#### Shenzhen Global Test Service Co.,Ltd.



No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

# FCC PART 15 SUBPART C TEST REPORT FCC PART 15.247

Report Reference No...... GTS20231020001-1-83

FCC ID .....: 2AG7C-R833

Compiled by

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Date of issue...... Feb.02, 2024

Representative Laboratory Name.: Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative

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Street, Longgang District, Shenzhen, Guangdong, China

Applicant's name...... Hangzhou Meari Technology Co., Ltd.

Binjiang District, Hangzhou, Zhejiang, China

Test specification .....:

( position+printed name+signature)..:

Standard ...... FCC Part 15.247

TRF Originator.....: Shenzhen Global Test Service Co.,Ltd.

Master TRF...... Dated 2014-12

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Test item description ...... CAMERA WIFI Module

Trade Mark .....: N/A

Manufacturer ...... Hangzhou Meari Technology Co., Ltd.

Model/Type reference...... R833

Listed Models ....... Speed 22Q, Speed 22T, OP1F, OP1, OP1T, OP1Q, Speed 24T,

Speed 24Q, Speed 25Q, Speed 26Q, P2T, P2F, P2, Speed 12F, Speed 12T, Mini 18T, MiniCam, Speed 18T, Speed 18S, PTCam,

PT-cam, Speed 4T, DOME1, DOME1 PRO, INDOOR1,

INDOOR1 PRO, OUTDOOR1, Mini 12Q, Mini 12T, Mini 8T, Mini 8Q,

M1T, M1Q, IN1T, IN1Q, M4T, M4Q

Operation Frequency...... From 2412MHz to 2462MHz

 Hardware Version
 V 1.0

 Software Version
 N/A

 Rating
 DC 3.3V

 Result
 PASS

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#### TEST REPORT

Test Report No. :	GTS20231020001-1-83	Feb.02, 2024
rest Report No	01020231020001-1-03	Date of issue

Equipment under Test : CAMERA WIFI Module

Model /Type : R833

Listed model Speed 22Q, Speed 22T, OP1F, OP1, OP1T, OP1Q, Speed 24T,

Speed 24Q, Speed 25Q, Speed 26Q, P2T, P2F, P2, Speed 12F, Speed 12T, Mini 18T, MiniCam, Speed 18T, Speed 18S, PTCam,

PT-cam, Speed 4T, DOME1, DOME1 PRO, INDOOR1,

INDOOR1 PRO, OUTDOOR1, Mini 12Q, Mini 12T, Mini 8T, Mini 8Q,

M1T, M1Q, IN1T, IN1Q, M4T, M4Q

Applicant : Hangzhou Meari Technology Co., Ltd.

Address Room 604-605, Building 1, No.768 Jianghong Road, Changhe Street,

Binjiang District, Hangzhou, Zhejiang, China

Manufacturer : Hangzhou Meari Technology Co., Ltd.

Address 4F of Building 1 and 2-4F of Building 2, No. 91 Chutian Road,

Xixing Street, Binjiang District, Hangzhou, Zhejiang, China

Test Result:	PASS
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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# 1. TEST STANDARDS

The tests were performed according to following standards:

<u>FCC Rules Part 15.247</u>: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz. <u>ANSI C63.10-2020</u>: American National Standard for Testing Unlicensed Wireless Devices <u>KDB 558074 D01 DTS Meas Guidance v05r02</u>: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.

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# 2. SUMMARY

# 2.1. General Remarks

Date of receipt of test sample	:	Jan.04, 2024
Testing commenced on		Jan.04, 2024
Testing concluded on	:	Jan.22, 2024

# 2.2. Product Description

Product Name	CAMERA WIFI Module
Trade Mark	N/A
Model/Type reference	R833
List Models	Speed 22Q, Speed 22T, OP1F, OP1, OP1T, OP1Q, Speed 24T, Speed 24Q, Speed 25Q, Speed 26Q, P2T, P2F, P2, Speed 12F, Speed 12T, Mini 18T, MiniCam, Speed 18T, Speed 18S, PTCam, PT-cam, Speed 4T, DOME1, DOME1 PRO, INDOOR1, INDOOR1 PRO, OUTDOOR1, Mini 12Q, Mini 12T, Mini 8T, Mini 8Q, M1T, M1Q, IN1T, IN1Q, M4T, M4Q
Model Declaration	PCB board, structure and internal of these model(s) are the same, Only the model name different, So no additional models were tested.
Power supply:	DC 3.3V
Sample ID	GTS20231130006-1-S0001-10#& GTS20231130006-1-S0001-11#
Bluetooth	
Operation frequency	2402-2480MHz
Channel Number	40 channels for Bluetooth (DTS)
Channel Spacing	2MHz for Bluetooth (DTS)
Modulation Type	GFSK for Bluetooth (DTS)
WIFI(2.4G Band)	
Frequency Range	2412MHz ~ 2462MHz
Channel Spacing	5MHz
Channel Number	11 Channel for 20MHz bandwidth(2412~2462MHz)
Modulation Type	802.11b: DSSS; 802.11g/n: OFDM
WIFI(5.2G Band)	
Frequency Range	5150-5250MHz / 5250-5350MHz / 5500-5700MHz
Channel Number	4 Channels for 20MHz bandwidth(5180-5240MHz) 4 Channels for 20MHz bandwidth(5260-5320MHz) 11 Channels for 20MHz bandwidth(5500-5700MHz)
Modulation Type	802.11a/n: OFDM
WIFI (5.8G Band)	
Frequency Range	5745MHz ~ 5825MHz
Channel Number	5 channels for 20MHz bandwidth(5745-5825MHz)
Modulation Type	802.11a/n: OFDM
Antenna Description	Omni Antenna, 2.91dBi(Max.) for 2.4G Band and 3.81dBi(Max.) for 5G Band; FPC Antenna, 3.82dBi(Max.) for 2.4G Band and 3.60dBi(Max.) for 5G Band;

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# 2.3. Equipment Under Test

# Power supply system utilised

Power supply voltage	:	0	230V/ 50 Hz	0	120V/60Hz
		0	12 V DC	0	24 V DC
		•	Other (specified in blank bel	ow)	

DC 3.3V

# 2.4. Short description of the Equipment under Test (EUT)

This is a CAMERA WIFI Module.

