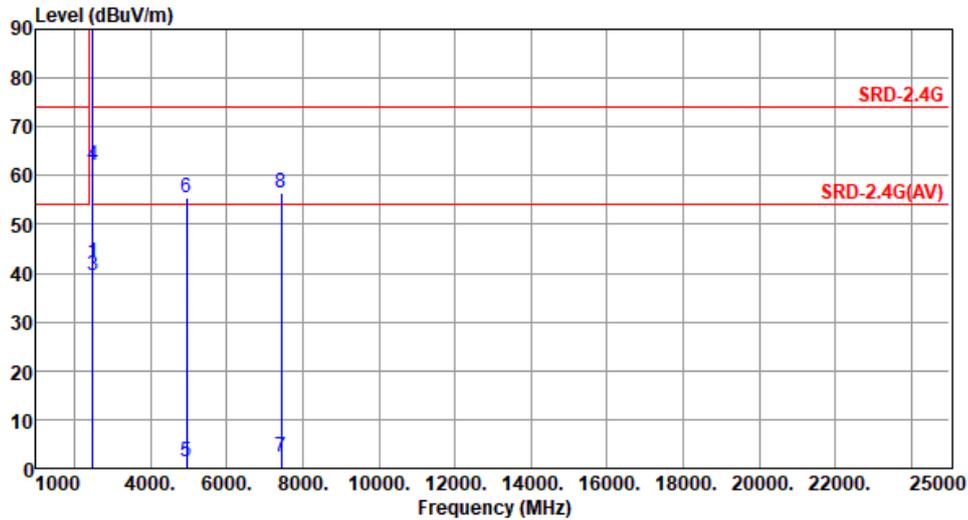
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2480.00	38.09	94.00	-55.91			Average	249	159
2	2480.00	92.04	114.00	-21.96	94.75	-2.71	Peak	249	159
3	2483.50	38.90	54.00	-15.10	41.60	-2.70	Average	249	159
4	2483.50	58.28	74.00	-15.72	60.98	-2.70	Peak	249	159
5	4960.00	1.15	54.00	-52.85	----	----	Average	100	26
6	4960.00	55.10	74.00	-18.90	51.07	4.03	Peak	100	26
7	7440.00	1.18	54.00	-52.82			Average	100	23
8	7440.00	55.13	74.00	-18.87	45.76	9.37	Peak	100	23

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
 Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Vertical		

Test By : Akun Chung Temperature(°C): 23 Humidity(%): 67



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2480.00	42.21	94.00	-51.79			Average	126	191
2	2480.00	96.16	114.00	-17.84	98.87	-2.71	Peak	126	191
3	2483.50	39.67	54.00	-14.33	42.37	-2.70	Average	126	191
4	2483.50	62.02	74.00	-11.98	64.72	-2.70	Peak	126	191
5	4960.00	1.39	54.00	-52.61			Average	100	154
6	4960.00	55.34	74.00	-18.66	51.31	4.03	Peak	100	154
7	7440.00	2.45	54.00	-51.55			Average	125	184
8	7440.00	56.40	74.00	-17.60	47.03	9.37	Peak	125	184

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.

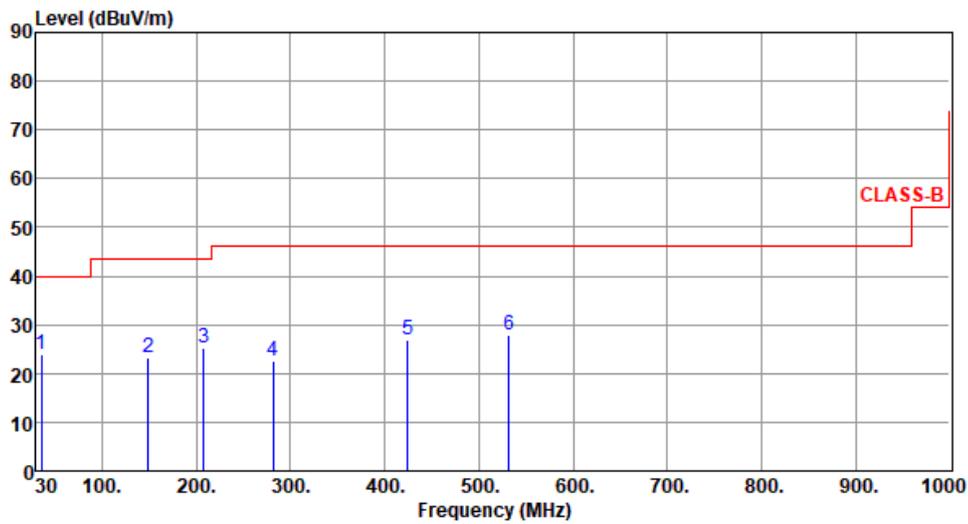


Configuration 1: Charging mode

Unwanted Emissions (Below 1GHz)

Modulation	Charging	Test Freq. (MHz)	---
Polarization	Horizontal		

Test By :Roger Lu Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	35.82	23.84	40.00	-16.16	33.27	-9.43	Peak	---	---
2	149.31	23.19	43.50	-20.31	32.24	-9.05	Peak	---	---
3	207.51	25.19	43.50	-18.31	37.15	-11.96	Peak	---	---
4	281.23	22.74	46.00	-23.26	31.39	-8.65	Peak	---	---
5	424.79	26.86	46.00	-19.14	31.88	-5.02	Peak	---	---
6	531.49	27.89	46.00	-18.11	30.73	-2.84	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

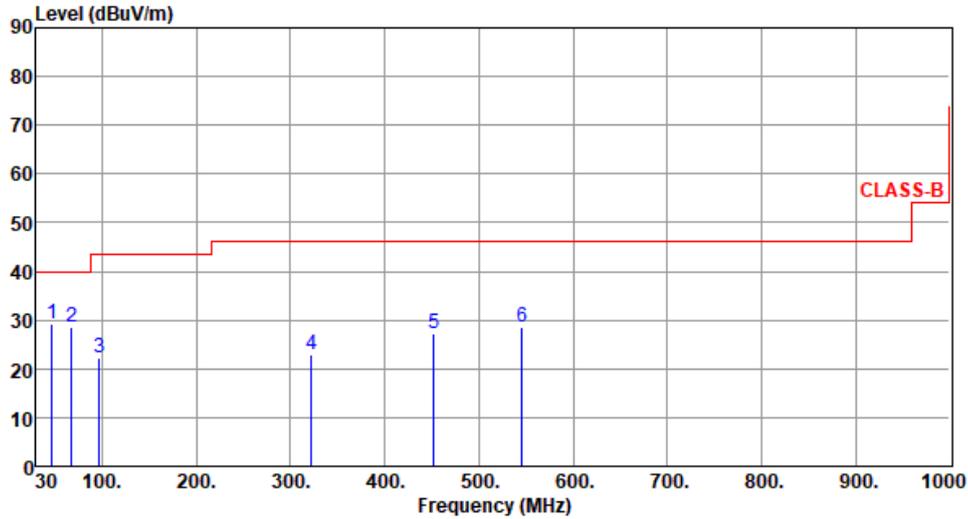
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Modulation	Charging	Test Freq. (MHz)	---
Polarization	Vertical		

Test By :Roger Lu Temperature(°C):24 Humidity(%):65



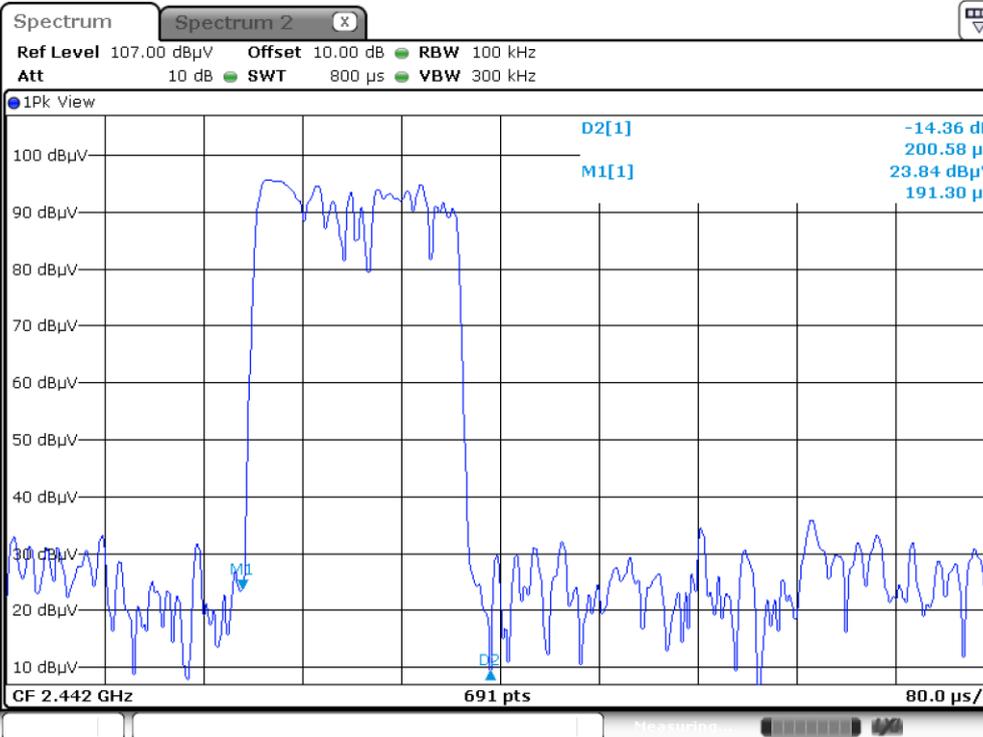
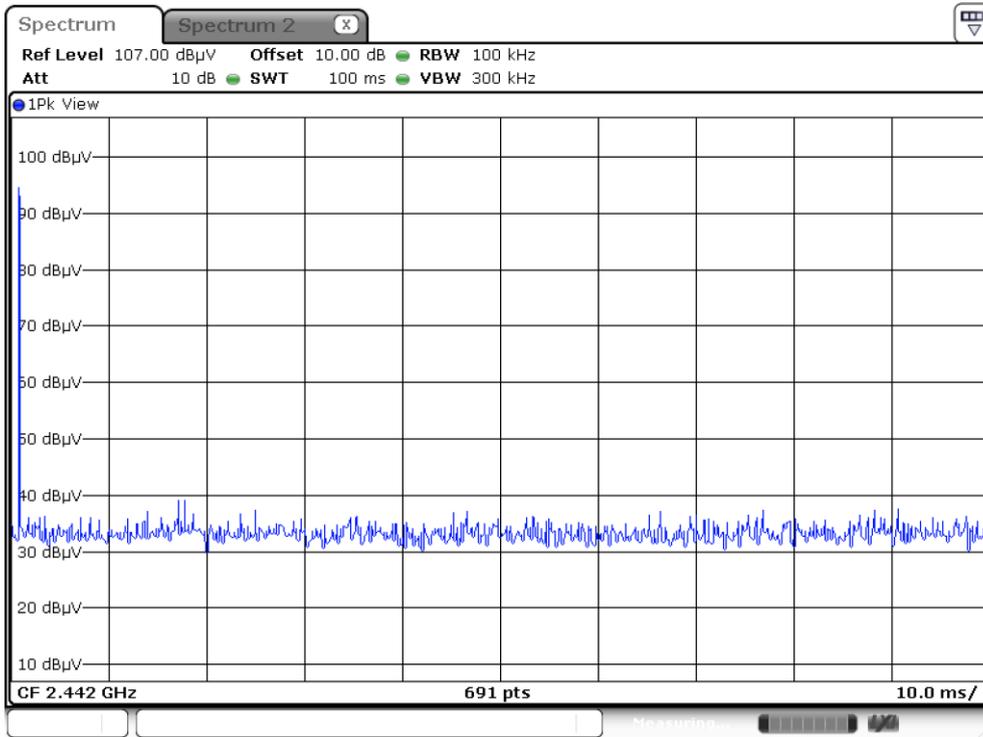
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	46.49	29.37	40.00	-10.63	37.86	-8.49	Peak	---	---
2	67.83	28.72	40.00	-11.28	38.88	-10.16	Peak	---	---
3	96.93	22.30	43.50	-21.20	36.10	-13.80	Peak	---	---
4	321.97	22.89	46.00	-23.11	30.35	-7.46	Peak	---	---
5	451.95	27.07	46.00	-18.93	31.26	-4.19	Peak	---	---
6	546.04	28.71	46.00	-17.29	31.34	-2.63	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

