GARMIN
Garmin International, Inc.
1200 East 151st Street
Olathe, Kansas 66062
P: 913-397-8200 F: 913-397-8282

26-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: Vivomove Sport

	Información (Information)
Tipo de equipo (Equipment type)	Portable Digital Transceiver
Marca (Brand)	Garmin GARMIN.
Modelo (Model)	AB4224
Tecnología o modulación (Technology or modulation)	GFSK for ANT/ GFSK for BLE
Frecuencias (Frequencies)	2402-2480 MHz / 2402-2480 MHz
Ganancia de antena (dBi) (Antenna gain (dBi)	ANT –5.42 dBi / BLE –5.42 dBi
P.i.r.e. (E.I R P.)	-1.21 dBm, 0.75 mW / -2.08 dBm, 0.62 mW
Módulos (Modules)	ANT, BLE

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-B4224**
Equipment	:	**Watch and Activity Monitor**
Model No.	:	**AB4224**
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. 16, 2021**
Tested Date	:	**Apr. 30 ~ Jul. 08, 2021**

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 may be duplicated completely for legal use with the approval of the applicant. 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**

Testing Laboratory 2732

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Release Record

Report No.	Version	Description	Issued Date
FR141603AC	Rev. 01	Initial issue	Sep. 09, 2021

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	[dBuV]: 4.525MHz 33.38 (Margin -22.62dB) - QP	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 12010.00MHz 43.52 (Margin -10.48dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Power [dBm]: 3.34	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 1: Bluetooth LE (Low energy) uses GFSK modulation.				

1.1.2 Antenna Details

Ant. No.	Brand	Model	Type	Connector	Gain (dBi)
1	Garmin	700-00157-00	PIFA	N/A	-5.42

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc from host 3.87Vdc from battery

1.1.4 Accessories

Accessories		
No.	**Equipment**	**Description**
1	Battery	Brand: GARMIN Model: 361-00151-01 Power Rating: 3.87Vdc, 84mAh
2	USB cable	Brand: GARMIN Model: 320-01069-10 Power line: 0.52m non-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	Garmin USB Monitor, Version: REV 3.0	
Duty Cycle and Duty Factor	Duty Cycle (%)	Duty Factor (dB)
	64.98	1.87

1.1.7 Power Index of Test Tool

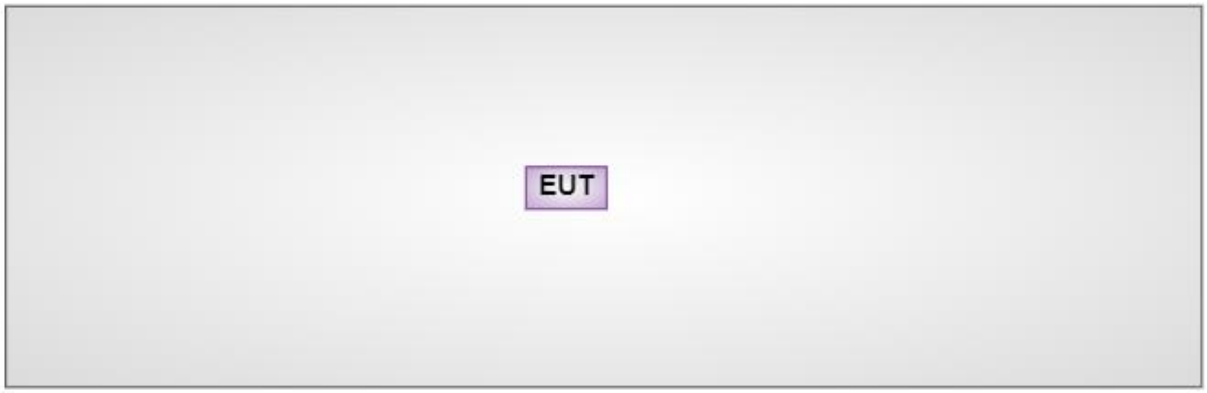
Modulation Mode	Test Frequency (MHz)		
	2402	2440	2480
BT LE-1Mbps	default	default	default

1.2 Local Support Equipment List

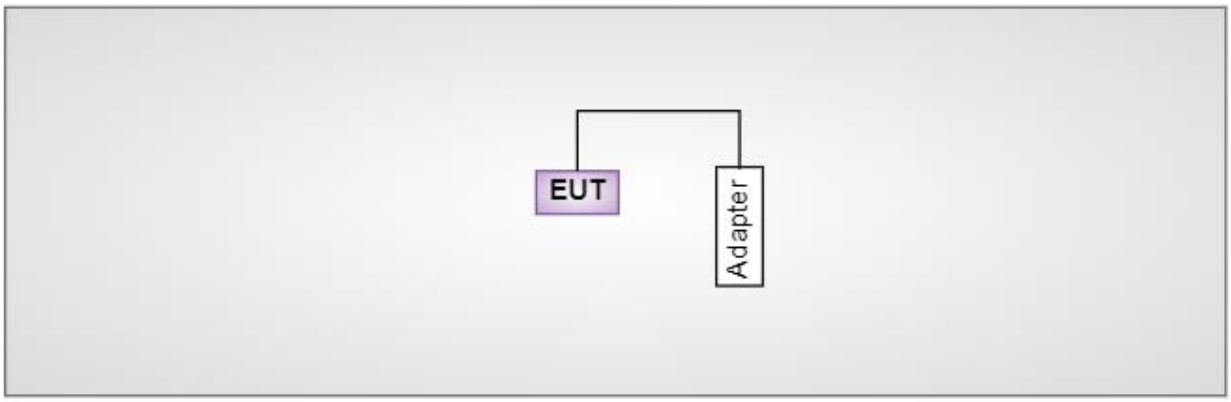
Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Remarks**
1	Adapter	Samsung	ETA-U90JWS	---	---

1.3 Test Setup Chart

Test Setup Diagram (Battery mode)



Test Setup Diagram (Changer mode)



1.4 Test Equipment List and Calibration Data

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	May 12, 2021				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
LISN	R&S	ENV216	101579	Mar. 17, 2021	Mar. 16, 2022
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 21, 2020	Oct. 20, 2021
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission below 1 GHz				
Test Site	966 chamber3 / (03CH03-WS)				
Tested Date	May 12, 2021				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 17, 2020	Nov. 16, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	May 06, 2021	May 05, 2022
Preamplifier	EMC	EMC02325	980187	Aug. 05, 2020	Aug. 04, 2021
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Sep. 26, 2020	Sep. 25, 2021
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Sep. 26, 2020	Sep. 25, 2021
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Sep. 26, 2020	Sep. 25, 2021
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission above 1 GHz				
Test Site	966 chamber3 / (03CH03-WS)				
Tested Date	Apr. 30, 2021				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101499	Mar. 02, 2021	Mar. 01, 2022
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Dec. 22, 2020	Dec. 21, 2021
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 06, 2020	Nov. 05, 2021
Preamplifier	Agilent	83017A	MY39501309	Sep. 02, 2020	Sep. 01, 2021
Preamplifier	EMC	EMC184045B	980192	Jul. 21, 2020	Jul. 20, 2021
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Sep. 26, 2020	Sep. 25, 2021
RF cable-8M	EMC	EMC104-SM-SM-8000	181107	Sep. 26, 2020	Sep. 25, 2021
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	Jul. 08, 2021				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Apr. 19, 2021	Apr. 18, 2022
Power Meter	Anritsu	ML2495A	1241002	Nov. 04, 2020	Nov. 03, 2021
Power Sensor	Anritsu	MA2411B	1207366	Nov. 04, 2020	Nov. 03, 2021
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
Radiated emission ≤ 1GHz	±3.96 dB
Radiated emission > 1GHz	±4.51 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-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.)
Test Site	03CH03-WS
Address of Test Site	No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 333, Taiwan (R.O.C.)

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- 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	---	---	2
Radiated Emissions ≤ 1GHz	BT LE	2480	1Mbps	1
	Charging	---	---	2
Maximum Output Power 6dB bandwidth Power spectral density Radiated Emissions > 1GHz	BT LE	2402, 2440, 2480	1Mbps	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 **Z-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: Battery mode
   2) Configuration 2: Charging mode

3 Transmitter Test Results

3.1 Conducted Emissions

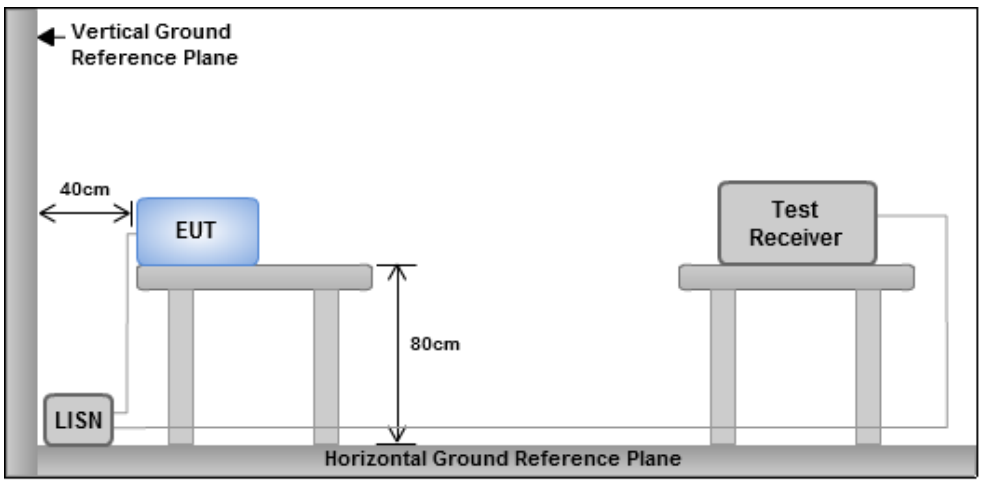
3.1.1 Limit of Conducted Emissions

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.		

3.1.2 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

3.1.3 Test Setup



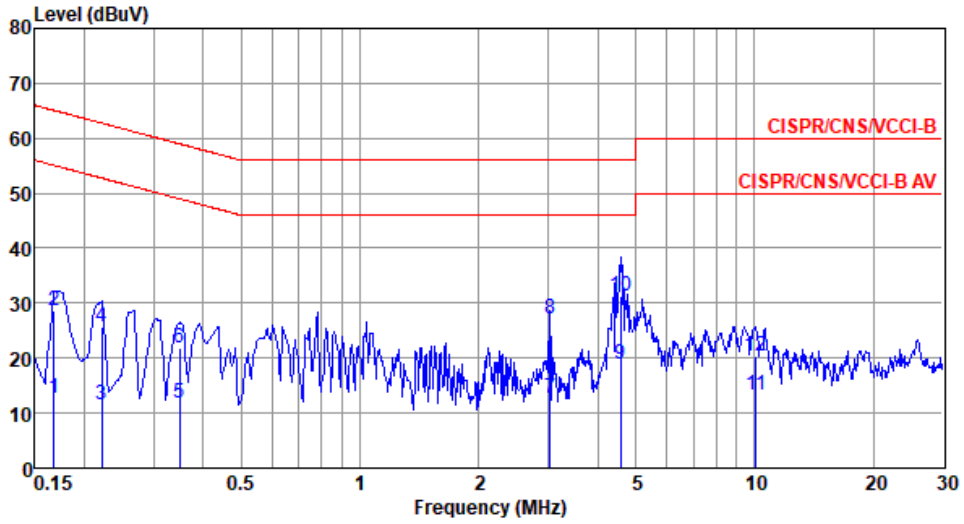
Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

Modulation Mode	Charging	Test Freq. (MHz)	---
Power Phase	Line		

Test by : BRAD WU Temperature: 24°C Humidity: 64%

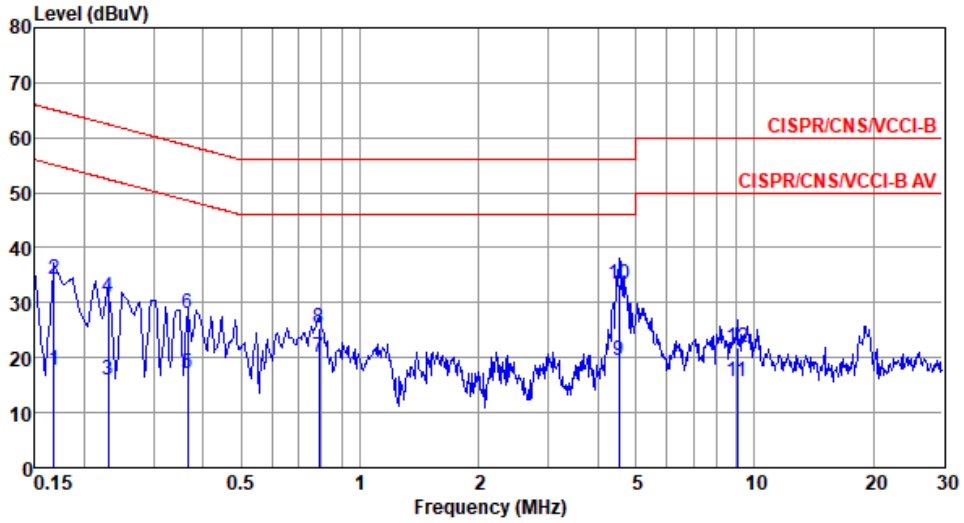


	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.168	12.71	55.08	-42.37	2.83	9.83	0.05	Average
2	0.168	28.64	65.08	-36.44	18.76	9.83	0.05	QP
3	0.222	11.66	52.74	-41.08	1.75	9.85	0.06	Average
4	0.222	25.82	62.74	-36.92	15.91	9.85	0.06	QP
5	0.348	11.92	49.00	-37.08	1.96	9.88	0.08	Average
6	0.348	21.75	59.00	-37.25	11.79	9.88	0.08	QP
7	3.025	12.68	46.00	-33.32	2.41	10.02	0.25	Average
8	3.025	27.25	56.00	-28.75	16.98	10.02	0.25	QP
9	4.574	18.88	46.00	-27.12	8.52	10.05	0.31	Average
10*	4.574	31.24	56.00	-24.76	20.88	10.05	0.31	QP
11	10.072	13.30	50.00	-36.70	2.79	10.11	0.40	Average
12	10.072	20.30	60.00	-39.70	9.79	10.11	0.40	QP

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

Modulation Mode	Charging	Test Freq. (MHz)	---
Power Phase	Neutral		

Test by : BRAD WU Temperature: 24℃ Humidity: 64%



	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.168	17.79	55.08	-37.29	7.92	9.82	0.05	Average
2	0.168	34.13	65.08	-30.95	24.26	9.82	0.05	QP
3	0.230	15.85	52.44	-36.59	5.96	9.83	0.06	Average
4	0.230	31.00	62.44	-31.44	21.11	9.83	0.06	QP
5	0.365	17.13	48.61	-31.48	7.20	9.85	0.08	Average
6	0.365	27.98	58.61	-30.63	18.05	9.85	0.08	QP
7	0.788	20.06	46.00	-25.94	10.08	9.87	0.11	Average
8	0.788	25.52	56.00	-30.48	15.54	9.87	0.11	QP
9	4.525	19.53	46.00	-26.47	9.25	9.98	0.30	Average
10*	4.525	33.38	56.00	-22.62	23.10	9.98	0.30	QP
11	9.059	15.71	50.00	-34.29	5.24	10.08	0.39	Average
12	9.059	21.80	60.00	-38.20	11.33	10.08	0.39	QP

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

3.2 6dB and Occupied Bandwidth

3.2.1 Limit of 6dB Bandwidth

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

3.2.2 Test Procedures

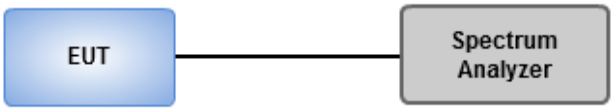
6dB Bandwidth

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.

