



<b>Prüfbericht-Nr.:</b> <i>Test report No.:</i>	<b>CN219130 001</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	170278231	Seite 1 von 30 <i>Page 1 of 30</i>	
<b>Kunden-Referenz-Nr.:</b> <i>Client reference No.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date.:</i>	02.07.2021		
<b>Auftraggeber:</b> <i>Client:</i>	<b>INNOVATIVE TECHNOLOGY ELECTRONICS LLC</b> 1979 Marcus Ave, Suite 210 Lake Success, NY 11042				
<b>Prüfgegenstand:</b> <i>Test item:</i>	4-IN-1 TURNTABLE				
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	VTA-250B-XXXX, VTA-260B-XXXX, VTA-255B-XXXX (XXXX can be 1-9 or A to Z or blank and means unit color or pattern)				
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	FCC and IC approval				
<b>Prüfgrundlage:</b> <i>Test specification:</i>	CFR47 FCC Part 15: Subpart C Section 15.247 RSS-247 Issue 2 February 2017 CFR47 FCC Part 15: Subpart C Section 15.207 RSS-Gen Issue 5 November 2018 CFR47 FCC Part 15: Subpart C Section 15.209 RSS-102 Issue 5 March 2015 FCC KDB Publication 447498 D01 v06				
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	03.08.2021	Please refer to photo documents			
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	A003090969				
<b>Prüfzeitraum:</b> <i>Testing period:</i>	Refer to test report				
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	TÜV Rheinland (Guangdong) Co.,Ltd. EMC Laboratory				
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	TÜV Rheinland (Guangdong) Co., Ltd.				
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass				
<b>geprüft von / tested by:</b>		<b>kontrolliert von / reviewed by:</b>			
					
03.08.2021	Storm Shu / Project Manager	03.08.2021	Amy Wang / Technical Certifier		
<b>Datum</b> <i>Date</i>	<b>Name/Stellung</b> <i>Name/Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>	<b>Name/Stellung</b> <i>Name/Position</i>	<b>Unterschrift</b> <i>Signature</i>
<b>Sonstiges / Other:</b>					
FCC ID: 2AFHW-VTA-255B IC: 9577A-VTA255B HVIN: VTA250B2					
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>			<b>Prüfmuster vollständig und unbeschädigt</b> <i>Test item complete and undamaged:</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet			Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested		
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>					

## Test Summary

**5.1.1 ANTENNA REQUIREMENT***RESULT: Pass***5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER***RESULT: Pass***5.1.3 CONDUCTED POWER SPECTRAL DENSITY***RESULT: Pass***5.1.4 6dB BANDWIDTH***RESULT: Pass***5.1.5 99% BANDWIDTH***RESULT: Pass***5.1.6 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH***RESULT: Pass***5.1.7 RADIATED SPURIOUS EMISSION***RESULT: Pass***5.1.8 20dB BANDWIDTH***RESULT: Pass***5.1.9 CARRIER FREQUENCY SEPARATION***RESULT: Pass***5.1.10 NUMBER OF HOPPING FREQUENCY***RESULT: Pass***5.1.11 TIME OF OCCUPANCY***RESULT: Pass***6.1.1 ELECTROMAGNETIC FIELDS***RESULT: Pass*

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# 1 General Remarks

## 1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test Results of BLE

Appendix 2: Test Results of General Bluetooth

Appendix 3: Test setup

# 2 Test Sites

## 2.1 Test Facilities

### **TÜV Rheinland (Guangdong) Ltd. EMC Laboratory**

No.102, 1F of Southwest and No.205, 2F of West Warehouse Building, No.767 Tianyuan Road, Tianhe District, Guangzhou, Guangdong, P.R. China

