



<b>Prüfbericht-Nr.:</b> <i>Test report No.:</i>	<b>50112177 001</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	164107872	Seite 1 von 27 <i>Page 1 of 27</i>	
<b>Kunden-Referenz-Nr.:</b> <i>Client reference No.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date.:</i>	13.10.2017		
<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>	Wi-Fi® digital audio monitor and smart soother				
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	MBP163CONNECT (Trademark: 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 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				
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	13.10.2017	Please refer to photo documents			
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	A000631991 004 to 006				
<b>Prüfzeitraum:</b> <i>Testing period:</i>	13.10.2017 - 03.12.2017				
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	TÜV Rheinland (Guangdong) Ltd.				
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	TÜV Rheinland (Guangdong) Ltd.				
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass				
<b>geprüft von / tested by:</b>		<b>kontrolliert von / reviewed by:</b>			
					
17.01.2018	Amy Wang / Project Manager	17.01.2018	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: VLJ-MBP163					
IC: 4522A-MBP163      HVIN: MBP163CONNECT					
<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 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 Bluetooth Low Energy

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**

TÜV Rheinland (Guangdong) Ltd.

<b>Radio Spectrum Testing</b>				
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Cal. Until</b>
Spectrum Analyzer	R & S	FSP30	100286	15.03.2018
<b>Spurious Emission</b>				
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Cal. Until</b>
EMI Test Receiver	R & S	ESCI-3	100216	17.09.2018
Spectrum Analyzer	R & S	FSP30	100286	15.03.2018
Loop Antenna	R & S	HFH2-Z2 (<30MHz)	100111	13.03.2019
Trilog-Broadband Antenna	Schwarzbeck	VULB9168 (30MHz-1GHz)	684	19.09.2019
Double-Ridged Waveguide Horn Antenna	R & S	HF907 (1-18GHz)	100377	26.10.2018
Standard Gain Horn Antenna	EMCO	3160-09 (18-26.5GHz)	21642	28.07.2019
Pre-amplifier	MITEQ	AFS33-18002650- 30-8P-44 (1-18GHz)	1108282	19.07.2019
Band Reject Filter	Micro-Tronics	BRM50702	023	06.07.2018
<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>
EMI Test Receiver	R & S	ESCI-3	100314	11.04.2018
Two-Line V-Network	R & S	ESV216	100195	11.04.2018
Pulse Limiter	R & S	ESH3-Z2	100701	15.05.2018

## 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 (dB $\mu$ V/m) ± 5.16 dB
Radiated Emission (above 1000MHz)	Field strength (dB $\mu$ V/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 EUT is a Wi-Fi® digital audio monitor and smart soother which supports Bluetooth 4.0 Low Energy and Wi-Fi 802.11 b/g/n wireless technologies.

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	Wi-Fi® digital audio monitor and smart soother
Type Designation	MBP163CONNECT
Trade Mark	motorola
FCC ID	VLJ-MBP163
IC	4522A-MBP163
HVIN	MBP163CONNECT
Operating Voltage	DC 5.0V@600mA input via AC/DC adapter
Testing Voltage	AC 120V, 60Hz
AC/DC Adapter #1	Model: S003GU0500060 Input: AC 100-240V~50/60Hz, 150mA Output: DC 5.0V@600mA
AC/DC Adapter #2	Model: CS3E050060FU Input: AC 100-240V~50/60Hz, 200mA Output: DC 5.0V@600mA
<b>Technical Specification of Bluetooth 4.0 Low Energy</b>	
Operating Frequency	2402 - 2480 MHz
Type of Modulation	GFSK
Channel Number	40 channels
Channel Separation	2 MHz
Antenna Type	Integral 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 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 Bluetooth Low Energy**

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
<b>01</b>	<b>2402.00</b>	11	2422.00	21	2442.00	31	2462.00
02	2404.00	12	2424.00	22	2444.00	32	2464.00
03	2406.00	13	2426.00	23	2446.00	33	2466.00
04	2408.00	14	2428.00	24	2448.00	34	2468.00
05	2410.00	15	2430.00	25	2450.00	35	2470.00
06	2412.00	16	2432.00	26	2452.00	36	2472.00
07	2414.00	17	2434.00	27	2454.00	37	2474.00
08	2416.00	18	2436.00	28	2456.00	38	2476.00
09	2418.00	19	2438.00	29	2458.00	39	2478.00
10	2420.00	<b>20</b>	<b>2440.00</b>	30	2460.00	<b>40</b>	<b>2480.00</b>

Test frequencies are lowest channel: 2402 MHz, middle channel: 2440 MHz and highest channel: 2480 MHz for Bluetooth Low Energy

**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, Bluetooth Low Energy wireless transmitting mode
  - 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, Normal operation with Bluetooth mode
- 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
- 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 tests were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model MBP163CONNECT 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	ThinkPad X260	PC0DZSKR	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)

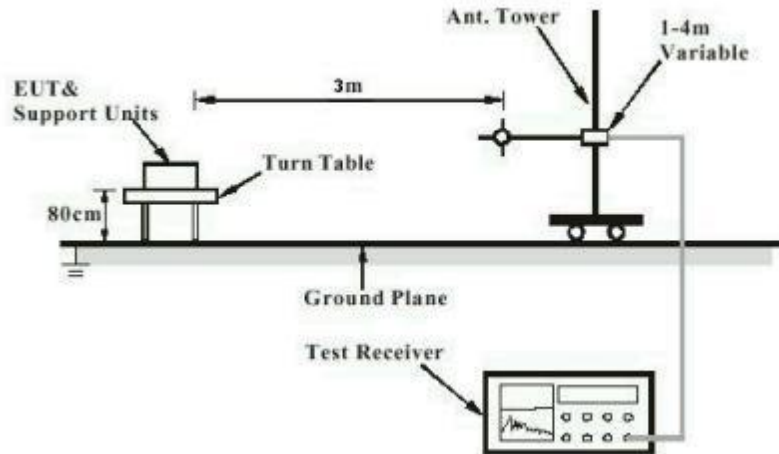


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

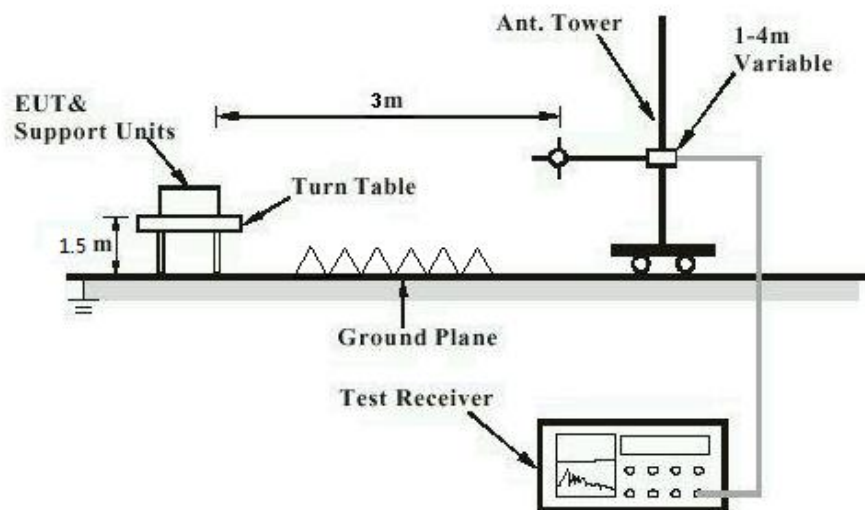


Diagram of Measurement Configuration for Mains Conduction Measurement

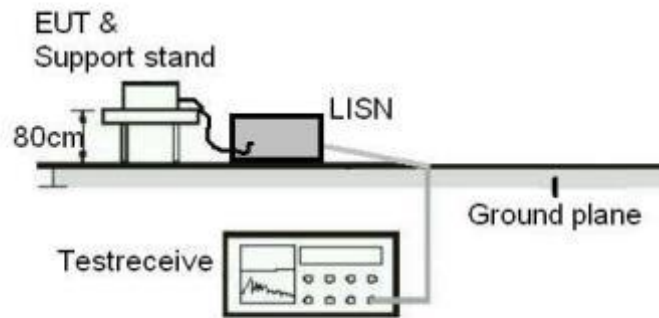
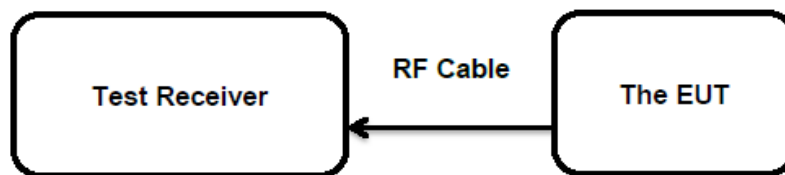


Diagram of Measurement Configuration for Conducted Transmitter Measurement



## 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 internal antennas, the directional gain of antenna are 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)(3)  
RSS-247 Clause 5.4(d)  
Basic standard : ANSI C63.10: 2013  
Limits : < 1.0 Watts  
Kind of test site : Shielded Room

**Test Setup**

Date of testing : 21.10.2017  
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, Bluetooth Low Energy**

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
Low Energy	2402	-1.17	0.00076	< 1.0
	2440	-1.12	0.00077	
	2480	-0.47	0.00090	
<b>Maximum Measured Value</b>		-0.47	0.00090	

Note:

- 1) The cable loss is taken into account in results.
- 2) Antenna gain(G) of Bluetooth Low Energy: 0 dBi,  
 The Maximum peak conducted output power (e.i.r.p.)= $P_{(\text{Peak power})} + G$ , 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	17.58	0.05728	< 1.0
		2437	17.67	0.05848	
		2462	17.85	0.06095	
802.11g	6 Mbps	2412	20.87	0.12218	
		2437	20.12	0.10280	
		2462	20.10	0.10233	
802.11n (HT20)	MCS0	2412	21.19	0.13152	
		2437	20.32	0.10765	
		2462	20.36	0.10864	
802.11n (HT40)	MCS0	2422	20.76	0.11912	
		2437	20.39	0.10940	
		2452	20.76	0.11912	
<b>Maximum Measured Value</b>			21.19	0.13152	