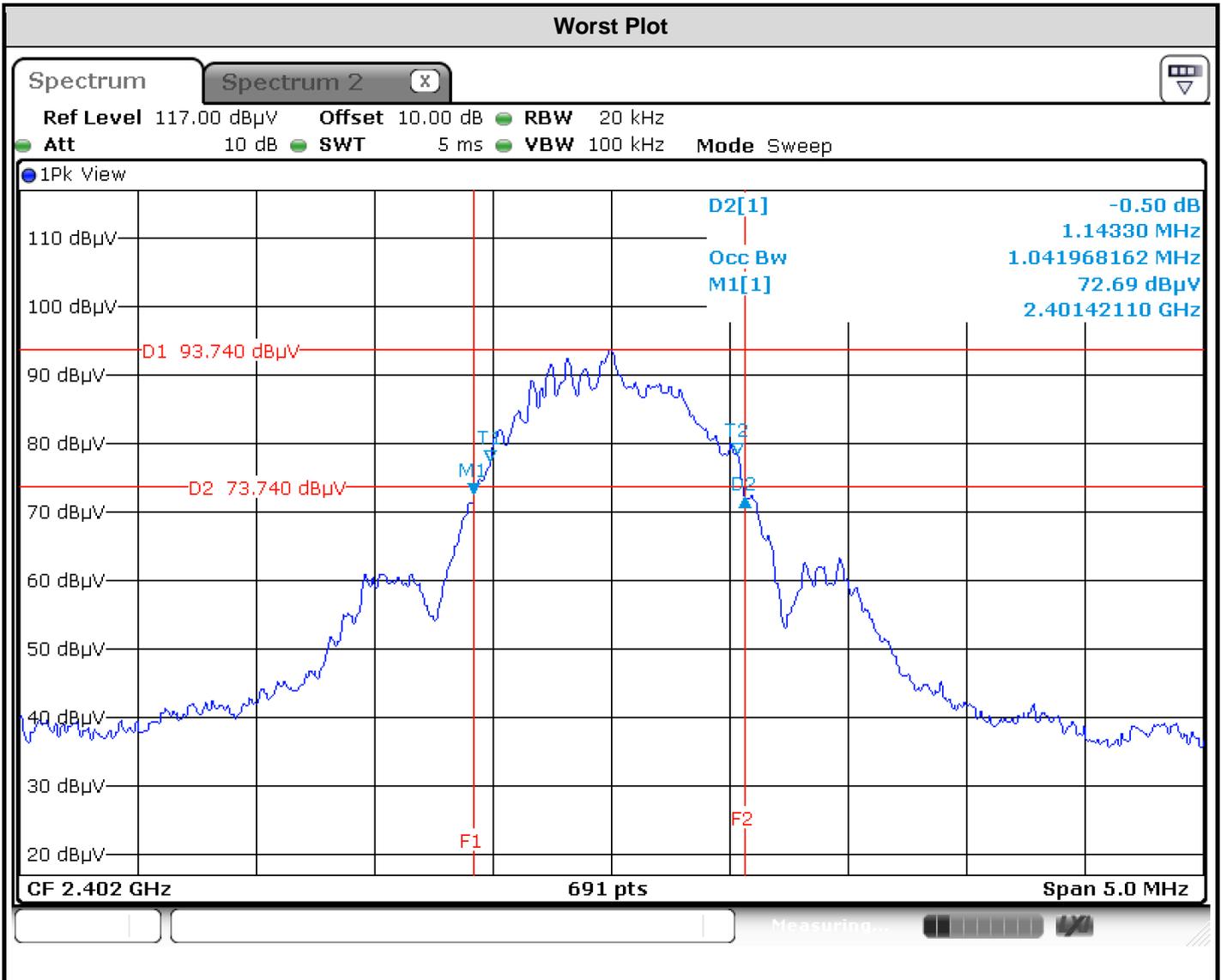
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



$$20\log(\text{Duty cycle}) = 20\log \frac{0.20058 \times 1 \text{ ms}}{100 \text{ ms}} = -53.95\text{dB}$$



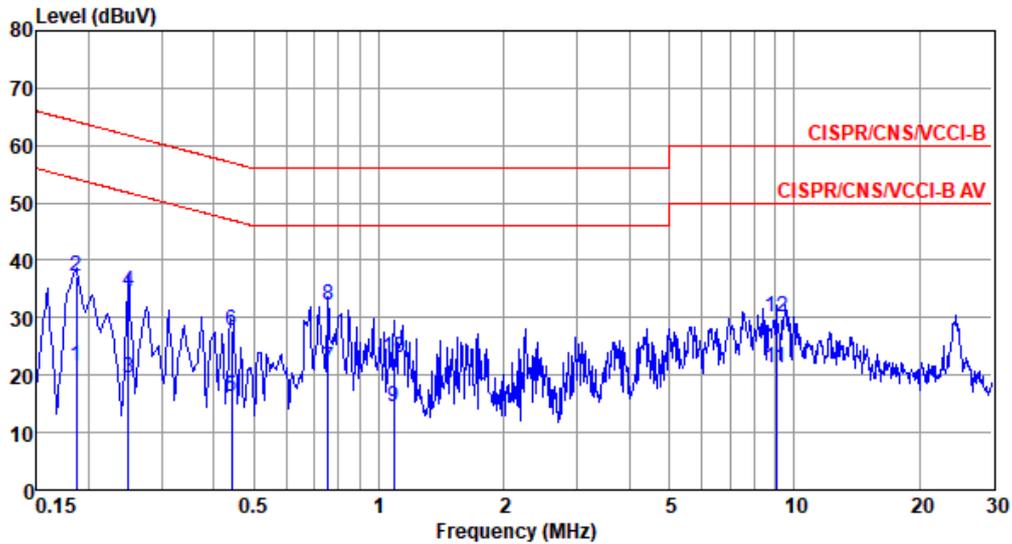
Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW
2402.0	1.143	1.042
2442.0	1.143	1.042
2480.0	1.143	1.042





Modulation	Charging
Power Phase	Line

Test by : Joe Liao Temperature: 22°C Humidity: 61%



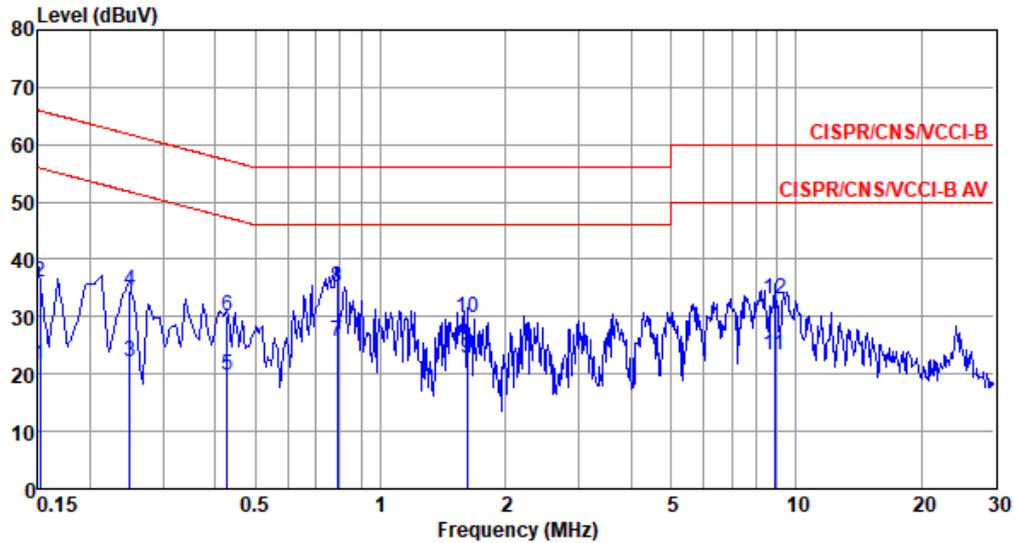
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.186	21.67	54.20	-32.53	11.70	9.68	0.08	0.21	Average
2	0.186	37.13	64.20	-27.07	27.16	9.68	0.08	0.21	QP
3	0.249	19.60	51.78	-32.18	9.58	9.68	0.08	0.26	Average
4	0.249	34.62	61.78	-27.16	24.60	9.68	0.08	0.26	QP
5	0.442	16.10	47.02	-30.92	5.98	9.67	0.09	0.36	Average
6	0.442	27.74	57.02	-29.28	17.62	9.67	0.09	0.36	QP
7	0.755	21.35	46.00	-24.65	11.16	9.68	0.14	0.37	Average
8*	0.755	32.20	56.00	-23.80	22.01	9.68	0.14	0.37	QP
9	1.088	14.56	46.00	-31.44	4.35	9.68	0.16	0.37	Average
10	1.088	23.10	56.00	-32.90	12.89	9.68	0.16	0.37	QP
11	9.059	21.32	50.00	-28.68	10.72	9.74	0.42	0.44	Average
12	9.059	30.03	60.00	-29.97	19.43	9.74	0.42	0.44	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).
 Note 2: Over Limit (dB) = Level (dBuV) - Limit Line (dBuV).



Modulation	Charging
Power Phase	Neutral

Test by : Joe Liao Temperature: 22°C Humidity: 61%



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.152	21.51	55.91	-34.40	11.66	9.61	0.08	0.16	Average
2	0.152	36.02	65.91	-29.89	26.17	9.61	0.08	0.16	QP
3	0.249	22.19	51.78	-29.59	12.32	9.61	0.08	0.18	Average
4	0.249	34.44	61.78	-27.34	24.57	9.61	0.08	0.18	QP
5	0.428	19.77	47.29	-27.52	9.87	9.61	0.09	0.20	Average
6	0.428	30.12	57.29	-27.17	20.22	9.61	0.09	0.20	QP
7*	0.788	25.56	46.00	-20.44	15.55	9.61	0.14	0.26	Average
8	0.788	35.19	56.00	-20.81	25.18	9.61	0.14	0.26	QP
9	1.619	22.74	46.00	-23.26	12.64	9.62	0.19	0.29	Average
10	1.619	29.75	56.00	-26.25	19.65	9.62	0.19	0.29	QP
11	8.869	23.46	50.00	-26.54	13.00	9.68	0.42	0.36	Average
12	8.869	32.95	60.00	-27.05	22.49	9.68	0.42	0.36	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).
 Note 2: Over Limit (dB) = Level (dBuV) - Limit Line (dBuV).

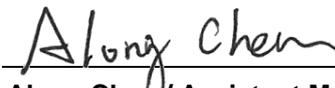
FCC Test Report

FCC ID : IPH-A4390
Equipment : Smart Watch
Model No. : AA4390
Brand Name : GARMIN
Applicant : Garmin International, Inc.
Address : 1200 E. 151st Street Olathe, KS 66062 United States
Standard : 47 CFR FCC Part 15.247
Received Date : Apr. 07, 2022
Tested Date : May. 04 ~ May. 10, 2022

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

Approved by:



Along Chen / Assistant Manager



Gary Chang / Manager

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Appendix A. 6dB and Occupied Bandwidth

Appendix B. Conducted Output Power

Appendix C. Power Spectral Density

Appendix D. Unwanted Emissions into Restricted Frequency Bands

Appendix E. Emissions in Non-Restricted Frequency Bands

Appendix F. AC Power Line Conducted Emissions

Release Record

Report No.	Version	Description	Issued Date
FR240703AE	Rev. 01	Initial issue	May 30, 2022

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	[dBuV]: 0.788MHz 25.56 (Margin -20.44dB) - AV	Pass
15.247(d) 15.209	Unwanted Emissions	[dBuV/m at 3m]: 12010.00MHz 46.37 (Margin -7.63dB) - AV	Pass
15.247(b)(3)	Conducted Output Power	Power [dBm]: 2.24	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e)	Power Spectral Density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	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:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information				
Frequency Range (MHz)	Bluetooth Mode	Ch. Freq. (MHz)	Channel Number	Data Rate
2400-2483.5	V5.0 LE	2402-2480	0-39 [40]	1 Mbps
Note: Bluetooth LE (Low energy) uses GFSK modulation.				

1.1.2 Antenna Details

Ant. No.	Brand	Model	Type	Connector	Gain (dBi)
1	Garmin	117-01806-0X	PIFA	No	-2.08

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Type	5Vdc from adapter 3.87Vdc from battery
------------	---

1.1.4 Accessories

No.	Equipment	Description
1	Battery	Brand: Garmin Model: 361-00136-20 Power Rating: 3.87V, 205mAh
2	USB cable	Brand: GARMIN Model: 320-01069-10 Power line: 0.52m shielded without core

1.1.5 Channel List

Frequency band (MHz)				2400~2483.5			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
37	2402	9	2422	18	2442	28	2462
0	2404	10	2424	19	2444	29	2464
1	2406	38	2426	20	2446	30	2466
2	2408	11	2428	21	2448	31	2468
3	2410	12	2430	22	2450	32	2470
4	2412	13	2432	23	2452	33	2472
5	2414	14	2434	24	2454	34	2474
6	2416	15	2436	25	2456	35	2476
7	2418	16	2438	26	2458	36	2478
8	2420	17	2440	27	2460	39	2480

1.1.6 Test Tool and Duty Cycle

Test Tool	BLE Test, Version: V97.26	
Modulation Mode	Duty Cycle Of Test Signal (%)	Duty Factor (dB)
BT-LE(1Mbps)	64.35%	1.91