FCC Designation No.: CN1207

## 2.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

Equipment	Manufacturer	Model No.	Serial No.	Cal Until	Calibratio Interval
<b>Radio Spectrum Testing</b>					
Spectrum Analyzer	Rohde & Schwarz	FSP30	100286	2021-08-16	1 Year
<b>Spurious Emission</b>					
EMI Test Receiver	Rohde&Schwarz	ESCI 3	100314	2022-03-14	1 Year
Two-Line V- Network	Rohde&Schwarz	ENV216	100195	2022-06-01	1 Year
EMI Test Receiver	Rohde&Schwarz	ESR7	102110	2022-03-14	1 Year
Artificial Mains Network	AFJ	LT32C/10	320318102 53	2022-07-30	1 Year
Impedance Stabilization Network	TESTQ	ISN T8-Cat6	39916	2022-03-14	1 Year
Artificial Mains Network	Rohde&Schwarz	ESH2-Z5	100114	2022-03-14	1 Year
EMI Test Receiver	Rohde & Schwarz	ESU 26	100209	2022-03-14	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSP30	100286	2021-08-16	1 Year
Trilog-Broadband Antenna	Schwarzbeckmess- elektronik	VULB9168	684	2021-08-21	1 Year
Double-Ridged Horn Antenna	Rohde & Schwarz	HF907	100377	2021-10-20	1 Year
Horn Antenna	EMCO	3160-09	21642	2022-01-19	1 Year
Pre-Amplifier(1- 18GHz)	MITEQ	AFS44- 00101800-25- 10P-44	1934457	2022-05-28	1 Year
Pre-Amplifier(18- 26GHz)	MITEQ	AFS33- 18002650-30- 8P-44	1108282	2022-07-30	1 Year
Band Reject Filter	Micro-Tronics	BRM50702	023	2022-07-04	1 Year
Highpass Filter	Micro-Tronics	HPM50115-03	001	2022-03-19	1 Year
Test software	Rohde&Schwarz	EMC32	V9.25	/	/

## 2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

## 2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

## 2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table

Item	Extended Uncertainty
Conducted Emission	± 2.68 dB
Radiated Emission (9kHz-30MHz)	Field strength (dBµV/m)
	U=3.08dB, k=2, σ=95%
Radiated Emission (30-1000MHz)	Field strength (dBµV/m)
	U=5.16dB, k=2, σ=95%
Radiated Emission (above 1000MHz)	Field strength (dBµV/m)
	U=3.08dB, k=2, σ=95%
Radio Spectrum	± 0.60 dB

## 2.6 Sample Calculations

Calculation of test results for conducted emission measurement:

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2100	24.61	20.35	44.96	63.21	-18.25	QP
2	0.2100	4.92	20.35	25.27	53.21	-27.94	AVG

Frequency (MHz) = Emission frequency in MHz

Correct Factor = Insertion loss + Cable loss

Margin = Result (Result = Reading + Correct Factor) – Limit

Detector: QP= Quasi-Peak; AVG= Average

e.g.:

44.96dBuV (Result) = 24.61dBuV (Reading) + 20.35dB (Correct Factor)

-18.25dB (Margin) = 44.96dBuV (Result) – 63.21dBuV (Limit)

## 2.7 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix 2&3 of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Guangdong) file for certification follow-up purposes.

## 2.8 Status of Facility Used for Testing

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory  
No.102, 1F of Southwest and No.205, 2F of West Warehouse Building, No.767 Tianyuan Road, Tianhe District, Guangzhou, Guangdong, P.R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.



### 3 General Product Information

#### 3.1 Product Function and Intended Use

The EUT is "4-IN-1 TURNTABLE" for indoor use. The unit supports BT5.0 (dual mode) wireless technologies.

Model difference:

The models VTA-250B-XXXX, VTA-260B-XXXX, VTA-255B-XXXX are identical to each other except for model name and unit color or pattern.

According to the above information, all applicable tests have been performed on VTA-255B.

