



<b>Prüfbericht-Nr.:</b> <i>Test report No.:</i>	<b>50061248 001</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	164075510	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>	09.10.2016		
<b>Auftraggeber:</b> <i>Client:</i>	<b>Binatone Electronics International Ltd.</b> Floor 23A, 9 Des Voeux Road West, Sheung Wan, Hong Kong				
<b>Prüfgegenstand:</b> <i>Test item:</i>	2.8" Video Baby Monitor With Wi-Fi Internet Viewing (Baby Unit)				
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	MBP667CONNECTBU, MBP845CONNECTBU (motorola)				
<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 1 May 2015 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				
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	09.10.2016	Please refer to photo documents			
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	A000405259 009-010				
<b>Prüfzeitraum:</b> <i>Testing period:</i>	09.10.2016 - 16.12.2016				
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	Audix Technology (Shenzhen) Co., Ltd.				
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.				
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass				
<b>geprüft von / tested by:</b>		<b>kontrolliert von / reviewed by:</b>			
 04.01.2017 Ryan Yang / Senior Project Engineer		 04.01.2017 Winnie Hou / 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: VLJ-FOCUS67					
IC: 4522A-FOCUS67 HVIN: MBP667CONNECTBU, MBP845CONNECTBU					
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <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					
<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***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 Conducted Testing

Appendix C: Test Results of Radiated Testing

## 2 Test Sites

### 2.1 Test Facilities

**Audix Technology (Shenzhen) Co., Ltd.**

No. 6, Ke Feng Road, Block 52, Shenzhen Science & Industry Park, Nantou, Shenzhen, Guangdong, 518057 China

FCC Registration No.: 90454

Test site Industry Canada No.: 5183A-1

The tests at the test sites have been conducted under the supervision of a TÜV engineer.

## 2.2 List of Test and Measurement Instruments

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

**Audix Technology (Shenzhen) Co., Ltd.**

<b>Radio Spectrum Test</b>				
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Cal. Until</b>
Spectrum	Agilent	N9030A	MY51380221	14.10.2017
<b>Conducted Emission on AC Mains</b>				
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Cal. Until</b>
Test Receiver	R&S	ESCI	100842	23.04.2017
L.I.S.N.#1	R&S	ESH2-Z5	100429	17.10.2017
L.I.S.N.#2	Kyoritsu	K NW-403D	8-1750-2	23.04.2017
Terminator	Hubersuhner	50Ω	No.1	04.05.2017
Terminator	Hubersuhner	50Ω	No.2	04.05.2017
RF Cable	MIYAZAKI	3D-2W	No.1	23.04.2017
Coaxial Switch	Anritsu	MP59B	6200766906	22.04.2017
<b>Spurious Emission, Below 1GHz</b>				
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Cal. Until</b>
EMI Spectrum	Agilent	E4407B	MY41440292	23.04.2017
Test Receiver	R&S	ESVS10	834468/011	23.04.2017
Amplifier	HP	8447D	2648A04738	23.04.2017
Loop Antenna	Chase	HLA6120	1062	24.09.2017
Tri-log-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-710	19.07.2017
RF Cable	MIYAZAKI	CFD400NL-LW	No.3	25.09.2017
Coaxial Switch	Anritsu	MP59B	6201397222	22.04.2017
Attenuator	EMCI	EMCI-N-6-06	AT-N0639	25.09.2017
<b>Spurious Emission, Above 1GHz</b>				
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Cal. Until</b>
3#Chamber	AUDIX	N/A	N/A	20.05.2017
Spectrum Analyzer	Agilent	E4446A	US44300459	23.04.2017
Horn Antenna	ETS	3115	9510-4877	14.10.2017
Amplifier	Agilent	8449B	3008A02495	23.04.2017
RF Cable	Hubersuhner	SUCOFLEX106	505238/6	23.04.2017

## 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	Uncertainty	Remark
Radiated Emission test in 3m chamber	±2.8 dB	Below 1GHz
Radiated Emission test in 3m chamber	±5.8 dB	Above 1GHz
Conducted Spurious emission test	±2.0 dB	
Output power test	±0.8 dB	
Power density test	±2.0 dB	
Bandwidth	±83 KHz	
Temperature	±3%	
humidity	±0.6°C	

## 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 (Shenzhen) file for certification follow-up purposes.

## 2.7 Status of Facility Used for Testing

The Audix Technology (Shenzhen) Co., Ltd. Test facility located at No. 6, Ke Feng Road, Block 52, Shenzhen Science & Industry Park, Nantou, Shenzhen, Guangdong, 518057 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 2.8" Video Baby Monitor With Wi-Fi Internet Viewing (Baby Unit), it contains the baby unit and parent unit, the baby unit supports Wi-Fi 802.11 b/g/n and general 2.4GHz wireless technologies, and the parent unit only supports general 2.4GHz wireless technology.

