


<b>Prüfbericht-Nr.:</b> <i>Test report No.:</i>	<b>50141724 001</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	174071875	Seite 1 von 29 <i>Page 1 of 29</i>
<b>Kunden-Referenz-Nr.:</b> <i>Client reference No.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date.:</i>	07.09.2018	
<b>Auftraggeber:</b> <i>Client:</i>	Adam Hall GmbH Daimlerstrasse 9, 61267 Neu-Anspach, Germany			
<b>Prüfgegenstand:</b> <i>Test item:</i>	MIXER WITH SPEAKER			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	LD MIX 102 A G3, LD MIX 10 A G3			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	FCC approval			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209 FCC KDB Publication 447498 D01 v06			
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	07.09.2018			
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	A000616164-001			
<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>			
19.03.2018	Arthur Liu/ Project Manager	20.03.2019	Storm Shu/ 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: 2AFF6-3GA01XIM				
<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		
<p><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></p> <p><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></p>				

## 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 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHz BANDWIDTH***RESULT: Pass***5.1.6 RADIATED SPURIOUS EMISSION***RESULT: Pass***5.1.7 20dB BANDWIDTH***RESULT: Pass***5.1.8 CARRIER FREQUENCY SEPARATION***RESULT: Pass***5.1.9 NUMBER OF HOPPING FREQUENCY***RESULT: Pass***5.1.10 TIME OF OCCUPANCY***RESULT: Pass***5.1.11 CONDUCTED EMISSION ON AC MAINS***RESULT: Pass***5.1.12 RADIATED EMISSION***RESULT: Pass***6.1.1 ELECTROMAGNETIC FIELDS***RESULT: Pass*

## Contents

<b>1</b>	<b>GENERAL REMARKS .....</b>	<b>5</b>
<b>1.1</b>	<b>COMPLEMENTARY MATERIALS .....</b>	<b>5</b>
<b>2</b>	<b>TEST SITES .....</b>	<b>5</b>
<b>2.1</b>	<b>TEST FACILITIES .....</b>	<b>5</b>
<b>2.2</b>	<b>LIST OF TEST AND MEASUREMENT INSTRUMENTS.....</b>	<b>6</b>
<b>2.3</b>	<b>TRACEABILITY .....</b>	<b>6</b>
<b>2.4</b>	<b>CALIBRATION .....</b>	<b>6</b>
<b>2.5</b>	<b>MEASUREMENT UNCERTAINTY.....</b>	<b>6</b>
<b>2.6</b>	<b>LOCATION OF ORIGINAL DATA.....</b>	<b>6</b>
<b>2.7</b>	<b>STATUS OF FACILITY USED FOR TESTING.....</b>	<b>7</b>
<b>3</b>	<b>GENERAL PRODUCT INFORMATION .....</b>	<b>8</b>
<b>3.1</b>	<b>PRODUCT FUNCTION AND INTENDED USE.....</b>	<b>8</b>
<b>3.2</b>	<b>RATINGS AND SYSTEM DETAILS .....</b>	<b>8</b>
<b>3.3</b>	<b>INDEPENDENT OPERATION MODES .....</b>	<b>11</b>
<b>3.4</b>	<b>NOISE GENERATING AND NOISE SUPPRESSING PARTS.....</b>	<b>11</b>
<b>3.5</b>	<b>SUBMITTED DOCUMENTS.....</b>	<b>11</b>
<b>4</b>	<b>TEST SET-UP AND OPERATION MODES .....</b>	<b>12</b>
<b>4.1</b>	<b>PRINCIPLE OF CONFIGURATION SELECTION .....</b>	<b>12</b>
<b>4.2</b>	<b>TEST OPERATION AND TEST SOFTWARE.....</b>	<b>12</b>
<b>4.3</b>	<b>SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT.....</b>	<b>12</b>
<b>4.4</b>	<b>COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....</b>	<b>12</b>
<b>4.5</b>	<b>TEST SETUP DIAGRAM.....</b>	<b>13</b>
<b>5</b>	<b>TEST RESULTS .....</b>	<b>15</b>
<b>5.1</b>	<b>TRANSMITTER REQUIREMENT &amp; TEST SUITES .....</b>	<b>15</b>
<b>5.1.1</b>	<i>Antenna Requirement .....</i>	<i>15</i>
<b>5.1.2</b>	<i>Maximum Peak Conducted Output Power.....</i>	<i>16</i>
<b>5.1.3</b>	<i>Conducted Power Spectral Density .....</i>	<i>17</i>
<b>5.1.4</b>	<i>6dB Bandwidth .....</i>	<i>18</i>
<b>5.1.5</b>	<i>Conducted Spurious Emissions Measured in 100 kHz Bandwidth.....</i>	<i>19</i>
<b>5.1.6</b>	<i>Radiated Spurious Emission .....</i>	<i>20</i>
<b>5.1.7</b>	<i>20dB Bandwidth .....</i>	<i>21</i>
<b>5.1.8</b>	<i>Carrier Frequency Separation.....</i>	<i>22</i>
<b>5.1.9</b>	<i>Number of Hopping Frequency.....</i>	<i>23</i>
<b>5.1.10</b>	<i>Time of Occupancy.....</i>	<i>24</i>
<b>5.1.11</b>	<i>Conducted Emission on AC Mains .....</i>	<i>26</i>
<b>5.1.12</b>	<i>Radiated Emission.....</i>	<i>27</i>
<b>6</b>	<b>SAFETY HUMAN EXPOSURE .....</b>	<b>28</b>
<b>6.1</b>	<b>RADIO FREQUENCY EXPOSURE COMPLIANCE .....</b>	<b>28</b>
<b>6.1.1</b>	<i>Electromagnetic Fields.....</i>	<i>28</i>