#### 3.2 Ratings and System Details

**Table 2: Technical Specification of EUT**

Technical Specification	Value
Kind of Equipment	Classic Wooden Music Center
Type Designation	VTA-250B-XXXX, VTA-260B-XXXX, VTA-255B-XXXX
Trade Mark	VICTROLA
FCC ID	2AFHW-VTA-255B
Operating Temperature Range	-10°C to +40°C
Operating Voltage	AC 120V/60HZ
Testing Voltage	AC 120V/60HZ
<b>Technical Specification of Bluetooth 5.0 (Dual mode)</b>	
Operating Frequency	2402 - 2480 MHz
Type of Modulation	GFSK, $\pi/4$ DQPSK, 8-DPSK GFSK
Channel Number	79 channels 40 channels
Channel Separation	1MHz 2MHz
Wireless Technology	Bluetooth 5.0 (Dual mode)
Antenna Type	PCB Antenna
Antenna Gain	2.0 dBi (Declaration by manufacturer)

**Table 3: RF Channel and Frequency of General Bluetooth**

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
0	2402.00	20	2422.00	40	2442.00	60	2462.00
1	2403.00	21	2423.00	41	2443.00	61	2463.00
2	2404.00	22	2424.00	42	2444.00	62	2464.00
3	2405.00	23	2425.00	43	2445.00	63	2465.00
4	2406.00	24	2426.00	44	2446.00	64	2466.00
5	2407.00	25	2427.00	45	2447.00	65	2467.00
6	2408.00	26	2428.00	46	2448.00	66	2468.00
7	2409.00	27	2429.00	47	2449.00	67	2469.00
8	2410.00	28	2430.00	48	2450.00	68	2470.00
9	2411.00	29	2431.00	49	2451.00	69	2471.00
10	2412.00	30	2432.00	50	2452.00	70	2472.00
11	2413.00	31	2433.00	51	2453.00	71	2473.00
12	2414.00	32	2434.00	52	2454.00	72	2474.00
13	2415.00	33	2435.00	53	2455.00	73	2475.00
14	2416.00	34	2436.00	54	2456.00	74	2476.00
15	2417.00	35	2437.00	55	2457.00	75	2477.00
16	2418.00	36	2438.00	56	2458.00	76	2478.00
17	2419.00	37	2439.00	57	2459.00	77	2479.00
18	2420.00	38	2440.00	58	2460.00	<b>78</b>	<b>2480.00</b>
19	2421.00	<b>39</b>	<b>2441.00</b>	59	2461.00	/	/

**Table 4: RF Channel and Frequency of Bluetooth Low Energy**

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
<b>00</b>	<b>2402.00</b>	10	2422.00	20	2442.00	30	2462.00
01	2404.00	11	2424.00	21	2444.00	31	2464.00
02	2406.00	12	2426.00	22	2446.00	32	2466.00
03	2408.00	13	2428.00	23	2448.00	33	2468.00
04	2410.00	14	2430.00	24	2450.00	34	2470.00
05	2412.00	15	2432.00	25	2452.00	35	2472.00
06	2414.00	16	2434.00	26	2454.00	36	2474.00
07	2416.00	17	2436.00	27	2456.00	37	2476.00
08	2418.00	18	2438.00	28	2458.00	38	2478.00
09	2420.00	<b>19</b>	<b>2440.00</b>	29	2460.00	<b>39</b>	<b>2480.00</b>

**Table 5: Frequency Hopping Information**

Technical Specification	Description
Hopping Range	Hereby we declare that the frequency range of this device is: 2402-2480MHz. This is according the Bluetooth Core Specification V5.0 (dual mode) for devices which will be operated in the USA. This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/04-E).
Hopping Sequence	Example of a 79 hopping sequence in data mode:  33,04,21,44,23,42,53,46,55,48,40,59,72,29,76,31,08,73,07,75,09,45,60,39,58,13,47,11,77,52,35,50,65,54,67,56,69,62,71,64, 7,25,27,66,57,70,74,61,78,63,10,41,05,43,15,44,64,68,02,70,06,01,51,03,55,05,03,66,53,49,36,47,
Receiver input bandwidth	<p>The input bandwidth of the receiver is 1MHz. In every connection one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master.</p> <p>Additionally the type of connection is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.</p> <p>Repeating of a packer has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case.</p> <p>That means a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.</p>

### 3.3 Independent Operation Modes

The basic operation modes are:

- A. On, General Bluetooth transmitting mode
  - 1. Low channel
  - 2. Middle channel
  - 3. High channel
- B. On, BLE transmitting mode
  - 1. Low channel
  - 2. Middle channel
  - 3. High channel
- C. On, Normal operation with Bluetooth mode
- D. Off

### 3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

### 3.5 Submitted Documents

- Application Form
- Block Diagram
- FCC/IC Label and Location Info
- Model Difference Letter
- Operation Description
- Photo Document
- Schematics
- User Manual

## 4 Test Set-up and Operation Modes

### 4.1 Principle of Configuration Selection

**Radio Spectrum:** The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

### 4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013 and ANSI C63.4: 2014

According to clause 3.1, all tests were performed on model VTA-255B-MAH in this report.