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)  
RSS-247 Clause 5.2(b)  
Basic standard : ANSI C63.10: 2013  
Limits : < 8 dBm / 3kHz  
Kind of test site : Shielded Room

**Test Setup**

Date of testing : 21.10.2017  
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 8: Test Result of Power Spectral Density, Bluetooth Low Energy**

Test Mode	Test Channel (MHz)	Measured Peak Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
Low Energy	2402	-14.35	8 dBm / 3kHz
	2440	-14.40	
	2480	-13.94	
<b>Maximum Measured Value</b>		-13.94	

**Table 9: 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	-13.53	8 dBm / 3kHz
		2437	-12.96	
		2462	-13.45	
802.11g	6 Mbps	2412	-14.23	
		2437	-13.93	
		2462	-14.66	
802.11n (HT20)	MCS0	2412	-13.23	
		2437	-13.92	
		2462	-13.40	
802.11n (HT40)	MCS0	2422	-15.04	
		2437	-15.11	
		2452	-15.11	
<b>Maximum Measured Value</b>			-12.96	

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

### 5.1.4 6dB Bandwidth

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

Test standard : FCC Part 15.247(a)(2)  
RSS-247 Clause 5.2(a)  
Basic standard : ANSI C63.10: 2013  
Limits : > 500 KHz  
Kind of test site : Shielded Room

**Test Setup**

Date of testing : 21.10.2017  
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 6dB Bandwidth, Bluetooth Low Energy**

Test Mode	Test Channel (MHz)	-6dB Bandwidth (kHz)	Limit (kHz)
Low Energy	2402	848.90	> 500
	2440	835.00	
	2480	843.80	
<b>Minimum Measured Value</b>		835.00	

**Table 11: 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	9720.00	> 500
		2437	10010.00	
		2462	10020.00	
802.11g	6 Mbps	2412	16550.00	
		2437	16550.00	
		2462	16540.00	
802.11n (HT20)	MCS0	2412	17730.00	
		2437	17690.00	
		2462	17670.00	
802.11n (HT40)	MCS0	2422	36470.00	
		2437	36440.00	
		2452	36470.00	
<b>Minimum Measured Value</b>			9720.00	

### 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 : 21.10.2017  
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 12: Test Result of 99% Bandwidth, Bluetooth Low Energy**

Test Mode	Test Channel (MHz)	99% Bandwidth (MHz)	Limit
Low Energy	2402	1.54	/
	2440	1.55	
	2480	1.57	
<b>Maximum Measured Value</b>		1.57	

**Table 13: 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	12.82	/
		2437	12.82	
		2462	12.74	
802.11g	6 Mbps	2412	16.55	
		2437	16.64	
		2462	16.59	
802.11n (HT20)	MCS0	2412	17.61	
		2437	17.72	
		2462	17.69	
802.11n (HT40)	MCS0	2422	36.32	
		2437	36.31	
		2452	36.30	
<b>Maximum Measured Value</b>			36.32	

### 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	: 21.10.2017
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 & C.

### 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	: 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 & C.

### 5.1.8 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+D
Earthing	: Not connected
Ambient temperature	: 24 °C
Relative humidity	: 53 %
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 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:**

Bluetooth Low Energy: 0 dBm

802.11 Wi-Fi b/g/n: 22.00 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 Bluetooth Low Energy, 0.0 dBi for 802.11 Wi-Fi b/g/n), the RF power density can be calculated as below:

For Bluetooth Low Energy:  $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.000 \text{ mW/cm}^2$ For 802.11 Wi-Fi b/g/n:  $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.032 \text{ mW/cm}^2$ **Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310:**1.0 mW/cm<sup>2</sup>

➤ **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 Bluetooth Low Energy: 2.670 W
- RF exposure evaluation exempted power for 802.11 Wi-Fi b/g/n: 2.684 W

#### **The nominal maximum conducted output power specified:**

Bluetooth Low Energy: 0 dBm

802.11 Wi-Fi b/g/n: 22.00 dBm

Antenna Gain: 0.0 dBi for Bluetooth Low Energy

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

The Max. e.i.r.p. for Bluetooth Low Energy: 0.00 dBm = 0.001 W

The Max. e.i.r.p. for 802.11 Wi-Fi b/g/n: 22.00 dBm = 0.158 W

Both e.i.r.p. for Bluetooth Low Energy and 802.11 Wi-Fi b/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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## Appendix B: Test Results of Bluetooth Low Energy

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### Appendix B.1: Conducted Spurious Emissions Measured in 100 kHz Bandwidth

Low Channel



Middle Channel

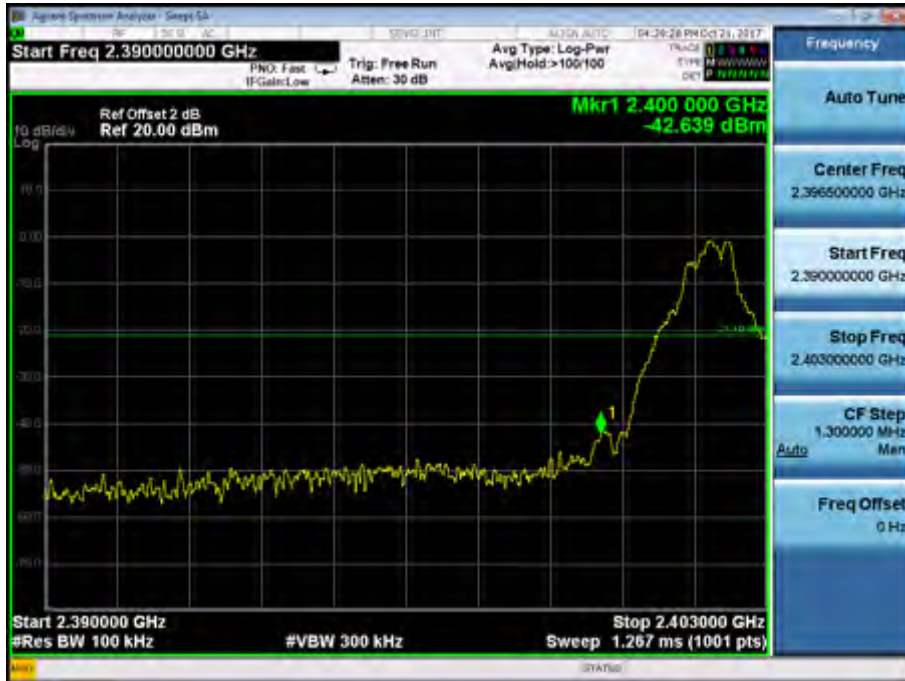


High Channel

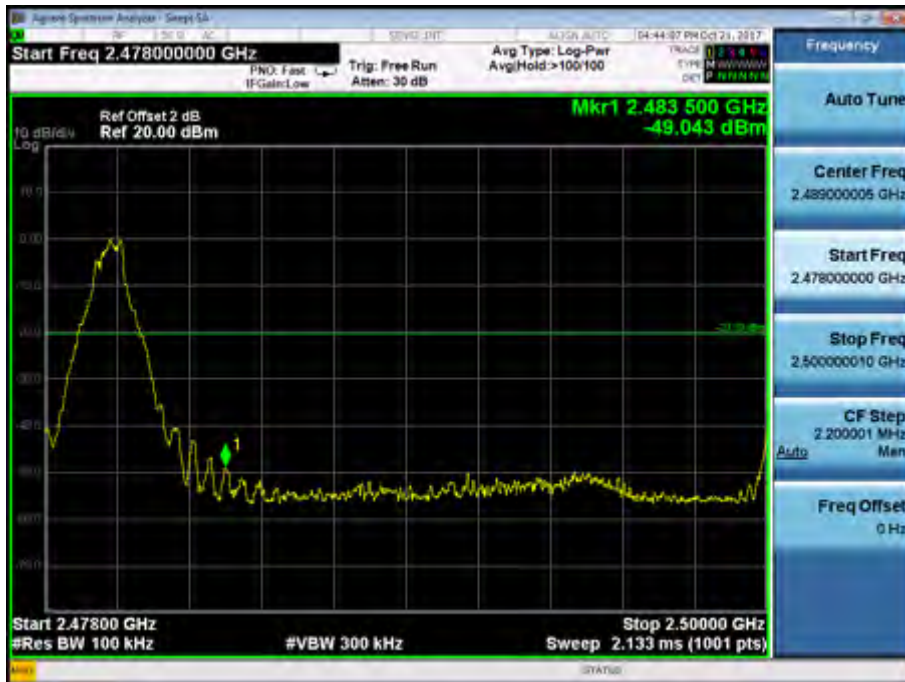




Band Edge, Low Channel



Band Edge, High Channel



Note: Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz -26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