7	PHOTOGRAPHS OF THE TEST SET-UP .....	29
8	LIST OF TABLES.....	29

## 1 General Remarks

### 1.1 Complementary Materials

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

Appendix A: Test setup and test equipment

Appendix B: Test Results

## 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**

For the measurement Equipment list, refer to the appendix A.

## 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 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix 1 of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Guangdong) file for certification follow-up purposes.

## **2.7 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 a Mixer device. It supports Bluetooth 4.0 (Dual mode) wireless technology.

The new submitted samples LD MIX 102 A G3 and LD MIX 10 A G3 are combination mixer with speaker for professional use. Modes LD MIX 10 A G3 is identical to LD MIX 102 A G3 except for appearance (panel printing).

According to above information, full test were performed on LD MIX 102 A G3.

For details refer to the User Manual, Technical Description and Circuit Diagram.

#### 3.2 Ratings and System Details

**Table 2: Technical Specification of EUT**

Technical Specification	Value
Kind of Equipment	MIXER WITH SPEAKER
Type Designation	LD MIX 102 A G3, LD MIX 10 A G3
Trade Mark	LD
FCC ID	2AFF6-3GA01XIM
Operating Frequency	2402 - 2480 MHz
Operating Temperature Range	-20°C to +55°C
Operating Voltage	100-120V~; 220-240V~ 50/60Hz
Testing Voltage	120V~ 60Hz
Type of Modulation	GFSK, $\pi/4$ DQPSK, 8DPSK
Channel Number	BDR & EDR mode:79 channels; Low Energy mode:40 channels
Channel Separation	BDR & EDR mode:1MHz; Low Energy mode:2MHz
Wireless Technology	Bluetooth 4.0 (Dual mode)
Antenna Type	PCB Antenna
Antenna Gain	0.00 dBi



