

Produkte Products

Prüfbericht - Nr.: Test Report No.:	14041814 002		Seite 1 von 17 Page 1 of 17
Auftraggeber: Client:	Binatone Electronics Interna Floor 23A, 9 Des Voeux Road Hong Kong		
Gegenstand der Prüfung: Test Item:	Digital Video Baby Monitor		
Bezeichnung: Identification:	MBP38SBU	Serien-Nr.: Serial No.:	Engineering sample
Wareneingangs-Nr.: Receipt No.:	A000571111-001	Eingangsdatum: Date of Receipt:	23.06.2017
Prüfort: Testing Location:	TÜV Rheinland Hong Kong L 3/F., Fou Wah Industrial Building, Hong Kong Productivity Cou HKPC Building, 78 Tat Chee Aver	10-16 Pun Shan Street, Incil	
Zustand des Prüfgegenstar Condition of test item at delive		Test samples are no for testing.	ot damaged and suitable
Prüfgrundlage: Test Specification:	FCC Part 15 Subpart C RSS-247 Issue 2 ANSI C63.10-2013		
Prüfergebnis: Test Results:	Das vorstehend beschrieben genannter Prüfgrundlage.	e Gerät wurde geprü	ft und entspricht oben
	The above mentioned product v	was tested and passed .	
Prüflaboratorium: Testing Laboratory:	TÜV Rheinland Hong Kong I 3-4, 11/F., Fou Wah Industrial Bu Kong	L td. iilding, 10-16 Pun Shan S	treet, Tsuen Wan, Hong
geprüft/ tested by:	kontrollie	ert! reviewed by:	
David Cheng <u>11.07.2017</u> Test Engineer Datum Name/Stellung Date Name/Position	Unterschrift Datum Signature Date	Benny Lau 2017 Senior Project Mar Name/Stellung Name/Position	nager Unterschrift Signature
Other Aspects FCC	ss 2 Permissive Change test re CID: VLJ-MBP38SBU 4522A-MBP38SBU	eport	
F(ail) = entspr N/A = nicht a	icht Prüfgrundlage icht nicht Prüfgrundlage nnwendbar yetestet	Abbreviations: $P(ass) = F(ail) = N/A = N/T =$	passed failed not applicable not tested
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Product information

Manufacturers declarations

	Transmitter
Operating frequency range	2402 - 2479 MHz
Type of modulation	GFSK
Number of channels	23
Channel separation	1 MHz
Type of antenna	Wire Antenna
Antenna gain (dBi)	0 dBi
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	Yes
Nominal voltage	100-240VAC
Independent Operation Modes	Transmitting

Product function and intended use

The equipment under test (EUT) is a 2.4 GHz digital video baby monitor – the Camera (Baby Unit). It is a wireless camera which transmits the captured image and sound to the corresponding monitor (Parent Unit). Moreover, it has a temperature sensor is to measure the ambient temperature. It is powered by AC-DC adaptor.

FCC ID: VLJ-MBP38SBU/ IC: 4522A-MBP38SBU

Models	Product description	
MBP38SBU	Digital video baby monitor – the Camera (Baby Unit)	

Submitted documents

Circuit Diagram Block Diagram Bill of material User manual Rating Label

Independent Operation Modes

The basic operation modes are:

- Transmitting mode.
- Normal operation mode

For further information refer to User Manual



Related Submittal(s) Grants

This is a single application for Class 2 Permissive Change.

The corresponding Parent Unit is authorized under the Class 2 Permissive Change procedure (FCC ID: VLJ-MBP38SPU).

Others digital function which is independent from the transmitter is authorized under verification procedure (refer to test report 14043055 002)

Description of the change(s)

Modification made in the certified equipment:

- Replace the CMOS sensor IC in the Camera.
- There is a minor change in the PCB layout of the Camera to fit the new CMOS sensor IC.
- Change the value of the de-coupling capacitors at CMOS signal.
- Remove the ferrite bead on the AC-DC adaptor.

Similarities between the certified equipment and the new version equipment:

- No change in the RF part. RF IC, RF circuit, PCB layout of the RF circuit, RF Antennas are identical to the certified equipment.
- MCU are identical to the certified equipment.
- Functionality and intended usage are identical to the certified equipment.
- Outlook is identical to the certified equipment.
- Rating is identical to the certified equipment.

Engineering Justification

Base on the description of the change(s) provided by the grantee, Conducted Emission, Peak Output Power, Emission Bandwidth, Radiated Emission and Spurious Emission were tested.

No increase in the fundamental emission was found.

Remark

The test results in this test report are only relevant to the tested sample and does not involve any assessment in the production.



Test Set-up and Operation Mode

Principle of Configuration Selection

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.

Test Operation and Test Software

Test operation should refer to test methodology.