### Appendix B.2: Test Results of Radiated Spurious Emissions 30MHz - 1GHz

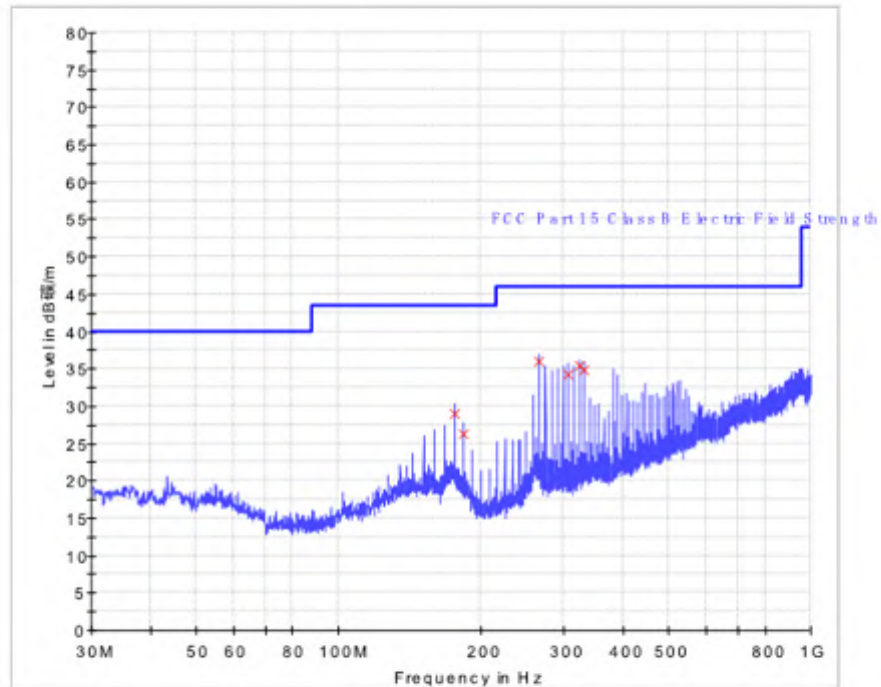
TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

## EMC Test Record (Emission)

### Common Information

Manufacturer:	
Test Item:	
Identification:	MBP163
Test Standard:	FCC Part 15
Test Detail:	Radiated Emission
Operation Mode:	BT(high)
Climate Condition:	21 °C, 52 %, 101 kPa
Test Voltage/ Freq:	AC 120 V / 60 Hz
Receipt No:	174075292
Report No:	
Result:	Pass
Comment:	Test distance is 3m; Horizontal
Subrange 1	
Frequency range:	30-1000MHz
Receiver:	ESCI 3
Transducer:	VULB9168



Tested by: *Jacky Chen* 20171203  
Reviewed by: \_\_\_\_\_



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EMC Test Service Hotline: +86-20-28391188

### Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)	Comment
176.120000	29.1	1000.0	120.000	H	14.3	14.4	43.5	
184.240000	26.4	1000.0	120.000	H	13.4	17.2	43.5	
266.200000	36.1	1000.0	120.000	H	15.0	9.9	46.0	
307.160000	34.3	1000.0	120.000	H	16.4	11.7	46.0	
323.560000	35.4	1000.0	120.000	H	16.9	10.6	46.0	
331.800000	34.9	1000.0	120.000	H	17.3	11.2	46.0	

Tested by: *Jacky Chen*  
20171203

Reviewed by: \_\_\_\_\_

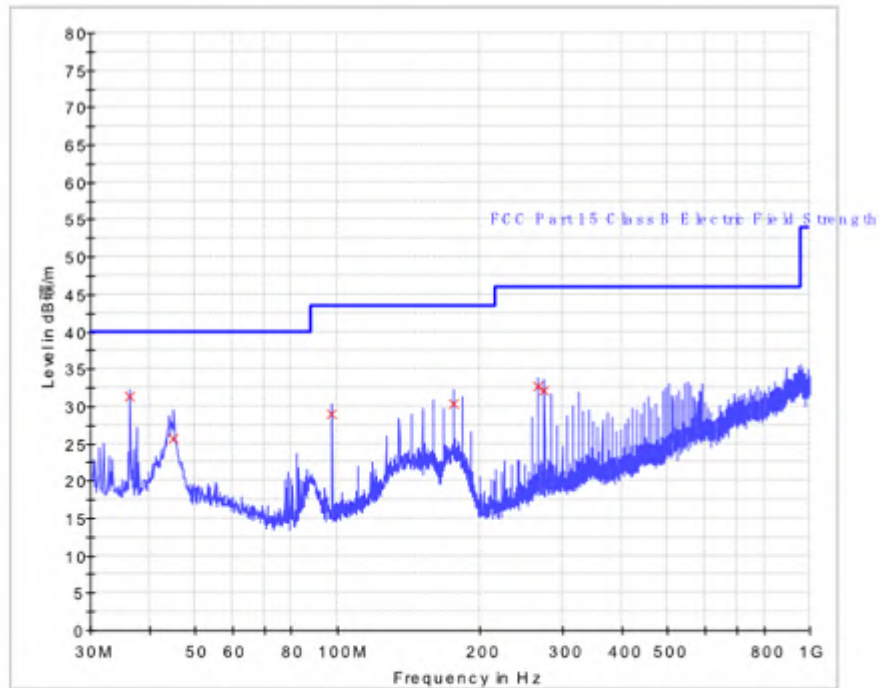
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EMC Test Service Hotline: +86-20-28391188

## EMC Test Record (Emission)

### Common Information

Manufacturer:	
Test Item:	
Identification:	MBP163
Test Standard:	FCC Part 15
Test Detail:	Radiated Emission
Operation Mode:	BT(high)
Climate Condition:	21 °C, 52 %, 101 kPa
Test Voltage/ Freq:	AC 120 V / 60 Hz
Receipt No:	174075292
Report No:	
Result:	Pass
Comment:	Test distance is 3m; Vertical
Subrange 1	
Frequency range:	30-1000MHz
Receiver:	ESCI 3
Transducer:	VULB9168



Tested by: *Jacky Chen* Reviewed by: \_\_\_\_\_  
20171203

TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

### Limit and Margin QP

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)	Comment
36.440000	31.3	1000.0	120.000	V	14.4	8.7	40.0	
45.040000	25.8	1000.0	120.000	V	13.9	14.2	40.0	
97.520000	29.1	1000.0	120.000	V	10.8	14.4	43.5	
176.120000	30.3	1000.0	120.000	V	14.3	13.2	43.5	
266.320000	32.8	1000.0	120.000	V	15.0	13.2	46.0	
274.440000	32.1	1000.0	120.000	V	15.4	13.9	46.0	

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20171203

Reviewed by: \_\_\_\_\_

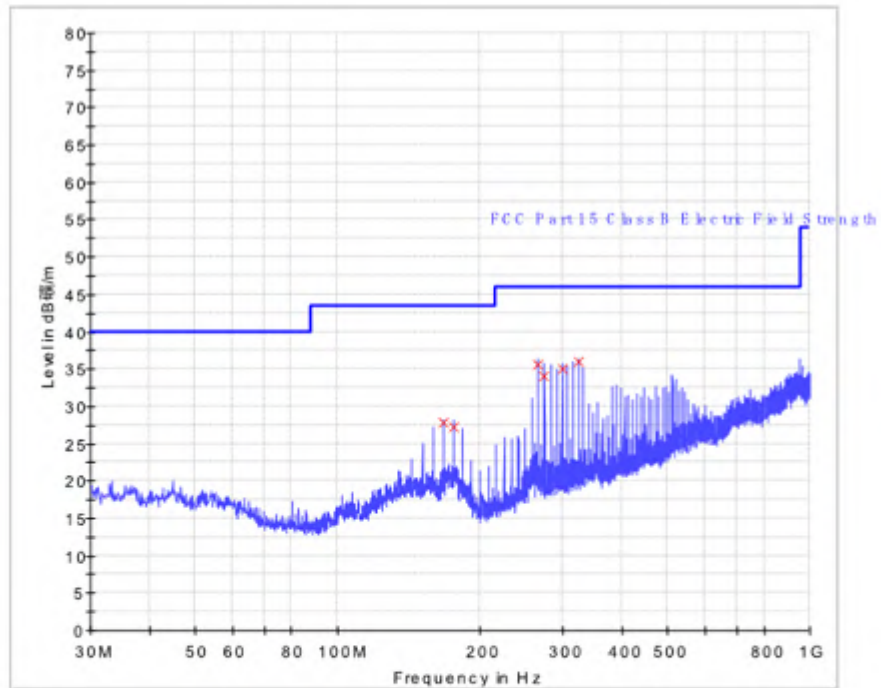
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EMC Test Service Hotline: +86-20-28391188

## EMC Test Record (Emission)

### Common Information

Manufacturer:	
Test Item:	
Identification:	MBP163
Test Standard:	FCC Part 15
Test Detail:	Radiated Emission
Operation Mode:	BT(mid)
Climate Condition:	21 °C, 52 %, 101 kPa
Test Voltage/ Freq:	AC 120 V / 60 Hz
Receipt No:	174075292
Report No:	
Result:	Pass
Comment:	Test distance is 3m; Horizontal
Subrange 1	
Frequency range:	30-1000MHz
Receiver:	ESCI 3
Transducer:	VULB9168



Tested by: *Jacky Chen* Reviewed by: \_\_\_\_\_  
20171203

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### Limit and Margin QP

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)	Comment
168.000000	27.8	1000.0	120.000	H	14.7	15.8	43.5	
176.000000	27.2	1000.0	120.000	H	14.3	16.3	43.5	
266.320000	35.6	1000.0	120.000	H	15.0	10.4	46.0	
274.440000	34.1	1000.0	120.000	H	15.4	11.9	46.0	
299.040000	35.0	1000.0	120.000	H	16.2	11.0	46.0	
323.560000	36.0	1000.0	120.000	H	16.9	10.1	46.0	