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

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
00	2402.00	20	2422.00	40	2442.00	60	2462.00
01	2403.00	21	2423.00	41	2443.00	61	2463.00
02	2404.00	22	2424.00	42	2444.00	62	2464.00
03	2405.00	23	2425.00	43	2445.00	63	2465.00
04	2406.00	24	2426.00	44	2446.00	64	2466.00
05	2407.00	25	2427.00	45	2447.00	65	2467.00
06	2408.00	26	2428.00	46	2448.00	66	2468.00
07	2409.00	27	2429.00	47	2449.00	67	2469.00
08	2410.00	28	2430.00	48	2450.00	68	2470.00
09	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)
00	2402.00	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 V4.0 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
  - 1. Bluetooth transmitting mode (BDR & EDR mode)
    - a) Low Channel
    - b) Middle Channel
    - c) High Channel
  - 2. Bluetooth transmitting mode (Low Energy mode)
    - a) Low Channel
    - b) Middle Channel
    - c) High Channel
- B. On, Transmitting on Hopping channel
- C. On, Bluetooth connecting 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 LD MIX 102 A G3 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)

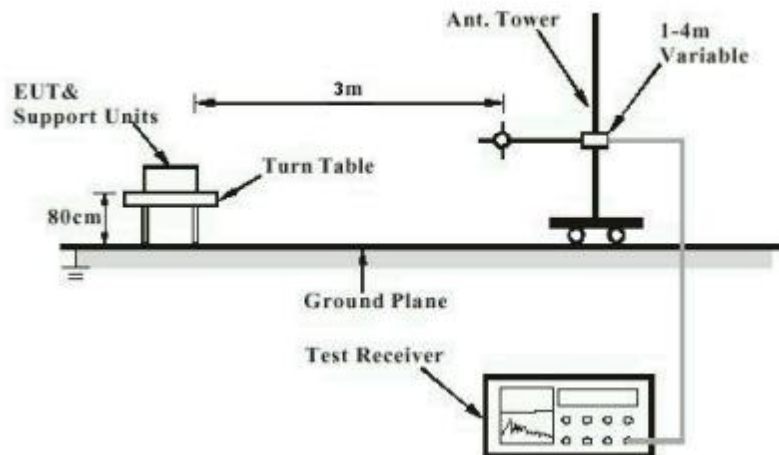


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

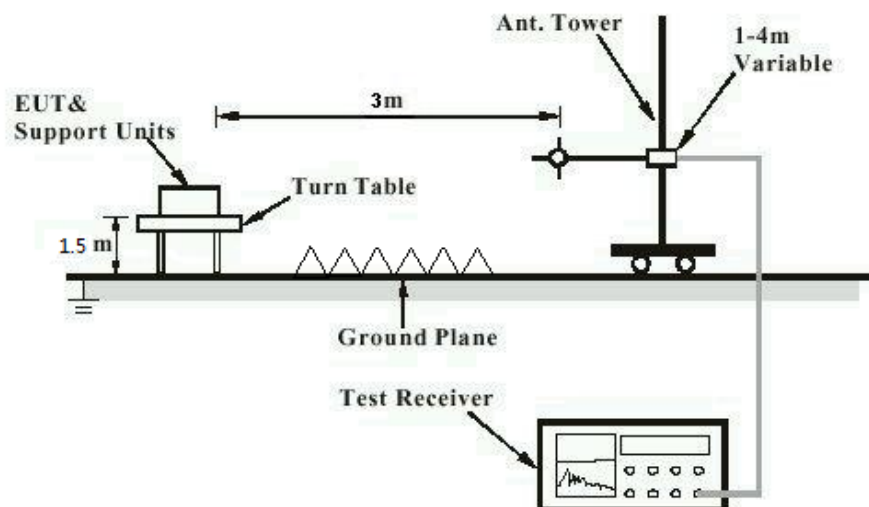


Diagram of Measurement Configuration for Mains Conduction Measurement

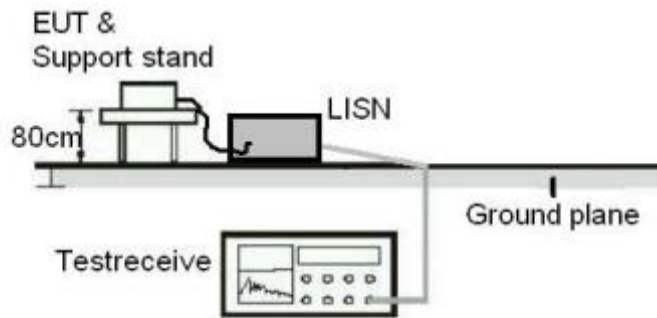
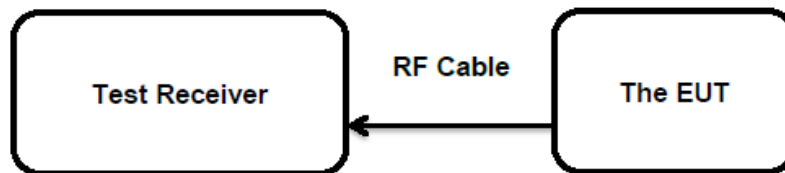


Diagram of Measurement Configuration for Conducted Transmitter Measurement



## 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 an internal antenna, the directional gain of antenna is 0 dBi, and the 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)  
 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 : 10.01.2018 & 11.01.2018  
 Input voltage : AC 120V  
 Operation mode : A.1, A.2  
 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**

Test Mode	Channel Frequency (MHz)	Measured Peak Output Power		Limit (W)
		(dBm)	(W)	
BDR	2402	-6.05	0.00025	< 0.125
	2441	-3.65	0.00043	
	2480	-2.71	0.00054	
EDR	2402	-7.20	0.00019	< 0.125
	2441	-3.61	0.00044	
	2480	-3.35	0.00046	
Low Energy	2402	-5.09	0.00031	< 1.0
	2440	-3.09	0.00049	
	2480	-2.25	0.00060	
<b>Maximum Measured Value</b>		-2.25	0.00060	/

Note: The cable loss 0.4 dB is taken into account in results.

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 : 11.01.2018  
 Input voltage : AC120V 60Hz  
 Operation mode : A.2  
 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	-21.67	< 8.0
	2440	-18.44	
	2480	-17.92	
<b>Maximum Measured Value</b>		-17.92	

