

Prüfbericht-Nr.: <i>Test report No.:</i>	50279852 001	Auftrags-Nr.: <i>Order No.:</i>	170109248	Seite 1 von 30 <i>Page 1 of 30</i>	
Kunden-Referenz-Nr.: <i>Client reference No.:</i>	N/A	Auftragsdatum: <i>Order date.:</i>	05.05.2019		
Auftraggeber: <i>Client:</i>	Dongguan Alllike Electronics Co., Ltd. Chuanca Development Zone, Machong Town Dongguan City, Guangdong 523141 P.R. China				
Prüfgegenstand: <i>Test item:</i>	Smart Side Table				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	SOSTB300xxxx-xx (xxxx-xx can be 0-9 or A-Z or blank, which is stand for unit color or country version)				
Auftrags-Inhalt: <i>Order content:</i>	FCC and IC approval				
Prüfgrundlage: <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 4 November 2014 CFR47 FCC Part 15: Subpart C Section 15.209 RSS-102 Issue 5 March 2015 CFR47 FCC Part 2: Section 2.1091				
Wareneingangsdatum: <i>Date of receipt:</i>	27.05.2019	Please refer to photo documents			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000917633-002/003				
Prüfzeitraum: <i>Testing period:</i>	Refer to test report				
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Guangdong) Ltd.				
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Guangdong) Ltd.				
Prüfergebnis*: <i>Test result*:</i>	Pass				
geprüft von / tested by:		kontrolliert von / reviewed by:			
 23.08.2019 Amy Wang / Project Manager		 23.08.2019 Storm Shu / Technical Certifier			
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other:					
FCC ID: BUQ-SOSTB300 IC: 11059A-SOSTB300 HVIN: SOSTB300					
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>			Prüfmuster vollständig und unbeschädigt <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					
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. <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***5.1.12 CONDUCTED EMISSION ON AC MAINS***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 A: Photographs of the Test Set-up

Appendix B: Test Results of BT

Appendix C: Test Results of Wi-Fi 802.11 b/g/n

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Guangdong) Ltd.

No.102, 1F of Southwest and No.205, 2F No.767 Tianyuan Road, Tianhe District, Guangzhou 510663,
Guangdong Province P.R. China

FCC Accreditation Designation No.: CN1207

Test site Industry Canada No.: 2932C-1

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 B.

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 (30-1000MHz)	Field strength (dBμV/m)	± 5.16 dB
Radiated Emission (above 1000MHz)	Field strength (dBμV/m)	± 2.22 dB
Radio Spectrum		± 4.51 dB

2.6 Location of Original Data

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

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Guangdong) Ltd. Test facility located at No.102, 1F of Southwest and No.205, 2F No.767 Tianyuan Road, Tianhe District, Guangzhou 510663, Guangdong Province 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 submitted sample SOSTB300xxxx-xx is a Smart Side Table with multimedia speaker, AC power outlets, USB output ports, refrigerator, LED light, wireless charging pad and WiFi/Bluetooth function for household use.

Model list: SOSTB300xxxx-xx (xxxx-xx can be 0-9 or A-Z or blank, which stands for color or country version.)

The first to second xx denotes the color of the table (product body);

The third to fourth xx denotes the color of the drawer door;

The last two xx denotes the country version.

No other differences, they are electrically identical.

Based on above information, full tests performed on model SOSTB300.

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

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	Smart Side Table
Type Designation	SOSTB300xxxx-xx
FCC ID	BUQ-SOSTB300
IC	11059A-SOSTB300
HVIN	SOSTB300
Operating Voltage	AC 120-240V, 50/60Hz
Testing Voltage	AC 120V, 60Hz
Technical Specification of Bluetooth 4.2 (Single mode)	
Operating Frequency	2402 - 2480 MHz
Type of Modulation	GFSK, ($\pi/4$)DQPSK, 8DPSK
Channel Number	79 channels
Channel Separation	1 MHz
Antenna Type	PCB Layout Antenna
Gain	0 dBi
Technical Specification of Wi-Fi 802.11 b/g/n	
Operating Frequency	2412 - 2462 MHz for 802.11b/g/n(HT20) 2422 - 2452 MHz for 802.11n(HT40)
Type of Modulation	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM)
Data Rate	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 for 802.11n
Channel Number	11 channels for 802.11b/g/n(HT20) 7 channels for 802.11n(HT40)

Channel Separation	5 MHz
Antenna Type	Integral Antenna
Gain	0 dBi

Table 3: RF Channel and Frequency of General 2.4GHz

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	78	2480.00
19	2421.00	39	2441.00	59	2461.00	/	/

Test frequencies are lowest channel: 2402 MHz, middle channel: 2441 MHz and highest channel: 2480 MHz.