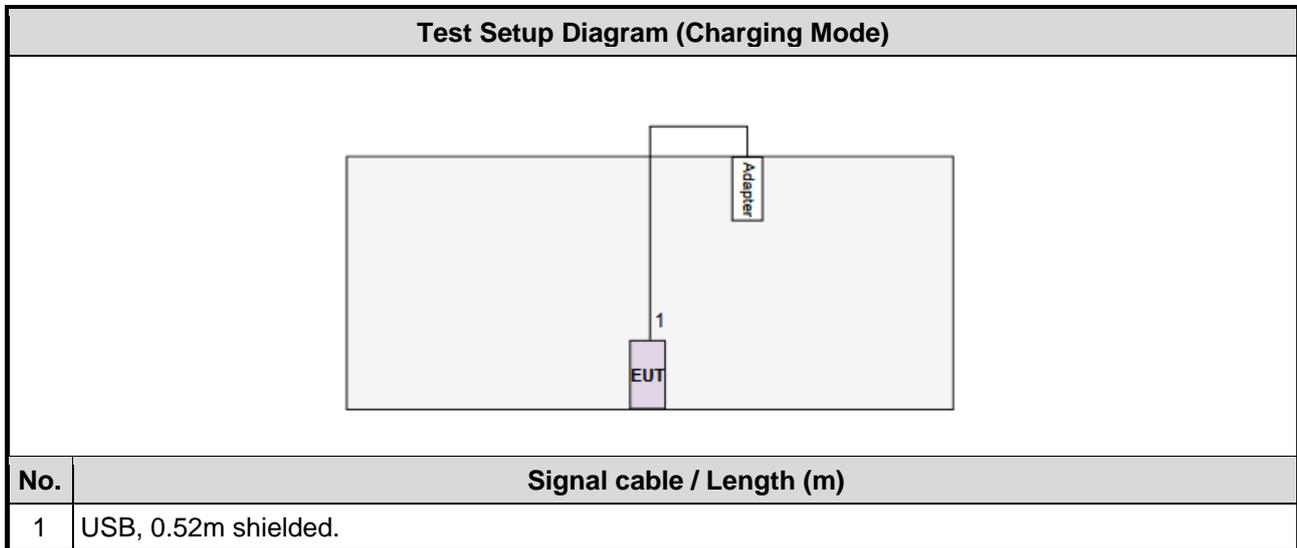
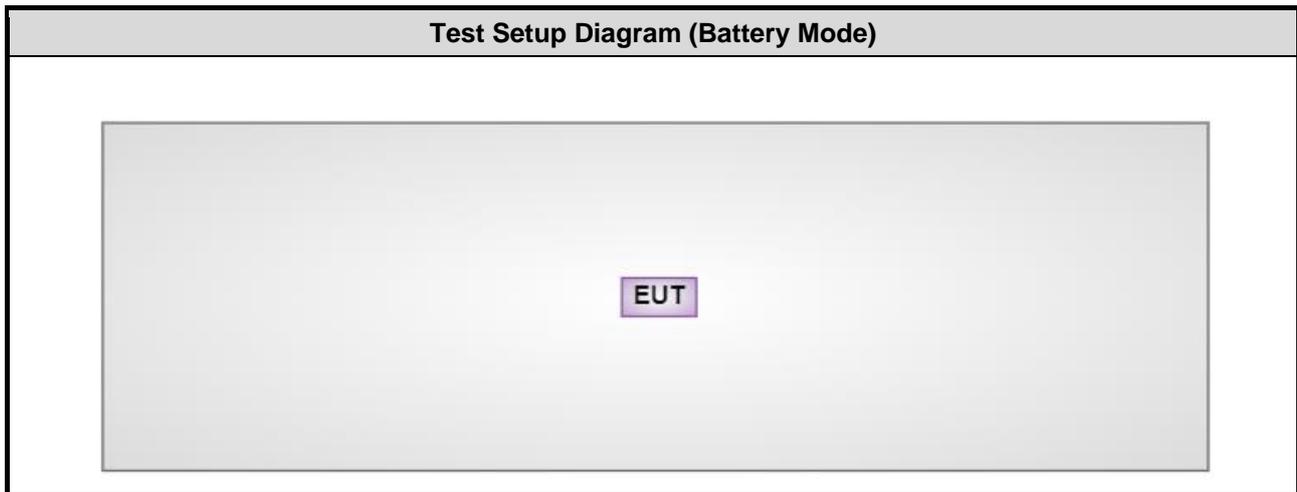
1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)		
	2402	2440	2480
BT-LE(1Mbps)	default	default	default

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Adapter	samsung	ETA-U90JWS	---	---

1.3 Test Setup Chart



1.4 Test Equipment List and Calibration Data

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	May 09, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 16, 2022	Feb. 15, 2023
LISN	R&S	ENV216	101579	Apr. 21, 2022	Apr. 20, 2023
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127667	Jan .07, 2022	Jan .06, 2023
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 19, 2021	Oct. 18, 2022
50 ohm terminal (Support Unit)	NA	50	04	May 25, 2021	May 24, 2022
Measurement Software	AUDIX	e3	6.120210k	NA	NA

Note: Calibration Interval of instruments listed above is one year.

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	May 04 ~ May 09, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Mar. 15, 2022	Mar. 14, 2023
Spectrum Analyzer	R&S	FSV40	101498	Nov. 29, 2021	Nov. 28, 2022
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 08, 2021	Nov. 07, 2022
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jun. 30, 2021	Jun. 29, 2022
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 03, 2021	Dec. 02, 2022
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170508	Jan. 11, 2022	Jan. 10, 2023
Preamplifier	EMC	EMC02325	980225	Jun. 29, 2021	Jun. 28, 2022
Preamplifier	Agilent	83017A	MY39501308	Sep. 28, 2021	Sep. 27, 2022
Preamplifier	EMC	EMC184045B	980192	Jul. 14, 2021	Jul. 13, 2022
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 05, 2021	Oct. 04, 2022
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 05, 2021	Oct. 04, 2022
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 05, 2021	Oct. 04, 2022
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 05, 2021	Oct. 04, 2022
RF Cable	EMC	EMC104-35M-35M- 8000	210920	Oct. 05, 2021	Oct. 04, 2022
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 05, 2021	Oct. 04, 2022
Measurement Software	AUDIX	e3	6.120210g	NA	NA

Note: Calibration Interval of instruments listed above is one year.

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	May 10, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101910	Apr. 18, 2022	Apr. 17, 2023
Power Meter	Anritsu	ML2495A	1241002	Nov. 07, 2021	Nov. 06, 2022
Power Sensor	Anritsu	MA2411B	1207366	Nov. 07, 2021	Nov. 06, 2022
Measurement Software	Sporton	SENSE-15247_FS	V5.10.7.11	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

47 CFR FCC Part 15.247
ANSI C63.10-2013

1.6 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

1.7 Deviation from Test Standard and Measurement Procedure

None

1.8 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	± 34.130 Hz
Conducted power	± 0.808 dB
Power density	± 0.583 dB
Conducted emission	± 2.715 dB
AC conducted emission	± 2.92 dB
Unwanted Emission ≤ 1 GHz	± 3.41 dB
Unwanted Emission > 1 GHz	± 4.59 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-WS, 03CH01-WS, TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Test Configuration
AC Power Line Conducted Emissions	Charging	---	1
Unwanted Emissions ≤ 1GHz	BT-LE(1Mbps)	2402	2
	Charging	---	1
Unwanted Emissions > 1GHz	BT-LE(1Mbps)	2402, 2440, 2480	2
Conducted Output Power 6dB bandwidth Power spectral density	BT-LE(1Mbps)	2402, 2440, 2480	2
NOTE:			
1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The Y-plane results were found as the worst case and were shown in this report.			
2. The EUT had been tested by following test configurations.			
1) Configuration 1: Charging mode			
2) Configuration 2: Battery mode			

3 Transmitter Test Results

3.1 6dB and Occupied Bandwidth

3.1.1 Limit of 6dB Bandwidth

The minimum 6dB bandwidth shall be at least 500 kHz.

3.1.2 Test Procedures

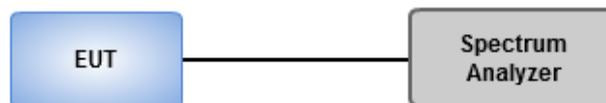
6dB Bandwidth

1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

Occupied Bandwidth

1. Set resolution bandwidth (RBW) = 1% ~ 5 % of OBW, Video bandwidth = 3 x RBW
2. Detector = Sample, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

3.1.3 Test Setup



3.1.4 Test Results

Ambient Condition	24°C / 67%	Tested By	Aska Huang
--------------------------	------------	------------------	------------

Refer to Appendix A.

3.2 Conducted Output Power

3.2.1 Limit of Conducted Output Power

Conducted power shall not exceed 1Watt.

Antenna gain $\leq 6\text{dBi}$, no any corresponding reduction is in output power limit.

3.2.2 Test Procedures

A broadband RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

3.2.3 Test Setup



3.2.4 Test Results

Ambient Condition	24°C / 67%	Tested By	Aska Huang
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Refer to Appendix B.

3.3 Power Spectral Density

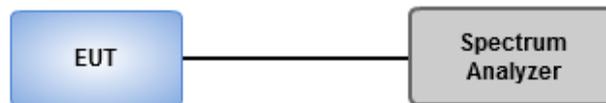
3.3.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

3.3.2 Test Procedures

1. Set the RBW = 3 kHz, VBW = 10 kHz.
2. Detector = Peak, Sweep time = auto couple.
3. Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

3.3.3 Test Setup



3.3.4 Test Results

Ambient Condition	24°C / 67%	Tested By	Aska Huang
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Refer to Appendix C.

3.4 Unwanted Emissions in Restricted Frequency Bands

3.4.1 Limit of Unwanted Emissions in Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.4.2 Test Procedures

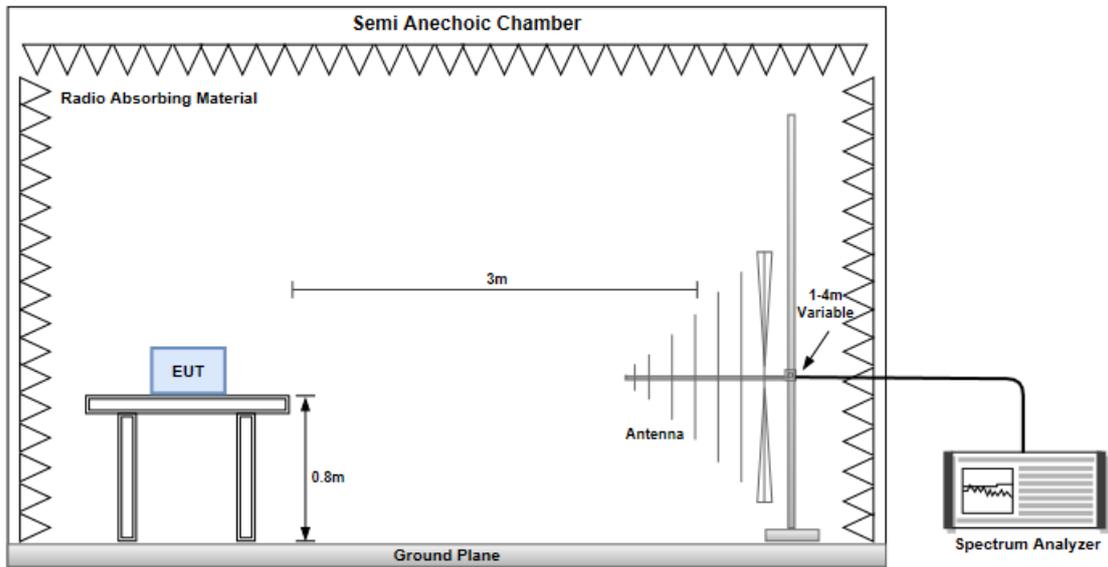
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

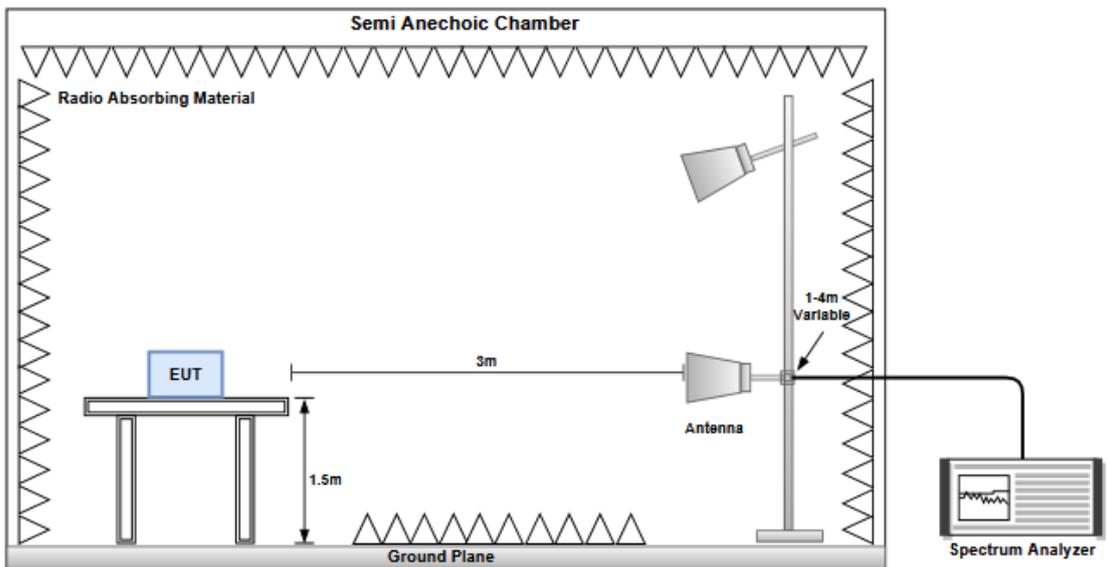
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.4.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



3.4.4 Test Results

Refer to Appendix D.

3.5 Emissions in non-restricted Frequency Bands

3.5.1 Emissions in non-restricted frequency bands limit

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.5.2 Test Procedures

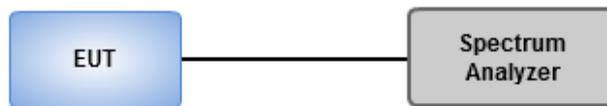
Reference level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

Emission level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

3.5.3 Test Setup



3.5.4 Test Results

Ambient Condition	24°C / 67%	Tested By	Aska Huang
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Refer to Appendix E.

3.6 AC Power Line Conducted Emissions

3.6.1 Limit of AC Power Line Conducted Emissions

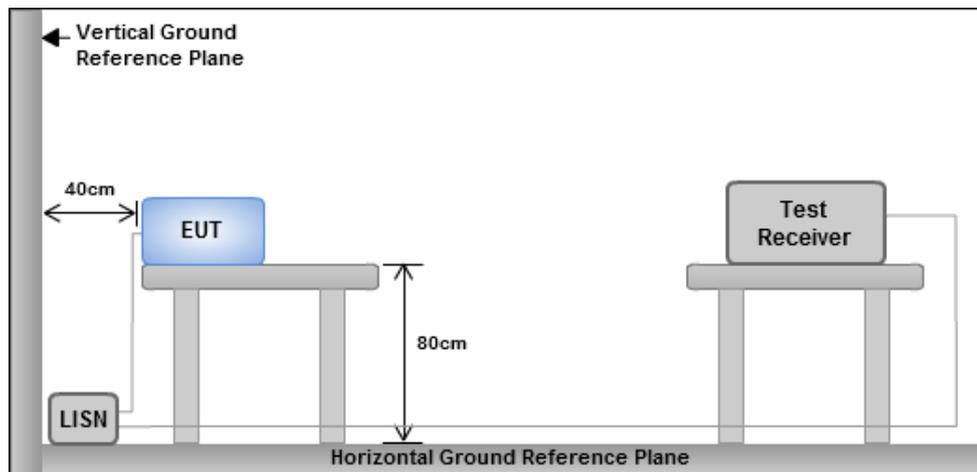
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

3.6.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V/60Hz

3.6.3 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 cm from other units and other metal planes

3.6.4 Test Results

Refer to Appendix F.