According to the declaration of the applicant, the electrical circuit design, PCB layout and components used are identical for all models, only the model No. and appearance are different.

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	2.8" Video Baby Monitor With Wi-Fi Internet Viewing (Baby Unit)
Type Designation	MBP667CONNECTBU, MBP845CONNECTBU
Trade Mark	motorola
FCC ID	VLJ-FOCUS67
IC	4522A-FOCUS67
HVIN	MBP667CONNECTBU, MBP845CONNECTBU
Operating Voltage	DC 5.0V 1000mA input via AC/DC adapter
Testing Voltage	AC 120V, 60Hz
AC/DC Adapter #1	Model: BLJ06W050100P1-U Input: AC 100-240V~50/60Hz, 200mA Output: DC 5.0V~1000mA
AC/DC Adapter #2	Model: S006AKU0500100 Input: AC 100-240V~50/60Hz, 200mA Output: DC 5.0V~1000mA
<b>Technical Specification of general 2.4GHz wireless</b>	
Operating Frequency	2402 - 2477 MHz
Type of Modulation	GFSK
Channel Number	22 channels
Channel Separation	2 / 5 MHz
Antenna Type	Integral Antenna
Antenna Gain	0 dBi



<b>Technical Specification of Wi-Fi 802.11 b/g/n</b>	
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 Mbps 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 Wireless**

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
<b>CH02</b>	<b>2402</b>	CH30	2430	CH67	2467
CH04	2404	CH35	2435	CH69	2469
CH06	2406	<b>CH40</b>	<b>2440</b>	CH71	2471
CH08	2408	CH45	2445	CH73	2473
CH10	2410	CH50	2450	CH75	2475
CH15	2415	CH55	2455	<b>CH77</b>	<b>2477</b>
CH20	2420	CH60	2460	/	/
CH25	2425	CH65	2465	/	/

**Table 4: RF Channel and Frequency of Wi-Fi 802.11 b/g/n**

RF Channel	802.11 b/g/n(HT20)	802.11 n(HT40)
	Frequency (MHz)	Frequency (MHz)
<b>01</b>	<b>2412</b>	/
02	2417	/
<b>03</b>	<b>2422</b>	<b>2422</b>
04	2427	2427
05	2432	2432
<b>06</b>	<b>2437</b>	<b>2437</b>
07	2442	2442
08	2447	2447
<b>09</b>	<b>2452</b>	<b>2452</b>
10	2457	/
<b>11</b>	<b>2462</b>	/

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)

### 3.3 Independent Operation Modes

The basic operation modes are:

- A. On, General 2.4GHz wireless transmitting
  - 1. Low channel
  - 2. Middle channel
  - 3. High channel
- B. On, Wi-Fi 802.11 b/g/n wireless transmitting
  - 1. Low channel
  - 2. Middle channel
  - 3. High channel
- C. On, General 2.4GHz wireless on hopping channel
- D. On, General 2.4GHz wireless transmitting
- E. On, Wi-Fi 802.11 b/g/n wireless transmitting
- F. 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
- 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.

According to clause 3.2, Radio Spectrum and Radiated Spurious Emission tests were performed on model MBP667CONNECTBU with adapter #1, and Conducted Emission tests were performed on model MBP667CONNECTBU with adapter #1, #2 in this report.

### 4.3 Special Accessories and Auxiliary Equipment

**Table 5: List of Accessories and Auxiliary Equipment**

Description	Manufacturer	Model	S/N	Rating
Laptop	DELL	Laititude E6420	N/A	N/A
Digital Video Baby Monitor (Parent Unit)	VTech (Dongguan) Telecommunications Ltd.	MBP667CONNECTPU	N/A	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)