For more details, refer to the user's manual of the EUT.

# 2.5. EUT operation mode

The application provider specific test software to control sample in continuous TX and RX (Duty Cycle >98%) for testing meet KDB 558074 test requirement.

IEEE 802.11b/g/n: 11 channels are provided to the EUT.

Antenna	Chain 0		Cha	Simultaneously	
Bandwidth Mode	20MHz	40MHz	20MHz	40MHz	/
IEEE 802.11b	Ø				
IEEE 802.11g	Ø				
IEEE 802.11n	V				

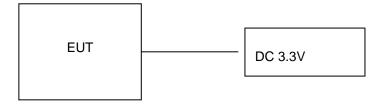
Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

The EUT has been tested under operating condition.

AC main conducted emission pre-test voltage at both AC 120V/60Hz and AC 240V/60Hz, recorded worst case; AC main conducted emission pre-test at charge from PC modes, recorded worst case;

This test was performed with EUT in X, Y, Z position and the worst case was found when EUT in X position. Worst-case mode and channel used for 9 KHz-1000 MHz radiated emissions was the mode and channel with the highest output power, that was determined to be IEEE 802.11g mode (MCH).

# 2.6. Block Diagram of Test Setup



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# 2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AG7C-R833** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

#### 2.8. EUT Exercise Software

The system was configured for testing in a continuous transmits condition and change test channels by software (IPOP order) provided by application.

# 2.9. Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
SHENZHEN TIANYIN ELECTRONICS CO.,LTD.	Adapter	TPA-46B050100UU		FCC
LENOVO	PC	DESKYOP-EUIVCNR		FCC

Note: The PC and Adapter is only used for auxiliary testing.

#### 2.10. External I/O Cable

I/O Port Description	Quantity	Cable
/	/	/

#### 2.11. Modifications

No modifications were implemented to meet testing criteria.

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# 3. TEST ENVIRONMENT

# 3.1. Address of the test laboratory

#### Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong, China.

# 3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS (No. CNAS L8169)

Shenzhen Global Test Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2019 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA (Certificate No. 4758.01)

Shenzhen Global Test Service Co., Ltd. has been assessed by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4758.01.

Industry Canada Registration Number. is 24189.

FCC Designation Number is CN1234.

FCC Registered Test Site Number is165725.

CAB identifier is CN0082.

#### 3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

#### 3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods — Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen Global Test Service Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)
On Time and Duty Cycle	1~18GHz	0.78 dB	(1)
Maximum Conducted Output Power	1~18GHz	0.57 dB	(1)
Power Spectral Density	1~18GHz	0.66 dB	(1)
99% and 6 dB Bandwidth	1~18GHz	1.20 dB	(1)
Conducted Spurious Emissions and Band Edges Test	1~18GHz	1.60 dB	(1)
Conducted at Restricted Band	1~18GHz	1.60 dB	(1)

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

# 3.5. Test Description

	Applied Standard: RSS-247 Issue 3 / RSS-Gen Issue 5							
ISED Rules	Description of Test	Test Sample	Result	Remark				
/	On Time and Duty Cycle	GTS20231130006-1- S0001-10#	Compliant	Appendix B				
RSS-247 §5.4 (d)	Maximum Conducted Output Power	GTS20231130006-1- S0001-10#	Compliant	Appendix B				
RSS-247 §5.2 (b)	Power Spectral Density	GTS20231130006-1- S0001-10#	Compliant	Appendix B				
RSS-247 §5.2 (a)	6dB Bandwidth	GTS20231130006-1- S0001-10#	Compliant	Appendix B				
RSS-Gen §6.7	99% Occupied Bandwidth	GTS20231130006-1- S0001-10#	Compliant	Appendix B				
RSS-247 5.4(d); RSS-247 5.5; RSS-Gen§6.13	Conducted Spurious Emissions and Band Edges Test	GTS20231130006-1- S0001-10#	Compliant	Appendix B				
RSS-247 5.4(d); RSS-247 5.5; RSS-Gen§6.13	Radiated Spurious Emissions	GTS20231130006-1- S0001-10# GTS20231130006-1- S0001-11#	Compliant	Note 1				
RSS-247 3.3 RSS-Gen§8.10	Emissions at Restricted Band	GTS20231130006-1- S0001-10#	Compliant	Appendix B				
RSS-Gen §8.8	AC Conducted Emissions	GTS20231130006-1- S0001-11#	Compliant	Note 1				
RSS-Gen§6.8	Antenna Requirements	GTS20231130006-1- S0001-10#	Compliant	Note 1				
RSS-102	RF Exposure	/	Compliant	Note 2				

#### Remark:

- 1. The measurement uncertainty is not included in the test result.
- 2. NA = Not Applicable; NP = Not Performed
- 3. Note 1 Test results inside test report;
- 4. Note 2 Test results in other test report (MPE Report).
- 5. We tested all test mode and recorded worst case in report

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
Maximum Peak Conducted Output Power	11b/DSSS	1 Mbps	1/6/11
Power Spectral Density 6dB Bandwidth	11g/OFDM	6 Mbps	1/6/11
Spurious RF conducted emission Radiated Emission 9kHz~1GHz& Radiated Emission 1GHz~10 <sup>th</sup> Harmonic	11n(20MHz)/OFDM	6.5Mbps	1/6/11
	11b/DSSS	1 Mbps	1/11
Band Edge	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	6.5Mbps	1/11