### 4.3 Special Accessories and Auxiliary Equipment

Table 6: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating
Laptop	IBM	2366(T30)	99-BLMAW 03/03	/

### 4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

## 4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

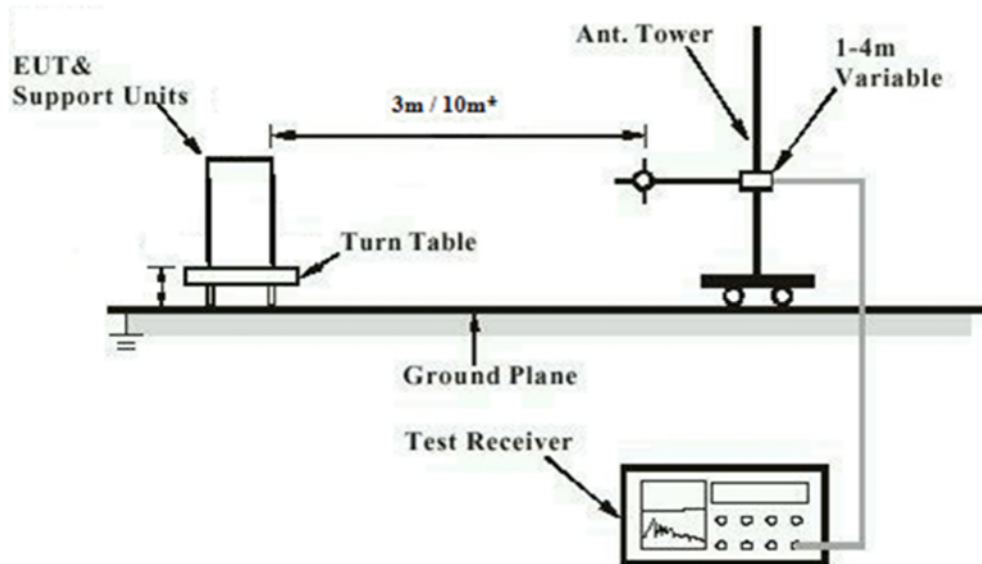


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

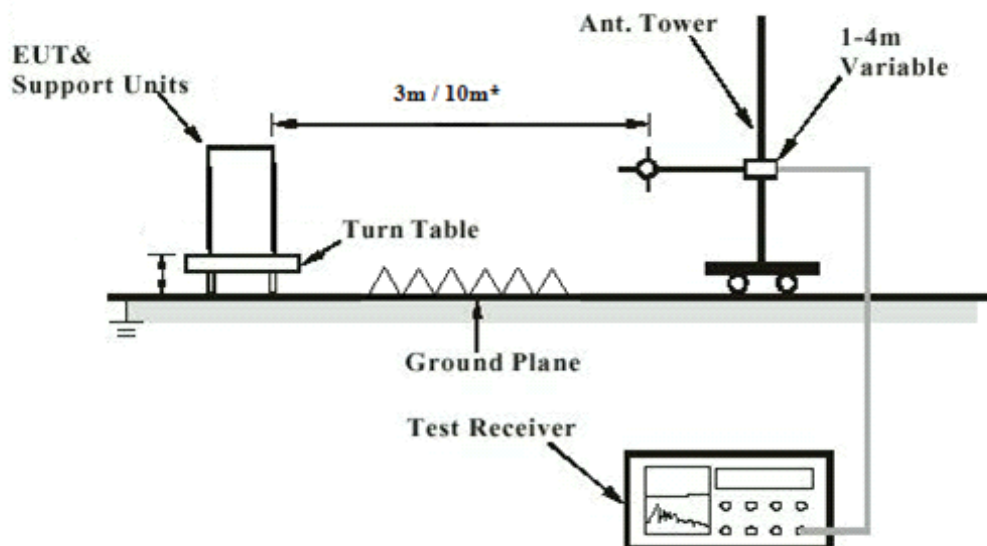


Diagram of Measurement Configuration for Mains Conduction Measurement

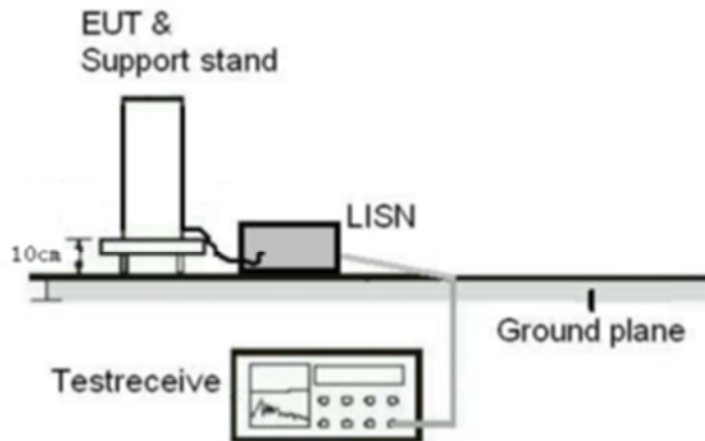
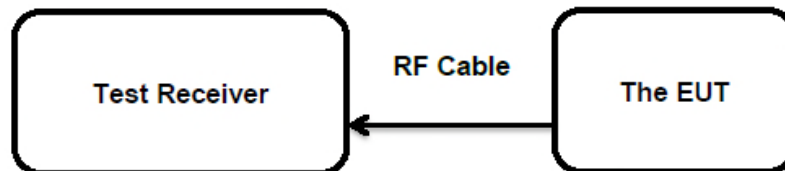


Diagram of Measurement Configuration for Conducted Transmitter Measurement



## 5 Test Results

### 5.1 Transmitter Requirement & Test Suites

#### 5.1.1 Antenna Requirement

RESULT:

**Pass****Test Specification**

Test standard : FCC Part 15.247(b)(4) and Part 15.203

According to the manufacturer declared, the EUT has two internal antenna, the directional gain of Bluetooth antenna is 0 dBi, and the two antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.