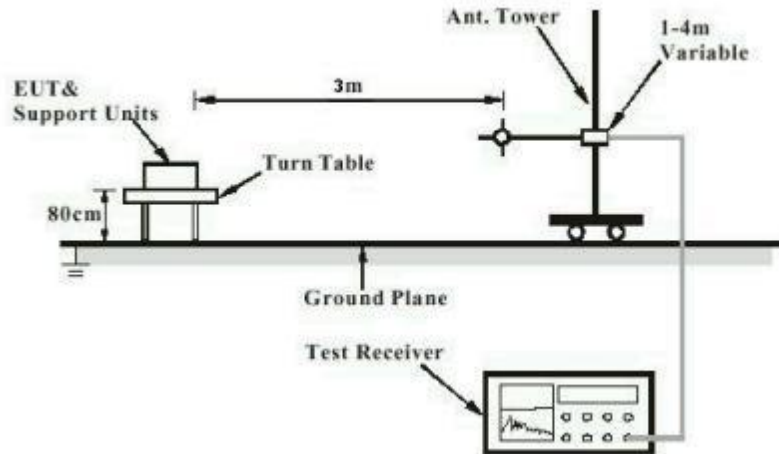


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

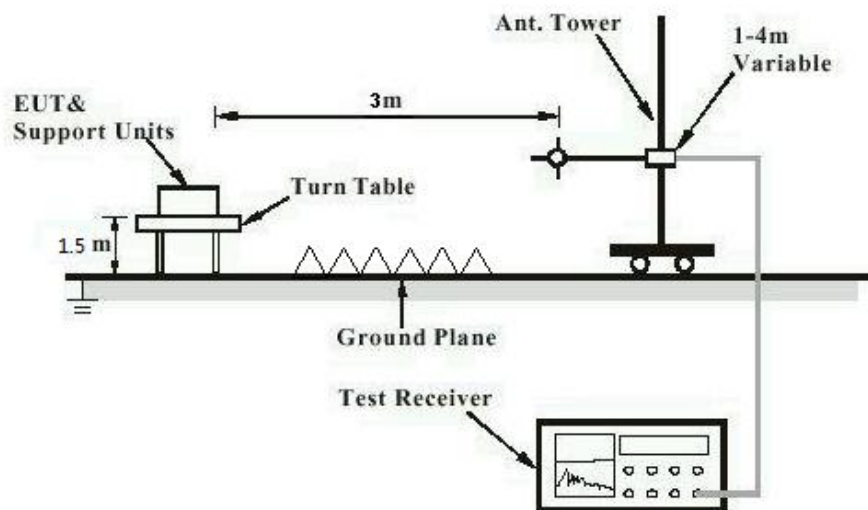


Diagram of Measurement Configuration for Mains Conduction Measurement

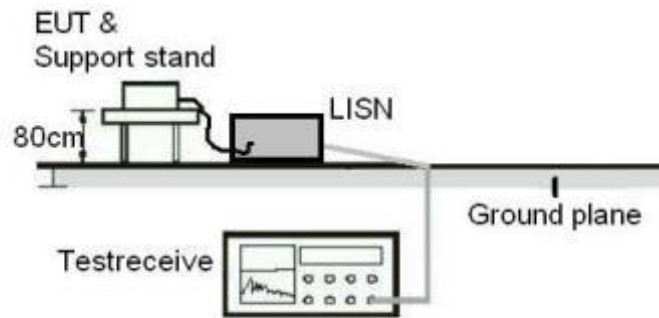
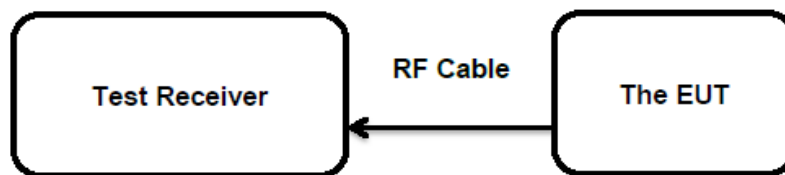


Diagram of Measurement Configuration for Conducted Transmitter Measurement



## 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 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) RSS-247 Clause 5.4(2)&(4)
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	: Refer to test result
Input voltage	: AC 120V, 60Hz
Operation mode	: A, B
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

For details refer to following test result.

**Table 6: Test Result of Maximum Peak Conducted Output Power, General 2.4GHz**

Test Mode	Frequency (MHz)	Measured Power		Limit (W)
		(dBm)	(W)	
General 2.4GHz	2402	13.88	0.02443	< 0.125
	2440	13.39	0.02183	
	2477	13.58	0.02280	
<b>Maximum Measured Value</b>		13.88	0.02443	

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

Test Mode	Data Rate	Frequency (MHz)	Measured Power		Limit
			dBm	W	
802.11b	1 Mbps	2412	11.97	0.01574	< 1.0W
		2437	10.87	0.01222	
		2462	11.39	0.01377	
802.11g	6 Mbps	2412	8.80	0.00759	
		2437	8.19	0.00659	
		2462	8.28	0.00673	
802.11n (HT20)	MCS0 Mbps	2412	8.63	0.00729	
		2437	8.02	0.00634	
		2462	8.12	0.00649	
802.11n (HT40)	MCS0 Mbps	2422	7.18	0.00522	
		2437	6.55	0.00452	
		2452	6.72	0.00470	
<b>Maximum Measured Value</b>			11.97	0.01574	

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

For the measurement records, refer to the appendix B.