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	5	2432	9	2452		
2	2417	6	2437	10	2457		
3	2422	7	2442	11	2462		
4	2427	8	2447				

Test frequencies are lowest channel: 2412 MHz, middle channel: 2437 MHz and highest channel: 2462 MHz for 802.11b/g/n(HT20)

Test frequencies are lowest channel: 2422 MHz, middle channel: 2437 MHz and highest channel: 2452 MHz for 802.11n(HT40)

Table 4: 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 V4.2 (single 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	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. 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. 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. That means a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Traditional Bluetooth
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- B. On, Wi-Fi 802.11 b/g/n wireless transmitting mode
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- C. On, Transmitting on hopping channel
- D. On, Normal operation with Wi-Fi mode
- E. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

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

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 tests were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model SOSTB300 in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 5: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating
Notebook	Lenovo	E46A	EB24320428	N/A
iPhone	Apple	A1586	/	N/A

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)

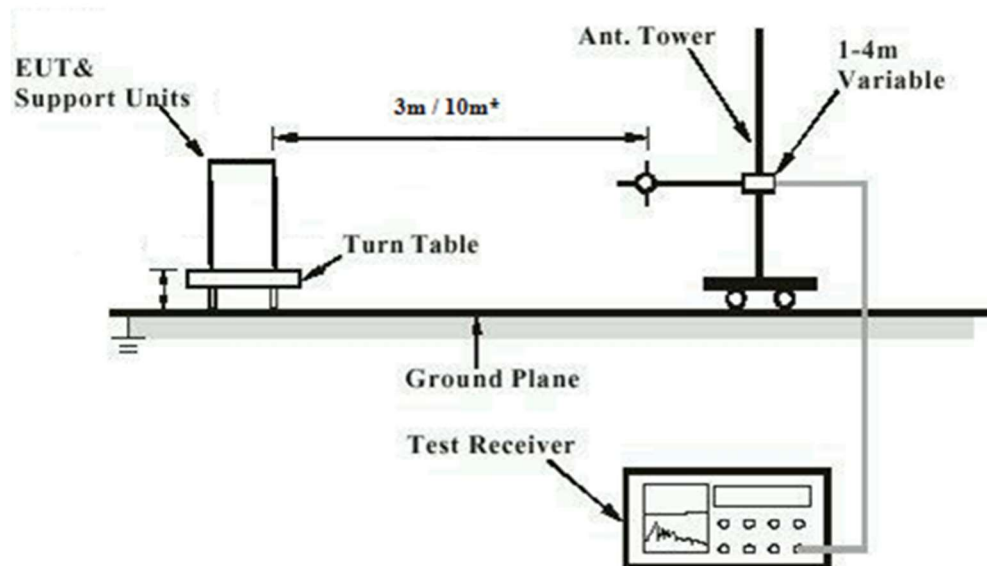


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

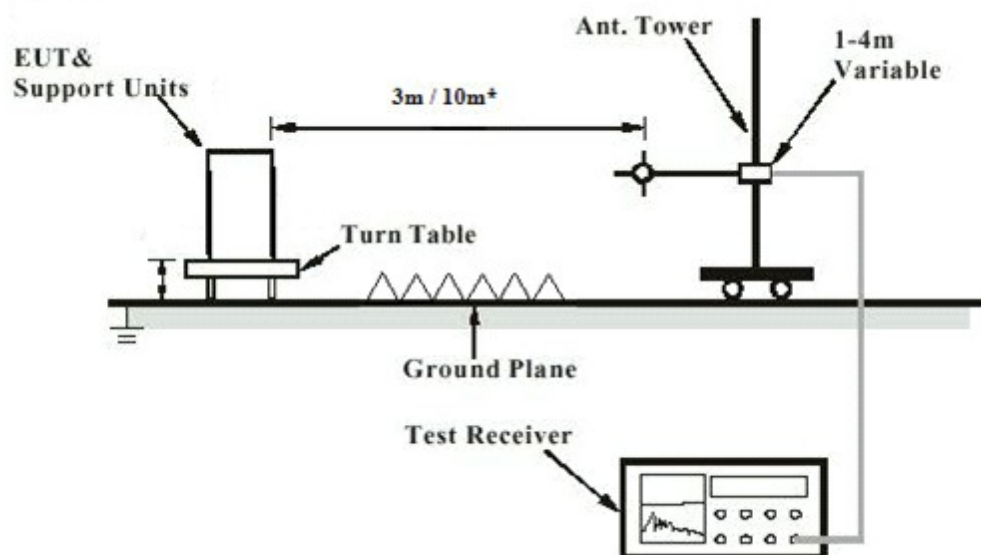


Diagram of Measurement Configuration for Mains Conduction Measurement

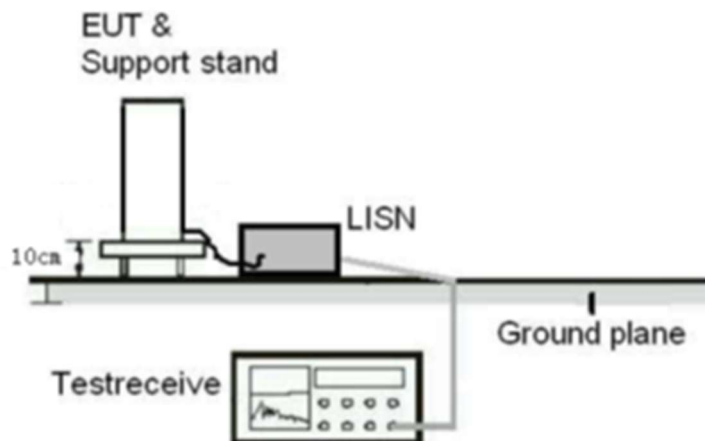
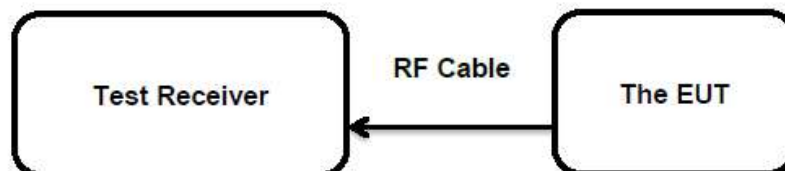


Diagram of Measurement Configuration for Conducted Transmitter Measurement