### 5.1.2 Maximum Peak Conducted Output Power

**RESULT:**
**Pass**
**Test Specification**

Test standard : FCC Part 15.247(b)(1)&(3)  
RSS-247 Clause 5.4(b)&(d)

Basic standard : ANSI C63.10: 2013

Limits : FHSS < 0.125 Watts, DSSS < 1.0 Watts

Kind of test site : Shielded Room

**Test Setup**

Date of testing : 29.07.2021

Input voltage : AC 120V/60HZ

Operation mode : A, B

Test channel : Low / Middle / High

Ambient temperature : 24 °C

Relative humidity : 50 %

Atmospheric pressure : 101 kPa

**Table 7: Test Result of Maximum Peak Conducted Output Power**

General BT:

Mode	Channel Number	Frequency (MHz)	Peak Power	Average Power	Limit
			(dBm)	(dBm)	(dBm)
BDR	0	2402	-5.53	-8.04	30.00
	39	2441	-6.17	-9.43	30.00
	78	2480	-6.26	-10.69	30.00
Mode	Channel Number	Frequency (MHz)	Peak Power	Average Power	Limit
			(dBm)	(dBm)	(dBm)
2EDR	0	2402	-4.31	-8.43	20.97
	39	2441	-5.43	-9.73	20.97
	78	2480	-6.28	-11.01	20.97
Mode	Channel Number	Frequency (MHz)	Peak Power	Average Power	Limit
			(dBm)	(dBm)	(dBm)
3EDR	0	2402	-3.81	-8.45	20.97
	39	2441	-5.18	-9.92	20.97
	78	2480	-6.67	-11.34	20.97