### 5.1.3 Conducted Power Spectral Density

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

Test standard : FCC Part 15.247(e)  
RSS-247 Clause 5.2(2)

Basic standard : ANSI C63.10: 2013

Limits : 8 dBm / 3kHz

Kind of test site : Shielded Room

**Test Setup**

Date of testing : Refer to test result

Input voltage : AC 120V, 60Hz

Operation mode : B

Test channel : Low / Middle / High

Ambient temperature : 25 °C

Relative humidity : 56 %

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	Frequency (MHz)	Measured Peak Power Spectral Density (dBm/3KHz)
802.11b	1 Mbps	2412	-17.675
		2437	-18.876
		2462	-18.630
802.11g	6 Mbps	2412	-17.644
		2437	-18.455
		2462	-18.099
802.11n (HT20)	MCS0 Mbps	2412	-18.287
		2437	-18.730
		2462	-18.787
802.11n (HT40)	MCS0 Mbps	2422	-21.039
		2437	-21.956
		2452	-21.576
<b>Maximum Measured Value</b>			<b>-17.644</b>

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

For the measurement records, refer to the appendix B.

### 5.1.4 6dB Bandwidth

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

Test standard : FCC Part 15.247(a)(2)  
RSS-247 Clause 5.2(1)

Basic standard : ANSI C63.10: 2013

Limits : > 500 KHz

Kind of test site : Shielded Room

**Test Setup**

Date of testing : Refer to test result

Input voltage : AC 120V, 60Hz

Operation mode : B

Test channel : Low / Middle / High

Ambient temperature : 25 °C

Relative humidity : 56 %

Atmospheric pressure : 101 kPa

For details refer to following test result.

**Table 9: Test Result of 6dB Bandwidth, Wi-Fi 802.11 b/g/n**

Test Mode	Data Rate	Frequency (MHz)	-6dB Bandwidth (MHz)	Limit (kHz)
802.11b	1 Mbps	2412	10.08	> 500
		2437	10.08	
		2462	10.08	
802.11g	6 Mbps	2412	16.55	
		2437	16.55	
		2462	16.55	
802.11n (HT20)	MCS0 Mbps	2412	17.83	
		2437	17.83	
		2462	17.83	
802.11n (HT40)	MCS0 Mbps	2422	36.50	
		2437	36.51	
		2452	36.50	
<b>Minimum Measured Value</b>			10.08	

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

For the measurement records, refer to the appendix B.

### 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 : Refer to test result  
Input voltage : AC 120V, 60Hz  
Operation mode : A, B  
Test channel : Low / Middle / High  
Ambient temperature : 25 °C  
Relative humidity : 56 %  
Atmospheric pressure : 101 kPa

For details refer to following test result.

**Table 10: Test Result of 99% Bandwidth, General 2.4GHz**

Test Mode	Frequency (MHz)	99% Bandwidth (MHz)	Limit (kHz)
General 2.4GHz	2402	1.466	/
	2440	1.446	
	2477	1.472	
<b>Maximum Measured Value</b>		1.472	

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

Test Mode	Data Rate	Frequency (MHz)	99% Bandwidth (MHz)	Limit (kHz)
802.11b	1 Mbps	2412	15.005	/
		2437	15.002	
		2462	14.989	
802.11g	6 Mbps	2412	16.490	
		2437	16.488	
		2462	16.485	
802.11n (HT20)	MCS0 Mbps	2412	17.697	
		2437	17.696	
		2462	17.688	
802.11n (HT40)	MCS0 Mbps	2422	36.136	
		2437	36.142	
		2452	36.124	
<b>Maximum Measured Value</b>			36.142	

For the measurement records, refer to the appendix B.

### 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, B
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
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, B
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
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 C.

### 5.1.8 20dB Bandwidth

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

Test standard : FCC Part 15.247(a)(1)  
RSS-247 Clause 5.1(1)

Basic standard : ANSI C63.10: 2013

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 : 25 °C

Relative humidity : 56 %

Atmospheric pressure : 101 kPa

For details refer to following test result.

**Table 12: Test Result of 20dB Bandwidth, General 2.4GHz**

Test Mode	Frequency (MHz)	20dB Bandwidth (kHz)	2/3 of 20dB Bandwidth (kHz)	Limit (MHz)
General 2.4GHz	2402	1381	920.667	/
	2440	1397	931.333	
	2477	1393	928.667	
<b>Maximum Measured Value</b>		1397.00	931.333	/

For the measurement records, refer to the appendix B.