# 3.6. Equipments Used during the Test

Calibration						
LISN	Test Equipment	Manufacturer	Model No.	Serial No.		
EMI Test Receiver   R&S   ESPI3   101841-cd   2023/07/14   2024/07/15   EMI Test Receiver   R&S   ESCI7   101102   2023/07/13   2024/07/12   Spectrum Analyzer   Agilent   N9020A   MY48010425   2023/08/28   2024/08/27   Spectrum Analyzer   R&S   FSV40   100019   2023/07/13   2024/07/12   Vector Signal generator   Agilent   N5181A   MY49060502   2023/07/13   2024/07/12   Signal generator   Agilent   N5182A   Agi10A0Tolog   2023/07/13   2024/07/12   Climate Chamber   ESPEC   EL-10KA   A20120523   2023/07/13   2024/07/12   Controller   EM Electronics   Controller EM   1000   N/A   N/	LISN	CYBERTEK	EM5040A	E1850400105	2023/07/13	2024/07/12
EMI Test Receiver   R&S	LISN	R&S	ESH2-Z5	893606/008	2023/07/13	2024/07/12
Spectrum Analyzer	EMI Test Receiver	R&S	ESPI3	101841-cd	2023/07/14	2024/07/13
Spectrum Analyzer	EMI Test Receiver	R&S	ESCI7	101102	2023/07/13	2024/07/12
Vector Signal generator         Agilent         N5181A         MY49060502         2023/07/13         2024/07/12           Signal generator         Agilent         N5182A         3610AO1069         2023/07/13         2024/07/12           Climate Chamber         ESPEC         EL-10KA         A20120523         2023/07/13         2024/07/12           Controller         EM Electronics         Controller EM 1000         N/A         N/A         N/A           Horn Antenna         Schwarzbeck         BBHA 9120D         01622         2023/07/13         2024/07/12           Active Loop Antenna         Beijing Da Ze Technology Co.l.td.         ZN30900C         15006         2023/07/13         2024/07/12           Bilog Antenna         Schwarzbeck         VULB9163         000976         2023/07/13         2024/07/12           Broadband Horn Antenna         Schwarzbeck         BBHA 9170         791         2023/07/13         2024/07/12           Amplifier         Schwarzbeck         BBV 9743         #202         2023/07/14         2024/07/12           Amplifier         Schwarzbeck         BBV 9743         #202         2023/07/14         2024/07/13           Amplifier         EMCI         EMCOS1845B         980355         2023/07/14         2024/07/12 </td <td>Spectrum Analyzer</td> <td>Agilent</td> <td>N9020A</td> <td>MY48010425</td> <td>2023/08/28</td> <td>2024/08/27</td>	Spectrum Analyzer	Agilent	N9020A	MY48010425	2023/08/28	2024/08/27
generator         Aglient         N5161A         M149000002         2023/07/13         2024/07/12           Signal generator         Aglient         N5182A         3610AO1069         2023/07/13         2024/07/12           Climate Chamber         ESPEC         EL-10KA         A20120523         2023/07/13         2024/07/12           Controller         EM Electronics         Controller EM 1000         N/A         N/A         N/A           Horn Antenna         Schwarzbeck         BBHA 9120D         01622         2023/07/13         2024/07/12           Active Loop Antenna         Schwarzbeck         BBHA 9120D         15006         2023/07/13         2024/07/12           Active Loop Antenna         Schwarzbeck         BBHA 9170         791         2023/07/13         2024/07/12           Active Loop Antenna         Schwarzbeck         VULB9163         000976         2023/07/13         2024/07/12           Active Loop Antenna         Schwarzbeck         VULB9163         000976         2023/07/13         2024/07/12           Bilog Antenna         Schwarzbeck         BBHA 9170         791         2023/07/13         2024/07/12           Amplifier         Schwarzbeck         BBV 9743         #202         2023/07/14         2024/07/13	Spectrum Analyzer	R&S	FSV40	100019	2023/07/13	2024/07/12
Climate Chamber         ESPEC         EL-10KA         A20120523         2023/07/13         2024/07/12           Controller         EM Electronics         Controller EM 1000         N/A         N/A         N/A           Horn Antenna         Schwarzbeck         BBHA 9120D         01622         2023/07/13         2024/07/12           Active Loop Antenna         Beijing Da Ze Technology Co., Ltd.         2N30900C         15006         2023/07/13         2024/07/12           Bilog Antenna         Schwarzbeck         VULB9163         000976         2023/07/13         2024/07/12           Broadband Horn Antenna         Schwarzbeck         BBHA 9170         791         2023/07/13         2024/07/12           Amplifier         Schwarzbeck         BBW 9743         #202         2023/07/14         2024/07/13           Amplifier         Schwarzbeck         BBV 9179         9719-025         2023/07/14         2024/07/13           Temperature/Humidi ty Meter         Gangxing         CTH-608         92         2023/07/14         2024/07/12           High-Pass Filter         K&L         2700/X12750- 0/O         KL142031         2023/08/30         2024/08/29           RF Cable(below 1GHz)         HUBER+SUHNE R         RG214         RE01         2023/07/13         20	•	Agilent	N5181A	MY49060502	2023/07/13	2024/07/12
Controller         EM Electronics         Controller EM 1000         N/A         N/A         N/A           Horn Antenna         Schwarzbeck         BBHA 9120D         01622         2023/07/13         2024/07/12           Active Loop Antenna         Beijing Da Ze Technology Co., Ltd.         ZN30900C         15006         2023/07/13         2024/07/12           Bilog Antenna         Schwarzbeck         VULB9163         000976         2023/07/13         2024/07/12           Broadband Horn Antenna         SCHWARZBECK         BBHA 9170         791         2023/07/13         2024/07/12           Amplifier         Schwarzbeck         BBV 9743         #202         2023/07/14         2024/07/13           Amplifier         Schwarzbeck         BBV 9743         #202         2023/07/14         2024/07/13           Amplifier         EMCI         EMC051845B         980355         2023/07/14         2024/07/13           Temperature/Humidi ty Meter         Gangxing         CTH-608         02         2023/07/13         2024/07/12           High-Pass Filter         K&L         2500/0X12750- 0/O         KL142031         2023/08/30         2024/08/29           RF Cable(below 1GHz)         R         RG214         RE01         2023/07/13         2024/07/12 <td>Signal generator</td> <td>Agilent</td> <td>N5182A</td> <td>3610AO1069</td> <td>2023/07/13</td> <td>2024/07/12</td>	Signal generator	Agilent	N5182A	3610AO1069	2023/07/13	2024/07/12