## BLE:

Test Channel	Frequency	Peak Conducted Output Power	Average Conducted Output Power	LIMIT
	(MHz)	(dBm)	(dBm)	dBm
CH0	2402	-5.03	-7.44	30
CH19	2440	-5.93	-8.54	30
CH39	2480	-7.43	-9.94	30

## Note:

- 1) The cable loss is 0.5dB taken into account in results.
- 2) Antenna gain(G) of Bluetooth: 0 dBi,

The Maximum peak conducted output power (e.i.r.p.)= $P_{(\text{Peak power})} + G$ , which is far below the 4 W

This testing was carried out on all operation modes, but only the worst case was presented in this report.

### 5.1.3 Conducted Power Spectral Density

**RESULT:**
**Pass**
**Test Specification**

Test standard : FCC Part 15.247(e)  
 Basic standard : ANSI C63.10: 2013  
 Limits : 8 dBm/3kHz  
 Kind of test site : Shielded Room

**Test Setup**

Date of testing : 31.07.2021  
 Input voltage : AC 120V/60HZ  
 Operation mode : B  
 Test channel : Low / Middle / High  
 Ambient temperature : 25 °C  
 Relative humidity : 56 %  
 Atmospheric pressure : 101 kPa

**Table 8: Test Result of Power Spectral Density, Low Energy**

Test Mode	Test Channel (MHz)	Power Spectrum Density(dBm/3kHz)	Limit (dBm/3kHz)
Low Energy	2402	-20.450	< 8.0
	2440	-21.700	
	2480	-23.460	
<b>Maximum Measured Value</b>		-20.450	

Note: The cable loss is 0.5dB taken into account in results.

For the measurement records, refer to the appendix 1.

### 5.1.4 6dB Bandwidth

**RESULT:**
**Pass**
**Test Specification**

Test standard : FCC Part 15.247(a)(2)  
 Basic standard : ANSI C63.10: 2013  
 Limits : More than 500 KHz  
 Kind of test site : Shielded Room

**Test Setup**

Date of testing : 30.07.2021  
 Input voltage : AC 120V/60HZ  
 Operation mode : B  
 Test channel : Low / Middle / High  
 Ambient temperature : 24 °C  
 Relative humidity : 50 %  
 Atmospheric pressure : 101 kPa

**Table 9: Test Result of 6dB Bandwidth, Low Energy**

Test Mode	Test Channel (MHz)	-6dB Bandwidth (kHz)	Limit (kHz)
Low Energy	2402	712.000	> 500
	2440	706.200	
	2480	712.000	
<b>Minimum Measured Value</b>		712.000	

For the measurement records, refer to the appendix 1.

### 5.1.5 99% Bandwidth

**RESULT:**
**Pass**
**Test Specification**

Test standard : RSS-Gen Clause 6.6  
 Basic standard : ANSI C63.10: 2013  
 Limits : More than 500 KHz  
 Kind of test site : Shielded Room

**Test Setup**

Date of testing : 30.07.2021  
 Input voltage : AC 120V/60HZ  
 Operation mode : A, B  
 Test channel : Low / Middle / High  
 Ambient temperature : 24 °C  
 Relative humidity : 50 %  
 Atmospheric pressure : 101 kPa

**Table 10: Test Result of 99% Bandwidth**

Test Mode	Test Channel (MHz)	99% Bandwidth (kHz)	Limit (kHz)
Low Energy	2402	1018.8	/
	2440	1094.1	
	2480	1018.1	
<b>Minimum Measured Value</b>		1094.1	

Test Mode	Test Channel (MHz)	99% Bandwidth (MHz)	Limit
BDR	2402	0.81	/
	2441	0.82	
	2480	0.81	
<b>Maximum Measured Value</b>		0.82	

Test Mode	Test Channel (MHz)	99% Bandwidth (MHz)	Limit
2EDR	2402	1.15	/
	2441	1.16	
	2480	1.16	
<b>Maximum Measured Value</b>		1.16	

Test Mode	Test Channel (MHz)	99% Bandwidth (MHz)	Limit
3EDR	2402	1.15	/
	2441	1.15	
	2480	1.14	
<b>Maximum Measured Value</b>		1.15	

For the measurement records, refer to the appendix 1 & 2.