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

Tel: 886-2-2601-1640

No.30-2, Ding Fwu Tsuen, Lin Kou
District, New Taipei City, Taiwan
(R.O.C.)

Kwei Shan

Tel: 886-3-271-8666

No.3-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

Kwei Shan Site II

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 333, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666

Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

==END==



Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	706.522k	1.042M	1M04F1D	688.406k	1.035M

Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth

Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	688.406k	1.035M
2440MHz	Pass	500k	688.406k	1.042M
2480MHz	Pass	500k	706.522k	1.038M

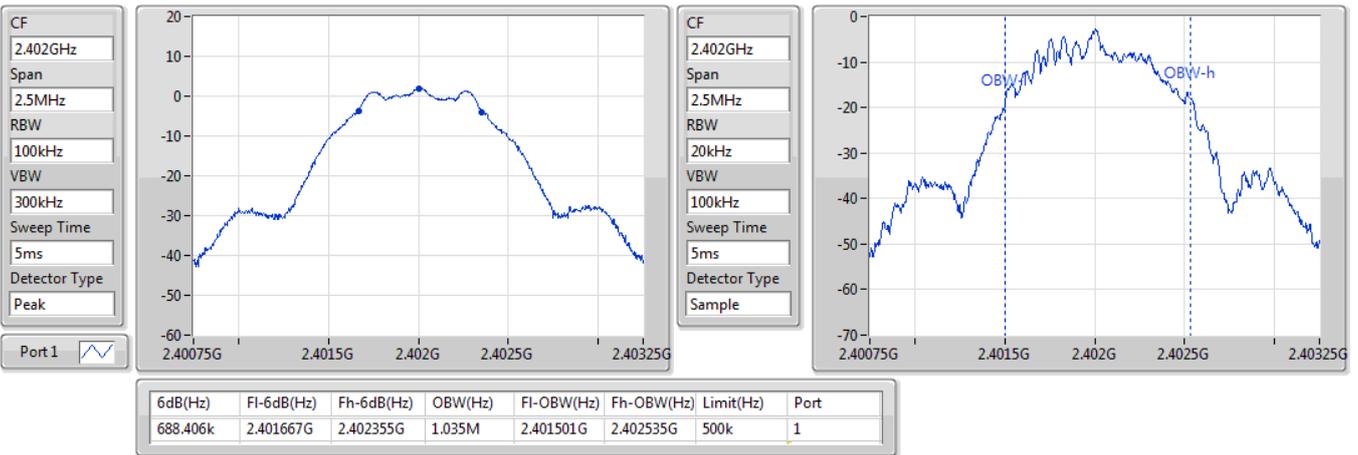
Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth



BT-LE(1Mbps)

EBW-DTS

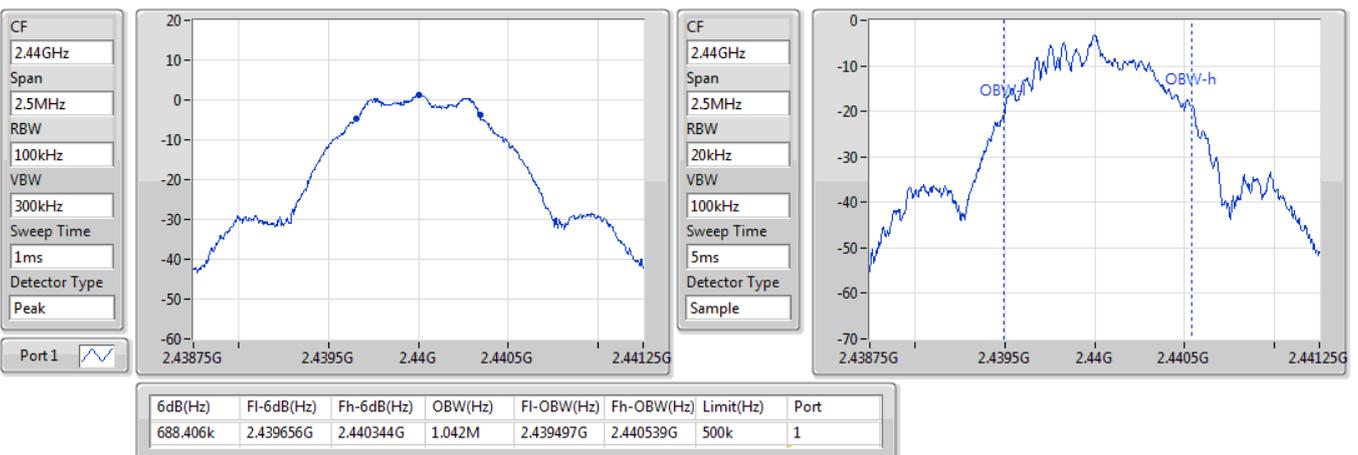
2402MHz

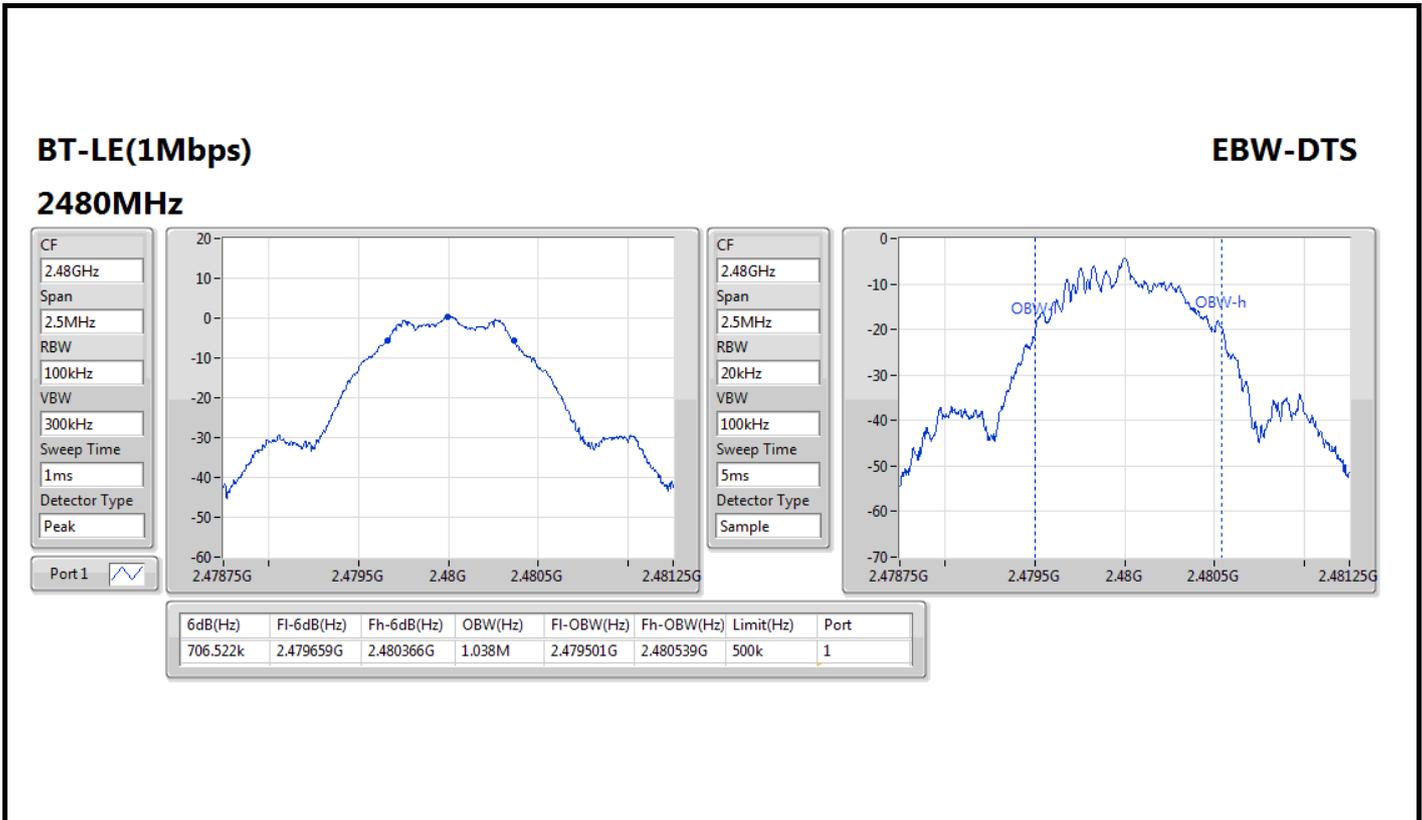


BT-LE(1Mbps)

EBW-DTS

2440MHz







Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	2.21	0.00166

Result

Mode	Result	Antenna Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	-2.08	2.21	-
2440MHz	Pass	-2.08	1.76	-
2480MHz	Pass	-2.08	1.09	-

Note: Average power is for reference only.



Conducted Output Power (Peak)

Appendix B

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	2.24	0.00167

Result

Mode	Result	Antenna Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	-2.08	2.24	30.00
2440MHz	Pass	-2.08	1.80	30.00
2480MHz	Pass	-2.08	1.13	30.00



Summary

Mode	PD (dBm/3kHz)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-12.98

Result

Mode	Result	Antenna Gain (dBi)	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	-2.08	-12.98	8.00
2440MHz	Pass	-2.08	-13.43	8.00
2480MHz	Pass	-2.08	-14.48	8.00

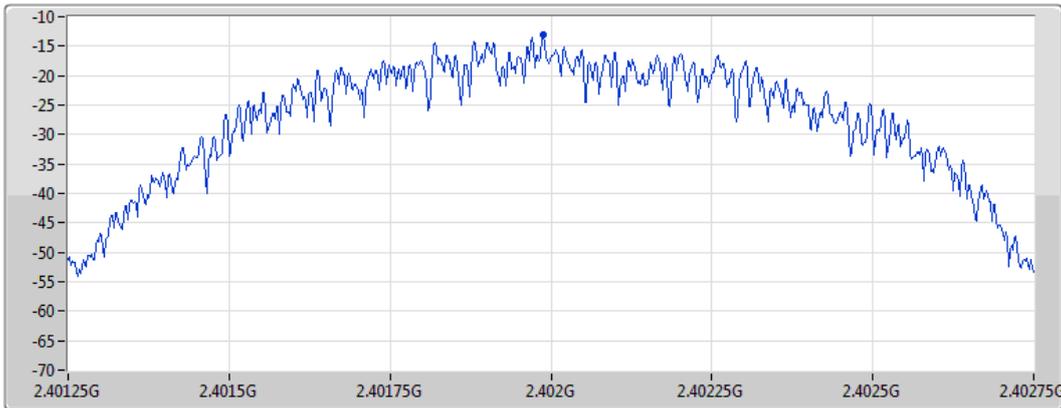


BT-LE(1Mbps)

PSD

2402MHz

CF
2.402GHz
Span
1.5MHz
RBW
3kHz
VBW
10kHz
Sweep Time
16.7ms
Detector Type
Peak



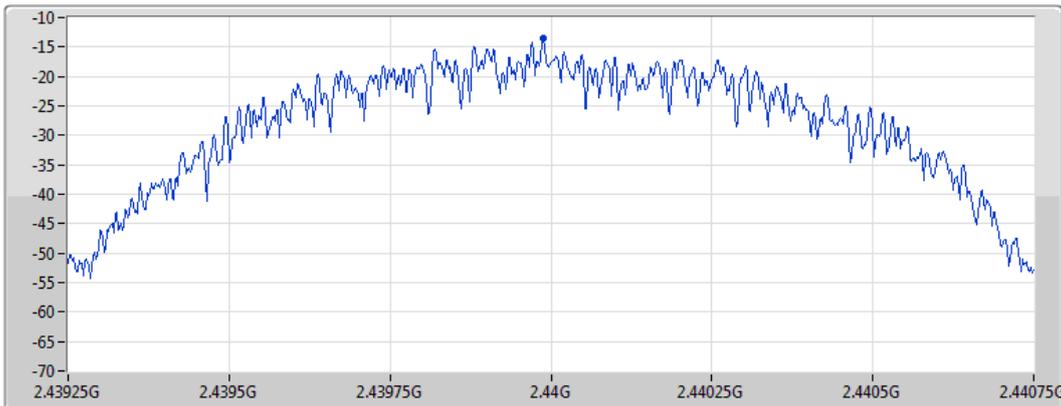
Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-12.98	-12.98	-12.98

BT-LE(1Mbps)

PSD

2440MHz

CF
2.44GHz
Span
1.5MHz
RBW
3kHz
VBW
10kHz
Sweep Time
16.7ms
Detector Type
Peak



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-13.43	-13.43	-13.43

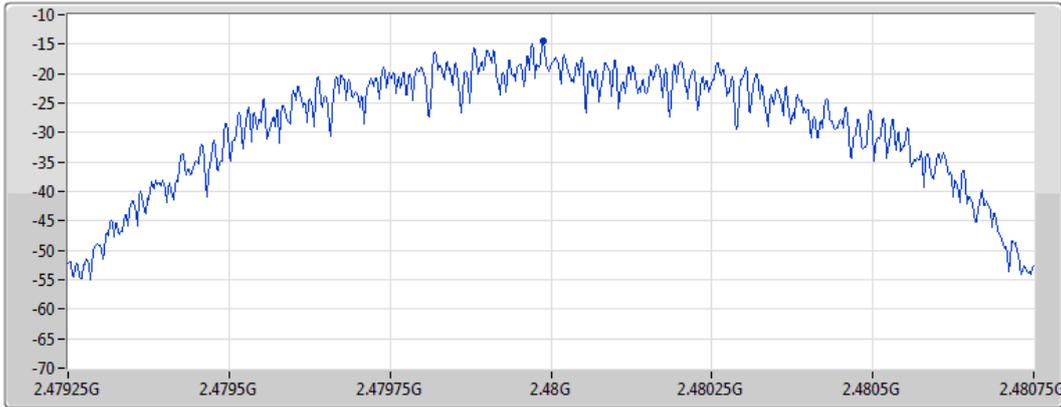


BT-LE(1Mbps)