Hom Antenna   Schwarzbeck   BBHA 9120D   01622   2023/07/13   2024/07/12	Climate Chamber	ESPEC	EL-10KA	A20120523	2023/07/13	2024/07/12
Active Loop Antenna         Beijing Da Ze Technology Co., Ltd.         ZN30900C         15006         2023/07/13         2024/07/12           Bilog Antenna         Schwarzbeck         VULB9163         000976         2023/07/13         2024/07/12           Broadband Horn Antenna         SCHWARZBECK         BBHA 9170         791         2023/07/14         2024/07/12           Amplifier         Schwarzbeck         BBV 9743         #202         2023/07/14         2024/07/13           Amplifier         Schwarzbeck         BBV9179         9719-025         2023/07/14         2024/07/13           Amplifier         EMCI         EMC051845B         980355         2023/07/14         2024/07/13           Temperature/Humidi ty Meter         Gangxing         CTH-608         02         2023/07/13         2024/07/12           High-Pass Filter         K&L         9SH10-2700/X12750-0/O/O         KL142031         2023/08/30         2024/08/29           RF Cable(below 1GHz)         HUBER+SUHNE R         RG214         RE01         2023/07/13         2024/07/12           RF Cable(above 1GHz)         R         RG214         RE02         2023/07/13         2024/07/12           Power Sensor         Agilent         U2531A         TW53323507         2023/07/13         2024/07	Controller	EM Electronics		N/A	N/A	N/A
Active Loop Antenna         Technology Co., Ltd.         ZN30900C         15006         2023/07/13         2024/07/12           Bilog Antenna         Schwarzbeck         VULB9163         000976         2023/07/13         2024/07/12           Broadband Horn Antenna         SCHWARZBECK         BBHA 9170         791         2023/07/13         2024/07/12           Amplifier         Schwarzbeck         BBV 9743         #202         2023/07/14         2024/07/13           Amplifier         Schwarzbeck         BBV9179         9719-025         2023/07/14         2024/07/13           Amplifier         EMCI         EMC051845B         980355         2023/07/14         2024/07/13           Temperature/Humidi ty Meter         Gangxing         CTH-608         02         2023/07/13         2024/07/12           High-Pass Filter         K&L         29SH10- 2700/X12750- 0/O         KL142031         2023/08/30         2024/08/29           RF Cable(below 1GHz)         K&L         1375/U12750- 0/O         KL142032         2023/08/30         2024/08/29           RF Cable(above 1GHz)         R         RG214         RE01         2023/07/13         2024/07/12           RF Cable(above 1GHz)         R         RG214         RE02         2023/07/13         2024/07/12	Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2023/07/13	2024/07/12
Broadband Horn Antenna         SCHWARZBECK         BBHA 9170         791         2023/07/13         2024/07/12           Amplifier         Schwarzbeck         BBV 9743         #202         2023/07/14         2024/07/13           Amplifier         Schwarzbeck         BBV9179         9719-025         2023/07/14         2024/07/13           Amplifier         EMCI         EMC051845B         980355         2023/07/14         2024/07/13           Temperature/Humidi ty Meter         Gangxing         CTH-608         02         2023/07/13         2024/07/12           High-Pass Filter         K&L         9SH10- 2700/X12750- 0/O         KL142031         2023/08/30         2024/08/29           RF Cable(below 1GHz)         HUBER+SUHNE R         RG214         RE01         2023/07/13         2024/07/12           RF Cable(above 1GHz)         HUBER+SUHNE R         RG214         RE02         2023/07/13         2024/07/12           Data acquisition card         Agilent         U2531A         TW53323507         2023/07/13         2024/07/12           Power Sensor         Agilent         U2021XA         MY5365004         2023/07/13         2024/07/12           Test Control Unit         Tonscend         JS0806-1         178060067         2023/07/13         2024/07/12 <td>Active Loop Antenna</td> <td>Technology</td> <td>ZN30900C</td> <td>15006</td> <td>2023/07/13</td> <td>2024/07/12</td>	Active Loop Antenna	Technology	ZN30900C	15006	2023/07/13	2024/07/12
Antenna         SCHWARZBECK         BBHA 91/0         /91         2023/07/13         2024/07/12           Amplifier         Schwarzbeck         BBV 9743         #202         2023/07/14         2024/07/13           Amplifier         Schwarzbeck         BBV9179         9719-025         2023/07/14         2024/07/13           Amplifier         EMCI         EMC051845B         980355         2023/07/14         2024/07/13           Temperature/Humidi ty Meter         Gangxing         CTH-608         02         2023/07/13         2024/07/12           High-Pass Filter         K&L         9SH10- 2700/X12750- 0/O         KL142031         2023/08/30         2024/08/29           RF Cable(below 1GHz)         HUBER+SUHNE R         RG214         RE01         2023/08/30         2024/08/29           RF Cable(above 1GHz)         HUBER+SUHNE R         RG214         RE02         2023/07/13         2024/07/12           Data acquisition card         Agilent         U2531A         TW53323507         2023/07/13         2024/07/12           Power Sensor         Agilent         U2021XA         MY5365004         2023/07/13         2024/07/12           Automated filter bank         Tonscend         JS0806-F         19F8060177         2023/07/13         2024/07/12 <td>Bilog Antenna</td> <td>Schwarzbeck</td> <td>VULB9163</td> <td>000976</td> <td>2023/07/13</td> <td>2024/07/12</td>	Bilog Antenna	Schwarzbeck	VULB9163	000976	2023/07/13	2024/07/12