3.2.3 Test Setup



3.2.4 Test Result of 6dB and Occupied Bandwidth

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

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)	699.275k	1.038M	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

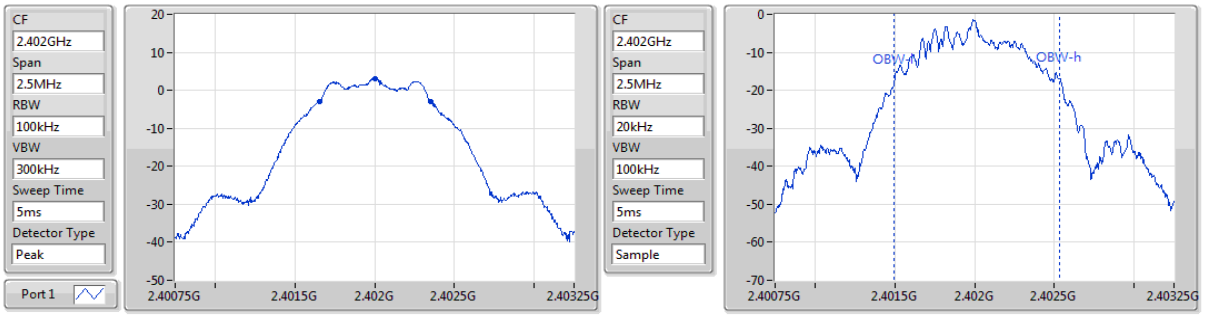
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	699.275k	1.035M
2440MHz	Pass	500k	692.029k	1.035M
2480MHz	Pass	500k	688.406k	1.038M

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

BT-LE(1Mbps) **EBW-DTS**

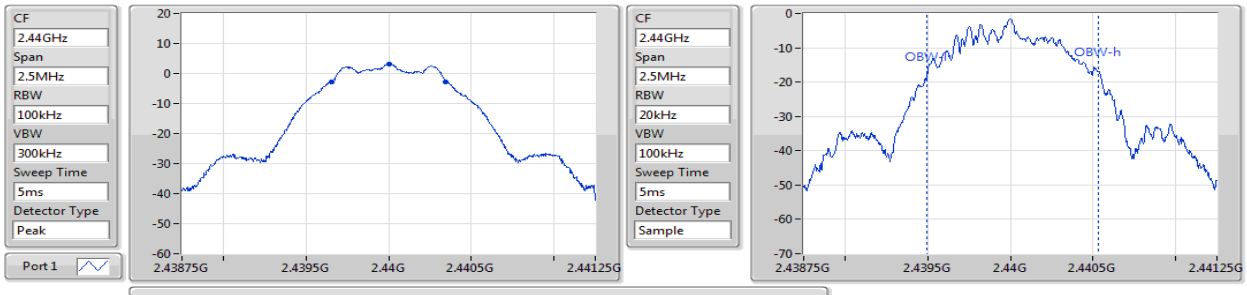
2402MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
699.275k	2.401652G	2.402351G	1.035M	2.401497G	2.402532G	500k	1

BT-LE(1Mbps) **EBW-DTS**

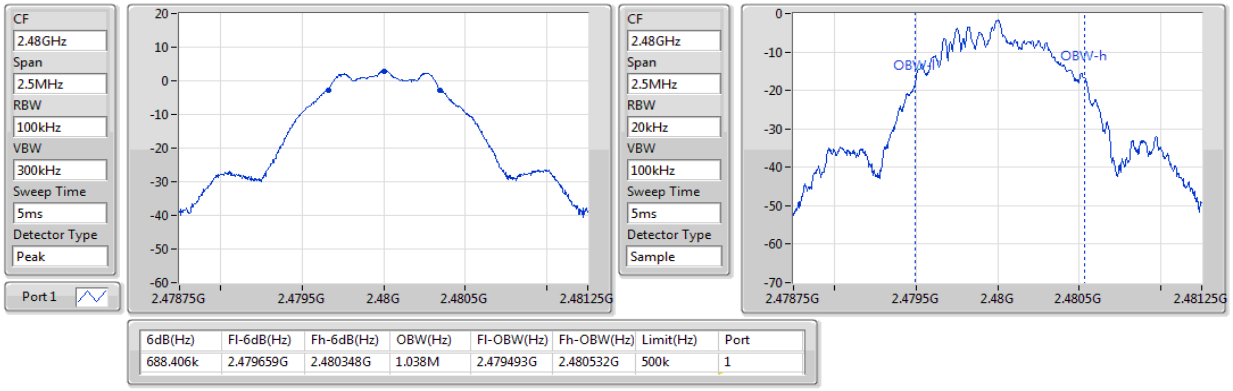
2440MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
692.029k	2.439656G	2.440348G	1.035M	2.439497G	2.440532G	500k	1

BT-LE(1Mbps) **EBW-DTS**

2480MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
688.406k	2.479659G	2.480348G	1.038M	2.479493G	2.480532G	500k	1

3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

Antenna gain <= 6dBi, no any corresponding reduction is in output power limit.

3.3.2 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.

3.3.3 Test Setup

3.3.4 Test Result of Maximum Output Power

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

Summary of Peak Conducted Output Power

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	3.34	0.00216

Result

Mode	Result	Antenna Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	-5.42	3.31	30.00
2440MHz	Pass	-5.42	3.33	30.00
2480MHz	Pass	-5.42	3.34	30.00

Summary of Conducted (Average) Output Power

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	3.29	0.00213

Result

Mode	Result	Antenna Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	-5.42	3.26	-
2440MHz	Pass	-5.42	3.28	-
2480MHz	Pass	-5.42	3.29	-

Note: Average power is for reference only.

3.4 Power Spectral Density

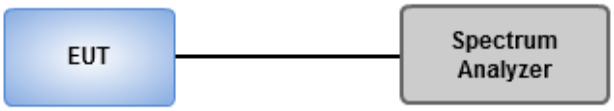
3.4.1 Limit of Power Spectral Density

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

3.4.2 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.

3.4.3 Test Setup



3.4.4 Test Result of Power Spectral Density

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

Summary

Mode	PD (dBm/3kHz)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-11.66

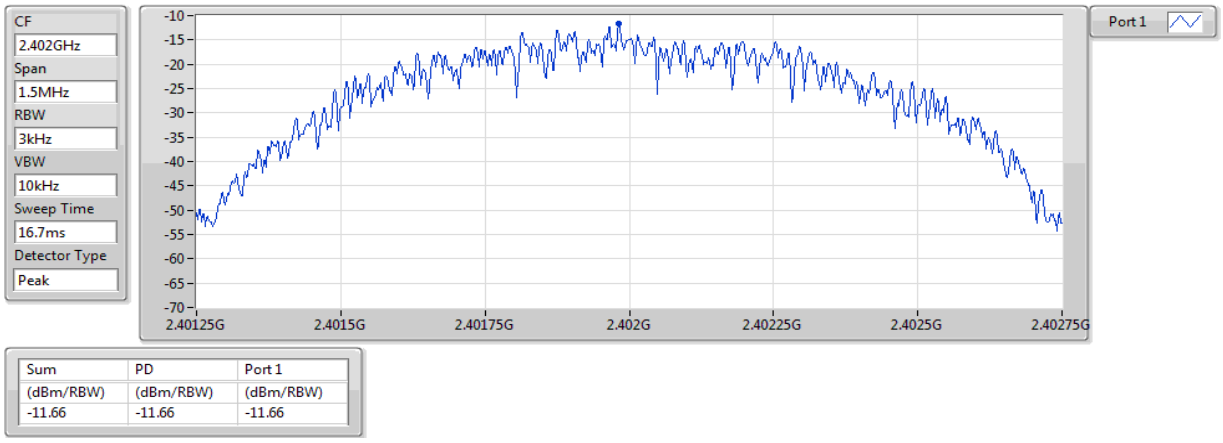
Result

Mode	Result	Antenna Gain (dBi)	PD (dBm/3kHz)	PD Limit (dBm/3kHz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	-5.42	-11.66	8.00
2440MHz	Pass	-5.42	-11.83	8.00
2480MHz	Pass	-5.42	-12.05	8.00

PD = Maximum power density

BT-LE(1Mbps) **PSD**

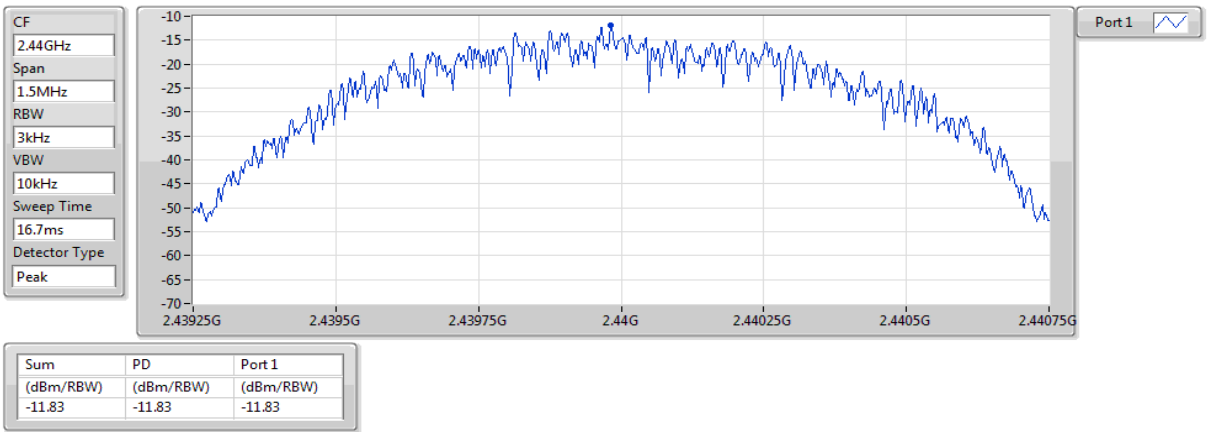
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.66	-11.66	-11.66

BT-LE(1Mbps) **PSD**

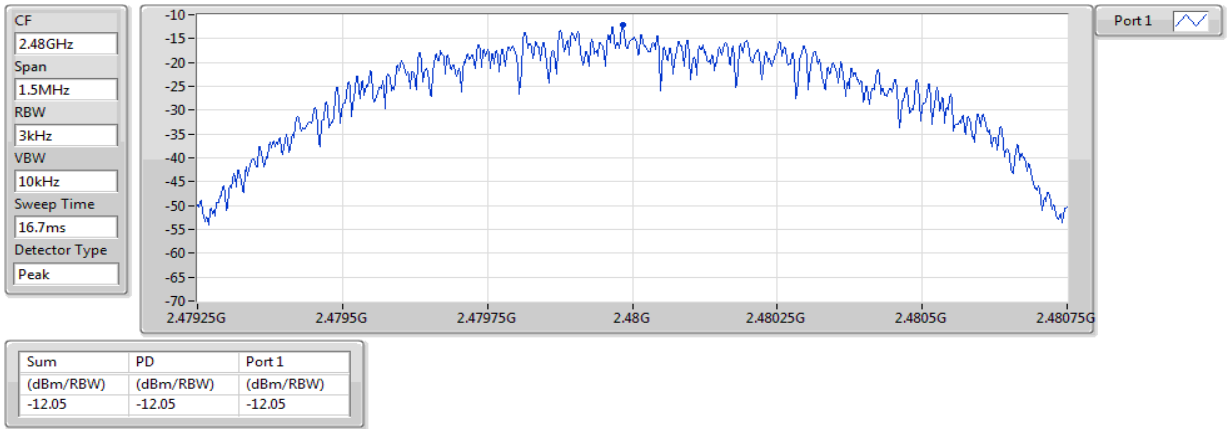
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.83	-11.83	-11.83

BT-LE(1Mbps) **PSD**

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-12.05	-12.05	-12.05

3.5 Emissions in Restricted Frequency Bands

3.5.1 Limit of 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.

3.5.2 Test Procedures

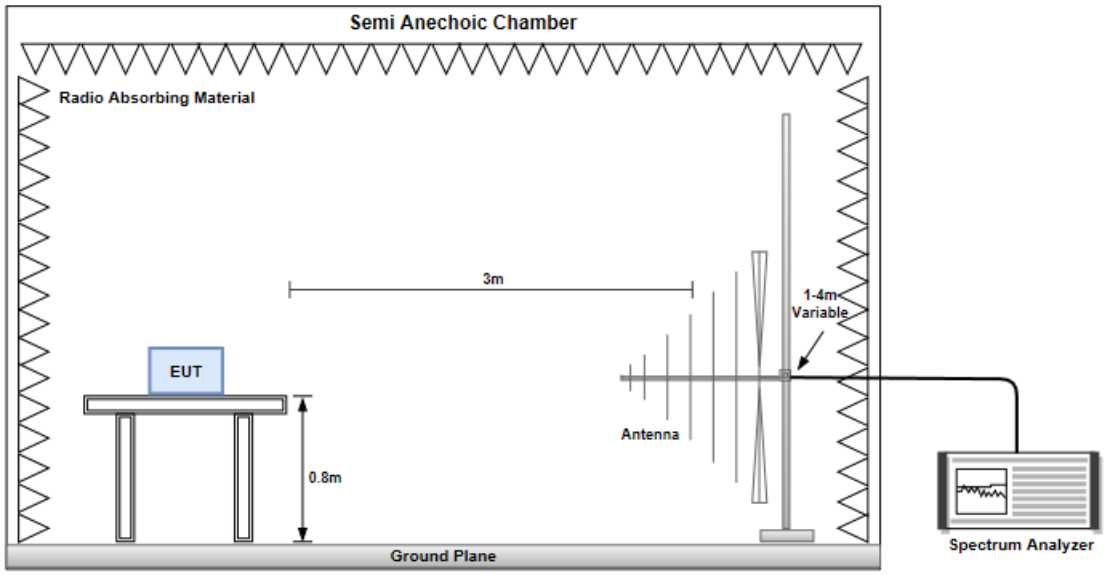
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission 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:

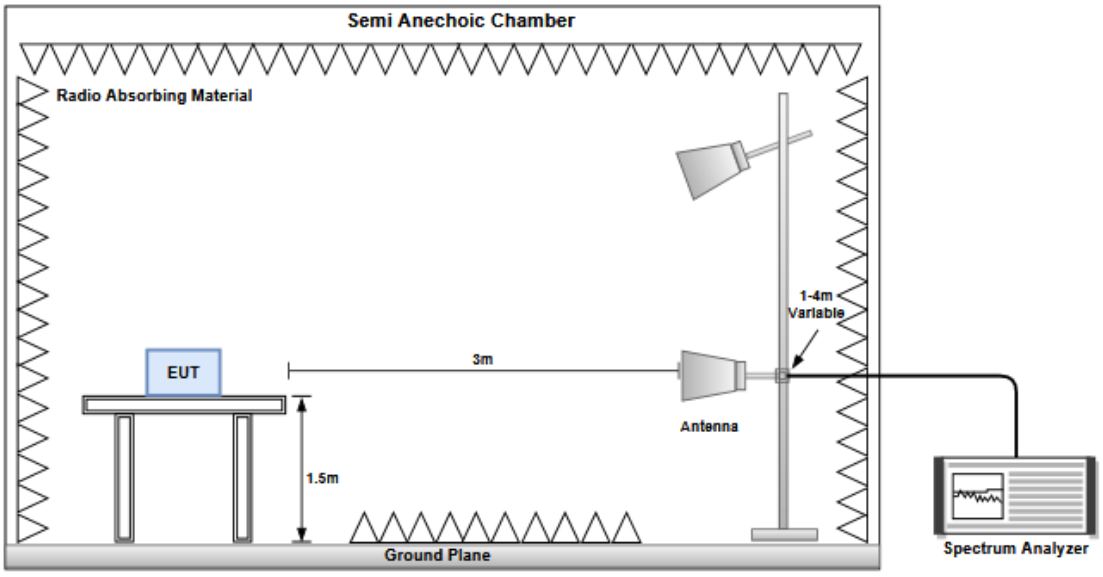
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz

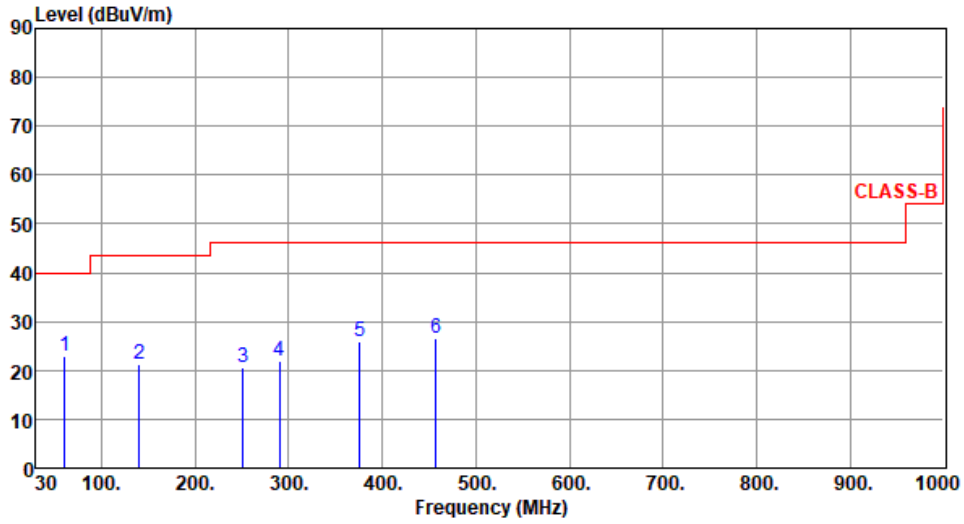


Configuration 1: Battery mode

3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

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

Test By :Roger Lu Temperature(℃):25 Humidity(%):63

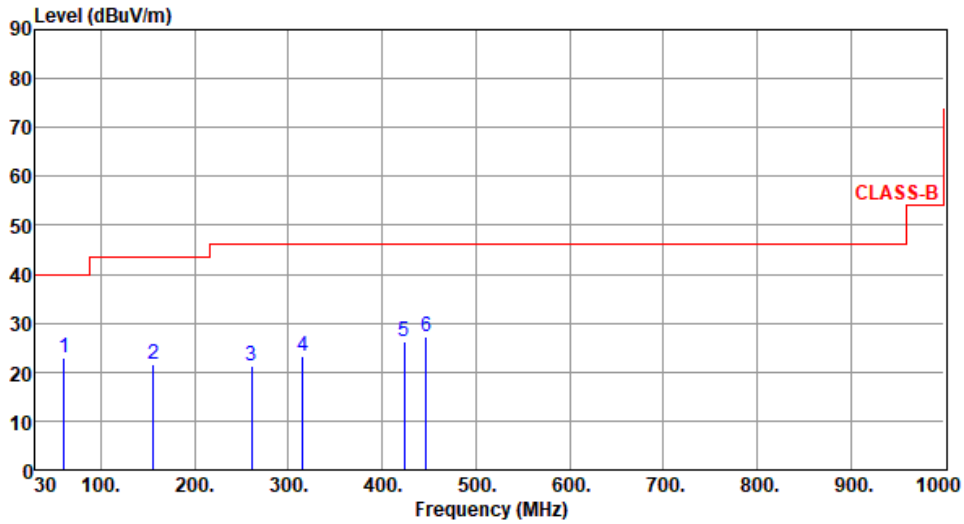


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	61.04	22.98	40.00	-17.02	32.37	-9.39	Peak	---	---
2	140.58	21.26	43.50	-22.24	30.43	-9.17	Peak	---	---
3	251.16	20.68	46.00	-25.32	30.62	-9.94	Peak	---	---
4	289.96	22.00	46.00	-24.00	30.62	-8.62	Peak	---	---
5	376.29	26.01	46.00	-19.99	32.27	-6.26	Peak	---	---
6	457.77	26.73	46.00	-19.27	30.44	-3.71	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	BT LE-1Mbps	Test Freq. (MHz)	2480
Polarization	Vertical		

Test By :Roger Lu Temperature(℃):25 Humidity(%):63



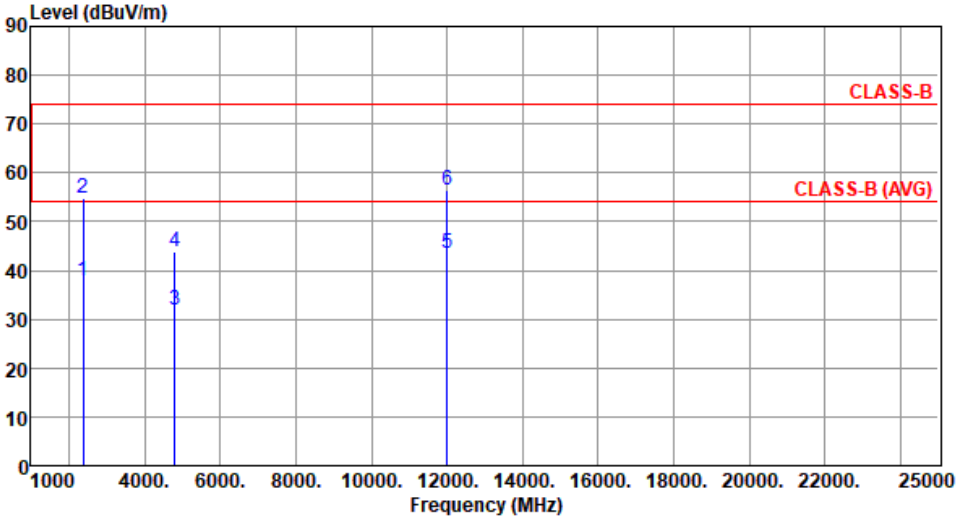
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	61.04	22.89	40.00	-17.11	32.28	-9.39	Peak	---	---
2	156.10	21.43	43.50	-22.07	30.07	-8.64	Peak	---	---
3	260.86	21.20	46.00	-24.80	31.02	-9.82	Peak	---	---
4	315.18	23.37	46.00	-22.63	31.24	-7.87	Peak	---	---
5	423.82	26.21	46.00	-19.79	31.03	-4.82	Peak	---	---
6	447.10	27.23	46.00	-18.77	31.21	-3.98	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.

3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz)

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

Test By :Roger Lu Temperature(℃):24 Humidity(%):68

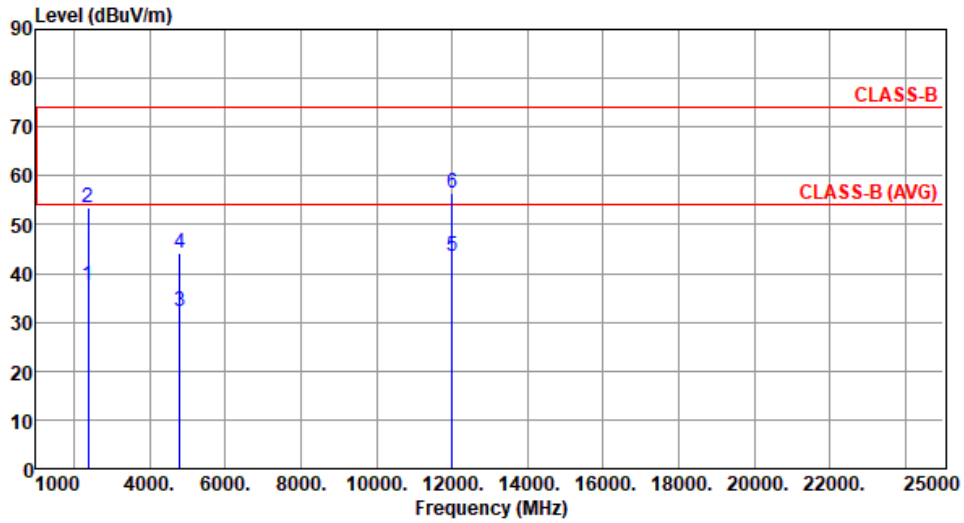


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	37.80	54.00	-16.20	39.46	-1.66	Average	366	29
2	2390.00	54.96	74.00	-19.04	56.62	-1.66	Peak	366	29
3	4804.00	31.98	54.00	-22.02	26.98	5.00	Average	100	30
4	4804.00	43.96	74.00	-30.04	38.96	5.00	Peak	100	30
5	12010.00	43.52	54.00	-10.48	28.84	14.68	Average	100	40
6	12010.00	56.61	74.00	-17.39	41.93	14.68	Peak	100	40

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 :Roger Lu Temperature(℃):24 Humidity(%):68

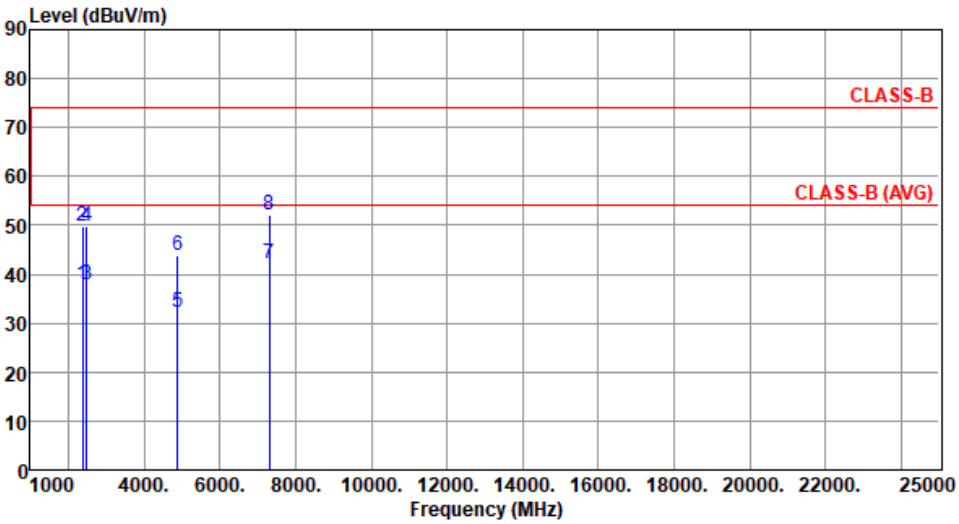


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	37.63	54.00	-16.37	39.29	-1.66	Average	356	279
2	2390.00	53.50	74.00	-20.50	55.16	-1.66	Peak	356	279
3	4804.00	32.26	54.00	-21.74	27.26	5.00	Average	100	346
4	4804.00	44.18	74.00	-29.82	39.18	5.00	Peak	100	346
5	12010.00	43.45	54.00	-10.55	28.77	14.68	Average	100	25
6	12010.00	56.54	74.00	-17.46	41.86	14.68	Peak	100	25

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 :Roger Lu Temperature(℃):24 Humidity(%):68

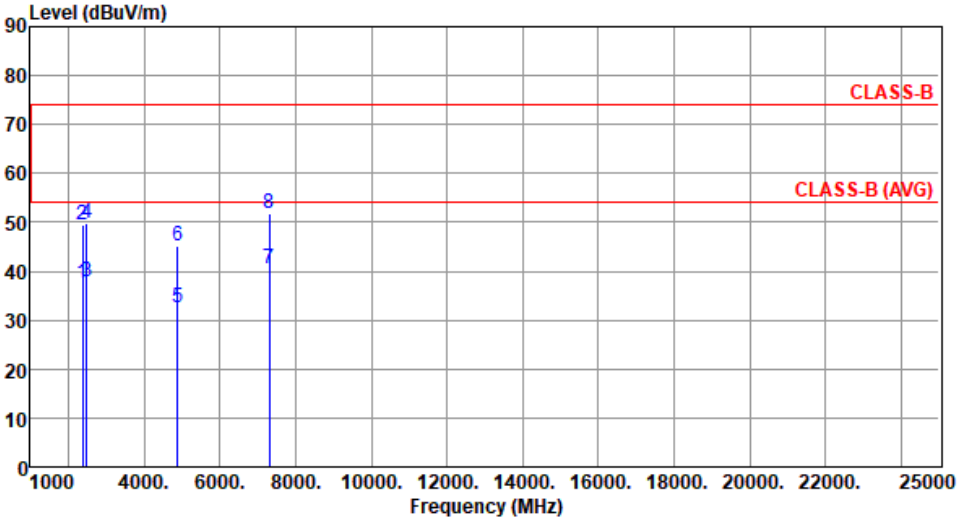


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	37.77	54.00	-16.23	39.43	-1.66	Average	349	18
2	2390.00	49.67	74.00	-24.33	51.33	-1.66	Peak	349	18
3	2483.50	37.87	54.00	-16.13	39.73	-1.86	Average	349	18
4	2483.50	49.85	74.00	-24.15	51.71	-1.86	Peak	349	18
5	4880.00	32.17	54.00	-21.83	27.10	5.07	Average	100	50
6	4880.00	43.97	74.00	-30.03	38.90	5.07	Peak	100	50
7	7320.00	42.13	54.00	-11.87	31.73	10.40	Average	100	8
8	7320.00	52.14	74.00	-21.86	41.74	10.40	Peak	100	8

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 :Roger Lu Temperature(℃):24 Humidity(%):68