- During test, Channel & Power Controlling Software provided by the customer was used to control the operating channel, data rate, modulation as well as the output power level. The RF output p ower was selected according to the instruction given by the manufacturer. The setting of the RF output power expected by the customer shall be fixed on the firmware of the final end product.

Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- AC-DC adaptor Model: S006AKU0500100 Input: 100-240 VAC 50/60 Hz 200mA Output: 5.0VDC 1000mA) (Provided by the applicant)

Supporting equipment:

- MBP38S – Parent Unit (Provided by the applicant)

Countermeasures to achieve EMC Compliance

- Nil



Test Methodology

Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.10-2013.

For measurement below 1GHz - the equipment under test (EUT) was placed at the middle of the 80 cm height turntable. For measurement above 1GHz - the EUT was placed at the middle of the 1.5 m height turntable and RF absorbing material was placed on ground plane between turntable and measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in particular parts of this test report.

Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

FS = R + AF + CF + FA - PA

Where FS = Field Strength in dBuV/m at 3 meters.

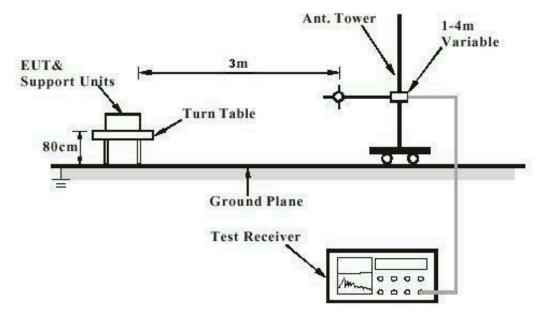
- R = Reading of Spectrum Analyzer in dBuV.
- AF = Antenna Factor in dB.
- CF = Cable Attenuation Factor in dB.
- FA = Filter Attenuation Factor in dB.
- PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.



Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

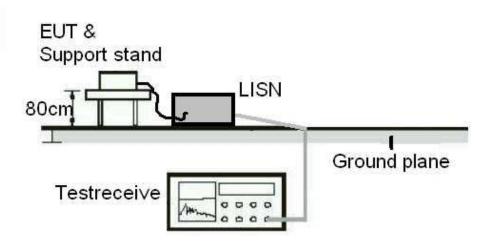
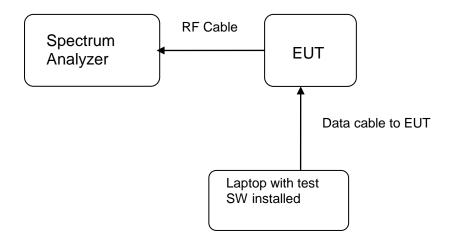




Diagram of Equipment Configuration for Antenna-port Conducted Measurement (if applicable)





List of Test and Measurement Instruments

Hong Kong Productivity Council (FCC/ IC Registration number: 90656/ 4780A-1)

Radiated Emission

Equipment	Manufacturer	Туре	Cal. Date	Due Date
Semi-anechoic Chamber	Frankonia	Nil	25-Apr-17	25-Apr-18
Test Receiver	R & S	ESU40	11-Jul-17	11-Jul-18
Active Loop Antenna	EMCO	6502	27-Oct-16	27-Oct-17
Bi-conical Antenna	R&S	HK116	1-Sep-15	1-Sep-17
Log Periodic Antenna	R&S	HL223	1-Sep-15	1-Sep-17
Standard Gain Horn	ETS-Lindgren	3160-07	3-Mar-16	3-Mar-18
Standard Gain Horn	ETS-Lindgren	3160-08	3-Mar-16	3-Mar-18
Standard Gain Horn	ETS-Lindgren	3160-10	3-Mar-16	3-Mar-18
Double-Ridged Waveguide Horn	EMCO	3116	17-Jun-16	17-Jun-18
Double-Ridged Waveguide Horn	EMCO	3117	22-Jun-16	22-Jun-18
Coaxial cable	Harbour	LL335	10-Jun-16	10-Jun-18
High Frequency Cable	Pasternack	PE3VNA4001-3M	27-Jan-17	27-Jan-18
Microwave amplifer 0.5- 26.5GHz, 25dB gain	HP	83017A	18-Jul-16	18-Jul-18
Preamplifier 18GHz to 40GHz with cable (EMC656)	A.H. Systems, Inc.	PAM-1840VH	27-Jan-17	27-Jan-18
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	28-Oct-15	28-Oct-17

AC Mains Conducted Emission

Equipment	Manufacturer	Туре	Cal. Date	Due Date
Test Receiver	R & S	ESU40	11-Jul-17	11-Jul-18
RF Voltage Probe	Schwarzbeck	TK9416	11-Feb-17	11-Feb-18
LISN	R&S	ESH3-Z5	19-Jul-17	19-Jul-18
Double Shield Cable	Radiall	RG142	18-May-17	18-May-19
Pulse Limiter	R&S	ESH3-Z2	3-Jun-17	3-Jun-18

TÜV Rheinland Hong Kong Ltd

Radio Test

Equipment	Manufacturer	Туре	Cal. Date	Due Date
Spectrum Analyzer	R & S	FSP30	15-Oct-16	15-Oct-2017



Measurement Uncertainty

The estimated combined standard uncertainty for power-line conducted emissions measurements is ±2.42dB.