Tested by: *Jacky Chen*  
20171203

Reviewed by: \_\_\_\_\_

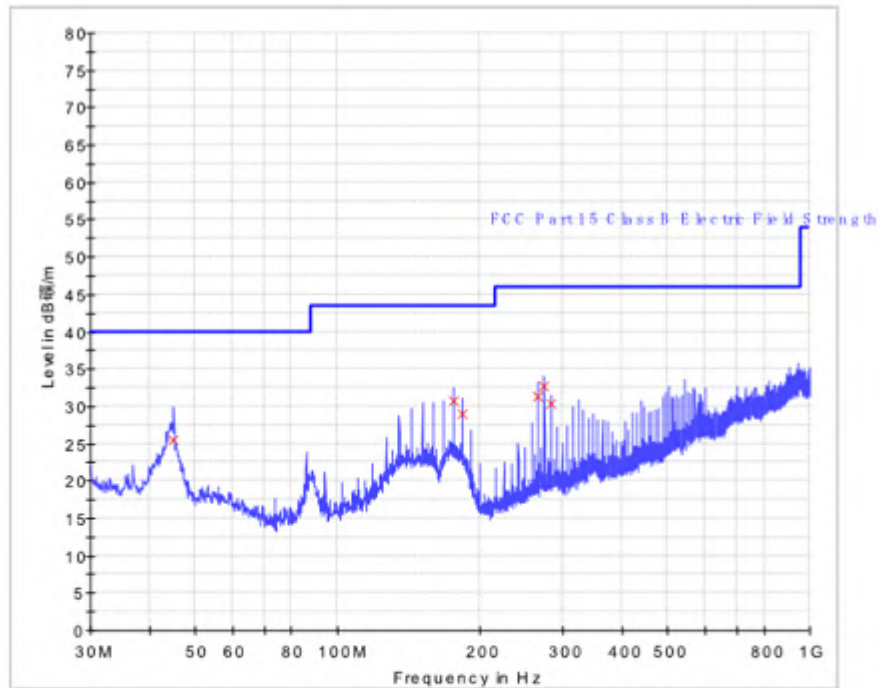
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EMC Test Service Hotline: +86-20-28391188

## EMC Test Record (Emission)

### Common Information

Manufacturer:	
Test Item:	
Identification:	MBP163
Test Standard:	FCC Part 15
Test Detail:	Radiated Emission
Operation Mode:	BT(mid)
Climate Condition:	21 °C, 52 %, 101 kPa
Test Voltage/ Freq:	AC 120 V / 60 Hz
Receipt No:	174075292
Report No:	
Result:	Pass
Comment:	Test distance is 3m; Vertical
Subrange 1	
Frequency range:	30-1000MHz
Receiver:	ESCI 3
Transducer:	VULB9168



Tested by: *Jacky Chen*  
20171203

Reviewed by: \_\_\_\_\_

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### Limit and Margin QP

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)	Comment
45.040000	25.5	1000.0	120.000	V	13.9	14.5	40.0	
176.120000	30.7	1000.0	120.000	V	14.3	12.8	43.5	
184.240000	29.1	1000.0	120.000	V	13.4	14.4	43.5	
266.200000	31.4	1000.0	120.000	V	15.0	14.6	46.0	
274.440000	32.8	1000.0	120.000	V	15.4	13.2	46.0	
282.680000	30.3	1000.0	120.000	V	15.7	15.7	46.0	

Tested by: *Jacky Chen*  
20171203

Reviewed by: \_\_\_\_\_

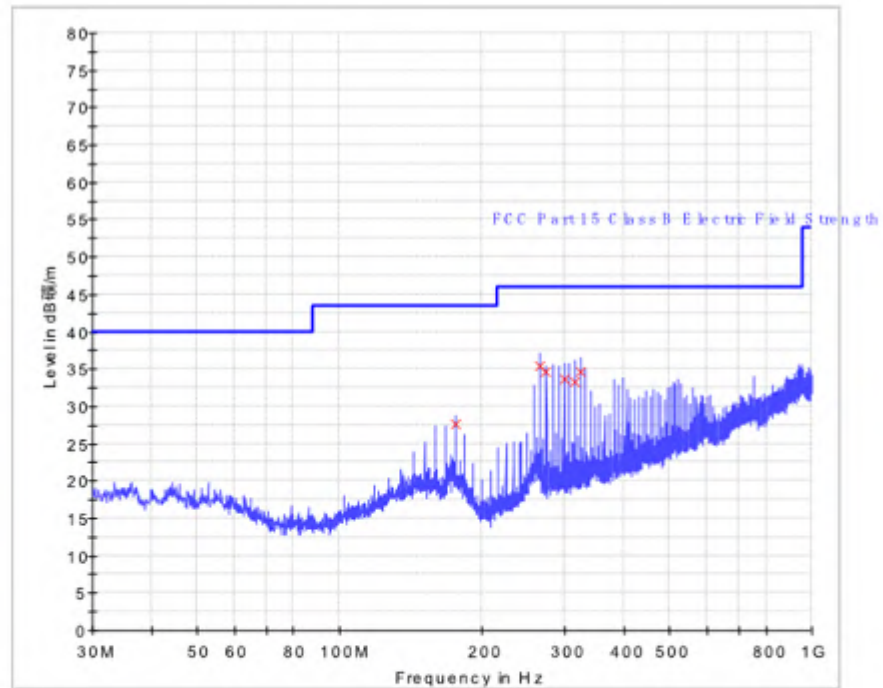
TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

## EMC Test Record (Emission)

### Common Information

Manufacturer:	
Test Item:	
Identification:	MBP163
Test Standard:	FCC Part 15
Test Detail:	Radiated Emission
Operation Mode:	BT(low)
Climate Condition:	21 °C, 52 %, 101 kPa
Test Voltage/ Freq:	AC 120 V / 60 Hz
Receipt No:	174075292
Report No:	
Result:	Pass
Comment:	Test distance is 3m; Horizontal
Subrange 1	
Frequency range:	30-1000MHz
Receiver:	ESCI 3
Transducer:	VULB9168



Tested by: *Jacky Chen*  
20171203

Reviewed by: \_\_\_\_\_



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### Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)	Comment
176.120000	27.6	1000.0	120.000	H	14.3	15.9	43.5	
266.320000	35.4	1000.0	120.000	H	15.0	10.6	46.0	
274.440000	34.7	1000.0	120.000	H	15.4	11.3	46.0	
298.920000	33.6	1000.0	120.000	H	16.2	12.4	46.0	
315.440000	33.3	1000.0	120.000	H	16.6	12.7	46.0	
323.560000	34.6	1000.0	120.000	H	16.9	11.5	46.0	

Tested by: *Jacky Chen*  
20171203

Reviewed by: \_\_\_\_\_

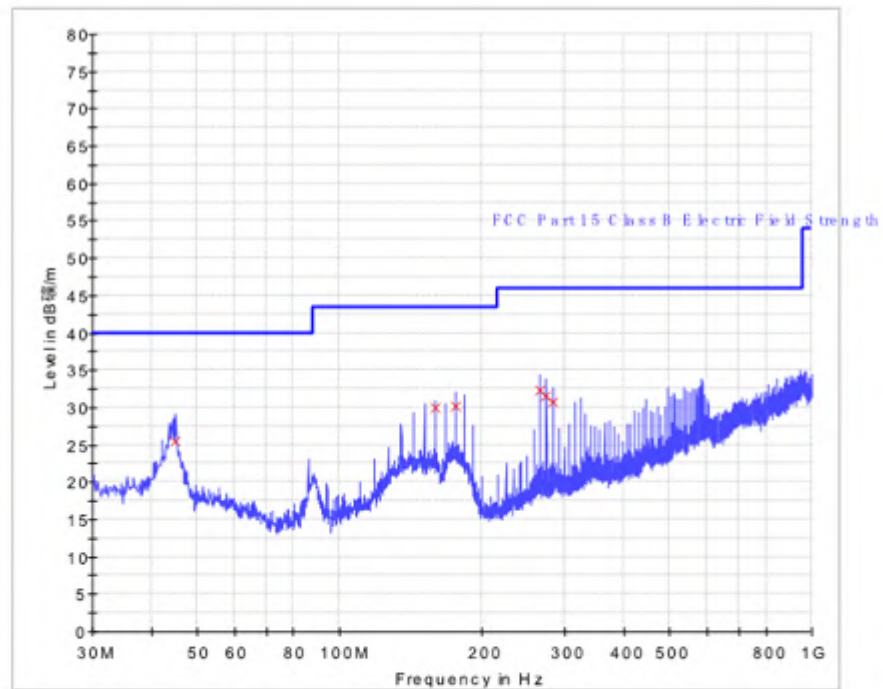
TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

## EMC Test Record (Emission)

### Common Information

Manufacturer:	
Test Item:	
Identification:	MBP163
Test Standard:	FCC Part 15
Test Detail:	Radiated Emission
Operation Mode:	BT(low)
Climate Condition:	21 °C, 52 %, 101 kPa
Test Voltage/ Freq:	AC 120 V / 60 Hz
Receipt No:	174075292
Report No:	
Result:	Pass
Comment:	Test distance is 3m; Vertical
Subrange 1	
Frequency range:	30-1000MHz
Receiver:	ESCI 3



Tested by: *Jacky Chen* Reviewed by: \_\_\_\_\_  
20171203

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EMC Test Service Hotline: +86-20-28391188

### Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)	Comment
45.040000	25.5	1000.0	120.000	V	13.9	14.5	40.0	
159.720000	29.9	1000.0	120.000	V	15.0	13.6	43.5	
176.120000	30.3	1000.0	120.000	V	14.3	13.3	43.5	
266.200000	32.3	1000.0	120.000	V	15.0	13.7	46.0	
274.440000	31.6	1000.0	120.000	V	15.4	14.4	46.0	
282.560000	30.8	1000.0	120.000	V	15.7	15.2	46.0	