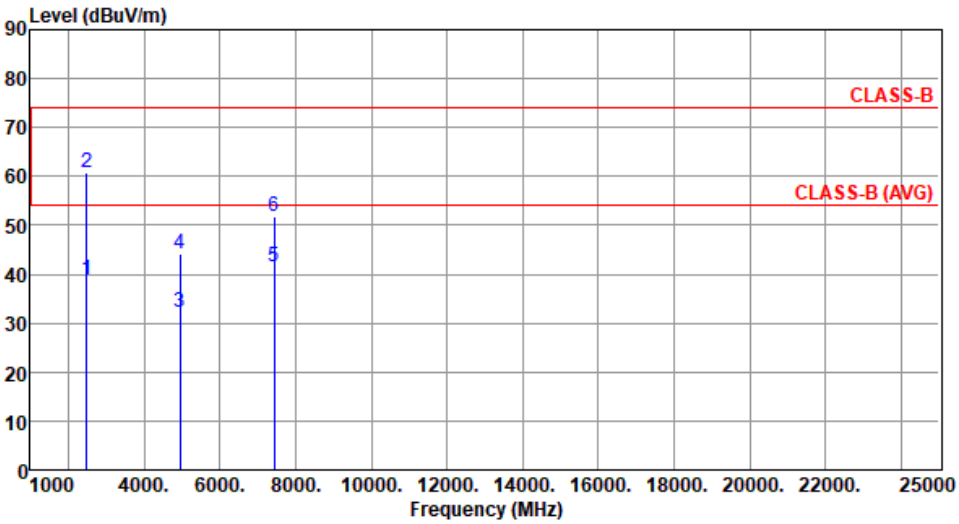


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	37.46	54.00	-16.54	39.12	-1.66	Average	352	283
2	2390.00	49.52	74.00	-24.48	51.18	-1.66	Peak	352	283
3	2483.50	37.80	54.00	-16.20	39.66	-1.86	Average	352	283
4	2483.50	49.72	74.00	-24.28	51.58	-1.86	Peak	352	283
5	4880.00	32.57	54.00	-21.43	27.50	5.07	Average	100	344
6	4880.00	45.02	74.00	-28.98	39.95	5.07	Peak	100	344
7	7320.00	40.58	54.00	-13.42	30.18	10.40	Average	100	104
8	7320.00	51.80	74.00	-22.20	41.40	10.40	Peak	100	104

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 :Roger Lu Temperature(℃):24 Humidity(%):68

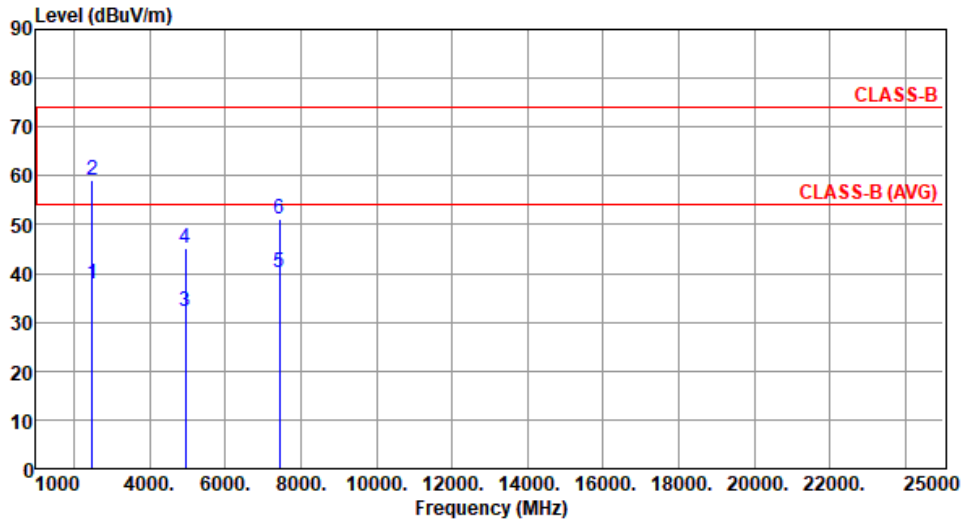


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	38.83	54.00	-15.17	40.69	-1.86	Average	339	27
2	2483.50	60.78	74.00	-13.22	62.64	-1.86	Peak	339	27
3	4960.00	32.33	54.00	-21.67	27.03	5.30	Average	100	40
4	4960.00	44.14	74.00	-29.86	38.84	5.30	Peak	100	40
5	7440.00	41.54	54.00	-12.46	31.39	10.15	Average	100	10
6	7440.00	51.75	74.00	-22.25	41.60	10.15	Peak	100	10

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 :Roger Lu Temperature(℃):24 Humidity(%):68



	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	37.90	54.00	-16.10	39.76	-1.86	Average	355	281
2	2483.50	58.95	74.00	-15.05	60.81	-1.86	Peak	355	281
3	4960.00	32.36	54.00	-21.64	27.06	5.30	Average	100	345
4	4960.00	45.14	74.00	-28.86	39.84	5.30	Peak	100	345
5	7440.00	40.26	54.00	-13.74	30.11	10.15	Average	100	106
6	7440.00	51.26	74.00	-22.74	41.11	10.15	Peak	100	106

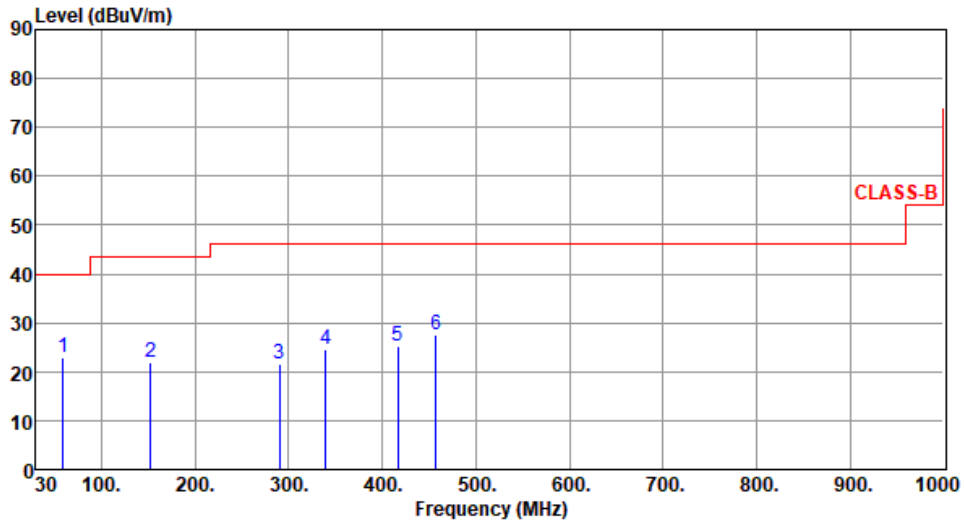
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Configuration 2: Charging mode

3.5.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

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

Test By :Roger Lu Temperature(℃):25 Humidity(%):63

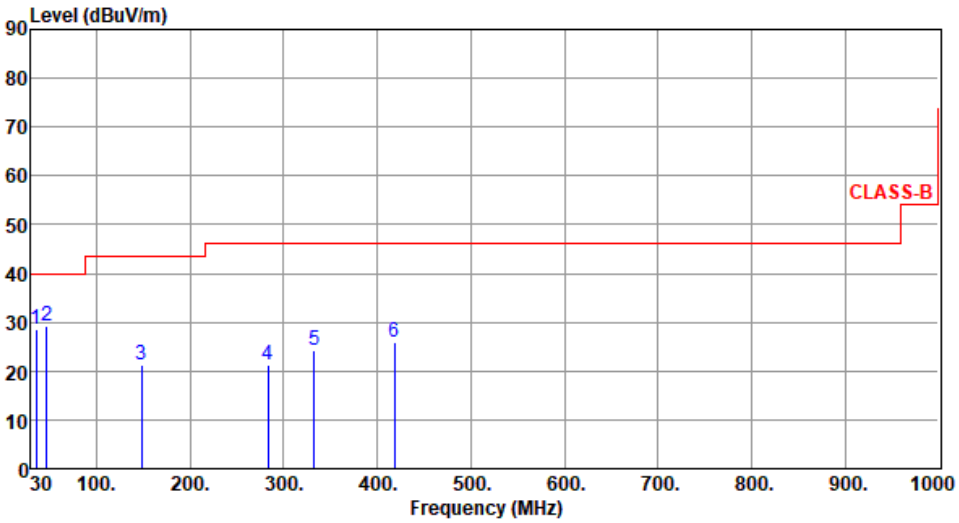


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	59.10	23.01	40.00	-16.99	32.48	-9.47	Peak	---	---
2	152.22	21.99	43.50	-21.51	30.67	-8.68	Peak	---	---
3	289.96	21.74	46.00	-24.26	30.36	-8.62	Peak	---	---
4	339.43	24.63	46.00	-21.37	31.79	-7.16	Peak	---	---
5	417.03	25.29	46.00	-20.71	30.36	-5.07	Peak	---	---
6	457.77	27.64	46.00	-18.36	31.35	-3.71	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	Charging	Test Freq. (MHz)	---
Polarization	Vertical		

Test By :Roger Lu Temperature(℃):25 Humidity(%):63



	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	28.49	40.00	-11.51	38.27	-9.78	Peak	---	---
2	46.49	29.14	40.00	-10.86	37.79	-8.65	Peak	---	---
3	148.34	21.25	43.50	-22.25	30.04	-8.79	Peak	---	---
4	283.17	21.09	46.00	-24.91	29.86	-8.77	Peak	---	---
5	332.64	24.20	46.00	-21.80	31.47	-7.27	Peak	---	---
6	418.00	25.82	46.00	-20.18	30.86	-5.04	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.

3.6 Emissions in non-restricted Frequency Bands

3.6.1 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.

3.6.2 Test Procedures

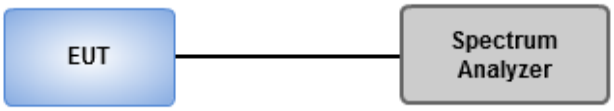
Reference level measurement

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

3.6.3 Test Setup

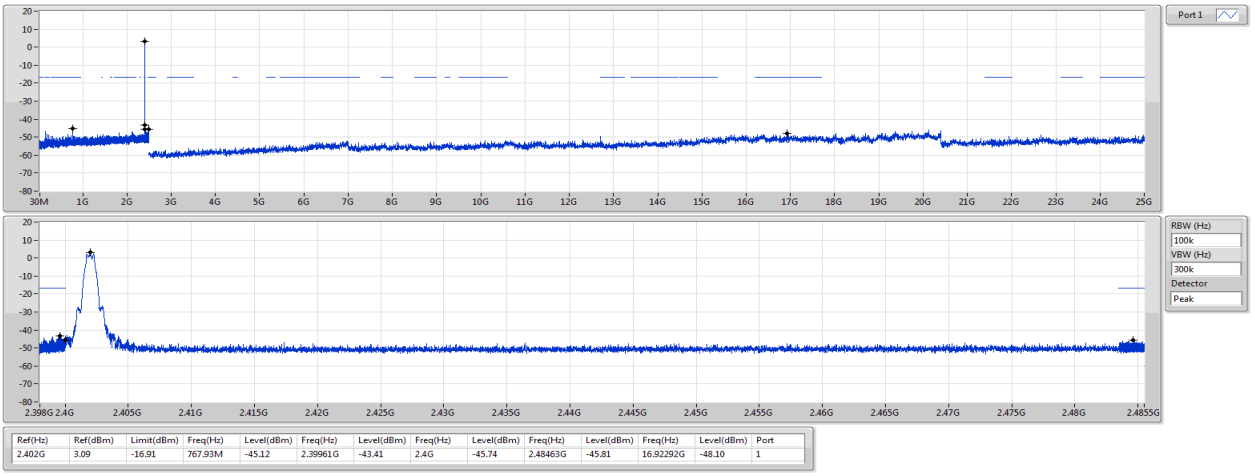


3.6.4 Test Result of Emissions in non-restricted Frequency Bands

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

BT-LE(1Mbps) **CSENdB-DTS**

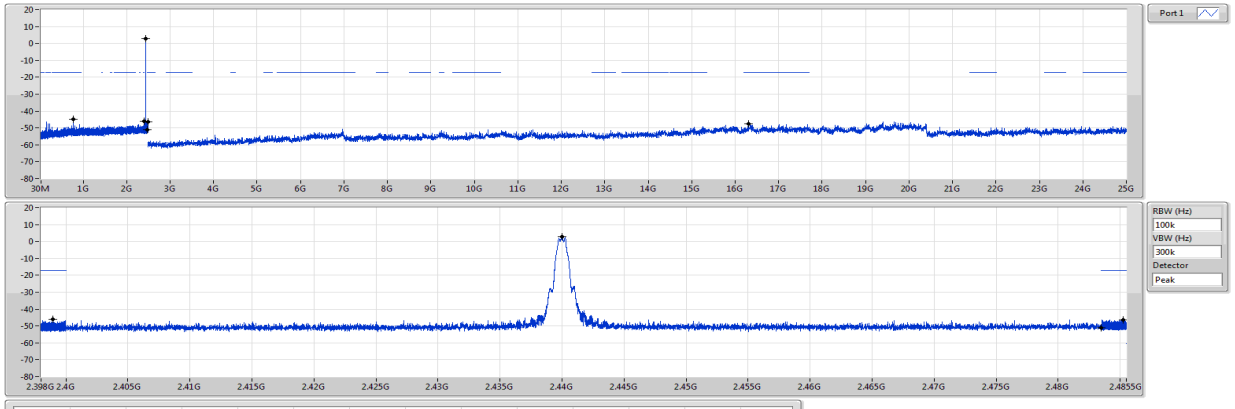
2402MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.402G	3.09	-16.91	767.93M	-45.12	2.39961G	-43.41	2.4G	-45.74	2.48463G	-45.81	16.92292G	-48.10	1

BT-LE(1Mbps) **CSENdB-DTS**

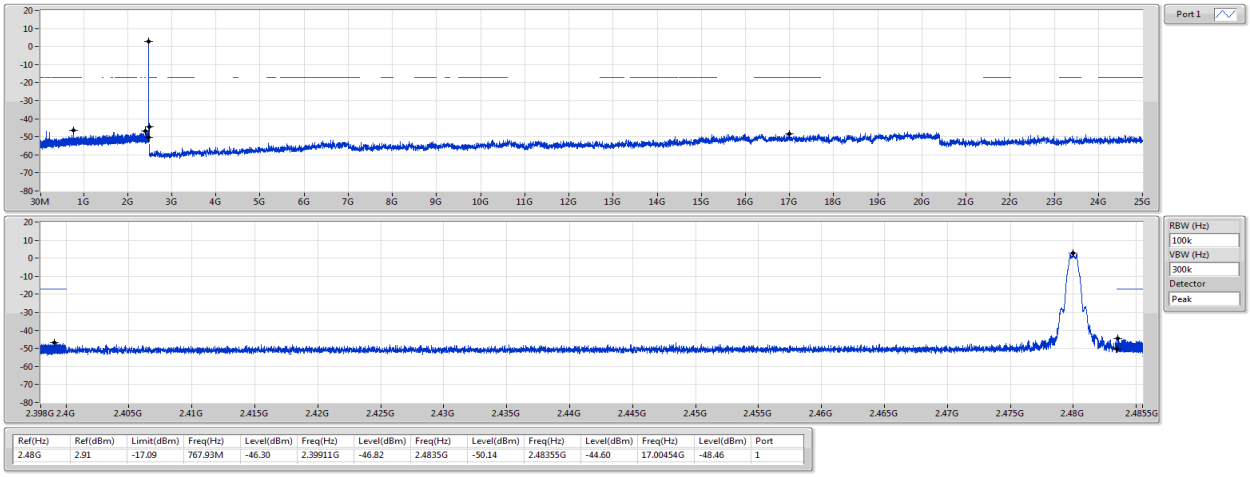
2440MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44G	2.97	-17.03	767.93M	-44.78	2.39893G	-46.21	2.4835G	-50.95	2.48527G	-46.36	16.31222G	-47.67	1