Amplifier         Schwarzbeck         BBV9179         9719-025         2023/07/14         2024/07/13           Amplifier         EMCI         EMC051845B         980355         2023/07/14         2024/07/13           Temperature/Humidi ty Meter         Gangxing         CTH-608         02         2023/07/13         2024/07/12           High-Pass Filter         K&L         9SH10-2700/X12750-0/O         KL142031         2023/08/30         2024/08/29           High-Pass Filter         K&L         41H10-1375/U12750-0/O         KL142032         2023/08/30         2024/08/29           RF Cable(below 1GHz)         HUBER+SUHNE R         RG214         RE01         2023/07/13         2024/07/12           RF Cable(above 1GHz)         HUBER+SUHNE R         RG214         RE02         2023/07/13         2024/07/12           Data acquisition card         Agilent         U2531A         TW53323507         2023/07/13         2024/07/12           Power Sensor         Agilent         U2021XA         MY5365004         2023/07/13         2024/07/12           Test Control Unit         Tonscend         JS0806-F         19F8060177         2023/07/13         2024/07/12           EMI Test Software         Tonscend         JS1120-1         Ver 2.68.0518         /         /		SCHWARZBECK	BBHA 9170	791	2023/07/13	2024/07/12
Amplifier         EMCI         EMC051845B         980355         2023/07/14         2024/07/13           Temperature/Humidi ty Meter         Gangxing         CTH-608         02         2023/07/13         2024/07/12           High-Pass Filter         K&L         9SH10- 2700/X12750- 0/O         KL142031         2023/08/30         2024/08/29           High-Pass Filter         K&L         41H10- 1375/U12750- 0/O         KL142032         2023/08/30         2024/08/29           RF Cable(below 1GHz)         HUBER+SUHNE R         RG214         RE01         2023/07/13         2024/07/12           RF Cable(above 1GHz)         HUBER+SUHNE R         RG214         RE02         2023/07/13         2024/07/12           Data acquisition card         Agilent         U2531A         TW53323507         2023/07/13         2024/07/12           Power Sensor         Agilent         U2021XA         MY5365004         2023/07/13         2024/07/12           Test Control Unit         Tonscend         JS0806-1         178060067         2023/07/13         2024/07/12           Automated filter bank         Tonscend         JS1120-1         Ver 2.6.8.0518         /         /           EMI Test Software         Tonscend         JS1120-3         Ver 2.5         /         /	Amplifier	Schwarzbeck	BBV 9743	#202	2023/07/14	2024/07/13
Temperature/Humidi ty Meter         Gangxing         CTH-608         02         2023/07/13         2024/07/12           High-Pass Filter         K&L         9SH10-2700/X12750-0/O         KL142031         2023/08/30         2024/08/29           High-Pass Filter         K&L         41H10-1375/U12750-0/O         KL142032         2023/08/30         2024/08/29           RF Cable(below 1GHz)         HUBER+SUHNE R         RG214         RE01         2023/07/13         2024/07/12           RF Cable(above 1GHz)         HUBER+SUHNE R         RG214         RE02         2023/07/13         2024/07/12           Data acquisition card         Agilent         U2531A         TW53323507         2023/07/13         2024/07/12           Power Sensor         Agilent         U2021XA         MY5365004         2023/07/13         2024/07/12           Test Control Unit         Tonscend         JS0806-1         178060067         2023/07/13         2024/07/12           Automated filter bank         Tonscend         JS1120-1         Ver 2.6.8.0518         /         /           EMI Test Software         Tonscend         JS1120-3         Ver 2.5.77.0418         /         /           EMI Test Software         Tonscend         JS32-CE         Ver 2.5         /         / <td>Amplifier</td> <td>Schwarzbeck</td> <td>BBV9179</td> <td>9719-025</td> <td>2023/07/14</td> <td>2024/07/13</td>	Amplifier	Schwarzbeck	BBV9179	9719-025	2023/07/14	2024/07/13
ty Meter         Garigxing         CTH-608         02         2023/07/13         2024/07/12           High-Pass Filter         K&L         9SH10- 2700/X12750- 0/O         KL142031         2023/08/30         2024/08/29           High-Pass Filter         K&L         1375/U12750- 0/O         KL142032         2023/08/30         2024/08/29           RF Cable(below 1GHz)         HUBER+SUHNE R         RG214         RE01         2023/07/13         2024/07/12           RF Cable(above 1GHz)         HUBER+SUHNE R         RG214         RE02         2023/07/13         2024/07/12           Data acquisition card         Agilent         U2531A         TW53323507         2023/07/13         2024/07/12           Power Sensor         Agilent         U2021XA         MY5365004         2023/07/13         2024/07/12           Test Control Unit         Tonscend         JS0806-1         178060067         2023/07/13         2024/07/12           Automated filter bank         Tonscend         JS0806-F         19F8060177         2023/07/13         2024/07/12           EMI Test Software         Tonscend         JS1120-1         Ver 2.6.8.0518         /         /           EMI Test Software         Tonscend         JS32-CE         Ver 2.5         /         / <td>Amplifier</td> <td>EMCI</td> <td>EMC051845B</td> <td>980355</td> <td>2023/07/14</td> <td>2024/07/13</td>	Amplifier	EMCI	EMC051845B	980355	2023/07/14	2024/07/13
High-Pass Filter         K&L         2700/X12750- O/O         KL142031         2023/08/30         2024/08/29           High-Pass Filter         K&L         41H10- 1375/U12750- O/O         KL142032         2023/08/30         2024/08/29           RF Cable(below 1GHz)         HUBER+SUHNE R         RG214         RE01         2023/07/13         2024/07/12           RF Cable(above 1GHz)         HUBER+SUHNE R         RG214         RE02         2023/07/13         2024/07/12           Data acquisition card         Agilent         U2531A         TW53323507         2023/07/13         2024/07/12           Power Sensor         Agilent         U2021XA         MY5365004         2023/07/13         2024/07/12           Test Control Unit         Tonscend         JS0806-1         178060067         2023/07/13         2024/07/12           Automated filter bank         Tonscend         JS0806-F         19F8060177         2023/07/13         2024/07/12           EMI Test Software         Tonscend         JS1120-1         Ver 2.6.8.0518         /         /           EMI Test Software         Tonscend         JS32-CE         Ver 2.5         /         /		Gangxing	CTH-608	02	2023/07/13	2024/07/12