Note: The cable loss 0.4 dB is taken into account in results.

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

### 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 : 11.01.2018  
 Input voltage : AC 120V 60Hz  
 Operation mode : A.2  
 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	708	> 500
	2440	720	
	2480	796	
<b>Minimum Measured Value</b>		796	

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

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

Test standard	: FCC Part 15.247(d)
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	: 11.01.2018
Input voltage	: AC 120V 60Hz
Operation mode	: A.1, A.2
Test channel	: Low / Middle / High
Ambient temperature	: 24 °C
Relative humidity	: 50 %
Atmospheric pressure	: 101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to following test plot, and compliance is achieved as well.

## 5.1.6 Radiated Spurious Emission

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

Test standard	: FCC Part 15.247(d) & FCC Part 15.205
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	: 11.01.2018
Input voltage	: AC 120V 60Hz
Operation mode	: A.1, A.2
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.

Pre-test the EUT in continuous transmitting mode at the low (2402 MHz), middle (2441 MHz) and high (2480 MHz) channel with different data packet. Compliance test in continuous transmitting mode with BDR mode (DH5) as the worst case was found.

For the measurement records, refer to the appendix 1.

### 5.1.7 20dB Bandwidth

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

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

**Test Setup**

Date of testing : 11.01.2018  
 Input voltage : AC 120V 60Hz  
 Operation mode : A.1  
 Test channel : Low / Middle / High  
 Ambient temperature : 24 °C  
 Relative humidity : 50 %  
 Atmospheric pressure : 101 kPa

**Table 10: Test Result of 20dB Bandwidth**

Test Mode	Channel Frequency (MHz)	20dB Bandwidth (kHz)	2/3 of 20dB Bandwidth (kHz)	Limit (MHz)
BDR	2402	924	616	/
	2441	968	645.3	
	2480	1038	692	
EDR	2402	1494	996	/
	2441	1332	888	
	2480	1302	868	
<b>Maximum Measured Value</b>		1494	996	/

### 5.1.8 Carrier Frequency Separation

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

Test standard : FCC Part 15.247(a)(1)  
 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 : 11.01.2018  
 Input voltage : AC120V,60Hz  
 Operation mode : B  
 Test channel : Low / Middle / High  
 Ambient temperature : 24 °C  
 Relative humidity : 50 %  
 Atmospheric pressure : 101 kPa