BT-LE(1Mbps) **CSENdB-DTS**

2480MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.48G	2.91	-17.09	767.93M	-46.30	2.39911G	-46.82	2.4835G	-50.14	2.48355G	-44.60	17.00454G	-48.46	1

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	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No.30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan (R.O.C.)	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.)	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==

FCC Test Report

FCC ID	:	**IPH-B4224**
Equipment	:	**Watch and Activity Monitor**
Model No.	:	**AB4224**
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. 16, 2021**
Tested Date	:	**May 12 ~ Jul. 07, 2021**

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 may be duplicated completely for legal use with the approval of the applicant. 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**

Testing Laboratory 2732

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Release Record

Report No.	Version	Description	Issued Date
FR141603	Rev. 01	Initial issue	Sep. 09, 2021

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	[dBuV]: 4.525MHz 33.38 (Margin -22.62dB) - QP	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	700-00157-00	PIFA	N/A	-5.42

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc from host 3.87Vdc from battery

1.1.4 Accessories

Accessories		
No.	**Equipment**	**Description**
1	Battery	Brand: GARMIN Model: 361-00151-01 Power Rating: 3.87Vdc, 84mAh
2	USB cable	Brand: GARMIN Model: 320-01069-10 Power line: 0.52m non-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+ , Version: SW22.83	
Duty Cycle and Duty Factor	Duty Cycle (%)	Duty Factor (dB)
	64.06	1.93

1.1.7 Power Index of Test Tool

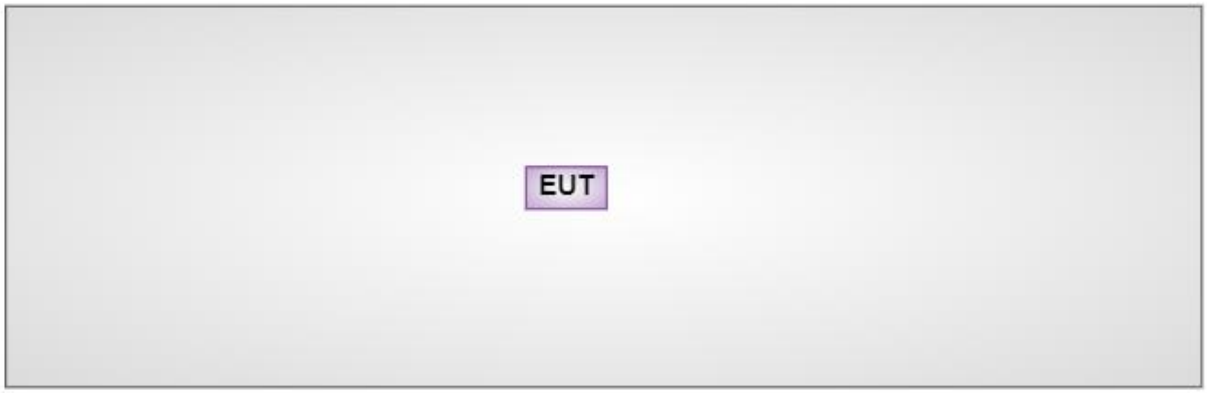
Modulation Mode	Test Frequency (MHz)		
	2402	2442	2480
BT LE-1Mbps	default	default	default

1.2 Local Support Equipment List

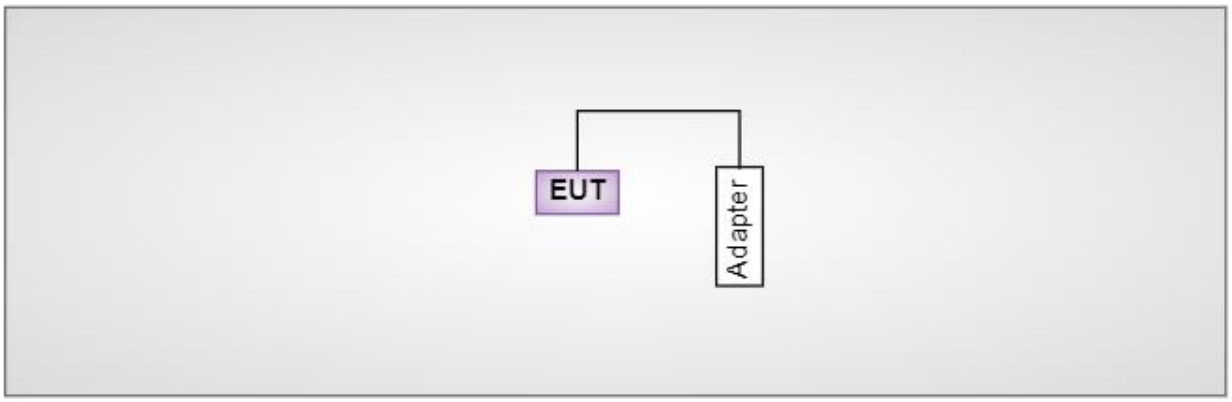
Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Remarks**
1	Adapter	Samsung	ETA-U90JWS	---	---

1.3 Test Setup Chart

Test Setup Diagram (Battery mode)



Test Setup Diagram (Changer mode)



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	May 12, 2021				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
LISN	R&S	ENV216	101579	Mar. 17, 2021	Mar. 16, 2022
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 21, 2020	Oct. 20, 2021
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 chamber3 / (03CH03-WS)				
Tested Date	May. 12, 2021 ~ Jul. 07, 2021				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
Spectrum Analyzer	R&S	FSV40	101499	Mar. 02, 2021	Mar. 01, 2022
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 17, 2020	Nov. 16, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	May 06, 2021	May 05, 2022
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Dec. 22, 2020	Dec. 21, 2021
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 06, 2020	Nov. 05, 2021
Preamplifier	EMC	EMC02325	980187	Aug. 05, 2020	Aug. 04, 2021
Preamplifier	Agilent	83017A	MY39501309	Sep. 02, 2020	Sep. 01, 2021
Preamplifier	EMC	EMC184045B	980192	Jul. 21, 2020	Jul. 20, 2021
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Sep. 26, 2020	Sep. 25, 2021
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Sep. 26, 2020	Sep. 25, 2021
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Sep. 26, 2020	Sep. 25, 2021
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Sep. 26, 2020	Sep. 25, 2021
RF cable-8M	EMC	EMC104-SM-SM-8000	181107	Sep. 26, 2020	Sep. 25, 2021
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 ≤ 1GHz	±3.96 dB
Radiated emission > 1GHz	±4.51 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-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.)
Test Site	03CH03-WS
Address of Test Site	No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 333, Taiwan (R.O.C.)

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- 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	---	---	2
Field Strength of Fundamental	GFSK	2402, 2442, 2480	1 Mbps	1
Radiated Emissions ≤ 1GHz	GFSK	2480	1 Mbps	1
	Charging	---	---	2
Radiated Emissions > 1GHz	GFSK	2402, 2442, 2480	1 Mbps	1
20dB bandwidth	GFSK	2402, 2442, 2480	1 Mbps	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 **Z-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: Battery mode
   2) Configuration 2: Charging mode

3 Transmitter Test Results

3.1 Conducted Emissions

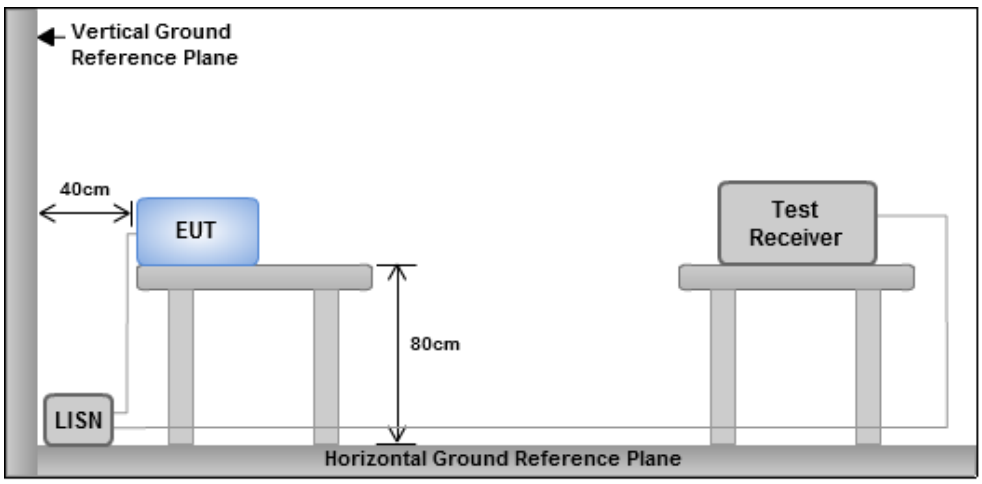
3.1.1 Limit of Conducted Emissions

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.		

3.1.2 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.

3.1.3 Test Setup



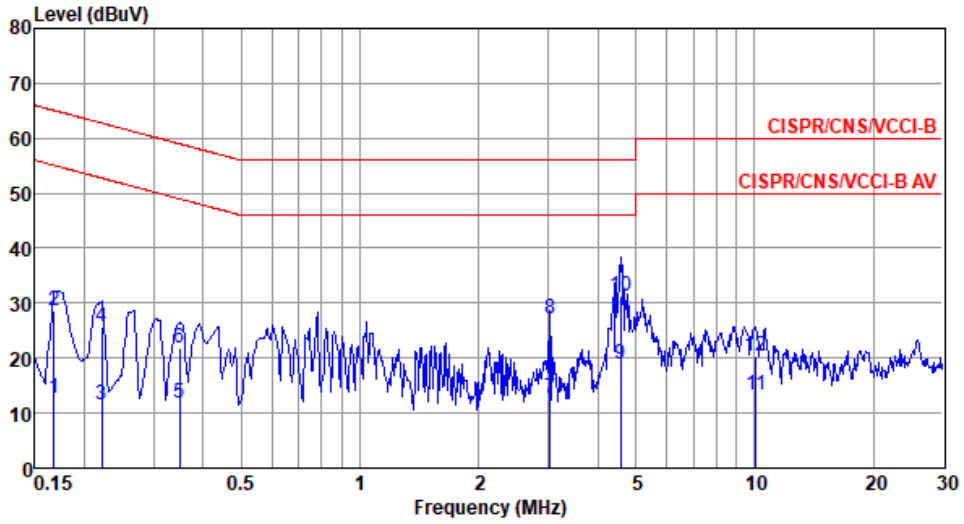
Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

Modulation Mode	Charging	Test Freq. (MHz)	---
Power Phase	Line		

Test by : BRAD WU Temperature: 24°C Humidity: 64%

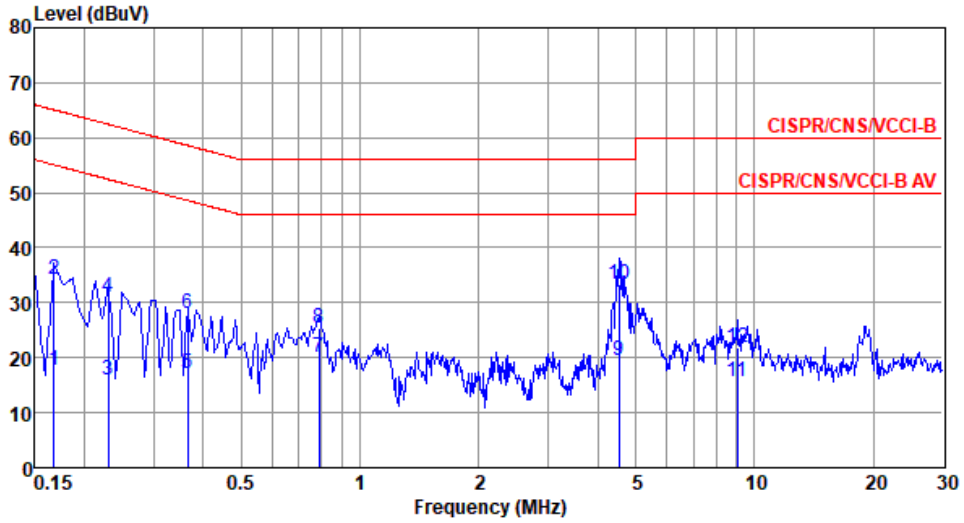


	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.168	12.71	55.08	-42.37	2.83	9.83	0.05	Average
2	0.168	28.64	65.08	-36.44	18.76	9.83	0.05	QP
3	0.222	11.66	52.74	-41.08	1.75	9.85	0.06	Average
4	0.222	25.82	62.74	-36.92	15.91	9.85	0.06	QP
5	0.348	11.92	49.00	-37.08	1.96	9.88	0.08	Average
6	0.348	21.75	59.00	-37.25	11.79	9.88	0.08	QP
7	3.025	12.68	46.00	-33.32	2.41	10.02	0.25	Average
8	3.025	27.25	56.00	-28.75	16.98	10.02	0.25	QP
9	4.574	18.88	46.00	-27.12	8.52	10.05	0.31	Average
10*	4.574	31.24	56.00	-24.76	20.88	10.05	0.31	QP
11	10.072	13.30	50.00	-36.70	2.79	10.11	0.40	Average
12	10.072	20.30	60.00	-39.70	9.79	10.11	0.40	QP

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

Modulation Mode	Charging	Test Freq. (MHz)	---
Power Phase	Neutral		

Test by : BRAD WU Temperature: 24℃ Humidity: 64%



	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.168	17.79	55.08	-37.29	7.92	9.82	0.05	Average
2	0.168	34.13	65.08	-30.95	24.26	9.82	0.05	QP
3	0.230	15.85	52.44	-36.59	5.96	9.83	0.06	Average
4	0.230	31.00	62.44	-31.44	21.11	9.83	0.06	QP
5	0.365	17.13	48.61	-31.48	7.20	9.85	0.08	Average
6	0.365	27.98	58.61	-30.63	18.05	9.85	0.08	QP
7	0.788	20.06	46.00	-25.94	10.08	9.87	0.11	Average
8	0.788	25.52	56.00	-30.48	15.54	9.87	0.11	QP
9	4.525	19.53	46.00	-26.47	9.25	9.98	0.30	Average
10*	4.525	33.38	56.00	-22.62	23.10	9.98	0.30	QP
11	9.059	15.71	50.00	-34.29	5.24	10.08	0.39	Average
12	9.059	21.80	60.00	-38.20	11.33	10.08	0.39	QP

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

3.2 Radiated Emission

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

3.2.1 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

3.2.2 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.