### 5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

**RESULT:** **Pass****Test Specification**

Test standard : FCC Part 15.247(d)  
RSS-247 Clause 5.5

Basic standard : ANSI C63.10: 2013

Limits : 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power);  
In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)

Kind of test site : Shielded Room

**Test Setup**

Date of testing : 02.08.2021

Input voltage : AC 120V/60HZ

Operation mode : A, B

Test channel : Low / Middle / High

Ambient temperature : 24 °C

Relative humidity : 50 %

Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix 1 & 2.

### 5.1.7 Radiated Spurious Emission

**RESULT:****Pass****Test Specification**

Test standard	: FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3
Basic standard	: ANSI C63.10: 2013
Limits	: Refer to 15.209(a) of FCC part 15.247(d)
Kind of test site	: 3m Semi-anechoic Chamber

**Test Setup**

Date of testing	: 02.08.2021
Input voltage	: AC 120V/60HZ
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: 23 °C
Relative humidity	: 48 %
Atmospheric pressure	: 101 kPa

**Remark:**

The Radiated Spurious Emission was carried out within frequency range 9kHz – 30MHz and 18GHz - 26.5GHz, and the measurements with active antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

For the measurement records, refer to the appendix 1 & 2.



### 5.1.8 20dB Bandwidth

**RESULT:**
**Pass**
**Test Specification**

Test standard : FCC Part 15.247(a)(1)  
                   : RSS-247 Clause 5.1(a)  
 Basic standard : ANSI C63.10: 2013  
 Kind of test site : Shielded Room

**Test Setup**

Date of testing : 02.08.2021  
 Input voltage : AC 120V/60HZ  
 Operation mode : A  
 Test channel : Low / Middle / High  
 Ambient temperature : 24 °C  
 Relative humidity : 50 %  
 Atmospheric pressure : 101 kPa

For details refer to following test result.

**Table 11: Test Result of 20dB Bandwidth**

BDR

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	0.8828	PASS
2441 MHz	0.8886	PASS
2480 MHz	0.8828	PASS

2EDR

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	1.2648	PASS
2441 MHz	1.2996	PASS
2480 MHz	1.2677	PASS

3EDR

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	1.2619	PASS
2441 MHz	1.2127	PASS
2480 MHz	1.2098	PASS

For the measurement records, refer to the appendix 2.

### 5.1.9 Carrier Frequency Separation

**RESULT:**
**Pass**
**Test Specification**

Test standard : FCC Part 15.247(a)(1)  
                   : RSS-247 Clause 5.1(b)  
 Basic standard : ANSI C63.10: 2013  
 Limits :  $\geq 25\text{kHz}$  or  $2/3$  of 20dB bandwidth, whichever is greater  
 Kind of test site : Shielded Room

**Test Setup**

Date of testing : 02.08.2021  
 Input voltage : AC 120V/60HZ  
 Operation mode : A  
 Test channel : Low / Middle / High  
 Ambient temperature : 24 °C  
 Relative humidity : 50 %  
 Atmospheric pressure : 101 kPa

For details refer to following test result.

**Table 12: Test Result of Carrier Frequency Separation**
**GFSK**

Frequency	Mark1 Frequency (MHz)	Mark2 Frequency (MHz)	Ch. Separation (MHz)	Limit (MHz)	Result
2402 MHz	2401.875	2402.878	1.003	0.883	Complies
2441 MHz	2440.879	2441.878	0.999	0.889	Complies
2480 MHz	2478.875	2479.878	1.003	0.883	Complies

**QPSK**

Frequency	Mark1 Frequency (MHz)	Mark2 Frequency (MHz)	Ch. Separation (MHz)	Limit (MHz)	Result
2402 MHz	2401.875	2402.873	0.999	0.843	Complies
2441 MHz	2440.875	2441.878	1.003	0.866	Complies
2480 MHz	2478.875	2479.873	0.999	0.845	Complies

**8-DPSK**

Frequency	Mark1 Frequency (MHz)	Mark2 Frequency (MHz)	Ch. Separation (MHz)	Limit (MHz)	Result
2402 MHz	2401.875	2402.878	1.003	0.841	Complies
2441 MHz	2440.875	2441.873	0.999	0.808	Complies
2480 MHz	2478.875	2479.873	0.999	0.807	Complies

Note: The limit is maximum  $2/3$  of the 20 dB bandwidth  
 For the measurement records, refer to the appendix 2.