PSD

2480MHz

CF
2.48GHz
Span
1.5MHz
RBW
3kHz
VBW
10kHz
Sweep Time
16.7ms
Detector Type
Peak



Port 1

Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-14.48	-14.48	-14.48

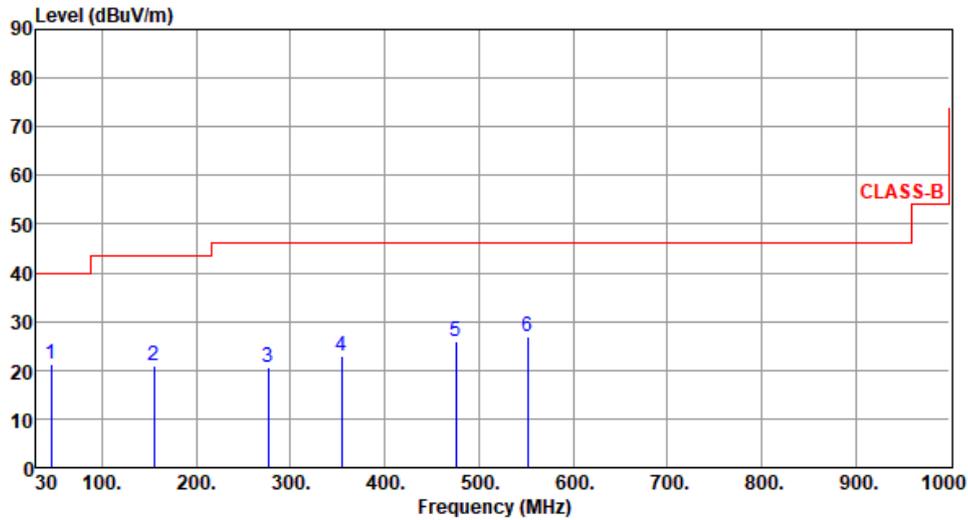


Configuration 2: Battery mode

Unwanted Emissions (Below 1GHz)

Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2402
Polarization	Horizontal		

Test By :Roger Lu Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	45.52	21.17	40.00	-18.83	29.67	-8.50	Peak	---	---
2	155.13	20.90	43.50	-22.60	29.60	-8.70	Peak	---	---
3	276.38	20.63	46.00	-25.37	29.46	-8.83	Peak	---	---
4	353.98	22.75	46.00	-23.25	29.66	-6.91	Peak	---	---
5	475.23	25.75	46.00	-20.25	29.61	-3.86	Peak	---	---
6	551.86	27.06	46.00	-18.94	29.47	-2.41	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

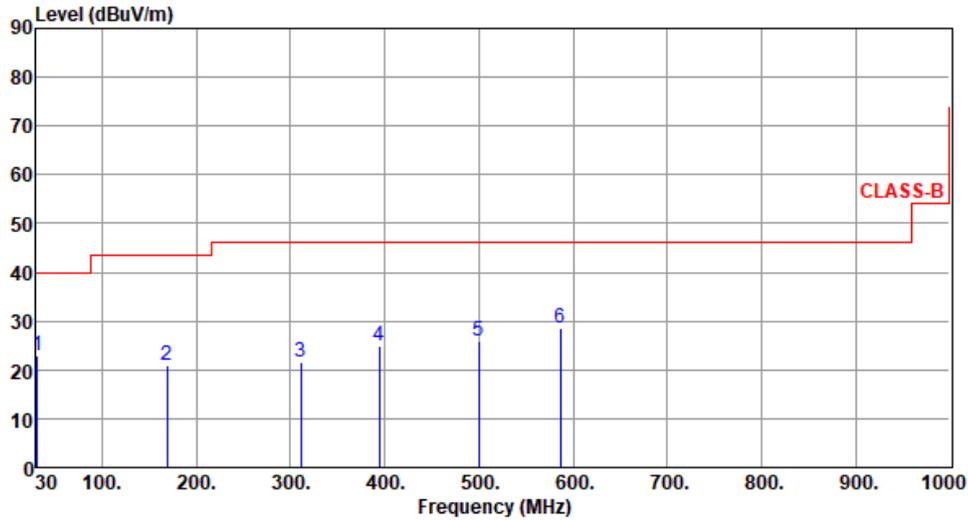
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2402
Polarization	Vertical		

Test By :Roger Lu Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	30.97	22.77	40.00	-17.23	32.72	-9.95	Peak	---	---
2	168.71	20.94	43.50	-22.56	29.90	-8.96	Peak	---	---
3	311.30	21.57	46.00	-24.43	29.33	-7.76	Peak	---	---
4	393.75	24.77	46.00	-21.23	30.68	-5.91	Peak	---	---
5	499.48	26.03	46.00	-19.97	29.33	-3.30	Peak	---	---
6	586.78	28.41	46.00	-17.59	29.82	-1.41	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Unwanted Emissions (Above 1GHz)

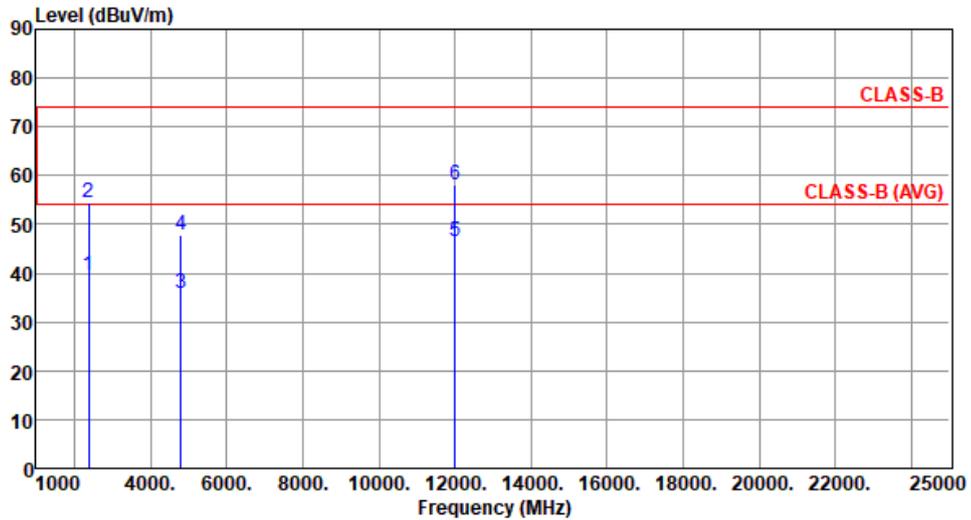
Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2402						
Polarization	Horizontal								
Test By :Akun Chung Temperature(°C):25 Humidity(%):65									
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	38.27	54.00	-15.73	41.02	-2.75	Average	100	172
2	2390.00	51.19	74.00	-22.81	53.94	-2.75	Peak	100	172
3	4804.00	34.19	54.00	-19.81	30.06	4.13	Average	100	21
4	4804.00	48.18	74.00	-25.82	44.05	4.13	Peak	100	21
5	12010.00	44.40	54.00	-9.60	30.78	13.62	Average	100	19
6	12010.00	57.49	74.00	-16.51	43.87	13.62	Peak	100	19

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2402
Polarization	Vertical		

Test By : Akun Chung Temperature(°C): 25 Humidity(%): 65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	39.37	54.00	-14.63	42.12	-2.75	Average	125	189
2	2390.00	54.39	74.00	-19.61	57.14	-2.75	Peak	125	189
3	4804.00	35.89	54.00	-18.11	31.76	4.13	Average	100	60
4	4804.00	47.98	74.00	-26.02	43.85	4.13	Peak	100	60
5	12010.00	46.37	54.00	-7.63	32.75	13.62	Average	100	66
6	12010.00	58.27	74.00	-15.73	44.65	13.62	Peak	100	66

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

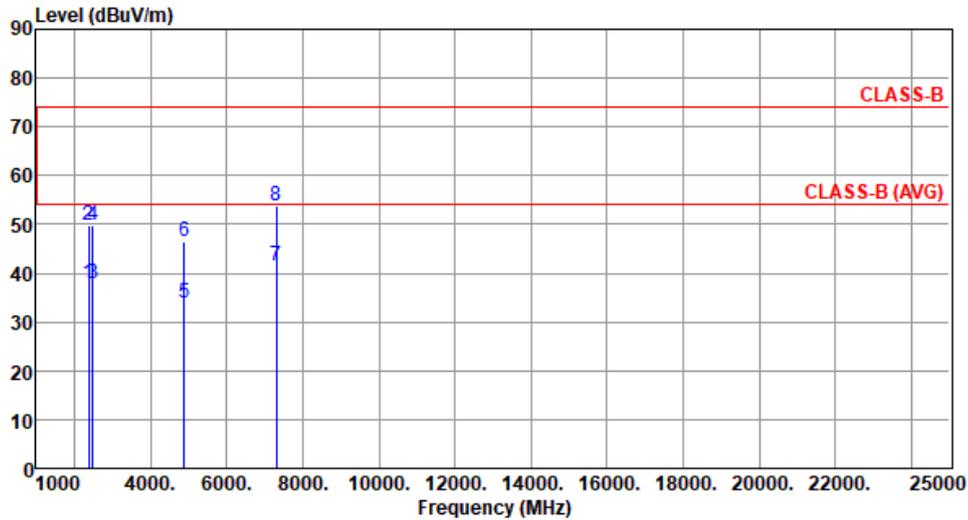
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2440
Polarization	Horizontal		

Test By : Akun Chung Temperature(°C): 25 Humidity(%): 65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	37.89	54.00	-16.11	40.64	-2.75	Average	100	169
2	2390.00	49.95	74.00	-24.05	52.70	-2.75	Peak	100	169
3	2483.50	37.84	54.00	-16.16	40.54	-2.70	Average	100	169
4	2483.50	49.78	74.00	-24.22	52.48	-2.70	Peak	100	169
5	4880.00	33.77	54.00	-20.23	29.65	4.12	Average	100	25
6	4880.00	46.53	74.00	-27.47	42.41	4.12	Peak	100	25
7	7320.00	41.50	54.00	-12.50	32.22	9.28	Average	100	22
8	7320.00	53.71	74.00	-20.29	44.43	9.28	Peak	100	22

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

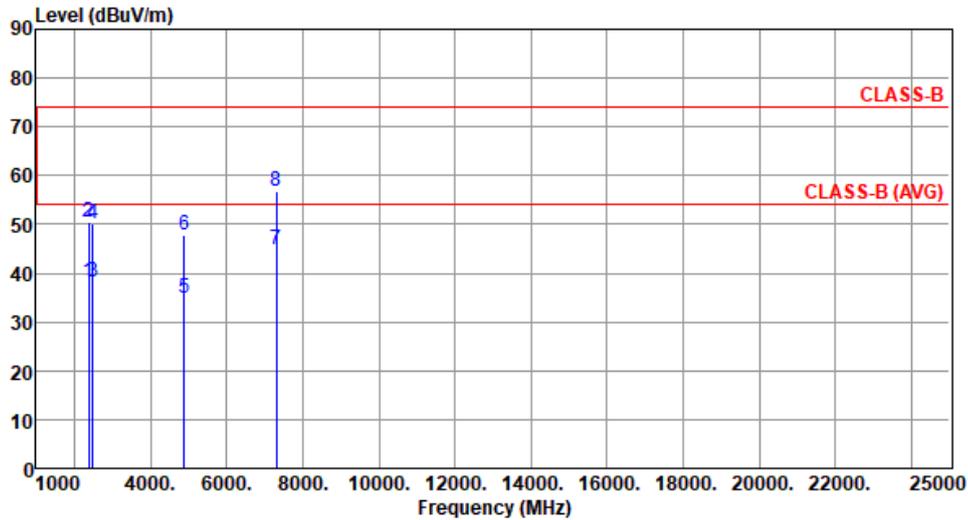
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2440
Polarization	Vertical		

Test By : Akun Chung Temperature(°C): 25 Humidity(%): 65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	38.19	54.00	-15.81	40.94	-2.75	Average	124	186
2	2390.00	50.38	74.00	-23.62	53.13	-2.75	Peak	124	186
3	2483.50	38.17	54.00	-15.83	40.87	-2.70	Average	124	186
4	2483.50	50.17	74.00	-23.83	52.87	-2.70	Peak	124	186
5	4880.00	35.01	54.00	-18.99	30.89	4.12	Average	100	55
6	4880.00	47.91	74.00	-26.09	43.79	4.12	Peak	100	55
7	7320.00	44.82	54.00	-9.18	35.54	9.28	Average	130	190
8	7320.00	56.69	74.00	-17.31	47.41	9.28	Peak	130	190

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

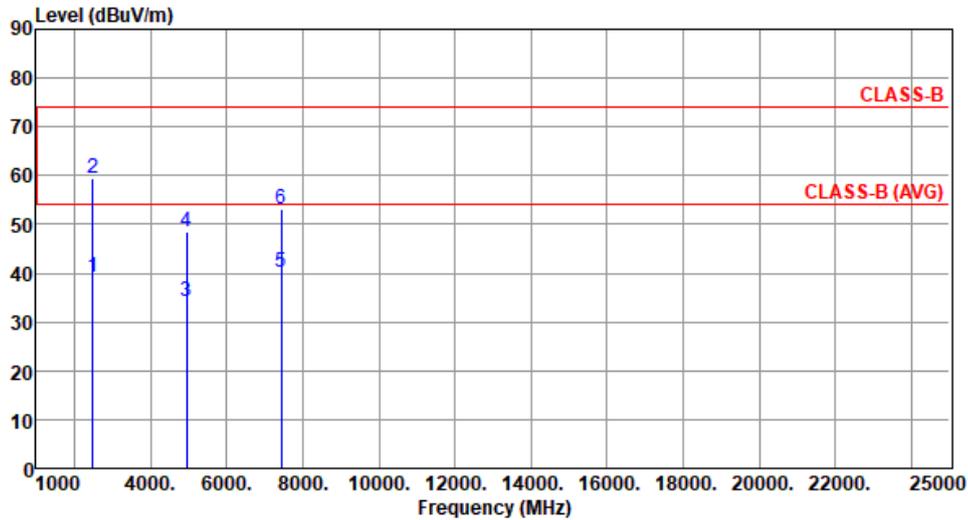
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2480
Polarization	Horizontal		