3.2.3 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:

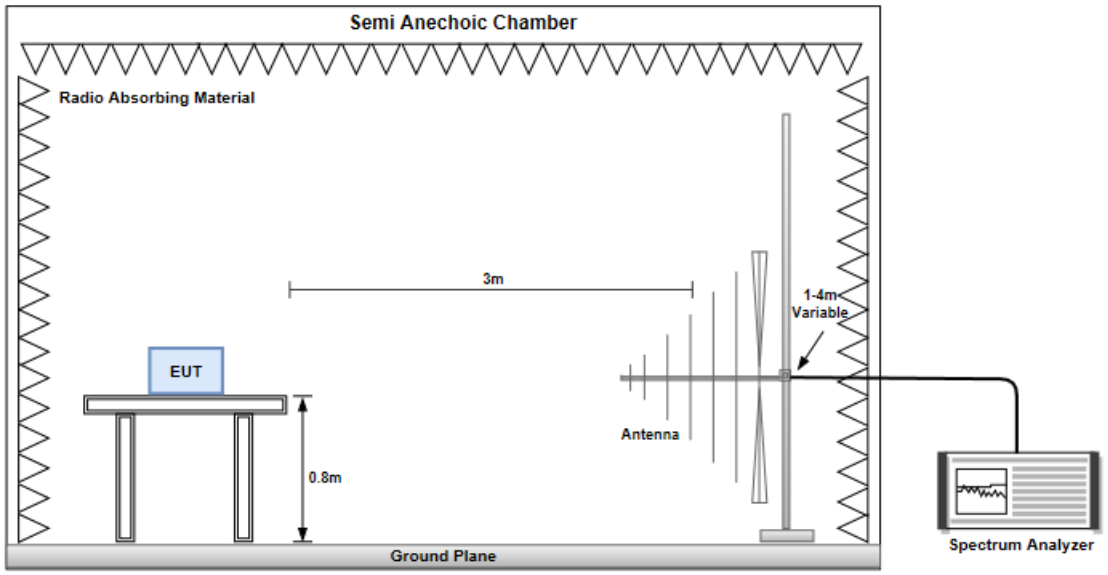
1. Radiated emission below 1GHz
   120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission
2. Radiated emission above 1GHz / Peak value except fundamental
   RBW=2MHz, VBW=10MHz and Peak detector
3. Radiated emission above 1GHz / Average value for field strength of fundamental and harmonics
   The average value is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log\frac{0.183188 * 1\ \text{ms}}{100\ \text{ms}} = -54.74\text{dB}$$

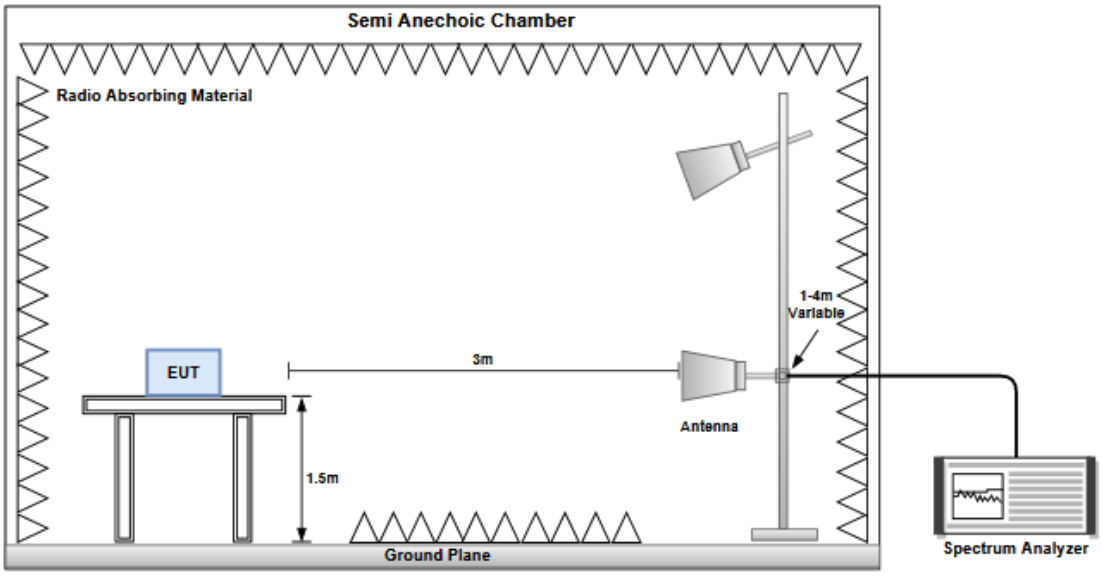
   Please see page 27 for plotted duty
4. Radiated emission above 1GHz / Average value for other emissions
   RBW=1MHz, VBW=1/T and Peak detector
5. Radiated emission Peak value for fundamental
   RBW=3MHz, VBW=10MHz and Peak detector

3.2.4 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz

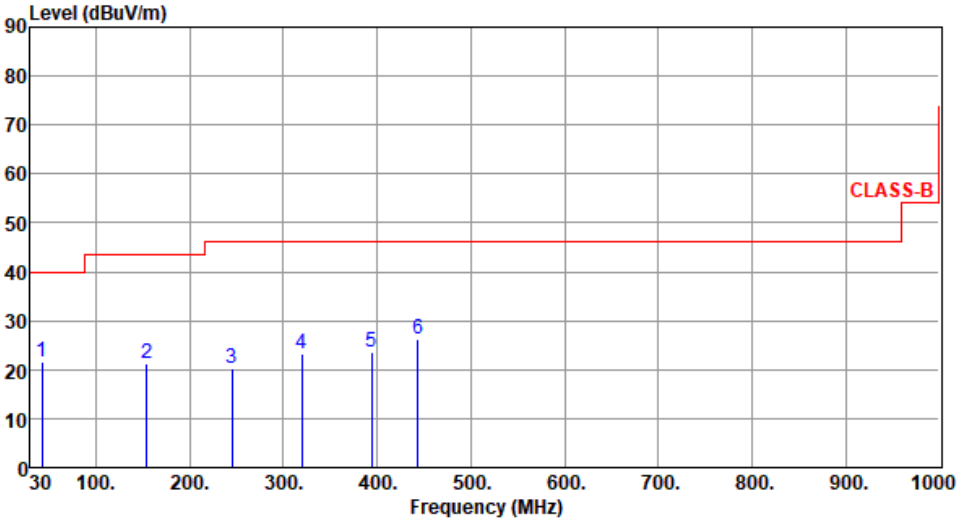


Configuration 1: Battery mode

3.2.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Horizontal		

Test By :Roger Lu Temperature(℃):25 Humidity(%):62

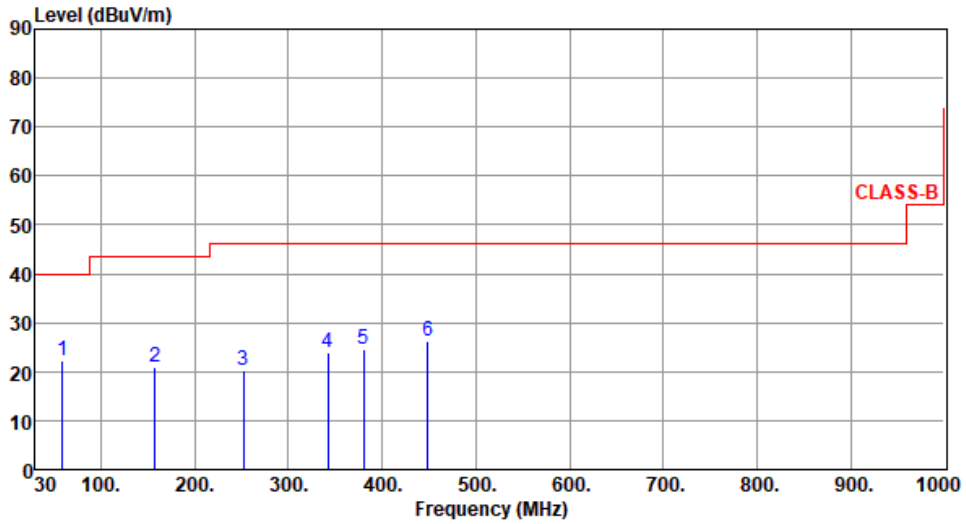


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	42.61	21.55	40.00	-18.45	30.27	-8.72	Peak	---	---
2	154.16	21.20	43.50	-22.30	29.93	-8.73	Peak	---	---
3	245.34	20.23	46.00	-25.77	30.39	-10.16	Peak	---	---
4	320.03	23.21	46.00	-22.79	30.94	-7.73	Peak	---	---
5	393.75	23.69	46.00	-22.31	29.45	-5.76	Peak	---	---
6	443.22	26.11	46.00	-19.89	30.19	-4.08	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + 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)	2480
Polarization	Vertical		

Test By :Roger Lu Temperature(℃):25 Humidity(%):62



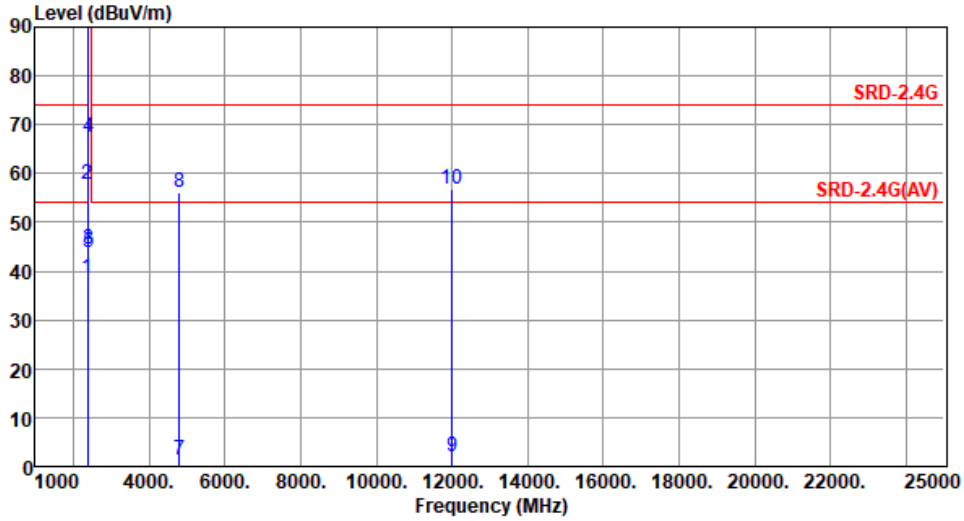
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	59.10	22.35	40.00	-17.65	31.82	-9.47	Peak	---	---
2	158.04	20.98	43.50	-22.52	29.62	-8.64	Peak	---	---
3	252.13	20.22	46.00	-25.78	30.14	-9.92	Peak	---	---
4	342.34	23.96	46.00	-22.04	31.10	-7.14	Peak	---	---
5	380.17	24.42	46.00	-21.58	30.60	-6.18	Peak	---	---
6	449.04	26.23	46.00	-19.77	30.14	-3.91	Peak	---	---

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

3.2.6 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Horizontal		

Test By :Roger Lu Temperature(℃):25 Humidity(%):62

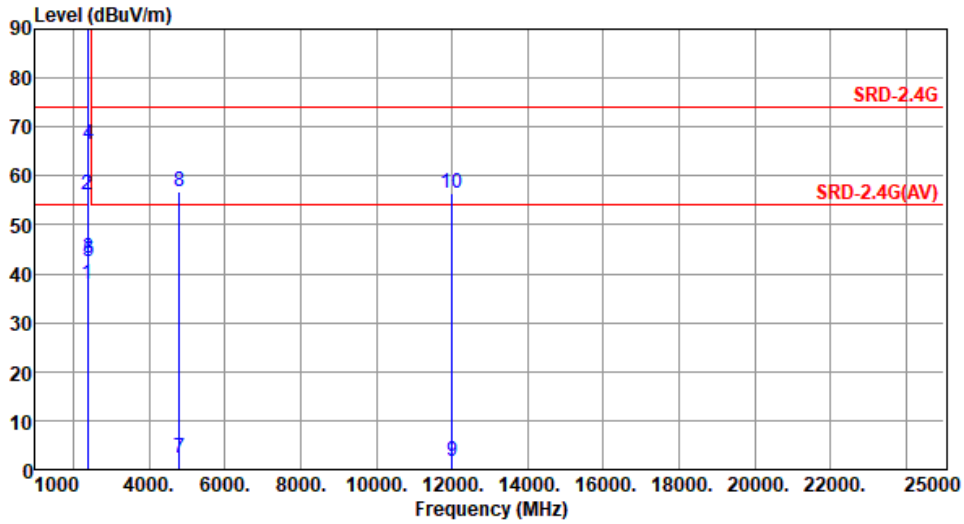


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	38.36	54.00	-15.64	40.02	-1.66	Average	265	1
2	2390.00	57.90	74.00	-16.10	59.56	-1.66	Peak	265	1
3	2400.00	44.42	54.00	-9.58	46.10	-1.68	Average	265	1
4	2400.00	67.53	74.00	-6.47	69.21	-1.68	Peak	265	1
5	2402.00	43.74	94.00	-50.26	45.42	-1.68	Average	265	1
6	2402.00	98.48	114.00	-15.52	100.16	-1.68	Peak	265	1
7	4804.00	1.38	54.00	-52.62	-3.62	5.00	Average	100	40
8	4804.00	56.12	74.00	-17.88	51.12	5.00	Peak	100	40
9	12010.00	2.12	54.00	-51.88	-12.56	14.68	Average	100	50
10	12010.00	56.86	74.00	-17.14	42.18	14.68	Peak	100	50

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

Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Vertical		

Test By :Roger Lu Temperature(℃):25 Humidity(%):62

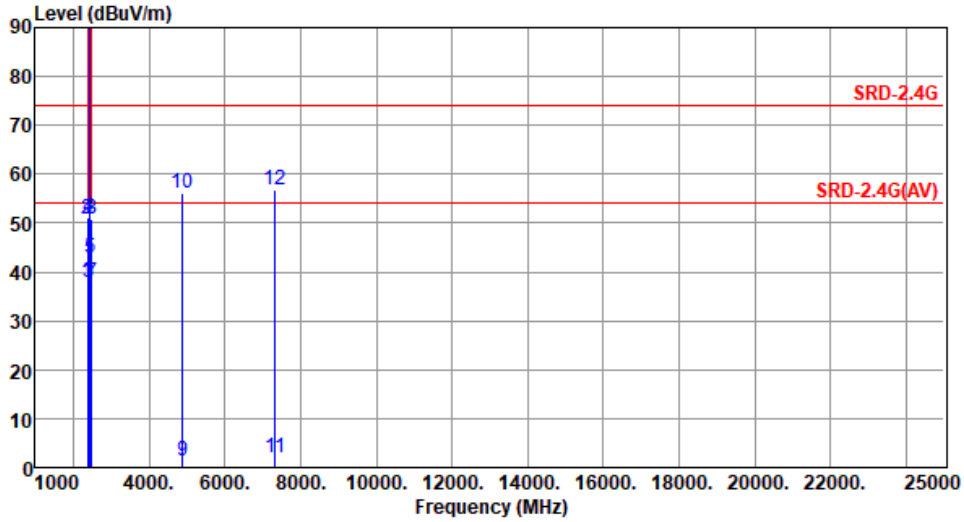


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	37.77	54.00	-16.23	39.43	-1.66	Average	355	279
2	2390.00	55.97	74.00	-18.03	57.63	-1.66	Peak	355	279
3	2400.00	43.24	54.00	-10.76	44.92	-1.68	Average	355	279
4	2400.00	66.49	74.00	-7.51	68.17	-1.68	Peak	355	279
5	2402.00	42.66	94.00	-51.34	44.34	-1.68	Average	355	279
6	2402.00	97.40	114.00	-16.60	99.08	-1.68	Peak	355	279
7	4804.00	2.20	54.00	-51.80	-2.80	5.00	Average	100	81
8	4804.00	56.94	74.00	-17.06	51.94	5.00	Peak	100	81
9	12010.00	1.79	54.00	-52.21	-12.89	14.68	Average	100	81
10	12010.00	56.53	74.00	-17.47	41.85	14.68	Peak	100	20