**Table 11: Test Result of Carrier Frequency Separation**

Channel	Channel Frequency (MHz)	Measured Channel Separation (KHz)	Limit (kHz)	Result
Low Channel	2402	1.002	$\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth	Pass
Adjacency Channel	2403			
Middle Channel	2441	0.978		Pass
Adjacency Channel	2442			
High Channel	2480	1.002		Pass
Adjacency Channel	2479			

Note:

 The limit is maximum  $2/3$  of the 20 dB bandwidth: 996 KHz.

### 5.1.9 Number of Hopping Frequency

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

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

**Test Setup**

Date of testing : 10.01.2018  
Input voltage : AC120V,60Hz  
Operation mode : B  
Ambient temperature : 24 °C  
Relative humidity : 50 %  
Atmospheric pressure : 101 kPa

**Table 12: Test Result of Number of Hopping Frequency**

Frequency Range	Measured Quantity of Hopping Channel	Limit	Result
2402 to 2480 MHz	79	$\geq 15$	Pass

**5.1.10 Time of Occupancy****RESULT:****Pass****Test Specification**

Test standard : FCC part 15.247(a)(1)(iii)  
Basic standard : ANSI C63.10: 2013  
Limits : < 0.4s  
Kind of test site : Shielded Room

**Test Setup**

Date of testing : 10.01.2018  
Input voltage : AC120V,60Hz  
Operation mode : B  
Test channel : Low / Middle / High  
Ambient temperature : 24 °C  
Relative humidity : 50 %  
Atmospheric pressure : 101 kPa



**Table 13: Test Result of Time of Occupancy**

Test Mode	Test Channel	Data Packet	Pulse width (ms)	Measured Dwell time(s)	Limit (s)
BDR mode	2402	DH1	0.46	0.147	< 0.4s
		DH3	1.73	0.277	
		DH5	2.99	0.319	
	2441	DH1	0.46	0.147	
		DH3	1.73	0.277	
		DH5	2.99	0.319	
	2480	DH1	0.47	0.150	
		DH3	1.73	0.277	
		DH5	2.96	0.316	
EDR mode	2402	DH1	0.44	0.141	< 0.4s
		DH3	1.5	0.240	
		DH5	2.97	0.320	
	2441	DH1	0.44	0.141	
		DH3	1.5	0.240	
		DH5	3.00	0.320	
	2480	DH1	0.44	0.141	
		DH3	1.48	0.237	
		DH5	2.96	0.316	
<b>Maximum Measured Value</b>			2.971	0.317	

Note:

$$\text{Dwell time} = \text{Pulse width} \times (\text{Hopping rate} / \text{Number of channels}) \times \text{Period}$$

$$\text{Period} = 0.4 \times 79 \text{ (channel)} = 31.6 \text{ seconds}$$

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

### 5.1.11 Conducted Emission on AC Mains

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

Test standard	: FCC Part 15.207(a) & FCC Part 15.107(a)
Basic standard	: ANSI C63.10: 2013 & ANSI C63.4: 2014
Frequency range	: 0.15 – 30MHz
Limits	: FCC Part 15.207(a) & FCC Part 15.107(a)
Kind of test site	: Shielded Room

**Test Setup**

Date of testing	: 02.11.2017
Input voltage	: AC 120V,60Hz
Operation mode	: C
Earthing	: Connected
Ambient temperature	: 24 °C
Relative humidity	: 50 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix 1.

## 5.1.12 Radiated Emission

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

Test standard	:	FCC part 15.209
Basic standard	:	ANSI C63.4: 2014
Frequency range	:	30 MHz – 26GHz
Limits	:	FCC part 15.209
Kind of test site	:	3m Semi-anechoic Chamber

**Test Setup**

Date of testing	:	13.01.2018
Input voltage	:	AC 120V,60Hz
Operation mode	:	C
Earthing	:	Connected
Ambient temperature	:	21 °C
Relative humidity	:	51 %
Atmospheric pressure	:	100 kPa

For the measurement records, refer to the appendix 1.