Tested by: *Jacky chen*  
20171203

Reviewed by: \_\_\_\_\_

1GHz - 18GHz

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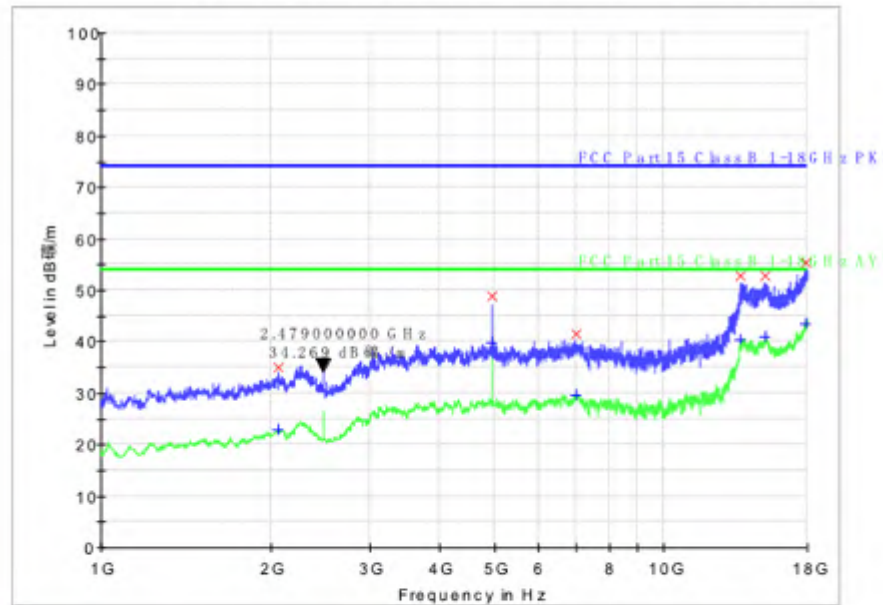
## EMC Test Record (Emission)

### Common Information

Manufacturer:  
Test Item:  
Identification: MBP163  
Test Standard: FCC Part 15  
Test Detail: Radiated Emission  
Operation Mode: BT(high)  
Climate Condition: 21 °C, 52 %, 101 kPa  
Test Voltage/ Freq: AC 120 V / 60 Hz  
Receipt No: 174075292  
Report No:  
Result: Pass  
Comment: Test distance is 3m; Horizontal

Subrange 1  
Frequency Range: 1GHz-18GHz  
Receiver: TUV FSP30  
Transducer: TUV SAC HF907/ TUV FSP30-TUV SAC HF907

EMCTT\_EREFO11-A02-07\_1GHz-18GHz\_With PreAMP EXT & Notch filter



— AVG\_MAXH  
— PK+\_MAXH  
— FCC Part 15 Class B 1-18GHz PK  
— FCC Part 15 Class B 1-18GHz AV  
× MaxPeak-PK+ (Single)  
+ Average-AVG (Single)

Tested by: *Jacky Chen*  
20171203  
Reviewed by: \_\_\_\_\_

TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

### Limit and Margin AV

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2067.000000	22.9	1000.0	1000.000	H	-15.1	31.1	54.0	
4959.000000	39.8	1000.0	1000.000	H	-7.7	14.2	54.0	
6980.000000	29.6	1000.0	1000.000	H	-5.4	24.4	54.0	
13712.000000	40.4	1000.0	1000.000	H	3.3	13.6	54.0	
15144.000000	40.8	1000.0	1000.000	H	5.7	13.2	54.0	
17887.000000	43.4	1000.0	1000.000	H	9.9	10.6	54.0	

### Limit and Margin PK

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
2067.000000	35.1	1000.0	1000.000	H	-15.1	38.9	74.0	
4959.000000	48.9	1000.0	1000.000	H	-7.7	25.1	74.0	
6980.000000	41.6	1000.0	1000.000	H	-5.4	32.5	74.0	
13712.000000	52.9	1000.0	1000.000	H	3.3	21.1	74.0	
15144.000000	52.9	1000.0	1000.000	H	5.7	21.1	74.0	
17887.000000	55.5	1000.0	1000.000	H	9.9	18.5	74.0	

Tested by: *Jacky Chen* Reviewed by: \_\_\_\_\_  
20171203

TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

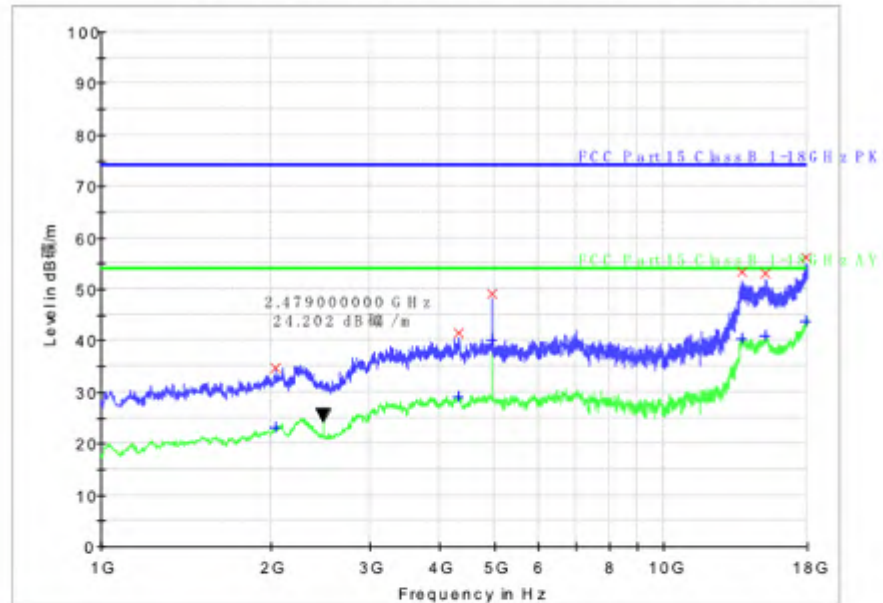
## EMC Test Record (Emission)

### Common Information

Manufacturer:  
Test Item:  
Identification: MBP163  
Test Standard: FCC Part 15  
Test Detail: Radiated Emission  
Operation Mode: BT(high)  
Climate Condition: 21 °C, 52 %, 101 kPa  
Test Voltage/ Freq: AC 120 V / 60 Hz  
Receipt No: 174075292  
Report No:  
Result: Pass  
Comment: Test distance is 3m; Vertical

Subrange 1  
Frequency Range: 1GHz-18GHz  
Receiver: TUV FSP30  
Transducer: TUV SAC HF907/ TUV FSP30-TUV SAC HF907

EMCTT\_EREFO11-A02-07\_1GHz-18GHz\_With PreAMP EXT & Notch filter



— AVG\_MAXH — PK+\_MAXH  
— FCC Part 15 Class B 1-18GHz PK — FCC Part 15 Class B 1-18GHz AV  
× MaxPeak-PK+ (Single) + Average-AVG (Single)

Tested by: *Jacky Chen* Reviewed by: \_\_\_\_\_  
20171203

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### Limit and Margin AV

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2041.000000	23.2	1000.0	1000.000	V	-15.0	50.8	74.0	
4330.000000	29.2	1000.0	1000.000	V	-8.7	44.8	74.0	
4959.000000	40.0	1000.0	1000.000	V	-7.7	34.0	74.0	
13799.000000	40.5	1000.0	1000.000	V	3.6	33.5	74.0	
15159.000000	40.9	1000.0	1000.000	V	5.7	33.2	74.0	
17921.000000	43.7	1000.0	1000.000	V	10.2	30.3	74.0	

### Limit and Margin PK

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
2041.000000	34.9	1000.0	1000.000	V	-15.0	39.1	74.0	
4330.000000	41.6	1000.0	1000.000	V	-8.7	32.4	74.0	
4959.000000	49.1	1000.0	1000.000	V	-7.7	24.9	74.0	
13799.000000	53.5	1000.0	1000.000	V	3.6	20.5	74.0	
15159.000000	53.0	1000.0	1000.000	V	5.7	21.0	74.0	
17921.000000	56.1	1000.0	1000.000	V	10.2	17.9	74.0	

Tested by: *Jacky Chen* Reviewed by: \_\_\_\_\_  
20171203

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EMC Test Service Hotline: +86-20-28391188

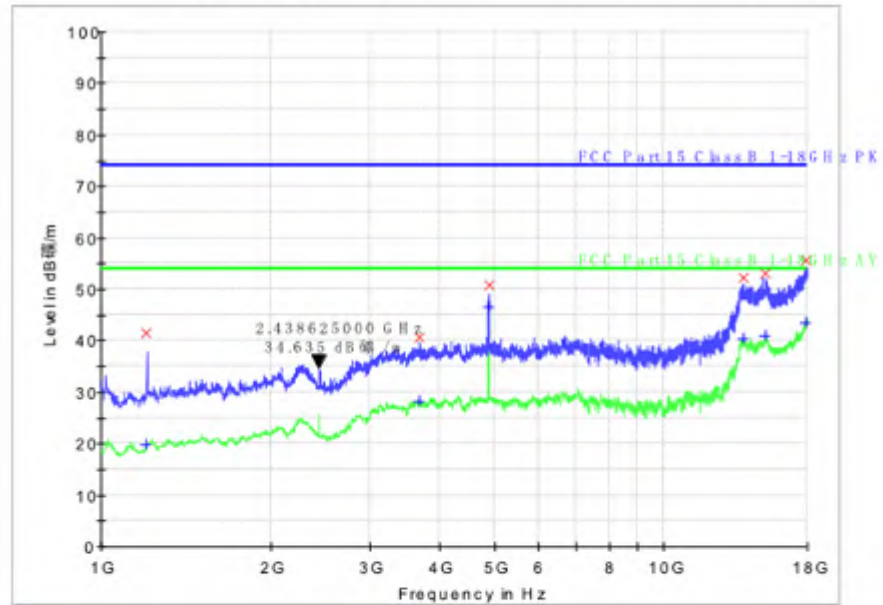
## EMC Test Record (Emission)

### Common Information

Manufacturer:  
Test Item:  
Identification: MBP163  
Test Standard: FCC Part 15  
Test Detail: Radiated Emission  
Operation Mode: BT(mid)  
Climate Condition: 21 °C, 52 %, 101 kPa  
Test Voltage/ Freq: AC 120 V / 60 Hz  
Receipt No: 174075292  
Report No:  
Result: Pass  
Comment: Test distance is 3m; Horizontal

Subrange 1  
Frequency Range: 1GHz-18GHz  
Receiver: TUV FSP30  
Transducer: TUV SAC HF907/ TUV FSP30-TUV SAC HF907