High-Pass Filter         K&L         1375/U12750-O/O         KL142032         2023/08/30         2024/08/29           RF Cable(below 1GHz)         HUBER+SUHNE R         RG214         RE01         2023/07/13         2024/07/12           RF Cable(above 1GHz)         HUBER+SUHNE R         RG214         RE02         2023/07/13         2024/07/12           Data acquisition card         Agilent         U2531A         TW53323507         2023/07/13         2024/07/12           Power Sensor         Agilent         U2021XA         MY5365004         2023/07/13         2024/07/12           Test Control Unit         Tonscend         JS0806-1         178060067         2023/07/13         2024/07/12           Automated filter bank         Tonscend         JS0806-F         19F8060177         2023/07/13         2024/07/12           EMI Test Software         Tonscend         JS1120-1         Ver 2.6.8.0518         /         /           EMI Test Software         Tonscend         JS1120-3         Ver 2.5.77.0418         /         /           EMI Test Software         Tonscend         JS32-CE         Ver 2.5         /         /	High-Pass Filter	K&L	2700/X12750-	KL142031	2023/08/30	2024/08/29
1GHz)         R         RG214         RE01         2023/07/13         2024/07/12           RF Cable(above 1GHz)         HUBER+SUHNE R         RG214         RE02         2023/07/13         2024/07/12           Data acquisition card         Agilent         U2531A         TW53323507         2023/07/13         2024/07/12           Power Sensor         Agilent         U2021XA         MY5365004         2023/07/13         2024/07/12           Test Control Unit         Tonscend         JS0806-1         178060067         2023/07/13         2024/07/12           Automated filter bank         Tonscend         JS0806-F         19F8060177         2023/07/13         2024/07/12           EMI Test Software         Tonscend         JS1120-1         Ver 2.6.8.0518         /         /           EMI Test Software         Tonscend         JS3120-3         Ver 2.5.77.0418         /         /           EMI Test Software         Tonscend         JS32-CE         Ver 2.5         /         /	High-Pass Filter	K&L	1375/U12750-	KL142032	2023/08/30	2024/08/29
1GHz)         R         RG214         RE02         2023/07/13         2024/07/12           Data acquisition card         Agilent         U2531A         TW53323507         2023/07/13         2024/07/12           Power Sensor         Agilent         U2021XA         MY5365004         2023/07/13         2024/07/12           Test Control Unit         Tonscend         JS0806-1         178060067         2023/07/13         2024/07/12           Automated filter bank         Tonscend         JS0806-F         19F8060177         2023/07/13         2024/07/12           EMI Test Software         Tonscend         JS1120-1         Ver 2.6.8.0518         /         /           EMI Test Software         Tonscend         JS3120-3         Ver 2.5.777.0418         /         /           EMI Test Software         Tonscend         JS32-CE         Ver 2.5         /         /			RG214	RE01	2023/07/13	2024/07/12
Card         Agrient         U2531A         TW53323507         2023/07/13         2024/07/12           Power Sensor         Agilent         U2021XA         MY5365004         2023/07/13         2024/07/12           Test Control Unit         Tonscend         JS0806-1         178060067         2023/07/13         2024/07/12           Automated filter bank         Tonscend         JS0806-F         19F8060177         2023/07/13         2024/07/12           EMI Test Software         Tonscend         JS1120-1         Ver 2.6.8.0518         /         /           EMI Test Software         Tonscend         JS1120-3         Ver 2.5.77.0418         /         /           EMI Test Software         Tonscend         JS32-CE         Ver 2.5         /         /	`		RG214	RE02	2023/07/13	2024/07/12
Test Control Unit         Tonscend         JS0806-1         178060067         2023/07/13         2024/07/12           Automated filter bank         Tonscend         JS0806-F         19F8060177         2023/07/13         2024/07/12           EMI Test Software         Tonscend         JS1120-1         Ver 2.6.8.0518         /         /           EMI Test Software         Tonscend         JS1120-3         Ver 2.5.77.0418         /         /           EMI Test Software         Tonscend         JS32-CE         Ver 2.5         /         /	-	Agilent	U2531A	TW53323507	2023/07/13	2024/07/12
Automated filter bank         Tonscend         JS0806-F         19F8060177         2023/07/13         2024/07/12           EMI Test Software         Tonscend         JS1120-1         Ver 2.6.8.0518         /         /           EMI Test Software         Tonscend         JS1120-3         Ver 2.5.77.0418         /         /           EMI Test Software         Tonscend         JS32-CE         Ver 2.5         /         /	Power Sensor	Agilent	U2021XA	MY5365004	2023/07/13	2024/07/12
bank         Tonscend         JS0806-F         19F8060177         2023/07/13         2024/07/12           EMI Test Software         Tonscend         JS1120-1         Ver 2.6.8.0518         /         /           EMI Test Software         Tonscend         JS1120-3         Ver 2.5.77.0418         /         /           EMI Test Software         Tonscend         JS32-CE         Ver 2.5         /         /	Test Control Unit	Tonscend	JS0806-1	178060067	2023/07/13	2024/07/12
EMI Test Software         Tonscend         JS1120-3         Ver 2.5.77.0418         /         /         /           EMI Test Software         Tonscend         JS32-CE         Ver 2.5         /         /		Tonscend	JS0806-F	19F8060177	2023/07/13	2024/07/12
EMI Test Software Tonscend JS1120-3 2.5.77.0418 /  EMI Test Software Tonscend JS32-CE Ver 2.5 / /	EMI Test Software	Tonscend	JS1120-1	Ver 2.6.8.0518	/	/
	EMI Test Software	Tonscend	JS1120-3		/	/
EMI Test Software Tonscend JS32-RE Ver 2.5.1.8 / /	EMI Test Software	Tonscend	JS32-CE	Ver 2.5	/	/
	EMI Test Software	Tonscend	JS32-RE	Ver 2.5.1.8	/	/