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 PCB Layout Antenna, the directional gain of antenna are 0dBi, 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) RSS-247 Clause 5.4(b)&(d)
Basic standard	: ANSI C63.10: 2013
Limits	: FHSS < 0.125 Watts
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 25.07.2019
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 6: Test Result of Maximum Peak Conducted Output Power

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(mW)	
BDR	2402	-3.41	0.46	< 0.125
	2441	-1.98	0.63	
	2480	-1.49	0.71	
Maximum Measured Value		-1.49	0.71	

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(mW)	
EDR	2402	-4.65	0.34	< 0.125
	2441	-2.76	0.53	
	2480	-2.03	0.62	
Maximum Measured Value		-2.03	0.62	

Note:

- 1) The cable loss is taken into account in results.
- 2) Antenna gain(G) of FHSS: 0dBi,
The Maximum peak conducted output power (e.i.r.p.)= $P_{(Peak\ power)} + G$, which is far below the 4 W

Table 7: Test Result of Maximum Peak Conducted Output Power, Wi-Fi 802.11 b/g/n

Test Mode	Data Rate	Test Channel (MHz)	Measured Peak Power		Limit (W)
			(dBm)	(W)	
802.11b	1 Mbps	2412	14.13	0.0259	< 1.0
		2437	13.57	0.0228	
		2462	12.96	0.0198	
802.11g	6 Mbps	2412	13.69	0.0234	
		2437	12.30	0.0170	
		2462	12.04	0.0160	
802.11n (HT20)	MCS0	2412	11.39	0.0138	
		2437	10.78	0.0120	
		2462	10.65	0.0116	
802.11n (HT40)	MCS0	2422	11.27	0.0134	
		2437	10.64	0.0116	
		2452	10.46	0.0111	
Maximum Measured Value			14.13	0.0259	

Note:

- 1) The cable loss is taken into account in results.
- 2) Antenna gain(G) of 802.11 b/g/n: 0 dBi,
The Maximum peak conducted output power (e.i.r.p.)= $P_{(\text{Peak power})} + G$, which is far below the 4 W

5.1.3 Conducted Power Spectral Density

RESULT:
Pass
Test Specification

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

Test Setup

Date of testing : 25.07.2019
 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 8: Test Result of Power Spectral Density, Wi-Fi 802.11 b/g/n