EMCTT\_EREFO11-A02-07\_1GHz-18GHz\_With PreAMP EXT & Notch filter



— AVG\_MAXH  
— PK+\_MAXH  
— FCC Part 15 Class B 1-18GHz PK  
— FCC Part 15 Class B 1-18GHz AV  
× MaxPeak-PK+ (Single)  
+ Average-AVG (Single)

Tested by: *Jacky Chen*  
20171203  
Reviewed by: \_\_\_\_\_



TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

### Limit and Margin AV

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1206.000000	19.8	1000.0	1000.000	H	-19.0	34.2	54.0	
3688.000000	28.2	1000.0	1000.000	H	-10.3	25.8	54.0	
4880.000000	46.7	1000.0	1000.000	H	-7.4	7.3	54.0	
13848.000000	40.3	1000.0	1000.000	H	3.6	13.7	54.0	
15165.000000	40.8	1000.0	1000.000	H	5.7	13.2	54.0	
17898.000000	43.4	1000.0	1000.000	H	10.0	10.6	54.0	

### Limit and Margin PK

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
1206.000000	41.5	1000.0	1000.000	H	-19.0	32.6	74.0	
3688.000000	40.6	1000.0	1000.000	H	-10.3	33.4	74.0	
4880.000000	50.7	1000.0	1000.000	H	-7.4	23.3	74.0	
13848.000000	52.3	1000.0	1000.000	H	3.6	21.7	74.0	
15165.000000	53.1	1000.0	1000.000	H	5.7	20.9	74.0	
17898.000000	55.6	1000.0	1000.000	H	10.0	18.4	74.0	

Tested by: *Jacky Chen*  
20171203

Reviewed by: \_\_\_\_\_

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EMC Test Service Hotline: +86-20-28391188

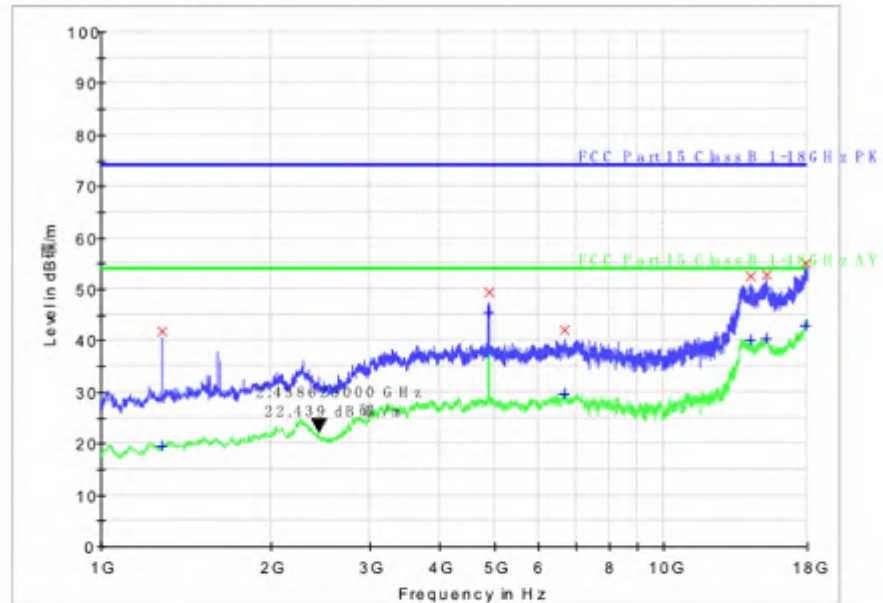
## EMC Test Record (Emission)

### Common Information

Manufacturer:  
Test Item:  
Identification: MBP163  
Test Standard: FCC Part 15  
Test Detail: Radiated Emission  
Operation Mode: BT(mid)  
Climate Condition: 21 °C, 52 %, 101 kPa  
Test Voltage/ Freq: AC 120 V / 60 Hz  
Receipt No: 174075292  
Report No:  
Result: Pass  
Comment: Test distance is 3m; Vertical

Subrange 1  
Frequency Range: 1GHz-18GHz  
Receiver: TUV FSP30  
Transducer: TUV SAC HF907/ TUV FSP30-TUV SAC HF907

EMCTT\_EREFO11-A02-07\_1GHz-18GHz\_With PreAMP EXT & Notch filter



— AVG\_MAXH  
— PK+\_MAXH  
— FCC Part 15 Class B 1-18GHz PK  
— FCC Part 15 Class B 1-18GHz AV  
x MaxPeak-PK+ (Single)  
+ Average-AVG (Single)

Tested by: *Jacky Chen*  
20171203  
Reviewed by: \_\_\_\_\_

TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

### Limit and Margin AV

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1285.000000	19.6	1000.0	1000.000	V	-18.9	34.4	54.0	
4880.000000	45.4	1000.0	1000.000	V	-7.4	8.6	54.0	
6682.000000	29.7	1000.0	1000.000	V	-5.8	24.3	54.0	
14275.000000	40.2	1000.0	1000.000	V	4.9	13.9	54.0	
15259.000000	40.3	1000.0	1000.000	V	5.4	13.7	54.0	
17875.000000	43.1	1000.0	1000.000	V	9.8	11.0	54.0	

### Limit and Margin PK

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
1285.000000	41.9	1000.0	1000.000	V	-18.9	32.1	74.0	
4880.000000	49.4	1000.0	1000.000	V	-7.4	24.6	74.0	
6682.000000	42.0	1000.0	1000.000	V	-5.8	32.0	74.0	
14275.000000	52.6	1000.0	1000.000	V	4.9	21.4	74.0	
15259.000000	52.9	1000.0	1000.000	V	5.4	21.1	74.0	
17875.000000	55.1	1000.0	1000.000	V	9.8	18.9	74.0	

Tested by: *Jacky Chen*  
20171203

Reviewed by: \_\_\_\_\_

TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

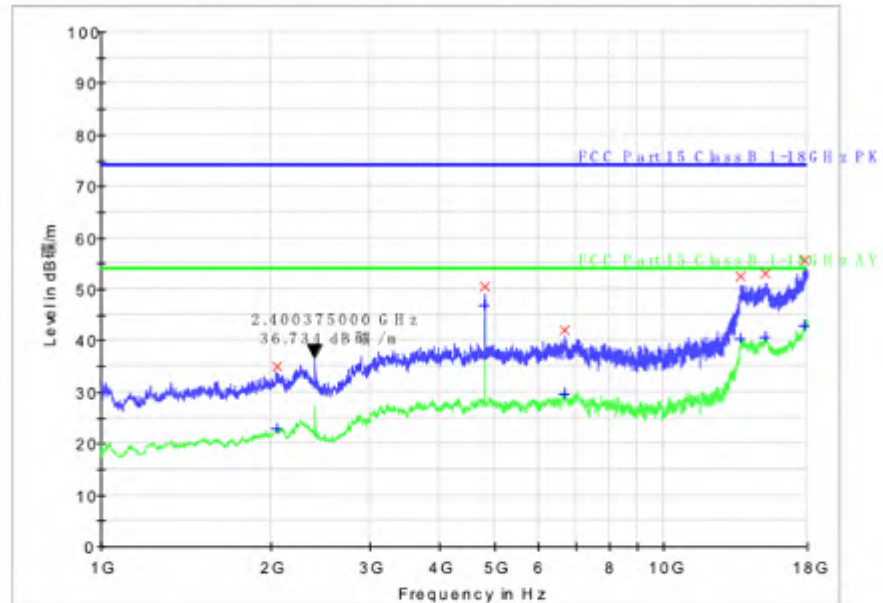
## EMC Test Record (Emission)

### Common Information

Manufacturer:  
Test Item:  
Identification: MBP163  
Test Standard: FCC Part 15  
Test Detail: Radiated Emission  
Operation Mode: BT(low)  
Climate Condition: 21 °C, 52 %, 101 kPa  
Test Voltage/ Freq: AC 120 V / 60 Hz  
Receipt No: 174075292  
Report No:  
Result: Pass  
Comment: Test distance is 3m; Horizontal

Subrange 1  
Frequency Range: 1GHz-18GHz  
Receiver: TUV FSP30  
Transducer: TUV SAC HF907/ TUV FSP30-TUV SAC HF907

EMCTT\_EREFO11-A02-07\_1GHz-18GHz\_With PreAMP EXT & Notch filter



— AVG\_MAXH      — PK+\_MAXH  
— FCC Part 15 Class B 1-18GHz PK      — FCC Part 15 Class B 1-18GHz AV  
× MaxPeak-PK+ (Single)      + Average-AVG (Single)

Date: 12/1/2017 - Time: 15:18:59

Tested by: *Jacky Chen*  
20171203      Reviewed by: \_\_\_\_\_

TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

### Limit and Margin AV

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2048.000000	22.8	1000.0	1000.000	H	-15.0	31.2	54.0	
4804.000000	47.0	1000.0	1000.000	H	-7.8	7.0	54.0	
6652.000000	29.5	1000.0	1000.000	H	-5.8	24.5	54.0	
13731.000000	40.4	1000.0	1000.000	H	3.4	13.6	54.0	
15152.000000	40.7	1000.0	1000.000	H	5.7	13.4	54.0	
17817.000000	43.1	1000.0	1000.000	H	9.7	10.9	54.0	

### Limit and Margin PK

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
2048.000000	35.2	1000.0	1000.000	H	-15.0	38.9	74.0	
4804.000000	50.5	1000.0	1000.000	H	-7.8	23.5	74.0	
6652.000000	42.1	1000.0	1000.000	H	-5.8	31.9	74.0	
13731.000000	52.4	1000.0	1000.000	H	3.4	21.6	74.0	
15152.000000	53.1	1000.0	1000.000	H	5.7	20.9	74.0	
17817.000000	55.6	1000.0	1000.000	H	9.7	18.4	74.0	

Date: 12/1/2017 - Time: 15:18:59

Tested by:

*Jacky Chen*

Reviewed by: \_\_\_\_\_

20171203

TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

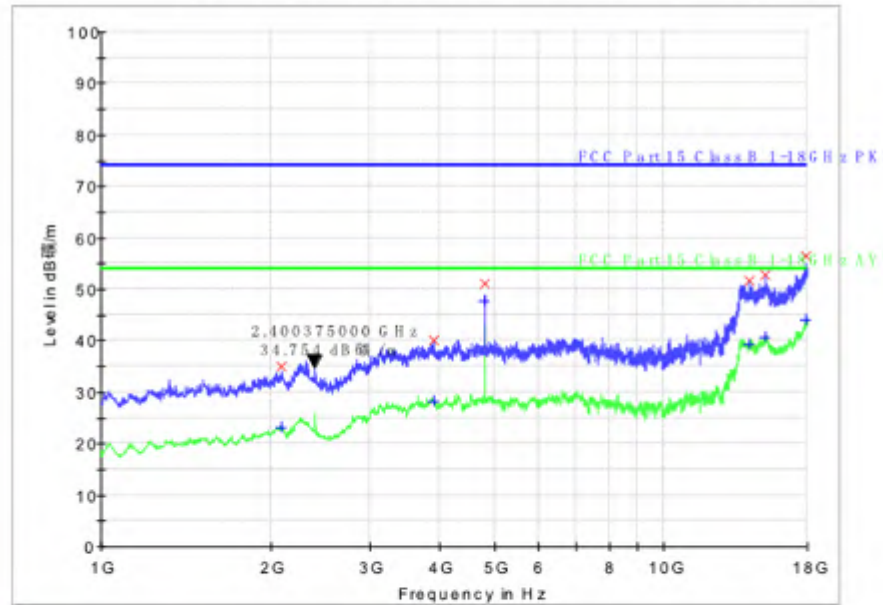
## EMC Test Record (Emission)

### Common Information

Manufacturer:  
Test Item:  
Identification: MBP163  
Test Standard: FCC Part 15  
Test Detail: Radiated Emission  
Operation Mode: BT(low)  
Climate Condition: 21 °C, 52 %, 101 kPa  
Test Voltage/ Freq: AC 120 V / 60 Hz  
Receipt No: 174075292  
Report No:  
Result: Pass  
Comment: Test distance is 3m; Vertical

Subrange 1  
Frequency Range: 1GHz-18GHz  
Receiver: TUV FSP30  
Transducer: TUV SAC HF907/ TUV FSP30-TUV SAC HF907

EMCTT\_EREFO11-A02-07\_1GHz-18GHz\_With PreAMP EXT & Notch filter



— AVG\_MAXH — PK+\_MAXH  
— FCC Part 15 Class B 1-18GHz PK — FCC Part 15 Class B 1-18GHz AV  
× MaxPeak-PK+ (Single) + Average-AVG (Single)

Tested by: *Jacky Chen* Reviewed by: \_\_\_\_\_  
20171203

TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

### Limit and Margin AV

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2096.000000	23.1	1000.0	1000.000	V	-15.2	30.9	54.0	
3903.000000	28.1	1000.0	1000.000	V	-9.9	25.9	54.0	
4804.000000	47.7	1000.0	1000.000	V	-7.8	6.3	54.0	
14154.000000	39.3	1000.0	1000.000	V	4.7	14.7	54.0	
15123.000000	40.6	1000.0	1000.000	V	5.6	13.4	54.0	
17943.000000	44.1	1000.0	1000.000	V	10.3	9.9	54.0	

### Limit and Margin PK

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
2096.000000	35.1	1000.0	1000.000	V	-15.2	38.9	74.0	
3903.000000	40.2	1000.0	1000.000	V	-9.9	33.8	74.0	
4804.000000	51.1	1000.0	1000.000	V	-7.8	22.9	74.0	
14154.000000	51.6	1000.0	1000.000	V	4.7	22.4	74.0	
15123.000000	52.9	1000.0	1000.000	V	5.6	21.1	74.0	
17943.000000	56.5	1000.0	1000.000	V	10.3	17.5	74.0	

Tested by: *Jacky Chen*  
20171203

Reviewed by: \_\_\_\_\_



### Appendix B.3: Test Results of Radiated Emissions in Restricted Bands Low channel

TUV Rheinland (Guangdong) Ltd.

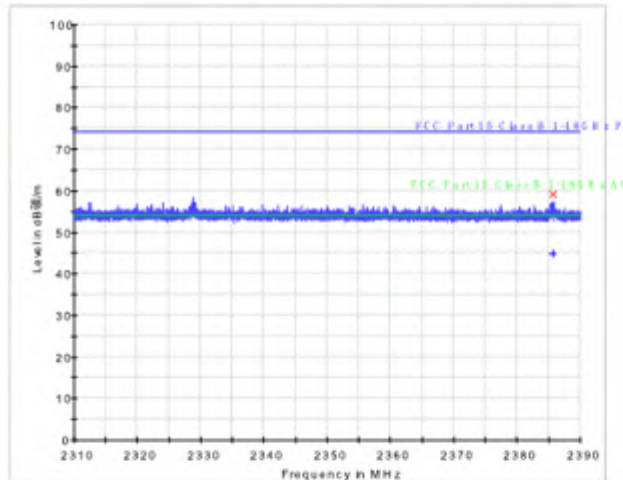
EMC Test Service Hotline: +86-20-28391188

## EMC Test Record (Emission)

### Common Information

Manufacturer:  
 Test Item:  
 Identification: MBP163  
 Test Standard: FCC Part 15  
 Test Detail: Radiated Emission(Band-edge)  
 Operation Mode: BT(low)  
 Climate Condition: 21 °C, 52 %, 101 kPa  
 Test Voltage/ Freq: AC 120 V / 60 Hz  
 Receipt No: 174075292  
 Report No:  
 Result: Pass  
 Comment: Test distance is 3m; Horizontal  
 Subrange 1  
 Frequency Range: 1GHz-18GHz  
 Receiver: TUV FSP30  
 Transducer: TUV SAC HF907/ TUV FSP30-TUV SAC HF907

EMCTT\_ERE011-A02-04\_1GHz-18GHz



### Limit and Margin AV

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2385.640000	44.9	1000.0	1000.000	H	31.1	9.1	54.0	

### Limit and Margin PK

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
2385.640000	59.3	1000.0	1000.000	H	31.1	14.7	74.0	

Tested by: *Jacky Chen*  
 20171203  
 Reviewed by: \_\_\_\_\_



TUV Rheinland (Guangdong) Ltd.

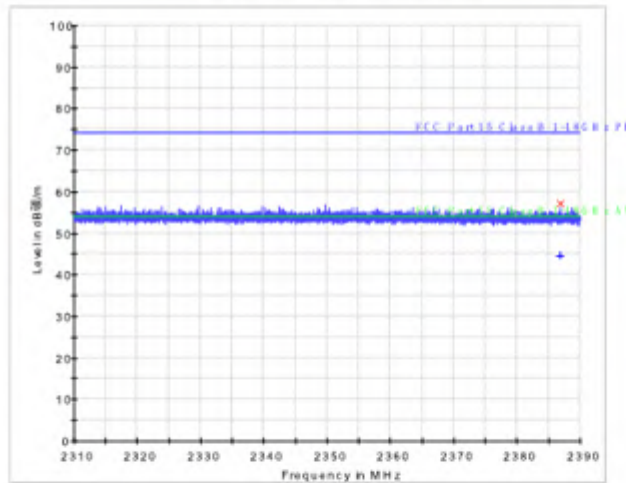
EMC Test Service Hotline: +86-20-28391188

## EMC Test Record (Emission)

### Common Information

Manufacturer:  
 Test Item:  
 Identification: MBP163  
 Test Standard: FCC Part 15  
 Test Detail: Radiated Emission(Band-edge)  
 Operation Mode: BT(low)  
 Climate Condition: 21 °C, 52 %, 101 kPa  
 Test Voltage/ Freq: AC 120 V / 60 Hz  
 Receipt No: 174075292  
 Report No:  
 Result: Pass  
 Comment: Test distance is 3m; Vertical  
  
 Subrange 1  
 Frequency Range: 1GHz-18GHz  
 Receiver: TUV FSP30  
 Transducer: TUV SAC HF907/ TUV FSP30-TUV SAC HF907

EMCTT\_EREFO11-A02-04\_1GHz-18GHz



### Limit and Margi AV

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2386.840000	44.5	1000.0	1000.000	V	31.1	9.5	54.0	

### Limit and Margi PK

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
2386.840000	57.2	1000.0	1000.000	V	31.1	16.8	74.0	

Tested by: *Jacky Chen*  
 20171203  
 Reviewed by: \_\_\_\_\_

High channel

TUV Rheinland (Guangdong) Ltd.