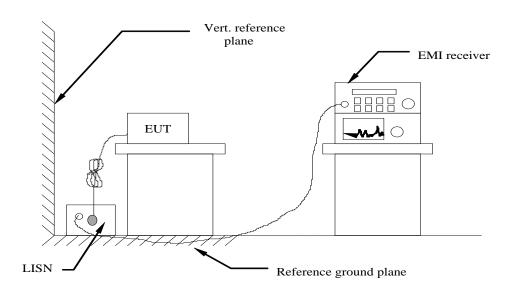
Note: The Cal.Interval was one year.

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# 4. TEST CONDITIONS AND RESULTS

#### 4.1. AC Power Conducted Emission

#### **TEST CONFIGURATION**



#### **TEST PROCEDURE**

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2020.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2020.
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2020.
- 4 The EUT received DC 5.0V power, the adapter received AC120V/60Hz or AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

#### **AC Power Conducted Emission Limit**

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following:

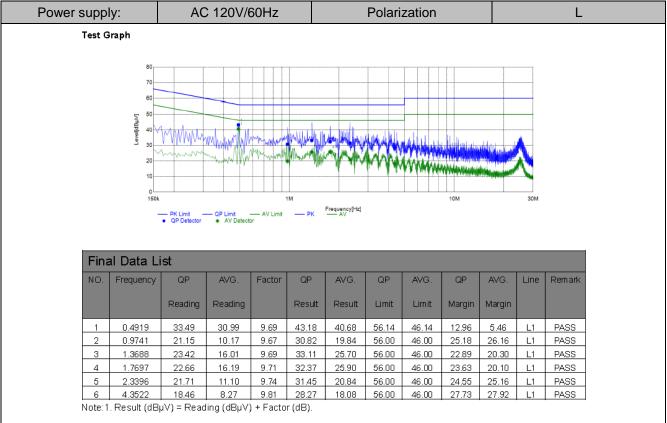
Frequency range (MHz)	Limit (	dBuV)
Frequency range (IMF12)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the freque	ncy.	

#### **TEST RESULTS**

Remark: We measured Conducted Emission at 802.11b/802.11g/802.11n HT20 mode from 150 KHz to 30MHz in AC120V and the worst case was recorded.

Temperature	<b>25</b> ℃	Humidity	60%
Test Engineer	Evan Ouyang	Configurations	IEEE 802.11g (MCH)

#### **Omni Antenna:**



2. Factor (dB) = Cable loss (dB) + LISN Factor (dB)

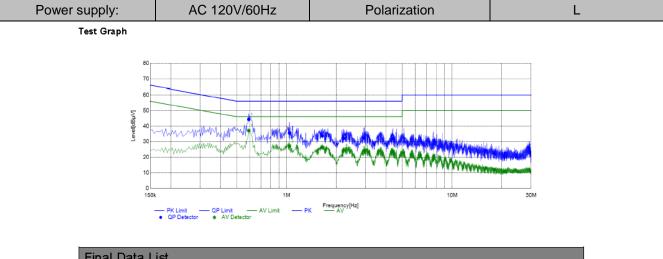
Power supply:	AC 120V/60Hz	Polarization	N
Test Graph			
80			
70			
Mighin Market	4414-		
30			
20	Markon Maria Languaga	A Secretarion Superintal and Secretarion (Second	
10			Mary Inc.
0 └─ 150k	1M	10M	30M
-	PK Limit — QP Limit — AV Limit — PK  • QP Detector • AV Detector	Frequency[Hz] AV	

Fina	Final Data List											
NO.	Frequency	QP	AVG.	Factor	QP	AVG.	QP	AVG.	QP	AVG.	Line	Remark
		Reading	Reading		Result	Result	∟imit	Limit	Margin	Margin		
1	0.2032	26.02	11.90	9.80	35.82	21.70	63.48	53.48	27.66	31.78	N	PASS
2	0.4970	25.72	16.72	9.68	35.40	26.40	56.05	46.05	20.65	19.65	N	PASS
3	1.1264	16.99	9.12	9.67	26.66	18.79	56.00	46.00	29.34	27.21	N	PASS
4	1.6009	32.66	21.16	9.69	42.35	30.85	56.00	46.00	13.65	15.15	N	PASS
5	2.3016	20.35	7.67	9.73	30.08	17.40	56.00	46.00	25.92	28.60	N	PASS
6	3.3462	16.74	5.37	9.77	26.51	15.14	56.00	46.00	29.49	30.86	N	PASS

Note: 1. Result  $(dB\mu V)$  = Reading  $(dB\mu V)$  + Factor (dB).

2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

# FPC Antenna:



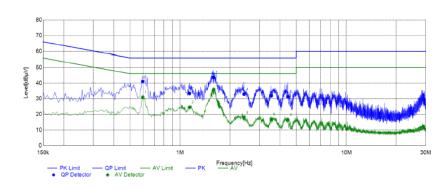
Fina	Final Data List											
NO.	Frequency	QP	AVG.	Factor	QP	AVG.	QP	AVG.	QP	AVG.	Line	Remark
		Reading	Reading		Result	Result	Limit	Limit	Margin	Margin		
1	0.5918	34.69	27.44	9.69	44.38	37.13	56.00	46.00	11.62	8.87	L1	PASS
2	1.0412	25.90	17.46	9.67	35.57	27.13	56.00	46.00	20.43	18.87	L1	PASS
3	1.6472	24.07	16.72	9.70	33.77	26.42	56.00	46.00	22.23	19.58	L1	PASS
4	2.2113	22.43	14.87	9.72	32.15	24.59	56.00	46.00	23.85	21.41	L1	PASS
5	2.9445	22.67	14.52	9.76	32.43	24.28	56.00	46.00	23.57	21.72	L1	PASS
6	4.3931	22.13	14.00	9.80	31.93	23.80	56.00	46.00	24.07	22.20	L1	PASS

Note: 1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).