**5.1.10 Number of Hopping Frequency****RESULT:****Pass****Test Specification**

Test standard : FCC part 15.247(a)(1)(iii)  
RSS-247 Clause 5.1(d)  
Basic standard : ANSI C63.10: 2013  
Limits :  $\geq 15$  non-overlapping channels  
Kind of test site : Shielded Room

**Test Setup**

Date of testing : 02.08.2021  
Input voltage : AC 120V/60HZ  
Operation mode : A  
Ambient temperature : 24 °C  
Relative humidity : 50 %  
Atmospheric pressure : 101 kPa

For details refer to following test result.

**Table 13: Test Result of Number of Hopping Frequency**

Test Mode	Frequency Range	Measured Quantity of Hopping Channel	Limit
FHSS	2402 - 2480 MHz	79	$\geq 15$

For the measurement records, refer to the appendix 2.

### 5.1.11 Time of Occupancy

**RESULT:**
**Pass**
**Test Specification**

Test standard : FCC part 15.247(a)(1)(iii)  
RSS-247 Clause 5.1(d)

Basic standard : ANSI C63.10: 2013

Limits : < 0.4s

Kind of test site : Shielded Room

**Test Setup**

Date of testing : 02.08.2021

Input voltage : AC 120V/60HZ

Operation mode : A

Test channel : Low / Middle / High

Ambient temperature : 24 °C

Relative humidity : 50 %

Atmospheric pressure : 101 kPa

For details refer to following test result.

**Table 14: Test Result of Time of Occupancy**

Modulation	Data Packet	Channel	pulse time(ms)	Dwell Time(s)	Limits(s)
GFSK	DH1	middle	0.407	0.130	0.4
	DH3	middle	1.674	0.268	0.4
	DH5	middle	2.922	0.312	0.4
Modulation	Data Packet	Channel	pulse time(ms)	Dwell Time(s)	Limits(s)
π/4DQPSK	2DH1	middle	0.419	0.134	0.4
	2DH3	middle	1.687	0.270	0.4
	2DH5	middle	2.933	0.313	0.4
Modulation	Data Packet	Channel	pulse time(ms)	Dwell Time(s)	Limits(s)
8-DPSK	3DH1	middle	0.422	0.135	0.4
	3DH3	middle	1.674	0.268	0.4
	3DH5	middle	2.939	0.314	0.4

Note:

Dwell time = Pulse width x Number of channels in Period  
Period = 0.4 (seconds/ channel) x 79 (channel) = 31.6 seconds

Pre-test the different type of Modulation for this test. Only the worst case BDR (DH5 packet) and EDR (2DH5 packet) were recorded in this report.

For the measurement records, refer to the appendix 2.

## 6 Safety Human Exposure

### 6.1 Radio Frequency Exposure Compliance

#### 6.1.1 Electromagnetic Fields

**RESULT:****Pass****Test Specification**

Test standard : CFR47 FCC Part 2: Section 2.1091  
CFR47 FCC Part 1: Section 1.1310  
FCC KDB Publication 447498 D01 v06  
RSS-102 Issue 5 March 2015

The minimum distance for the EUT is less than 5mm.  
Since maximum peak output power of the transmitter is 0.42 mW <10 mW.

Hence the EUT is excluded from SAR evaluation according to FCC KDB Publication 447498 D01 General RF Exposure Guidance v06.

The maximum peak output power of the transmitter is -3.81dBm (0.42 mW), which is far below the SAR exclusion threshold level 4 mW  $\approx$  6.02 dBm.  
Hence the EUT is exempted from routine evaluation limits (SAR Evaluation) according to clause 2.5.1 of RSS-102 Issue 5.

## 7 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix 3.

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