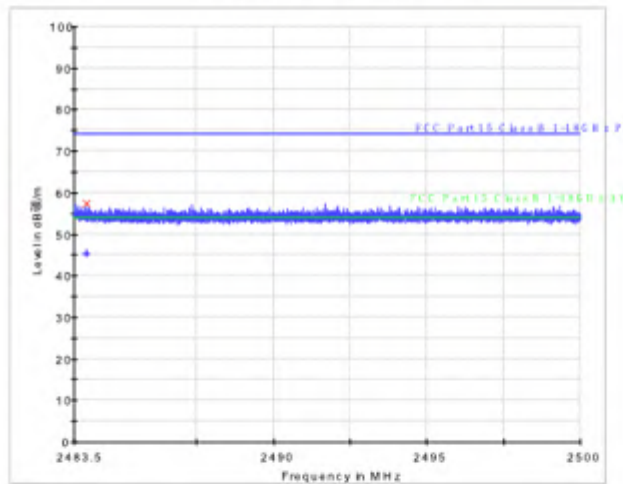
EMC Test Service Hotline: +86-20-28391188

## EMC Test Record (Emission)

### Common Information

Manufacturer:  
 Test Item:  
 Identification: MBP163  
 Test Standard: FCC Part 15  
 Test Detail: Radiated Emission(Band-edge)  
 Operation Mode: BT(high)  
 Climate Condition: 21 °C, 52 %, 101 kPa  
 Test Voltage/ Freq: AC 120 V / 60 Hz  
 Receipt No: 174075292  
 Report No:  
 Result: Pass  
 Comment: Test distance is 3m; Horizontal  
  
 Subrange 1  
 Frequency Range: 1GHz-18GHz  
 Receiver: TUV FSP30  
 Transducer: TUV SAC HF907/ TUV FSP30-TUV SAC HF907

EMCTT\_EREFO11-A02-04\_1GHz-18GHz



### Limit and Margin AV

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2483.920000	45.4	1000.0	1000.000	H	31.8	8.6	54.0	

### Limit and Margin PK

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
2483.920000	57.4	1000.0	1000.000	H	31.8	16.7	74.0	

Tested by: *Jacky Chen*  
 20171203  
 Reviewed by: \_\_\_\_\_

TUV Rheinland (Guangdong) Ltd.

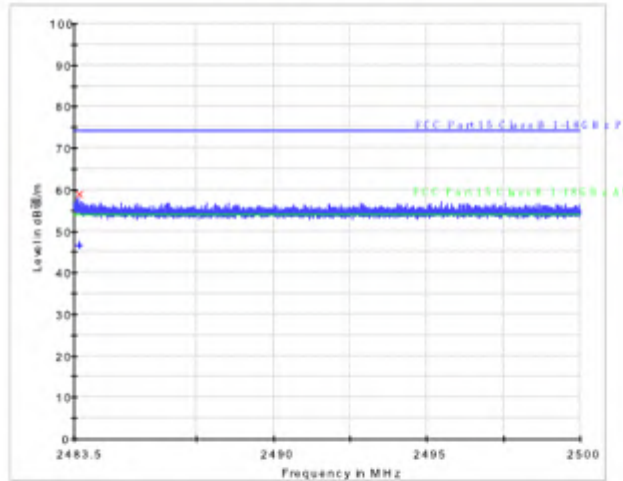
EMC Test Service Hotline: +86-20-28391188

## EMC Test Record (Emission)

### Common Information

Manufacturer:  
 Test Item:  
 Identification: MBP163  
 Test Standard: FCC Part 15  
 Test Detail: Radiated Emission(Band-edge)  
 Operation Mode: BT(high)  
 Climate Condition: 21 °C, 52 %, 101 kPa  
 Test Voltage/ Freq: AC 120 V / 60 Hz  
 Receipt No: 174075292  
 Report No:  
 Result: Pass  
 Comment: Test distance is 3m; Vertical  
  
 Subrange 1  
 Frequency Range: 1GHz-18GHz  
 Receiver: TUV FSP30  
 Transducer: TUV SAC HF907/ TUV FSP30-TUV SAC HF907

EMCTT\_EREFO11-A02-04\_1GHz-18GHz



### Limit and Margin AV

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
2483.680000	46.5	1000.0	1000.000	V	31.8	7.5	54.0	

### Limit and Margin PK

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
2483.680000	58.9	1000.0	1000.000	V	31.8	15.1	74.0	

Tested by: *Jacky Chen*  
 20171203  
 Reviewed by: \_\_\_\_\_

### Appendix B.4: Test Results of Conducted Emission on AC Mains B+C mode with adapter #1

TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

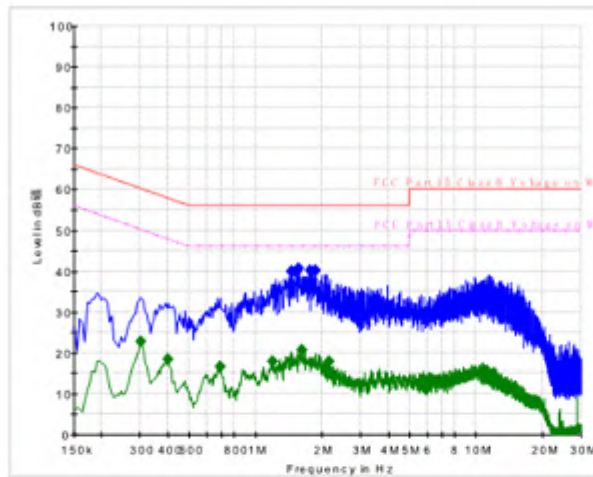
## EMC Test Record (EMISSION)

### Test Information

Manufacturer:  
Test Item:  
Identification: MBP163(with Tenpao adaptor)  
Test Standard: FCC Part 15  
Test Detail: Conducted Emission  
Operation Mode: Bluetooth + Wi-Fi mode  
Climate Condition: 22 °C; 50 %RH; 101 kPa.  
Test Voltage/ Freq.: AC 120 V/ 60 Hz  
Port / Line: AC Mains(L1+N)  
Receipt No.: 174075292  
Report No.: /  
Result: Pass  
Comment: /

Hardware Setup: 1phase LISN ENV216 to ESCI 3  
Level Unit: dBµV

Subrange	Detectors	IF Bandwidth	Step Size	Meas. Time	Receiver
150kHz - 30MHz	Peak; Average	9kHz	4.5kHz	10ms	ESCI 3



Tested by: *Jacky Chen*  
20171203  
Reviewed by: \_\_\_\_\_

TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

### Final Result

Frequency (MHz)	MaxPeak (dB $\mu$ V)	Average (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.303000	---	22.73	50.16	27.43	10.0	9.000	L1	OFF	9.7
0.402000	---	18.31	47.81	29.50	10.0	9.000	L1	OFF	9.8
0.690000	---	16.51	46.00	29.49	10.0	9.000	L1	OFF	9.8
1.194000	---	18.02	46.00	27.98	10.0	9.000	N	OFF	9.8
1.450500	39.98	---	56.00	16.02	10.0	9.000	N	OFF	9.8
1.473000	39.81	---	56.00	16.19	10.0	9.000	N	OFF	9.8
1.531500	39.89	---	56.00	16.11	10.0	9.000	N	OFF	9.8
1.567500	40.79	---	56.00	15.21	10.0	9.000	N	OFF	9.8
1.626000	---	20.59	46.00	25.41	10.0	9.000	N	OFF	9.8
1.774500	40.03	---	56.00	15.97	10.0	9.000	N	OFF	9.8
1.869000	40.03	---	56.00	15.97	10.0	9.000	N	OFF	9.8
2.166000	---	17.88	46.00	28.12	10.0	9.000	N	OFF	9.8

Tested by: *Jacky Chen*  
20171203

Reviewed by: \_\_\_\_\_

B+C mode with adapter #2

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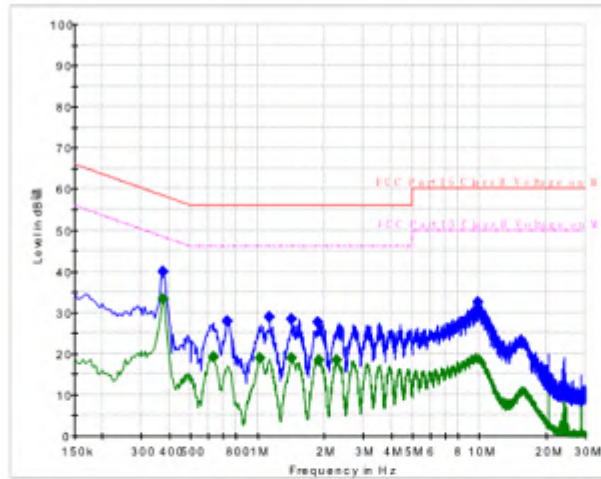
## EMC Test Record (EMISSION)

### Test Information

Manufacturer:  
Test Item: MBP163(with CSEC adaptor)  
Test Standard: FCC Part 15  
Test Detail: Conducted Emission  
Operation Mode: Bluetooth + Wi-Fi mode  
Climate Condition: 22 °C; 50 %RH; 101 kPa.  
Test Voltage/ Freq.: AC 120 V/ 60 Hz  
Port / Line: AC Mains(L1+N)  
Receipt No.: 174075292  
Report No.: /  
Result: Pass  
Comment: /

Hardware Setup: 1phase LISN ENV216 to ESCI 3  
Level Unit: dBµV

Subrange	Detectors	IF Bandwidth	Step Size	Meas. Time	Receiver
150kHz - 30MHz	Peak; Average	9kHz	4.5kHz	10ms	ESCI 3



Tested by: *Jacky Chen*  
20171202  
Reviewed by: \_\_\_\_\_

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### Final Result

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.375000	39.90	---	58.39	18.49	10.0	9.000	L1	OFF	9.7
0.375000	---	33.12	48.39	15.27	10.0	9.000	L1	OFF	9.7
0.631500	---	19.12	46.00	26.88	10.0	9.000	L1	OFF	9.8
0.730500	27.78	---	56.00	28.22	10.0	9.000	N	OFF	9.8
1.027500	---	18.92	46.00	27.08	10.0	9.000	L1	OFF	9.8
1.131000	28.97	---	56.00	27.03	10.0	9.000	L1	OFF	9.8
1.428000	---	19.03	46.00	26.97	10.0	9.000	L1	OFF	9.8
1.428000	28.31	---	56.00	27.69	10.0	9.000	L1	OFF	9.8
1.864500	27.56	---	56.00	28.44	10.0	9.000	L1	OFF	9.8
1.882500	---	18.43	46.00	27.57	10.0	9.000	L1	OFF	9.8
2.278500	---	18.45	46.00	27.55	10.0	9.000	L1	OFF	9.8
9.811500	32.39	---	60.00	27.61	10.0	9.000	N	OFF	10.3

Tested by:

*Jacky Chen*

20171202

Reviewed by: \_\_\_\_\_