Test By :Akun Chung Temperature(°C):25 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	39.29	54.00	-14.71	41.99	-2.70	Average	100	162
2	2483.50	59.41	74.00	-14.59	62.11	-2.70	Peak	100	162
3	4960.00	34.35	54.00	-19.65	30.32	4.03	Average	100	17
4	4960.00	48.36	74.00	-25.64	44.33	4.03	Peak	100	17
5	7440.00	40.27	54.00	-13.73	30.90	9.37	Average	100	28
6	7440.00	53.21	74.00	-20.79	43.84	9.37	Peak	100	28

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

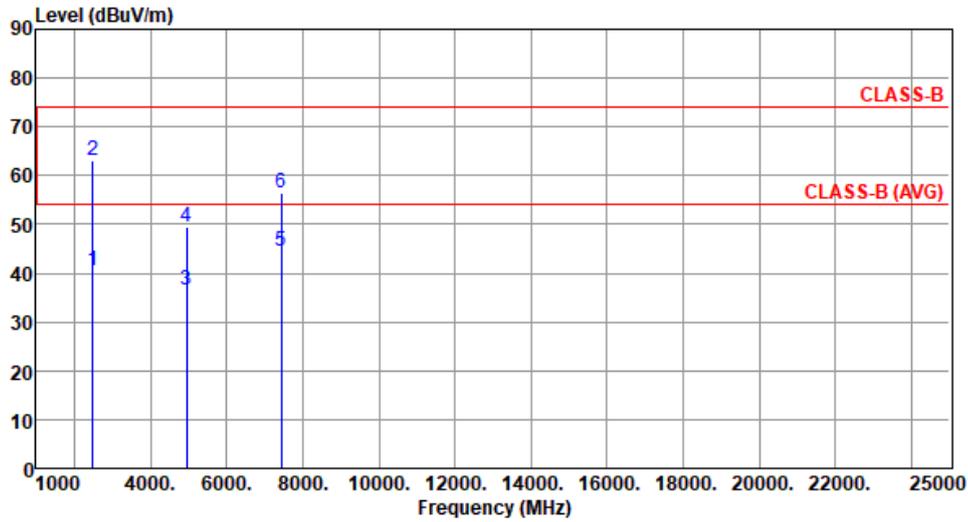
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	BT-LE (1Mbps)	Test Freq. (MHz)	2480
Polarization	Vertical		

Test By : Akun Chung Temperature(°C): 25 Humidity(%): 65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	40.41	54.00	-13.59	43.11	-2.70	Average	125	183
2	2483.50	63.08	74.00	-10.92	65.78	-2.70	Peak	125	183
3	4960.00	36.67	54.00	-17.33	32.64	4.03	Average	100	53
4	4960.00	49.48	74.00	-24.52	45.45	4.03	Peak	100	53
5	7440.00	44.40	54.00	-9.60	35.03	9.37	Average	127	188
6	7440.00	56.40	74.00	-17.60	47.03	9.37	Peak	127	188

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Configuration 1: Charging mode

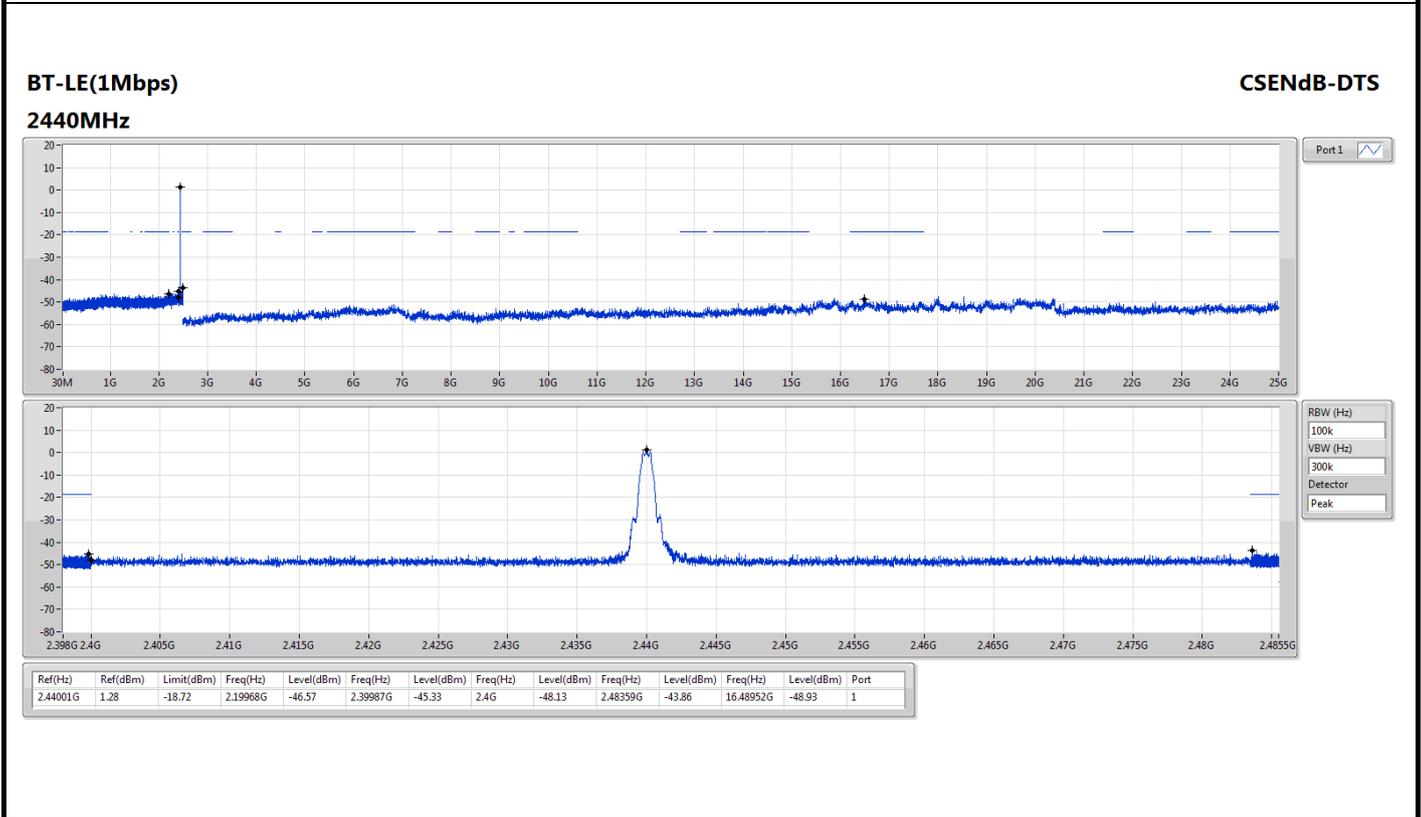
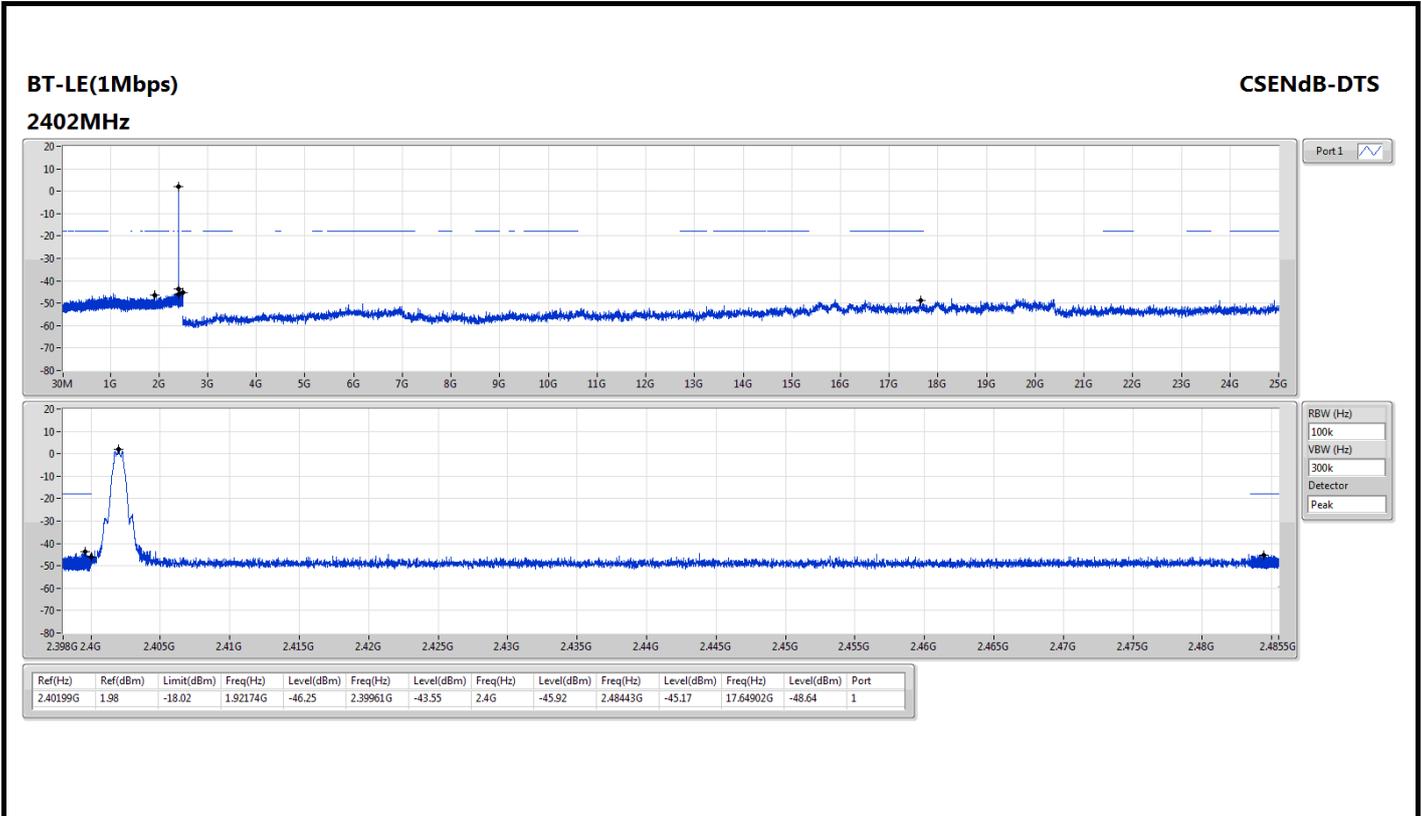
Unwanted Emissions (Below 1GHz)

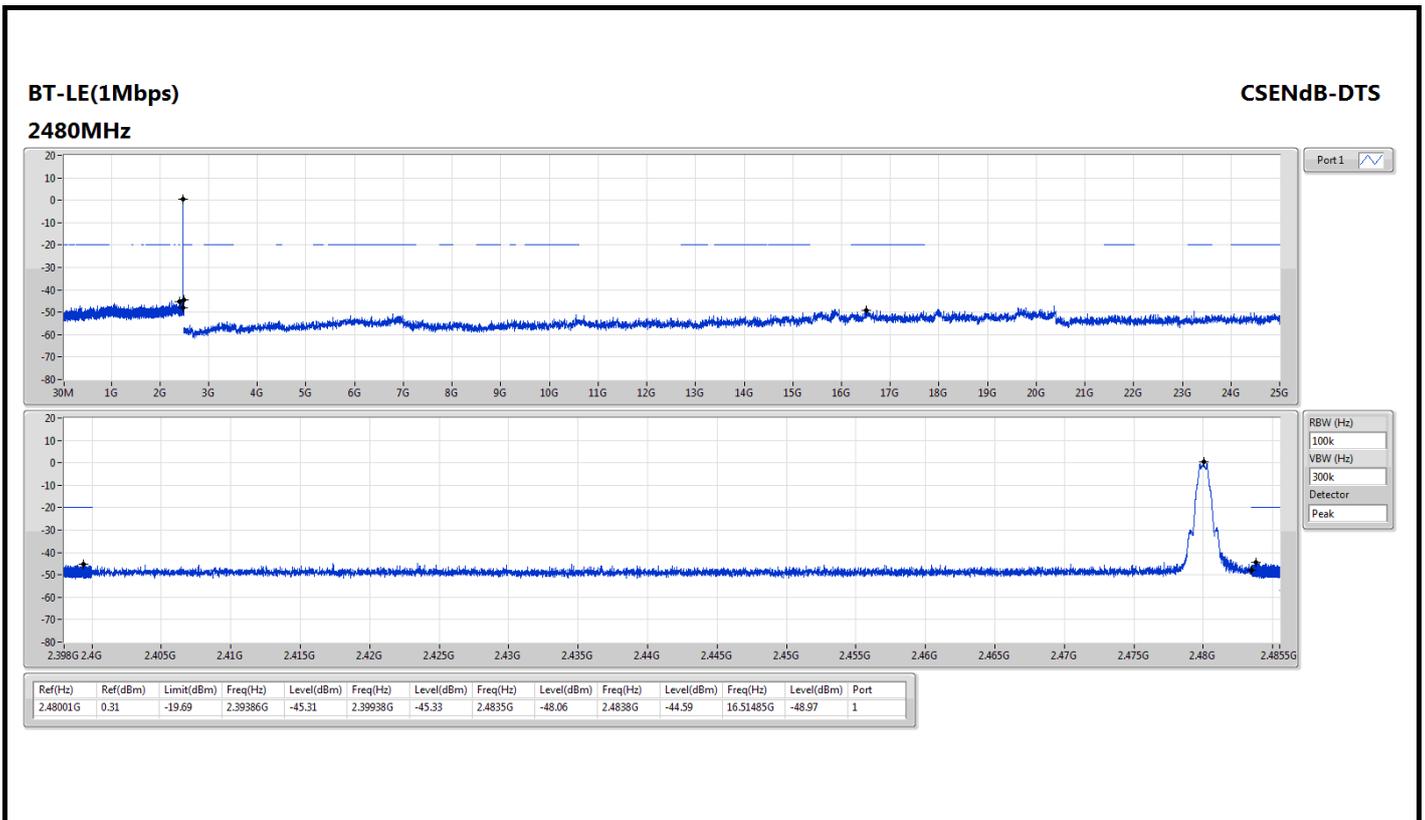
Modulation	Charging									
Polarization	Horizontal									
Test By : Roger Lu			Temperature(°C): 24			Humidity(%): 65				
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn	
	MHz	level	dBuV/m	dB	reading	dB/m		High	Table	
		dBuV/m			dBuV			cm	deg	
1	35.82	23.84	40.00	-16.16	33.27	-9.43	Peak	---	---	
2	149.31	23.19	43.50	-20.31	32.24	-9.05	Peak	---	---	
3	207.51	25.19	43.50	-18.31	37.15	-11.96	Peak	---	---	
4	281.23	22.74	46.00	-23.26	31.39	-8.65	Peak	---	---	
5	424.79	26.86	46.00	-19.14	31.88	-5.02	Peak	---	---	
6	531.49	27.89	46.00	-18.11	30.73	-2.84	Peak	---	---	
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m). Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.</p>										