Test Mode	Data Rate	Test Channel (MHz)	Measured Peak Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	1 Mbps	2412	-9.08	8 dBm / 3kHz
		2437	-10.03	
		2462	-10.54	
802.11g	6 Mbps	2412	-13.84	
		2437	-13.73	
		2462	-15.00	
802.11n (HT20)	MCS0	2412	-14.07	
		2437	-14.02	
		2462	-15.26	
802.11n (HT40)	MCS0	2422	-17.79	
		2437	-15.91	
		2452	-16.91	
Maximum Measured Value			-9.08	

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	: 01.08.2019
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, Wi-Fi 802.11 b/g/n

Test Mode	Data Rate	Test Channel (MHz)	-6dB Bandwidth (kHz)	Limit (kHz)
802.11b	1 Mbps	2412	10030.00	> 500
		2437	10030.00	
		2462	9565.00	
802.11g	6 Mbps	2412	16330.00	
		2437	16320.00	
		2462	15740.00	
802.11n (HT20)	MCS0	2412	16970.00	
		2437	17570.00	
		2462	16590.00	
802.11n (HT40)	MCS0	2422	35930.00	
		2437	35390.00	
		2452	35390.00	
Minimum Measured Value			9565.00	

5.1.5 99% Bandwidth

RESULT:
Pass
Test Specification

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

Test Setup

Date of testing : 25.07.2019
 Input voltage : AC 120V, 60Hz
 Operation mode : A
 Test channel : Low / Middle / High
 Ambient temperature : 24 °C
 Relative humidity : 50 %
 Atmospheric pressure : 101 kPa

Table 10: Test Result of 99% Bandwidth of BT

Test Mode	Test Channel (MHz)	99% Bandwidth (MHz)	Limit
BDR	2402	0.96	/
	2441	0.96	
	2480	0.96	
Maximum Measured Value		0.96	

Test Mode	Test Channel (MHz)	99% Bandwidth (MHz)	Limit
EDR	2402	1.09	/
	2441	1.09	
	2480	1.09	
Maximum Measured Value		1.09	

Table 11: Test Result of 99% Bandwidth, Wi-Fi 802.11 b/g/n

Test Mode	Data Rate	Test Channel (MHz)	99% Bandwidth (MHz)	Limit
802.11b	1 Mbps	2412	12.48	/
		2437	13.54	
		2462	12.85	
802.11g	6 Mbps	2412	16.60	
		2437	17.07	
		2462	16.56	
802.11n (HT20)	MCS0	2412	17.63	
		2437	17.73	
		2462	17.58	
802.11n (HT40)	MCS0	2422	36.18	
		2437	35.95	
		2452	36.28	
Maximum Measured Value			36.28	

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	: Refer to test result
Input voltage	: AC 120V, 60Hz
Operation mode	: A
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 test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix B.

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) RSS-Gen Issue 4 Table 4
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: Refer to test result
Input voltage	: AC 120V, 60Hz
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 22 °C
Relative humidity	: 53 %
Atmospheric pressure	: 101 kPa

Remark:

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix B.

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 : 25.05.2019
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 20dB Bandwidth, General 2.4GHz

Test Mode	Test Channel (MHz)	20dB Bandwidth (kHz)	2/3 of 20dB Bandwidth (kHz)	Limit (MHz)
BDR	2402	1044.00	696.000	/
	2441	1045.00	696.667	
	2480	1044.00	696.000	
Maximum Measured Value		1044.00	696.000	

Test Mode	Test Channel (MHz)	20dB Bandwidth (kHz)	2/3 of 20dB Bandwidth (kHz)	Limit (MHz)
EDR	2402	1169.00	779.333	/
	2441	1170.00	780.000	
	2480	1170.00	780.000	
Maximum Measured Value		1170.00	780.000	

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	: 25.07.2019
Input voltage	: AC 120V, 60Hz
Operation mode	: C
Test channel	: Low / Middle / High
Ambient temperature	: 24 °C
Relative humidity	: 50 %
Atmospheric pressure	: 101 kPa

For details refer to following test result.

Table 13: Test Result of Carrier Frequency Separation, General 2.4GHz

Test Mode	Test Channel	Test Channel (MHz)	Measured Channel Separation (KHz)	Limit (kHz)
FHSS	Low Channel	2402	1008.0	≥ 25kHz or 2/3 of 20dB bandwidth
	Adjacency Channel	2403		
	Middle Channel	2441	1050.0	
	Adjacency Channel	2442		
	High Channel	2480	999.0	
	Adjacency Channel	2479		

Note: The limit is maximum 2/3 of the 20 dB bandwidth: 696.000 KHz.