## 6 Safety Human Exposure

### 6.1 Radio Frequency Exposure Compliance

#### 6.1.1 Electromagnetic Fields

RESULT:

Pass

##### Test Specification

Test standard : CFR47 FCC Part 2.1093  
FCC KDB Publication 447498 D01 v06

##### Measurement Record:

The minimum distance for the EUT is less than 5mm.

Since maximum peak output power of the transmitter is -2.25 dBm  $\approx$  0.6 mW  $< \frac{3 \cdot d}{\sqrt{f}} = 9.52$  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 -2.25 dBm (0.6 mW), which is far below the SAR exclusion threshold level 4 mW  $\approx$  6.02 dBm.

## 7 Photographs of the Test Set-Up

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

## 8 List of Tables

Table 1: List of Test and Measurement Equipment.....	6
Table 2: Technical Specification of EUT .....	8
Table 3: RF Channel and Frequency of Bluetooth .....	9
Table 4: RF Channel and Frequency of Bluetooth Low Energy .....	9
Table 5: Frequency Hopping Information.....	10
Table 6: List of Accessories and Auxiliary Equipment.....	12
Table 7: Test Result of Maximum Peak Conducted Output Power.....	16
Table 8: Test Result of Power Spectral Density, Low Energy .....	17
Table 9: Test Result of 6dB Bandwidth, Low Energy .....	18
Table 10: Test Result of 20dB Bandwidth.....	21
Table 11: Test Result of Carrier Frequency Separation .....	22
Table 12: Test Result of Number of Hopping Frequency .....	23
Table 13: Test Result of Time of Occupancy .....	25

## **Appendix A.1: Photographs of the Test Set-Up**

<b>APPENDIX A.1: PHOTOGRAPHS OF THE TEST SET-UP .....</b>	<b>1</b>
<b>APPENDIX A.2: TEST EQUIPMENT.....</b>	<b>3</b>

## Appendix A.2: Test equipment



### Measurement Equipment List

Testing Start Date 07.09.2017  
 Testing end date 01.03.2019

Project Manager Arthur Liu  
 Cost Center 41  
 Test Report Number 50141724 001  
 Order Item Number 0174071875A00300

Customer Seikaku Technical Group Limited  
 Product Name MIXER WITH SPEAKER  
 Comment

Page 1 of 1

Old ID	Equip.	Description	Model	Manufacturer	Inte. (mon)	Due Date DD.MM.YYYY
1.887	1813944	EMI Test Receiver	ESCI	Rohde & Schwarz	12	16.03.2019
1.886	1813943	Two-Line V-Network	ENV216	Rohde & Schwarz	12	11.06.2019
1.807	1813832	EMI Test Receiver	ESCI	Rohde & Schwarz	12	23.08.2019
1.805	1813829	FSP30 Spectrum Analyzer	FSP30	Rohde & Schwarz	12	22.08.2019
1.921B	1814142	Trilog Broadband Antenna	VULB9168(6dB)	SCHWARZBECK	24	20.09.2019
1.822	1813850	Loop Antenna	HFH2-Z2	Rohde & Schwarz	24	14.03.2019
1.808	1813833	Horn Antenna	3160-09	EMCO	60	19.01.2024
1.889C	1814199	Double-Ridged Horn Antenna	HF907(3s)	Rohde & Schwarz	24	23.10.2020
1.819C	1814068	Pre-Amplifier	A44-00101800-25-10P-	MITEQ	12	16.03.2019
1.819A	1813846	Band Reject Filter	BRM50702	Micro-Tronics	24	04.07.2020
1.808A	1813834	Pre-Amplifier	A33-18002650-30-8P-4	MITEQ	24	20.07.2019
1.666	1813697	SAC	N/A	Albatross Project	36	27.11.2021
1.913	1814012	Shielding Room	9x4x3.4	Changzhou Yuanping	60	06.12.2020