Modulation		Charging								
Polarization		Vertical								
Test By		:Roger Lu		Temperature(°C):24			Humidity(%):65			
<p>The graph displays the emission level in dBuV/m across a frequency range from 30 MHz to 1000 MHz. A red step function represents the CLASS-B limit, starting at 40 dBuV/m, stepping up to 45 dBuV/m at 100 MHz, and then to 50 dBuV/m at 950 MHz. Six blue vertical lines indicate measured peaks at various frequencies: 1 (46.49 MHz), 2 (67.83 MHz), 3 (96.93 MHz), 4 (321.97 MHz), 5 (451.95 MHz), and 6 (546.04 MHz). The emission levels for these peaks are 29.37, 28.72, 22.30, 22.89, 27.07, and 28.71 dBuV/m, respectively. The margin between each peak and the limit is negative, indicating they are above the limit.</p>										
		Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
		MHz	level	dBuV/m	dB	reading	dB/m		High	Table
			dBuV/m			dBuV			cm	deg
1		46.49	29.37	40.00	-10.63	37.86	-8.49	Peak	---	---
2		67.83	28.72	40.00	-11.28	38.88	-10.16	Peak	---	---
3		96.93	22.30	43.50	-21.20	36.10	-13.80	Peak	---	---
4		321.97	22.89	46.00	-23.11	30.35	-7.46	Peak	---	---
5		451.95	27.07	46.00	-18.93	31.26	-4.19	Peak	---	---
6		546.04	28.71	46.00	-17.29	31.34	-2.63	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
 Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

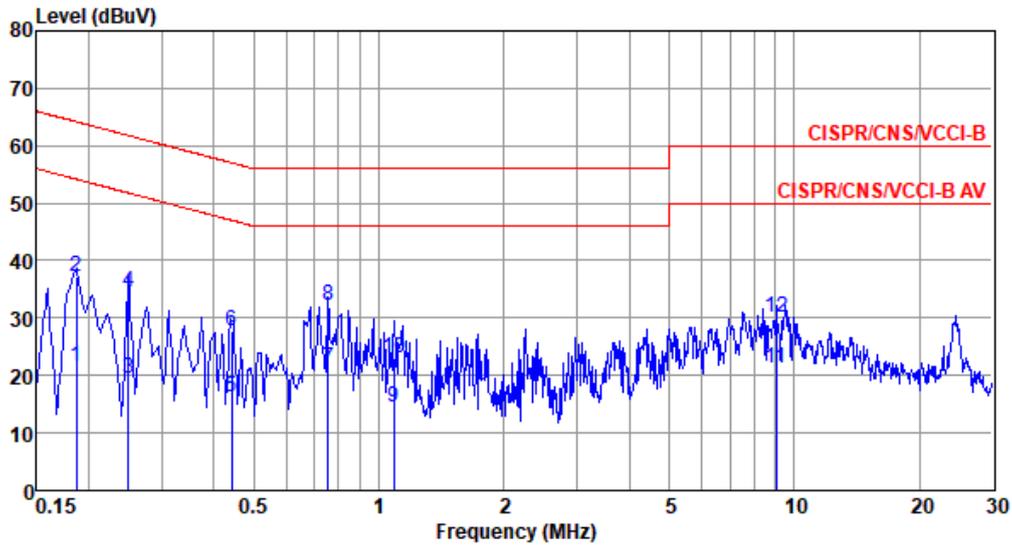






Modulation	Charging
Power Phase	Line

Test by : Joe Liao Temperature: 22°C Humidity: 61%



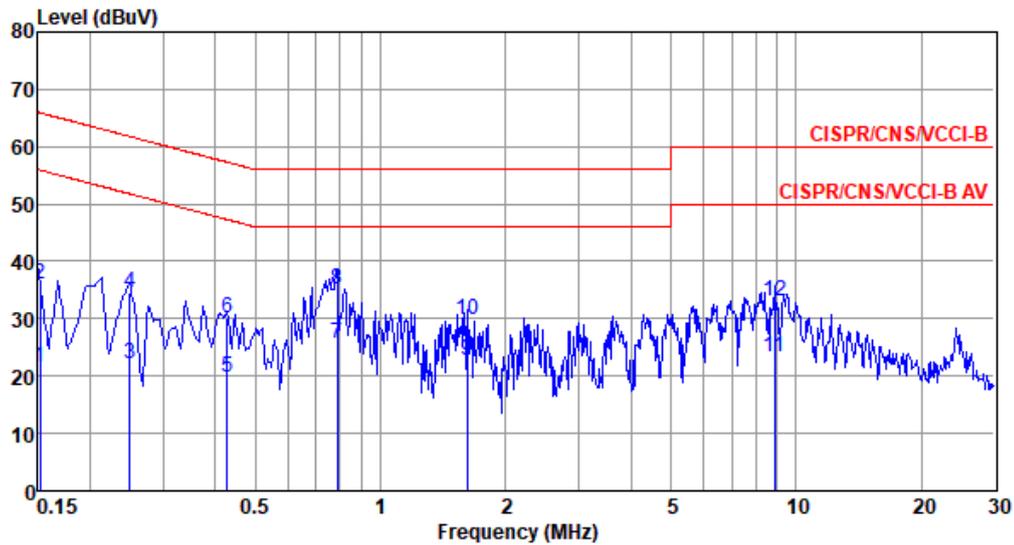
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.186	21.67	54.20	-32.53	11.70	9.68	0.08	0.21	Average
2	0.186	37.13	64.20	-27.07	27.16	9.68	0.08	0.21	QP
3	0.249	19.60	51.78	-32.18	9.58	9.68	0.08	0.26	Average
4	0.249	34.62	61.78	-27.16	24.60	9.68	0.08	0.26	QP
5	0.442	16.10	47.02	-30.92	5.98	9.67	0.09	0.36	Average
6	0.442	27.74	57.02	-29.28	17.62	9.67	0.09	0.36	QP
7	0.755	21.35	46.00	-24.65	11.16	9.68	0.14	0.37	Average
8*	0.755	32.20	56.00	-23.80	22.01	9.68	0.14	0.37	QP
9	1.088	14.56	46.00	-31.44	4.35	9.68	0.16	0.37	Average
10	1.088	23.10	56.00	-32.90	12.89	9.68	0.16	0.37	QP
11	9.059	21.32	50.00	-28.68	10.72	9.74	0.42	0.44	Average
12	9.059	30.03	60.00	-29.97	19.43	9.74	0.42	0.44	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).
 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).



Modulation	Charging
Power Phase	Neutral

Test by : Joe Liao Temperature: 22°C Humidity: 61%



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.152	21.51	55.91	-34.40	11.66	9.61	0.08	0.16	Average
2	0.152	36.02	65.91	-29.89	26.17	9.61	0.08	0.16	QP
3	0.249	22.19	51.78	-29.59	12.32	9.61	0.08	0.18	Average
4	0.249	34.44	61.78	-27.34	24.57	9.61	0.08	0.18	QP
5	0.428	19.77	47.29	-27.52	9.87	9.61	0.09	0.20	Average
6	0.428	30.12	57.29	-27.17	20.22	9.61	0.09	0.20	QP
7*	0.788	25.56	46.00	-20.44	15.55	9.61	0.14	0.26	Average
8	0.788	35.19	56.00	-20.81	25.18	9.61	0.14	0.26	QP
9	1.619	22.74	46.00	-23.26	12.64	9.62	0.19	0.29	Average
10	1.619	29.75	56.00	-26.25	19.65	9.62	0.19	0.29	QP
11	8.869	23.46	50.00	-26.54	13.00	9.68	0.42	0.36	Average
12	8.869	32.95	60.00	-27.05	22.49	9.68	0.42	0.36	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).
 Note 2: Over Limit (dB) = Level (dBuV) - Limit Line (dBuV).

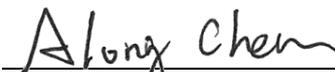
FCC Co-Location Test Report

FCC ID : IPH-A4390
Equipment : Smart Watch
Model No. : AA4390
Brand Name : GARMIN
Applicant : Garmin International, Inc.
Address : 1200 E. 151st Street Olathe, KS 66062 United States
Standard : 47 CFR FCC Part 15.247
47 CFR FCC Part 15.249
47 CFR FCC Part 15.225
Received Date : Apr. 07, 2022
Tested Date : May 09, 2022

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

Approved by:



Along Chen / Assistant Manager



Gary Chang / Manager

Table of Contents

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Appendix A. Unwanted Emissions Into Restricted Frequency Bands

Release Record

Report No.	Version	Description	Issued Date
FR240703CO	Rev. 01	Initial issue	May 30, 2022

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.247(d) 15.209 15.249(a) 15.225(d)	Radiated Emissions	[dBuV/m at 3m]: 633.34MHz 30.57 (Margin -15.43dB) - PK	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:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

ANT+	
Operating Frequency	2402 MHz ~ 2480 MHz
Modulation Type	GFSK
BT	
Operating Frequency	2402 MHz ~ 2480 MHz
Modulation Type	Bluetooth 5.0 LE: GFSK
NFC	
Operating Frequency	13.553 – 13.567
Modulation Type	ASK

1.1.2 Antenna Details

LE / ANT+

Ant. No.	Brand	Model	Type	Connector	Gain (dBi)
1	Garmin	117-01806-0X	PIFA	No	-2.08

NFC

Ant. No.	Brand	Model	Type	Connector	Gain (dBi)	Remarks
1	INPAQ TECH CO LTD	NF-C-F9-R0-120	Loop	No	---	---

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Type	5Vdc from adapter 3.87Vdc from battery
------------	---

1.2 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	May 09, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Mar. 15, 2022	Mar. 14, 2023
Spectrum Analyzer	R&S	FSV40	101498	Nov. 29, 2021	Nov. 28, 2022
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 08, 2021	Nov. 07, 2022
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jun. 30, 2021	Jun. 29, 2022
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 03, 2021	Dec. 02, 2022
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170508	Jan. 11, 2022	Jan. 10, 2023
Preamplifier	EMC	EMC02325	980225	Jun. 29, 2021	Jun. 28, 2022
Preamplifier	Agilent	83017A	MY39501308	Sep. 28, 2021	Sep. 27, 2022
Preamplifier	EMC	EMC184045B	980192	Jul. 14, 2021	Jul. 13, 2022
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 05, 2021	Oct. 04, 2022
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 05, 2021	Oct. 04, 2022
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 05, 2021	Oct. 04, 2022
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 05, 2021	Oct. 04, 2022
RF Cable	EMC	EMC104-35M-35M- 8000	210920	Oct. 05, 2021	Oct. 04, 2022
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 05, 2021	Oct. 04, 2022
Measurement Software	AUDIX	e3	6.120210g	NA	NA

Note: Calibration Interval of instruments listed above is one year.