The estimated combined standard uncertainty for radiated emissions measurements is ± 4.81 dB (9kHz to 30MHz) and ± 4.62 dB (30MHz to 200MHz) and ± 5.67 dB (200MHz to 1000MHz) and is ± 5.07 dB (1GHz to 8.2GHz) and ± 4.58 dB (8.2GHz to 12.4GHz) and ± 4.78 dB (12.4GHz to 18GHz)

The estimated combined standard uncertainty for antenna conducted emission is ±2.1dB

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for the level of confidence is approximately 95%.

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Results FCC Part 15 – Subpart C/ RSS-247 Issue 2

FCC 15.203 – Anter	nna Requirement 1	Pass
FCC Requirement:	No antenna other than that furnished device	by the responsible party shall be used with the
Results:	a) Antenna type: b) Manufacturer and model no: c) Peak Gain:	Fixed Integral antenna N/A 0 dBi
Verdict:	Pass	

FCC 15.204 – Antenna Requirement 2 Pass		
FCC Requirement:	An intentional radiator may be operated only with the antenna authorized. If an antenna is marketed with the intentional radia which is authorized with the intentional radiator.	
Results: Only one integral antenna can be used.		
Verdict: N/A		

RSS-Gen 6.3 – External Control Pass		
IC Requirement: The device shall not have any external controls accessible to the user that enable adjusted, selected or programmed to operate in violation of the limits prescrithe applicable RSS.		
Results: The device does not have any transmitter external controls accessible to the user can be adjusted and operated in violation of the limits of this standard.		
Verdict: Pass		

RSS-Gen 8.3 – Antenna Requirement		Pass
IC Requirement:	When a measurement at the antenna connector the effective gain of the device's antenna shall b data from the antenna manufacturer.	
Results:	a) Antenna type: b) Manufacturer c) model no d) Gain with reference to an isotropic radiator:	Fixed Integral wire antenna N/A N/A 0 dBi
Verdict:	Pass	



FCC 15.207/	RSS-Gen 8.8 – C	onducted Emis	sion on AC M	ains		Pass
	: Quasi-peal e : 120Vac 60	nput port of pov k and Average	ver supply			
Requirement	15.207(a)/	RSS-Gen 8.8				
Results:	Pass					
Live measur	ement					
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV	Average dBµV	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0,15 – 0,5	0.390	42.5	37.4	66 - 56	56 - 46	Pass
> 0,5 - 5	No peak found			56	46	Pass
> 5 - 30	No peak found			60	50	Pass
Neutral meas	surement					
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV	Average dBµV	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0,15 – 0,5	No peak found			66 - 56	56 - 46	Pass
> 0,5 - 5	No peak found			56	46	Pass
> 5 - 30	No peak found			60	50	Pass
Results:	combination The radio fr frequency c	as been conduc ns between ava requency voltag or frequencies w sults plots refer	ilable modulati e that is condu rithin the band	ons and data ra	ate. the AC power I	ine on any



FCC 15.247	(b)(1)/ RSS-2	247 5.4(2) – Pea	ak Output Power
	(

Pass

Test Specification Mode of operation		ANSI C63.10 – 2013 Tx mode
Port of testing Supply voltage Temperature Humidity	:	Temporary antenna port 120VAC 23°C 50%

FCC/ IC Requirement :

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 nonoverlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 Watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 Watts.

Results: For test protocols please refer to Appendix 1.				
Frequency (MHz)	Maximum peak output power (W/dBm)	Limit (W/dBm)	Verdict	
2402	0.021 / 13.21	0.125 / 21.0	Pass	
2440	0.020 / 13.02	0.125 / 21.0	Pass	
2479	0.019 / 12.84	0.125 / 21.0	Pass	

FCC 15.247 (a)/ RSS	N/A			
FCC/ IC Requiremen	nt : N/A			
Supply voltage : Temperature :	Tx mode Temporary antenna port 120VAC			
	Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types. For test protocols refer to Appendix 1.			
Frequency	20 dB left	20 dB right	20dB bandwidth	
(MHz)	(MHz)	(MHz)	(MHz)	
2402	2400.75	2403.22	2.47	
2440	2438.73	2441.27	2.54	
2479	2477.85	2480.29	2.44	