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

Modulation	GFSK	Test Freq. (MHz)	2442
Polarization	Horizontal		

Test By :Roger Lu Temperature(℃):25 Humidity(%):62

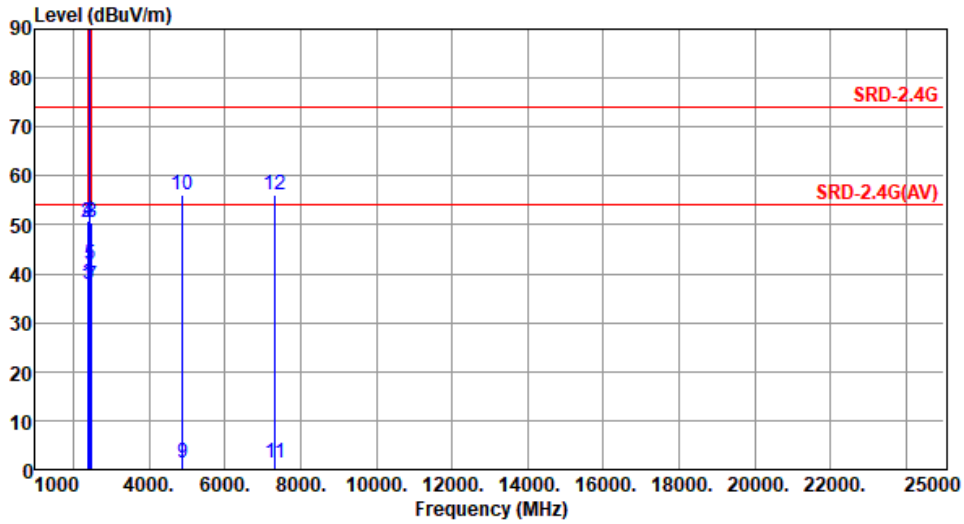


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	37.80	54.00	-16.20	39.46	-1.66	Average	294	1
2	2390.00	50.77	74.00	-23.23	52.43	-1.66	Peak	294	1
3	2400.00	37.91	54.00	-16.09	39.59	-1.68	Average	294	1
4	2400.00	51.09	74.00	-22.91	52.77	-1.68	Peak	294	1
5	2442.00	42.73	94.00	-51.27	44.50	-1.77	Average	294	1
6	2442.00	97.47	114.00	-16.53	99.24	-1.77	Peak	294	1
7	2483.50	37.94	54.00	-16.06	39.80	-1.86	Average	294	1
8	2483.50	50.72	74.00	-23.28	52.58	-1.86	Peak	294	1
9	4884.00	1.40	54.00	-52.60	-3.69	5.09	Average	100	50
10	4884.00	56.14	74.00	-17.86	51.05	5.09	Peak	100	50
11	7326.00	1.96	54.00	-52.04	-8.44	10.40	Average	100	9
12	7326.00	56.70	74.00	-17.30	46.30	10.40	Peak	100	9

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

Modulation	GFSK	Test Freq. (MHz)	2442
Polarization	Vertical		

Test By :Roger Lu Temperature(℃):25 Humidity(%):62

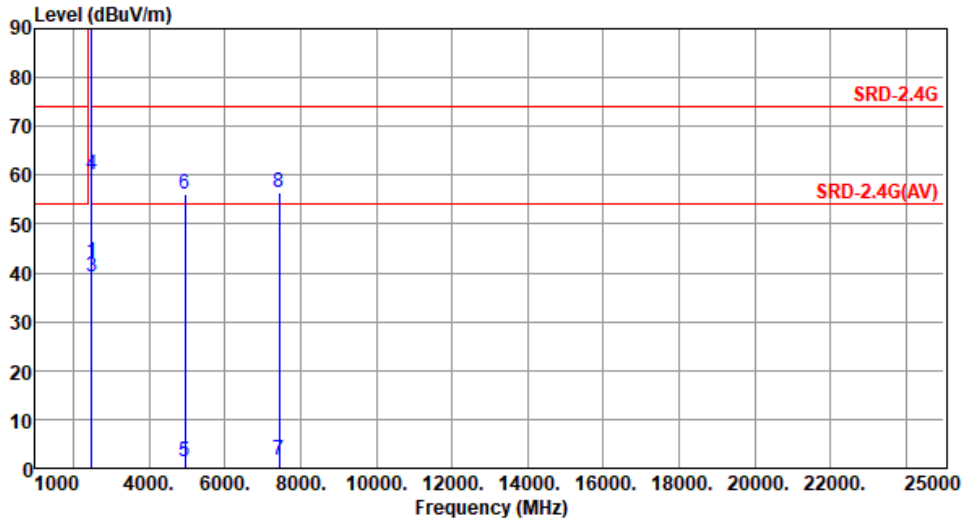


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	37.63	54.00	-16.37	39.29	-1.66	Average	351	275
2	2390.00	50.63	74.00	-23.37	52.29	-1.66	Peak	351	275
3	2400.00	37.87	54.00	-16.13	39.55	-1.68	Average	351	275
4	2400.00	50.90	74.00	-23.10	52.58	-1.68	Peak	351	275
5	2442.00	41.91	94.00	-52.09	43.68	-1.77	Average	351	275
6	2442.00	96.65	114.00	-17.35	98.42	-1.77	Peak	351	275
7	2483.50	37.69	54.00	-16.31	39.55	-1.86	Average	351	275
8	2483.50	50.63	74.00	-23.37	52.49	-1.86	Peak	351	275
9	4884.00	1.29	54.00	-52.71	-3.80	5.09	Average	100	83
10	4884.00	56.03	74.00	-17.97	50.94	5.09	Peak	100	83
11	7326.00	1.26	54.00	-52.74	-9.14	10.40	Average	314	208
12	7326.00	56.00	74.00	-18.00	45.60	10.40	Peak	314	208

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

Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Horizontal		

Test By :Roger Lu Temperature(℃):25 Humidity(%):62

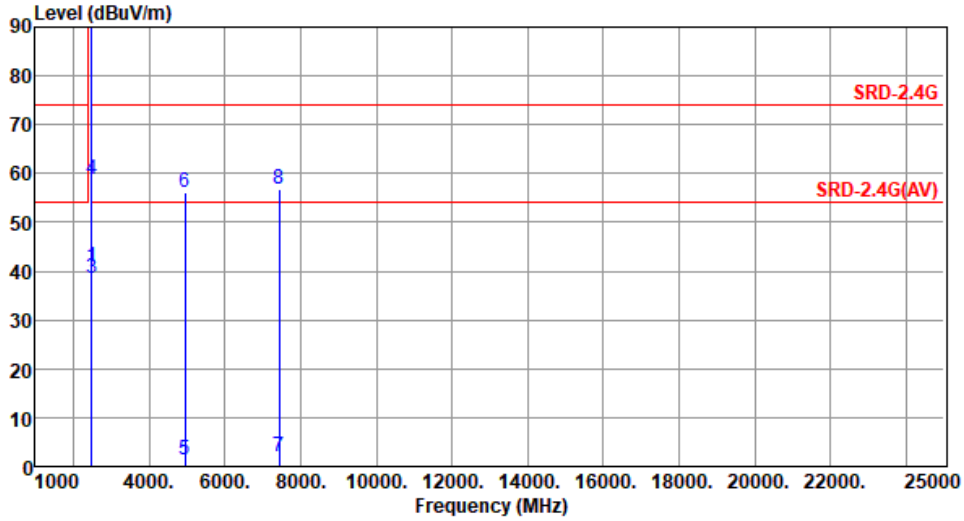


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2480.00	42.18	94.00	-51.82	44.03	-1.85	Average	284	359
2	2480.00	96.92	114.00	-17.08	98.77	-1.85	Peak	284	359
3	2483.50	39.23	54.00	-14.77	41.09	-1.86	Average	284	359
4	2483.50	60.24	74.00	-13.76	62.10	-1.86	Peak	284	359
5	4960.00	1.39	54.00	-52.61	-3.91	5.30	Average	100	40
6	4960.00	56.13	74.00	-17.87	50.83	5.30	Peak	100	40
7	7440.00	1.69	54.00	-52.31	-8.46	10.15	Average	100	11
8	7440.00	56.43	74.00	-17.57	46.28	10.15	Peak	100	11

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

Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Vertical		

Test By :Roger Lu Temperature(℃):25 Humidity(%):62



	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	40.99	94.00	-53.01	42.84	-1.85	Average	354	281
2	2480.00	95.73	114.00	-18.27	97.58	-1.85	Peak	354	281
3	2483.50	38.42	54.00	-15.58	40.28	-1.86	Average	354	281
4	2483.50	58.84	74.00	-15.16	60.70	-1.86	Peak	354	281
5	4960.00	1.37	54.00	-52.63	-3.93	5.30	Average	100	79
6	4960.00	56.11	74.00	-17.89	50.81	5.30	Peak	100	79
7	7440.00	2.02	54.00	-51.98	-8.13	10.15	Average	316	205
8	7440.00	56.76	74.00	-17.24	46.61	10.15	Peak	316	205

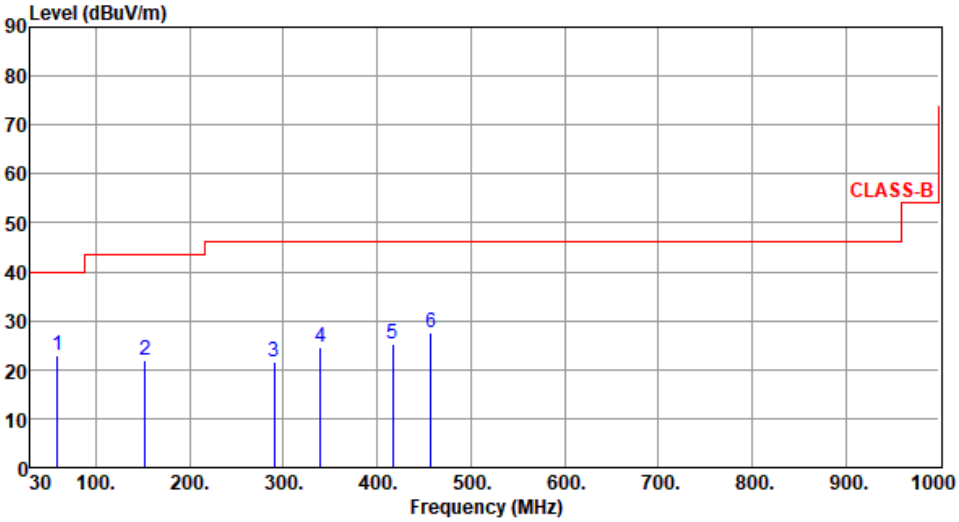
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB/m)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Configuration 2: Charging mode

3.2.7 Transmitter Radiated Unwanted Emissions (Below 1GHz)

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

Test By :Roger Lu Temperature(℃):25 Humidity(%):63

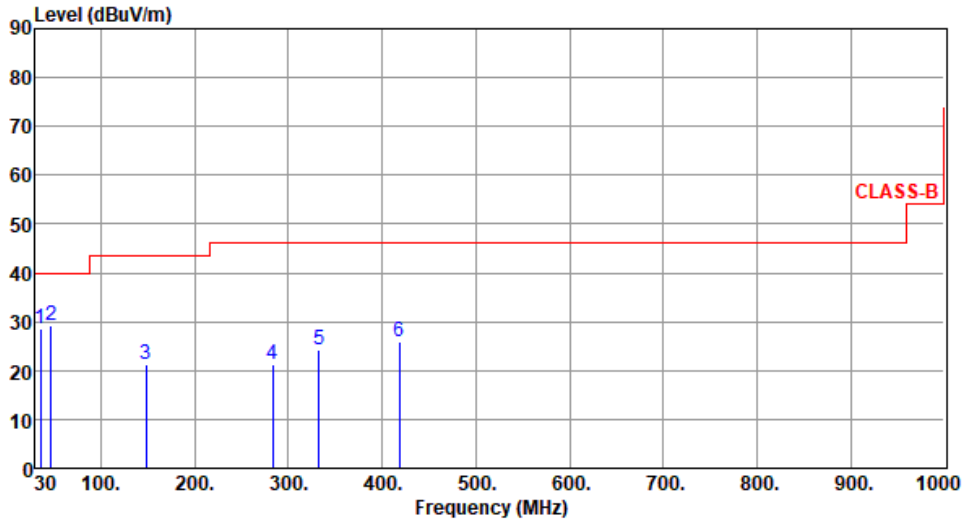


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	59.10	23.01	40.00	-16.99	32.48	-9.47	Peak	---	---
2	152.22	21.99	43.50	-21.51	30.67	-8.68	Peak	---	---
3	289.96	21.74	46.00	-24.26	30.36	-8.62	Peak	---	---
4	339.43	24.63	46.00	-21.37	31.79	-7.16	Peak	---	---
5	417.03	25.29	46.00	-20.71	30.36	-5.07	Peak	---	---
6	457.77	27.64	46.00	-18.36	31.35	-3.71	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + 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.