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 : ≥ 15 non-overlapping channels
Kind of test site : Shielded Room

Test Setup

Date of testing : 25.07.2019
Input voltage : AC 120V, 60Hz
Operation mode : C
Ambient temperature : 24 °C
Relative humidity : 50 %
Atmospheric pressure : 101 kPa

For details refer to following test result.

Table 14: Test Result of Number of Hopping Frequency, General 2.4GHz

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

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 : 25.07.2019

Input voltage : AC 120V, 60Hz

Operation mode : C

Test channel : Low / Middle / High

Ambient temperature : 24 °C

Relative humidity : 50 %

Atmospheric pressure : 101 kPa

For details refer to following test result.

Table 15: Test Result of Time of Occupancy

Test Mode	Test Channel (MHz)	Pulse Width(ms)	Number of Channels	Measured Dwell Time(s)	Limit (s)
BDR	2402	2.896	110	0.319	0.4s
	2441	2.896	110	0.319	
	2480	2.896	110	0.319	

Test Mode	Test Channel (MHz)	Pulse Width(ms)	Number of Channels	Measured Dwell Time(s)	Limit (s)
EDR	2402	2.899	110	0.319	0.4s
	2441	2.899	110	0.319	
	2480	2.899	110	0.319	

Note:

- 1) Dwell time = Pulse width x Number of channels in Period
Period = 0.4 (seconds/ channel) x 79 (channel) = 31.6 seconds
- 3) Pre-test the different type of Modulation for this test. Only the worst case BDR (DH5 packet) and EDR (3DH5 packet) were recorded in this report.

5.1.12 Conducted Emission on AC Mains**RESULT:****Pass****Test Specification**

Test standard	: FCC Part 15.207(a) RSS-Gen Clause 8.8
Basic standard	: ANSI C63.10: 2013
Frequency range	: 0.15 – 30MHz
Limits	: FCC Part 15.207(a) RSS-Gen Table 3
Kind of test site	: Shielded Room

Test Setup

Date of testing	: Refer to test result
Input voltage	: AC 120V, 60Hz
Operation mode	: C
Earthing	: Not connected
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix B.

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
FCC KDB Publication 865664 D01 v01r04
FCC KDB Publication 865664 D02 v01r02
RSS-102 Issue 5 March 2015

➤ FCC requirements

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

MPE Calculation Method according to KDB 865664 D01Power Density: $S_{(mW/cm^2)} = PG/4\pi R^2$ or $EIRP/4\pi R^2$

Where:

S = power density (mW/cm²)

P = power input to the antenna (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm)

The nominal maximum conducted output power specified:

BT: -1.49 dBm

Wi-Fi 802.11 b/g/n: 14.13 dBm

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain (Max. 0.0 dBi for BT, 0.0 dBi for Wi-Fi 802.11 b/g/n), the RF power density can be calculated as below:

For BT: $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.0001 \text{ mW/cm}^2$ For Wi-Fi 802.11 b/g/n: $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.016 \text{ mW/cm}^2$ **Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310:** 1.0 mW/cm²simultaneous transmission mode (BT & WIFI): $0.0001/1.0 + 0.016/1.0 = 0.0161$

➤ **IC requirements:** The EUT shall comply with the requirement of RSS-102 section 2.5.2.

Exemption from Routine Evaluation Limits – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

- RF exposure evaluation exempted power for BT: 2.670 W
- RF exposure evaluation exempted power for Wi-Fi 802.11 b/g/n: 2.684 W

The nominal maximum conducted output power specified:

BT: -1.49 dBm

Wi-Fi 802.11 b/g/n: 14.13 dBm

Antenna Gain: 0.0 dBi for BT

Antenna Gain: 0.0 dBi for Wi-Fi 802.11 b/g/n

The Max. e.i.r.p. for BT: -1.49 dBm = 0.001 W

The Max. e.i.r.p. for Wi-Fi 802.11 b/g/n: 14.13 dBm = 0.026 W

1. Both e.i.r.p. for BT and Wi-Fi 802.11 b/g/n are less than the RF exposure evaluation exempted power.
2. For simultaneous transmission mode (BT & WIFI): $0.001/2.67 + 0.026/2.684 = 0.01$

So RF exposure evaluation is not required.

“RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”

7 Photographs of the Test Set-Up

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

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