1.3 Test Standards

47 CFR FCC Part 15.247
47 CFR FCC Part 15.247
47 CFR FCC Part 15.247
ANSI C63.10-2013

1.4 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

1.5 Deviation from Test Standard and Measurement Procedure

None

1.6 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

Measurement Uncertainty	
Parameters	Uncertainty
Unwanted Emission \leq 1GHz	± 3.41 dB
Unwanted Emission $>$ 1GHz	± 4.59 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	03CH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode
Unwanted Emissions	BLE CH0 + NFC
	ANT+ 2402MHz + NFC

3 Transmitter Test Results

3.1 Unwanted Emissions into Restricted Frequency Bands

3.1.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.1.2 Test Procedures

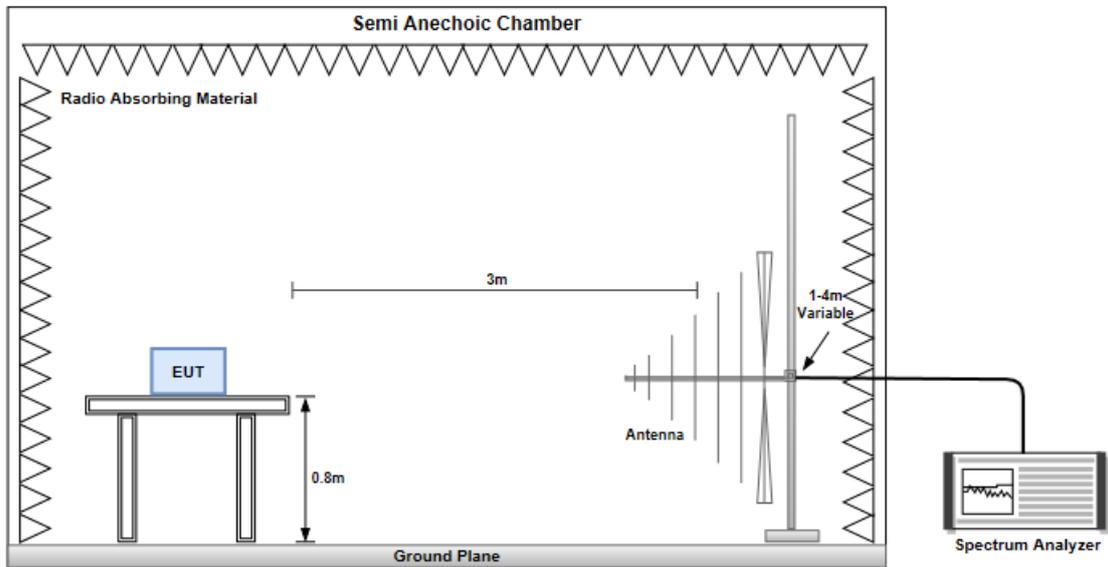
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m.
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

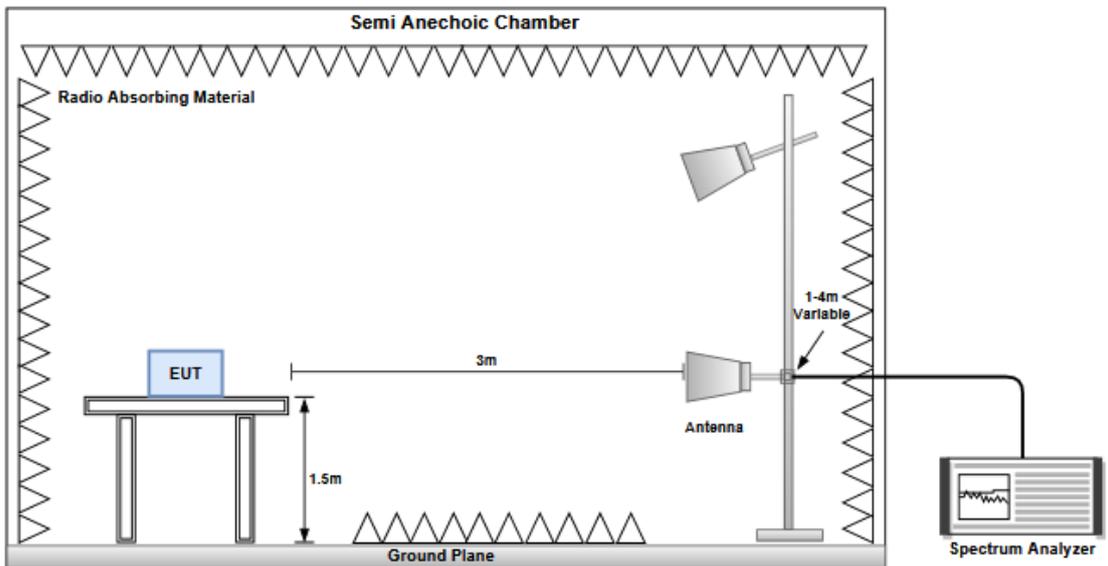
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.1.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



3.1.4 Test Results

Refer to Appendix A.

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

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Tel: 886-2-2601-1640

No.30-2, Ding Fwu Tsuen, Lin Kou
District, New Taipei City, Taiwan
(R.O.C.)

Kwei Shan

Tel: 886-3-271-8666

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St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

Kwei Shan Site II

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 333, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

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Fax: 886-3-318-0345

Email: ICC_Service@icertifi.com.tw

==END==



Unwanted Emissions (Below 1GHz)

Test Mode	ANT+ 2402MHz + NFC									
Polarization	Horizontal									
Test By : Roger Lu			Temperature(°C): 24			Humidity(%): 65				
<p>The graph plots Level (dBuV/m) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (30 to 1000). A red step function represents the CLASS-B emission limit. Six blue vertical lines indicate measured peaks at frequencies 135.73, 161.92, 189.08, 217.21, 339.43, and 511.12 MHz. The emission levels are 21.93, 27.40, 26.32, 23.90, 25.02, and 26.91 dBuV/m respectively. All peaks are well below the CLASS-B limit, which is approximately 43.5 dBuV/m in the 100-500 MHz range and 55 dBuV/m above 500 MHz.</p>										
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High cm	Turn Table deg	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m				
1	135.73	21.93	43.50	-21.57	31.38	-9.45	Peak	---	---	
2	161.92	27.40	43.50	-16.10	36.09	-8.69	Peak	---	---	
3	189.08	26.32	43.50	-17.18	37.63	-11.31	Peak	---	---	
4	217.21	23.90	46.00	-22.10	35.85	-11.95	Peak	---	---	
5	339.43	25.02	46.00	-20.98	32.33	-7.31	Peak	---	---	
6	511.12	26.91	46.00	-19.09	29.95	-3.04	Peak	---	---	

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
 Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Test Mode	ANT+ 2402MHz + NFC									
Polarization	Vertical									
Test By : Roger Lu			Temperature(°C): 24			Humidity(%): 65				
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn	
	MHz	level	dBuV/m	dB	reading	dB/m		High	Table	
					dBuV			cm	deg	
1	70.74	22.25	40.00	-17.75	33.25	-11.00	Peak	---	---	
2	161.92	24.57	43.50	-18.93	33.26	-8.69	Peak	---	---	
3	308.39	23.11	46.00	-22.89	30.97	-7.86	Peak	---	---	
4	409.27	24.15	46.00	-21.85	29.72	-5.57	Peak	---	---	
5	483.96	25.83	46.00	-20.17	29.57	-3.74	Peak	---	---	
6	552.83	27.82	46.00	-18.18	30.20	-2.38	Peak	---	---	
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m). Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.</p>										



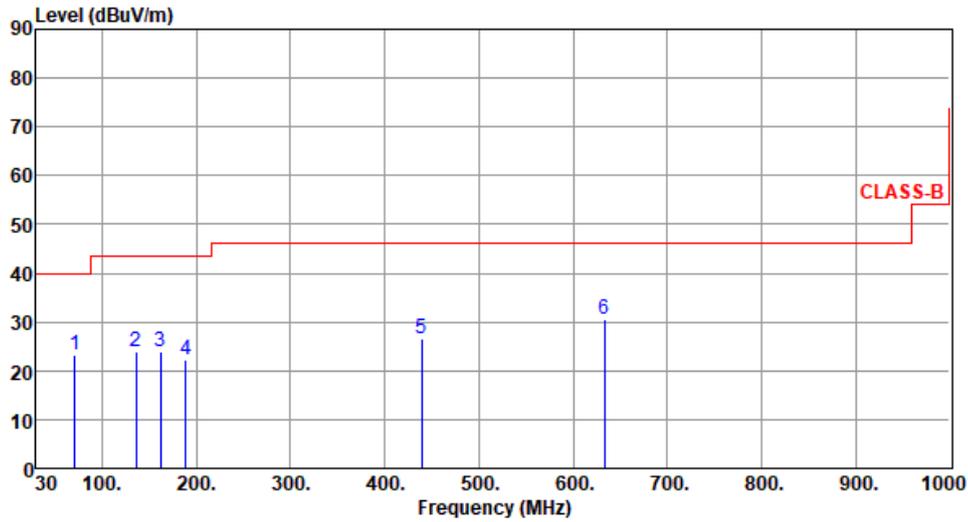
Test Mode	BLE CH0 + NFC									
Polarization	Horizontal									
Test By : Roger Lu			Temperature(°C): 24			Humidity(%): 65				
<p>The graph displays the emission level in dBuV/m across a frequency range from 30 MHz to 1000 MHz. A red step function represents the CLASS-B emission limit. Six peaks are identified and numbered 1 through 6. Peak 1 is at 36.79 MHz, peak 2 at 136.70 MHz, peak 3 at 161.92 MHz, peak 4 at 189.08 MHz, peak 5 at 217.21 MHz, and peak 6 at 584.84 MHz. The CLASS-B limit is approximately 40 dBuV/m from 30 MHz to 100 MHz, 45 dBuV/m from 100 MHz to 200 MHz, and 50 dBuV/m from 200 MHz to 1000 MHz.</p>										
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn	
	MHz	level	dBuV/m	dB	reading	dB/m		High	Table	
		dBuV/m			dBuV			cm	deg	
1	36.79	21.63	40.00	-18.37	30.79	-9.16	Peak	---	---	
2	136.70	23.67	43.50	-19.83	33.12	-9.45	Peak	---	---	
3	161.92	27.75	43.50	-15.75	36.44	-8.69	Peak	---	---	
4	189.08	26.55	43.50	-16.95	37.86	-11.31	Peak	---	---	
5	217.21	24.65	46.00	-21.35	36.60	-11.95	Peak	---	---	
6	584.84	28.66	46.00	-17.34	30.12	-1.46	Peak	---	---	

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
 Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Test Mode	BLE CH0 + NFC
Polarization	Vertical

Test By : Roger Lu Temperature(°C):24 Humidity(%):65



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	70.74	23.14	40.00	-16.86	34.14	-11.00	Peak	---	---
2	135.73	23.94	43.50	-19.56	33.39	-9.45	Peak	---	---
3	161.92	23.86	43.50	-19.64	32.55	-8.69	Peak	---	---
4	189.08	22.22	43.50	-21.28	33.53	-11.31	Peak	---	---
5	439.34	26.55	46.00	-19.45	31.13	-4.58	Peak	---	---
6	633.34	30.57	46.00	-15.43	30.94	-0.37	Peak	---	---

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Unwanted Emissions (Above 1GHz)

Test Mode	ANT+ 2402MHz + NFC									
Polarization	Horizontal									
Test By : Roger Lu			Temperature(°C): 24			Humidity(%): 65				
<p>The graph plots Level (dBuV/m) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (1000 to 25000). Two horizontal red lines represent limits: CLASS-B at approximately 74 dBuV/m and CLASS-B (AVG) at approximately 54 dBuV/m. Two vertical blue lines indicate emission peaks at 4831.12 MHz (labeled '2') and 7165.32 MHz (labeled '4').</p>										
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg	
1	4831.12	32.38	54.00	-21.62	28.23	4.15	Average	100	30	
2	4831.12	44.80	74.00	-29.20	40.65	4.15	Peak	100	30	
3	7165.32	37.34	54.00	-16.66	28.45	8.89	Average	100	70	
4	7165.32	49.78	74.00	-24.22	40.89	8.89	Peak	100	70	
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).</p>										



Test Mode	ANT+ 2402MHz + NFC									
Polarization	Vertical									
Test By : Roger Lu			Temperature(°C): 24			Humidity(%): 65				
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg	
1	4831.12	32.30	54.00	-21.70	28.15	4.15	Average	100	40	
2	4831.12	44.64	74.00	-29.36	40.49	4.15	Peak	100	40	
3	7165.32	37.45	54.00	-16.55	28.56	8.89	Average	100	65	
4	7165.32	49.91	74.00	-24.09	41.02	8.89	Peak	100	65	
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).</p>										



Test Mode	BLE CH0 + NFC									
Polarization	Horizontal									
Test By : Roger Lu			Temperature(°C): 24			Humidity(%): 65				
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg	
1	4831.12	32.27	54.00	-21.73	28.12	4.15	Average	100	60	
2	4831.12	44.74	74.00	-29.26	40.59	4.15	Peak	100	60	
3	7165.32	37.35	54.00	-16.65	28.46	8.89	Average	100	50	
4	7165.32	50.47	74.00	-23.53	41.58	8.89	Peak	100	50	
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).</p>										



Test Mode	BLE CH0 + NFC									
Polarization	Vertical									
Test By : Roger Lu			Temperature(°C): 24			Humidity(%): 65				
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg	
1	4831.12	32.37	54.00	-21.63	28.22	4.15	Average	100	40	
2	4831.12	44.61	74.00	-29.39	40.46	4.15	Peak	100	40	
3	7165.32	37.27	54.00	-16.73	28.38	8.89	Average	100	90	
4	7165.32	50.32	74.00	-23.68	41.43	8.89	Peak	100	90	
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).</p>										

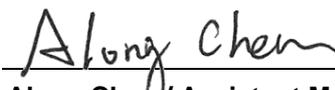
FCC RF Exposure Report

FCC ID : IPH-A4390
Equipment : Smart Watch
Model No. : AA4390
Brand Name : GARMIN
Applicant : Garmin International, Inc.
Address : 1200 E. 151st Street Olathe, KS 66062 United States
Standard : 47 CFR FCC Part 2.1093
Received Date : Apr. 07, 2022
Tested Date : May. 04 ~ May. 10, 2022

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

Approved by:



Along Chen / Assistant Manager



Gary Chang / Manager

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Release Record

Report No.	Version	Description	Issued Date
FA240703	Rev. 01	Initial issue	May 30, 2022

1 EXPOSURE EVALUATION OF PORTABLE DEVICES

1.1 SAR TEST EXCLUSION THRESHOLD FOR 100MHz to 6GHz and ≤ 50 mm

Frequency (MHz)	5	10	15	20	25	Separation distance (mm)
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

1.2 DEVIATION FROM TEST STANDARD AND MEASUREMENT PROCEDURE

None

1.3 MEASUREMENT UNCERTAINTY

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Parameters	Uncertainty
Conducted power	±0.808 dB

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:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1.4 EVALUATION RESULTS

Maximum Conducted Output Power Result				
Condition		RF Output Power (dBm)		
Modulation Mode	Freq. (MHz)	Average Power (dBm)	Rated Power (dBm)	Rated Power (mW)
LE-1Mbps	2402	2.21	2.5	1.78
LE-1Mbps	2440	1.76	2	1.58
LE-1Mbps	2480	1.09	1.5	1.41

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})}]$
 $= 1.78 / 5 * \sqrt{2.402} = 0.552 < 3.0$

SAR Test Exclusion Thresholds is < 10mW and 3.0 for separation distance 5mm. Therefore, SAR test is not required.

2 Test laboratory information

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==END==