RSS-Gen 6.6 – Occupie	N/A			
FCC/ IC Requirement :	N/A			
Test Specification:RSSMode of operation:Tx rPort of testing:TenSupply voltage:120Temperature:23%Humidity:50%	node nporary antenna port VAC C			
con	Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types. For test protocols refer to Appendix 1.			
Frequency	Left	Right	99% bandwidth	
(MHz)	(MHz)	(MHz)	(MHz)	
2402	2400.870	2403.160	2.29	
2440 2438.870		2411.180	2.31	
2479	2477.930	2480.210	2.28	

FCC 15.247 (d)/ RSS-247 5.5 – Spurious Conducted Emissions Pass						
Test Specification : ANSI C63.10 – 2013Mode of operation : Tx modePort of testing : Temporary antenna portSupply voltage : 120VACTemperature : 23 °CHumidity : 50 %						
FCC/ IC Requirem	ent:					
intentional radiator be at least 20 dB b	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.					
Results:	Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.					
There is no peak found outside any 100kHz bandwidth of the operating frequency band in the three transmit frequency. All three transmit frequency modes comply with the limit stated in subclause 15.247(d). For test protocols refer to Appendix 1.						
Operating	Spurious Spurious Level Reference value Delta Verdict					
frequency	frequency	(dBm)	(dBm)	(dB)		
(MHz)	(MHz)	45.40	11.01	07.04	Deee	
2402	2400.000	-15.40	11.64	27.04	Pass	
2440 2479	24568.000 2483.500	-20.02 -31.53	<u>11.71</u> 11.49	<u>31.73</u> 43.02	Pass	
2419	2403.300	-31.33	11.49	43.UZ	Pass	



FCC 15.205/ RSS-G	en – Radiated En	nissions in Restricted Frequen	cy Bands Pass			
Test Specification :	ANSI C63 10 - 20	013				
Mode of operation :						
	120VAC					
	23°C					
	50%					
FCC Requirement:	In any 100kHz ba	ndwidth outside the frequency ba	and at least 20dB below the highest			
	level of the desire bands, as defined	ed power. In addition, radiated en	issions which fall in the restricted comply with the radiated emission			
IC Requirement: Spurious emissions from licence-exempt transmitters shall comply with the field strength limits shown in RSS-Gen table 5. Unwanted emissions falling into restrict bands of Table 3 shall comply with the limits specified in RSS-Gen. Unwanted emissions not falling within restricted frequency bands shall either comply with the specified in the applicable RSS, or with those specified in RSS-Gen.						
Results:	Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. All three transmit frequency modes comply with the field strength within the restricted					
Mode: 2402MHz TX		o spurious found below 30MHz. Vertical Polarization				
Freq		Level	Limit/ Detector			
MHz		dBuV/m	dBuV/m			
2390.00		45.26	74.0 / PK			
2390.00		33.73	54.0 / AV			
4804.00		54.58	74.0 / PK			
4804.00		40.95	54.0 / AV			
7204.80		57.88	74.0 / PK			
7204.80)7	44.60	54.0 / AV			
Mode: 2402 MHz TX	(Horizontal Polarization				
Freq		Level	Limit/ Detector			
MHz		dBuV/m	dBuV/m			
2390.00		44.51	74.0 / PK			
2390.00	00	34.42	54.0 / AV			
4804.00		53.55	74.0 / PK			
4804.00		39.88	54.0 / AV			
7206.000		58.66	74.0 / PK			
7206.00	00	45.57	54.0 / AV			
Mode: 2440 MHz TX	< compared with the second sec	Vertical Polarization				
Freq		Level	Limit/ Detector			
MHz		dBuV/m	dBuV/m			
96.025	5	29.9	43.5 / QP			
192.050		32.1	43.5 / QP			
576.15		28.1	46.0 / QP			
768.20		35.5	46.0 / QP			
4880.92		54.94	74.0 / PK			
1000102						



7319.230	59.47	74.0 / PK
7319.230	44.34	54.0 / AV
Mode: 2440 MHz TX	Horizontal Polarization	
Freq	Level	Limit/ Detector
MHz	dBuV/m	dBuV/m
96.025	26.40	46.0 / QP
4880.000	59.56	74.0 / PK
4880.000	49.01	54.0 / AV
9760.000	64.89	74.0 / PK
9760.000	53.13	54.0 / AV
Mode: 2479 MHz TX	Vertical Polarization	
Freq	Level	Limit/ Detector
MHz	dBuV/m	dBuV/m
2483.500	50.21	74.0 / PK
2483.500	40.88	54.0 / AV
4958.000	53.62	74.0 / PK
4958.000	40.60	54.0 / AV
Mode: 2479 MHz TX	Horizontal Polarization	
Freq	Level	Limit/ Detector
MHz	dBuV/m	dBuV/m
2483.500	47.56	74.0 / PK
2483.500	35.53	54.0 / AV
4958.000	54.11	74.0 / PK
4958.000	39.97	54.0 / AV