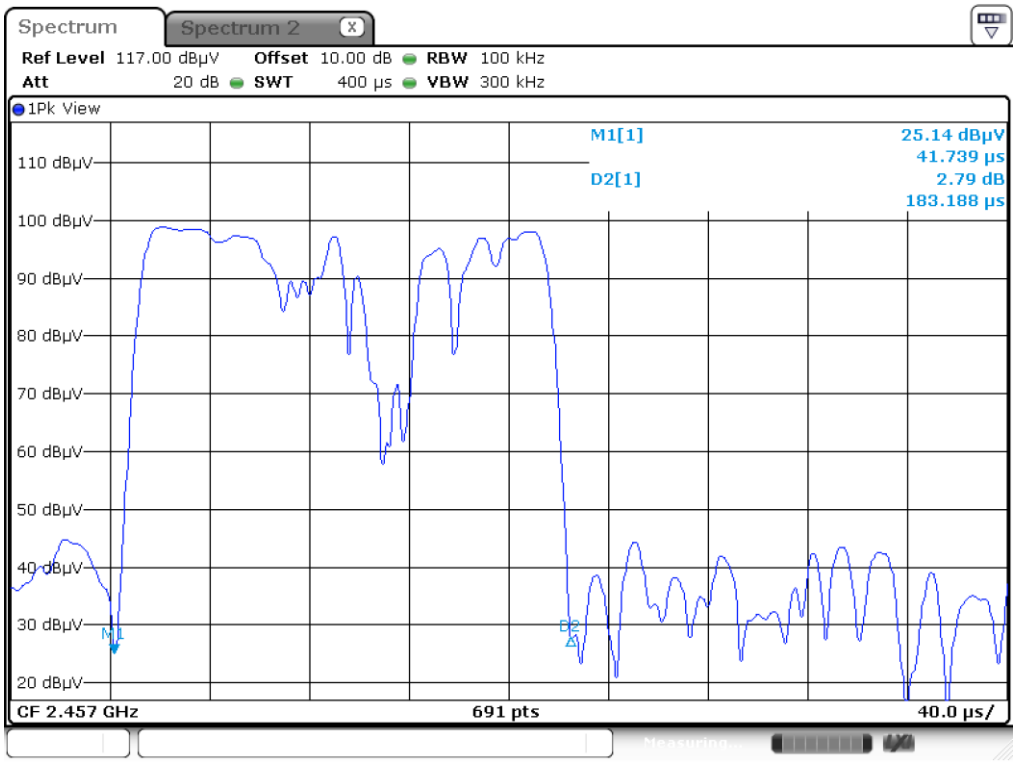
Modulation	Charging	Test Freq. (MHz)	---
Polarization	Vertical		

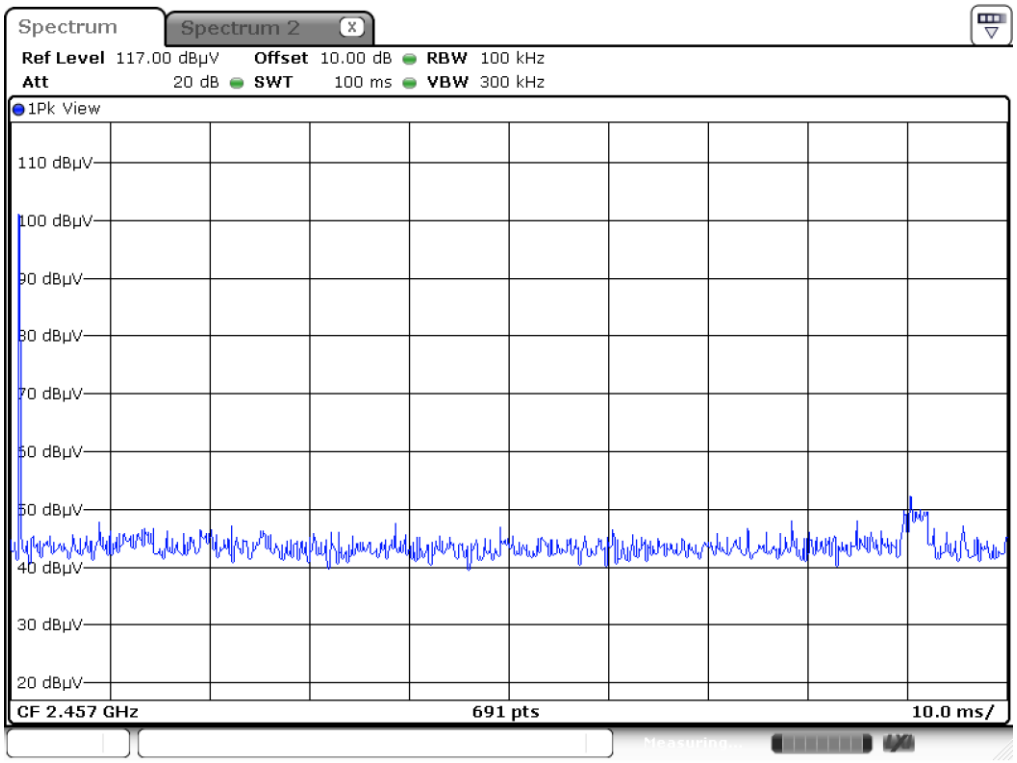
Test By :Roger Lu Temperature(℃):25 Humidity(%):63



	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	28.49	40.00	-11.51	38.27	-9.78	Peak	---	---
2	46.49	29.14	40.00	-10.86	37.79	-8.65	Peak	---	---
3	148.34	21.25	43.50	-22.25	30.04	-8.79	Peak	---	---
4	283.17	21.09	46.00	-24.91	29.86	-8.77	Peak	---	---
5	332.64	24.20	46.00	-21.80	31.47	-7.27	Peak	---	---
6	418.00	25.82	46.00	-20.18	30.86	-5.04	Peak	---	---

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





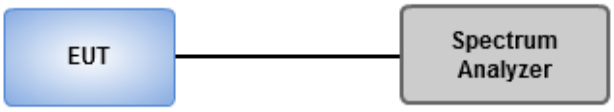
$$20\log(\text{Duty cycle}) = 20\log\frac{0.183188*1\ \text{ms}}{100\ \text{ms}} = -54.74\text{dB}$$

3.3 20dB and Occupied Bandwidth

3.3.1 Test Procedures

1. Set resolution bandwidth (RBW) = 20kHz, 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 specturm analyzer to measure 99% occupied bandwidth.

3.3.2 Test Setup

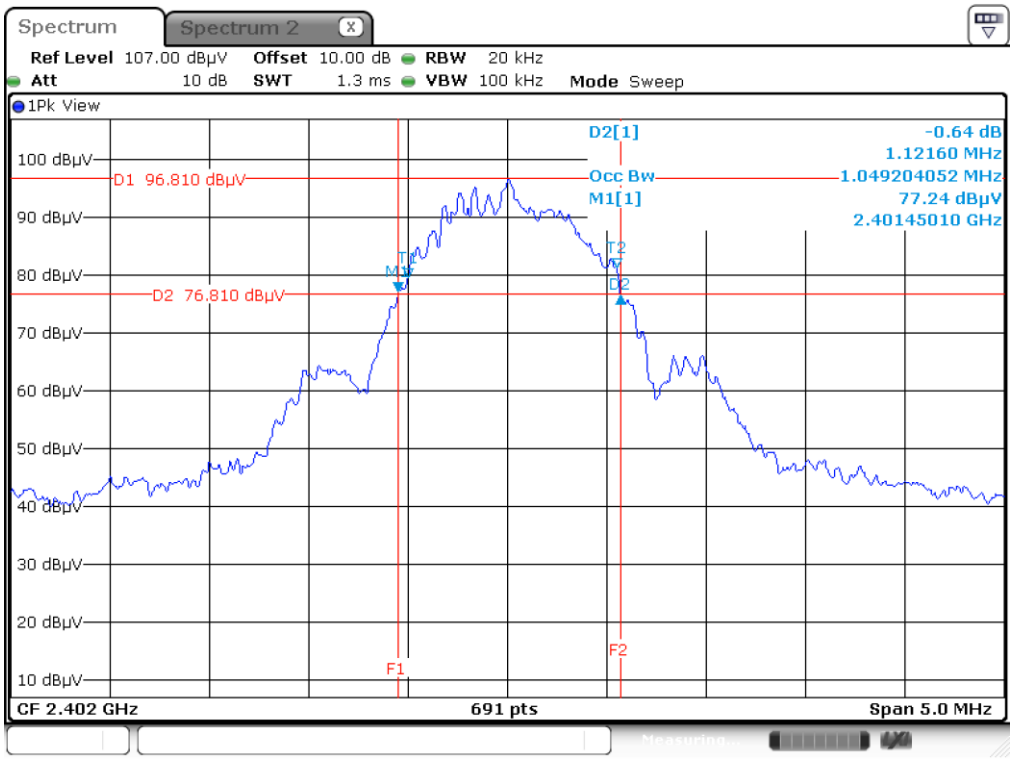


3.3.3 20dB and Occupied Bandwidth

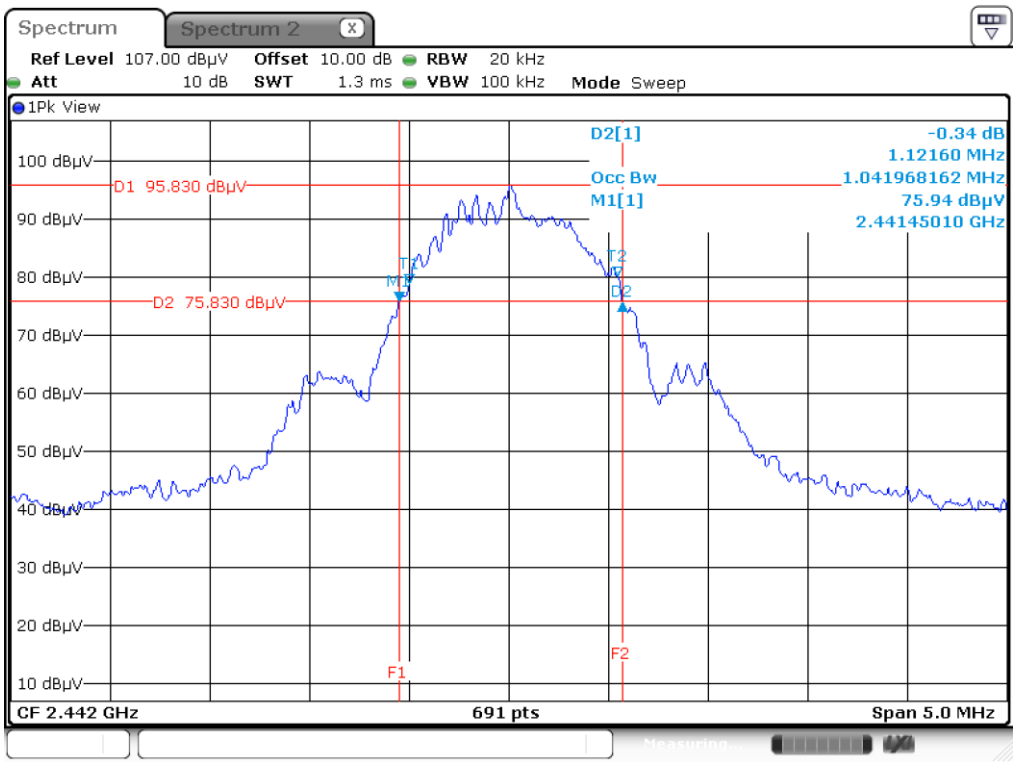
Ambient Condition	25°C / 62%	**Tested By**	Roger Lu

Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW
2402	1.122	1.049
2442	1.122	1.042
2480	1.129	1.056

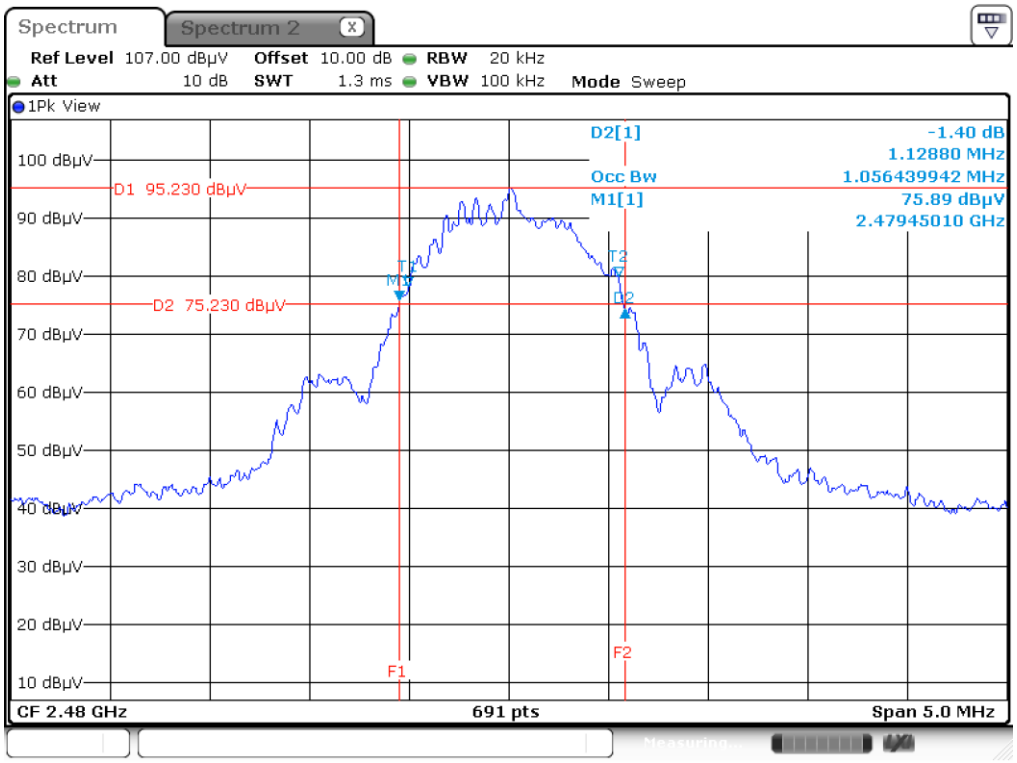
2402MHz



2442MHz



2480MHz


Spectrum
Spectrum 2
Ref Level 107.00 dBµV Offset 10.00 dB RBW 20 kHz
Att 10 dB SWT 1.3 ms VBW 100 kHz Mode Sweep
1Pk View
D2[1] -1.40 dB
1.12880 MHz
Occ Bw 1.056439942 MHz
M1[1] 75.89 dBµV
2.47945010 GHz
D1 95.230 dBµV
D2 75.230 dBµV
100 dBµV
90 dBµV
80 dBµV
70 dBµV
60 dBµV
50 dBµV
40 dBµV
30 dBµV
20 dBµV
10 dBµV
T1
M1
T2
D2
F1
F2
CF 2.48 GHz
691 pts
Span 5.0 MHz
Measuring...

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==

FCC RF Exposure Report

FCC ID	:	**IPH-B4224**
Equipment	:	**Watch and Activity Monitor**
Model No.	:	**AB4224**
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. 16, 2021**
Tested Date	:	**Apr. 30, 2021 ~ Jul. 07, 2021**

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 may be duplicated completely for legal use with the approval of the applicant. 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**

Testing Laboratory 2732

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1.2 DEVIATION FROM TEST STANDARD AND MEASUREMENT PROCEDURE 5

1.4 EVALUATION RESULTS 6

2 TEST LABORATORY INFORMATION 7

Release Record

Report No.	Version	Description	Issued Date
FA141603	Rev. 01	Initial issue	Sep. 09, 2021

1 EXPOSURE EVALUATION OF PORTABLE DEVICES

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

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

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

•f(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	3.26	3.5	2.24
LE-1Mbps	2440	3.28	3.5	2.24
LE-1Mbps	2480	3.29	3.5	2.24

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] * [√f(GHz)] =2.24 / 5 * √2.480 = 0.706 < 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

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	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No.30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan (R.O.C.)	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.)	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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