### 5.1.9 Carrier Frequency Separation

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

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

**Test Setup**

Date of testing : Refer to test result  
 Input voltage : AC 120V, 60Hz  
 Operation mode : C  
 Test channel : Low / Middle / High  
 Ambient temperature :  $25\text{ }^{\circ}\text{C}$   
 Relative humidity : 56 %  
 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	Frequency (MHz)	Measured Channel Separation (KHz)	Limit (kHz)
General 2.4GHz	Low Channel	2402	2000.0	$\geq 25\text{kHz}$ or $2/3$ of $20\text{dB}$ bandwidth
	Adjacency Channel	2404		
	Middle Channel	2440	5004.0	
	Adjacency Channel	2435		
	High Channel	2477	2000.0	
	Adjacency Channel	2475		

 Note: The limit is maximum  $2/3$  of the  $20\text{ dB}$  bandwidth:  $931.333\text{ KHz}$ .

For the measurement records, refer to the appendix B.



### 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(4)

Basic standard : ANSI C63.10: 2013

Limits :  $\geq 15$  non-overlapping channels

Kind of test site : Shielded Room

**Test Setup**

Date of testing : Refer to test result

Input voltage : AC 120V, 60Hz

Operation mode : C

Ambient temperature : 25 °C

Relative humidity : 56 %

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
General 2.4GHz	2402 - 2477 MHz	22	$\geq 15$

For the measurement records, refer to the appendix B.

### 5.1.11 Time of Occupancy

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

Test standard : FCC part 15.247(a)(1)(iii)  
RSS-247 Clause 5.1(4)

Basic standard : ANSI C63.10: 2013

Limits : < 0.4s

Kind of test site : Shielded Room

**Test Setup**

Date of testing : Refer to test result

Input voltage : AC 120V, 60Hz

Operation mode : C

Test channel : Low / Middle / High

Ambient temperature : 25 °C

Relative humidity : 56 %

Atmospheric pressure : 101 kPa

For details refer to following test result.

**Table 15: Test Result of Time of Occupancy, General 2.4GHz**

Test EUT	Frequency (MHz)	Pulse width (ms)	Number of Channels	Measured Dwell time (s)	Limit (s)
General 2.4GHz	2402	0.434	105	0.046	0.4s
	2440	0.438	105	0.046	
	2477	0.436	105	0.046	

Note:

Dwell time = Pulse width x Number of channels in Period

Period = 0.4 (seconds/ channel) x 22 (channel) = 8.8 seconds

For the measurement records, refer to the appendix B.

**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	: D, E
Earthing	: Not connected
Ambient temperature	: 24 °C
Relative humidity	: 53 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix C.

## 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 v06  
FCC KDB Publication 865664 D02 v01r02  
OET Bulletin 65 (Edition 97-01)  
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 OET Bulletin 65

Power Density:  $S_{(mW/cm^2)} = PG/4\pi R^2$  or  $EIRP/4\pi R^2$

Where:

S = power density (mW/cm<sup>2</sup>)

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:

2.4GHz FHSS: 14.00 dBm

802.11b/g/n: 13.00 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 2.4GHz FHSS and 0.0 dBi 802.11b/g/n), the RF power density can be calculated as below:

For 2.4GHz FHSS:  $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.008$  mW/cm<sup>2</sup>

For 802.11b/g/n:  $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.006$  mW/cm<sup>2</sup>

**Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310:**1.0 mW/cm<sup>2</sup>

For Simultaneous transmitting of 2.4GHz FHSS and 802.11b/g/n:

According to 865664D02 2.2 d) 1):

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits =  
 $0.008/1 + 0.006/1 = 0.014 < 1$ ➤ **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 2.4GHz FHSS: 2.679 W
- RF exposure evaluation exempted power for 802.11b/g/n: 2.684 W

**The nominal maximum conducted output power specified:**2.4GHz FHSS: 14.00 dBm (Tolerance:  $\pm 2$  dB)802.11b/g/n: 13.00 dBm (Tolerance:  $\pm 2$  dB)

Antenna Gain: 0.0 dBi for 2.4GHz FHSS

Antenna Gain: 0.0 dBi for 802.11b/g/n

The Max. e.i.r.p. for 2.4GHz FHSS: 16.00 dBm = 0.063 W

The Max. e.i.r.p. for 802.11b/g/n: 15.00 dBm = 0.032 W

Both e.i.r.p. for the 2.4GHz FHSS and 802.11b/g/n are less than the RF exposure evaluation exempted power. 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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