2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

Power supply:	AC 120V/60Hz	Polarization	N

#### Test Graph



Fina	Final Data List											
NO.	Frequency	QP	AVG.	Factor	QP	AVG.	QP	AVG.	QP	AVG.	Line	Remark
		Reading	Reading		Result	Result	∟imit	Limit	Margin	Margin		
1	0.5965	31.31	21.28	9.68	40.99	30.96	56.00	46.00	15.01	15.04	N	PASS
2	1.1399	23.71	14.89	9.67	33.38	24.56	56.00	46.00	22.62	21.44	Ν	PASS
3	1.5897	33.97	26.04	9.69	43.66	35.73	56.00	46.00	12.34	10.27	N	PASS
4	2.4280	23.24	8.42	9.73	32.97	18.15	56.00	46.00	23.03	27.85	N	PASS
5	3.5382	22.19	7.07	9.78	31.97	16.85	56.00	46.00	24.03	29.15	N	PASS
6	4.4475	21.54	6.73	9.80	31.34	16.53	56.00	46.00	24.66	29.47	Ν	PASS

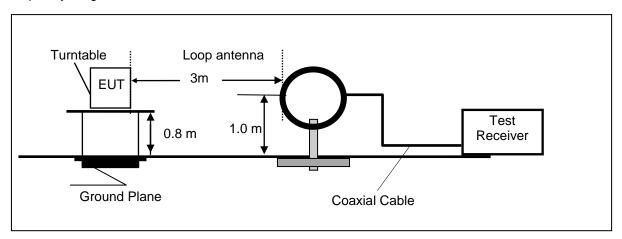
Note: 1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).

2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

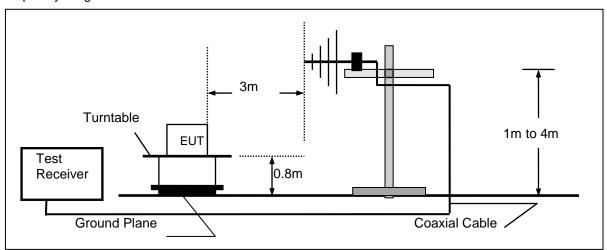
# 4.2. Radiated Emission

# **TEST CONFIGURATION**

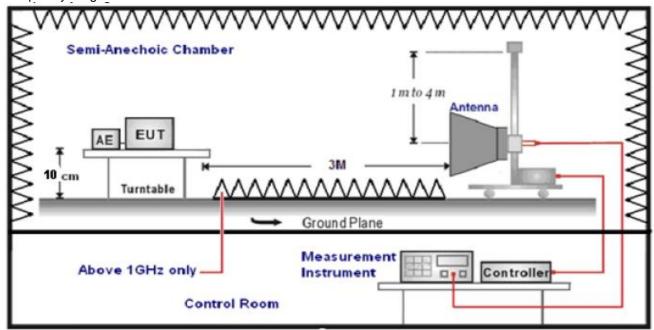
Frequency range 9 KHz - 30MHz



Frequency range 30MHz - 1000MHz



Frequency range above 1GHz-25GHz



#### **TEST PROCEDURE**

- 1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 30MHz –1GHz; the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz 25GHz.
- 2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from  $0^{\circ}$  to  $360^{\circ}$  to acquire the highest emissions from EUT.
- 3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 4. Repeat above procedures until all frequency measurements have been completed.
- 5. Radiated emission test frequency band from 30MHz to 25GHz.
- 6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

#### Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

#### FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Transd=AF +CL-AG

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#### **RADIATION LIMIT**

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

#### **TEST RESULTS**

Remark: We measured Radiated Emission at 802.11b/802.11g/802.11n HT20 mode from 30 MHz to 25GHz in AC120V and the worst case was recorded.

Temperature	<b>25</b> ℃	Humidity	60%
Test Engineer	Evan Ouyang	Configurations	IEEE 802.11g (MCH)

#### For 9 KHz~30MHz

Freq.	Level	Over Limit	Over Limit	Remark
(MHz)	(dBuV)	(dB)	(dBuV)	
-	-	-	-	See Note

#### Note:

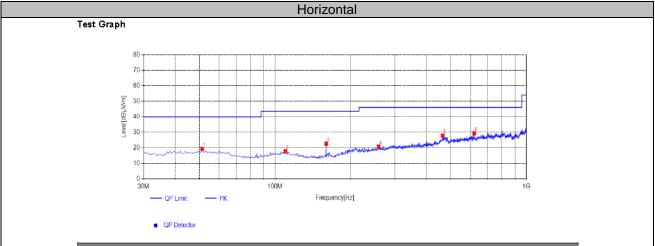
The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

#### For 30MHz-1GHz

# Omni Antenna:



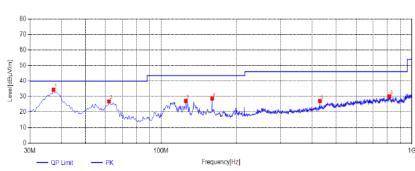
Sus	pected Lis	st									
NO.	Frequency [MHz]	Reading	Factor	Result	Limit	Margin	Height	Angle	Detector	Polarity	Remark
	[]	[dBµV/m]	[dB]	[dBµV/m]	[dBµV/m]	[dB]	[cm]	[°]			
1	51.34	30.21	-10.92	19.29	40.00	20.71	100	107	PK	Horizonta	PASS
2	110.025	29.30	-11.47	17.83	43.50	25.67	100	278	PK	Horizonta	PASS
3	159.98	35.82	-13.21	22.61	43.50	20.89	100	325	PK	Horizonta	PASS
4	258.435	29.16	-8.34	20.82	46.00	25.18	100	51	PK	Horizonta	PASS
5	465.045	31.32	-3.42	27.90	46.00	18.10	100	222	PK	Horizonta	PASS
6	620.245	29.90	-0.46	29.44	46.00	16.56	100	21	PK	Horizonta	PASS

Note: 1. Result (dB $\mu$ V/m) = Reading(dB $\mu$ V/m) + Factor (dB)

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

#### Vertical





QP Detector

Susp	ected Lis	st									
NO.	Frequency [MHz]	Reading	Factor	Result	Limit	Margin	Height	Angle	Detector	Polarity	Remark
	[]	[dBµV/m]	[dB]	[dBµV/m]	[dBµV/m]	[dB]	[cm]	[°]			
1	37.275	46.48	-12.15	34.33	40.00	5.67	100	29	PK	Vertical	PASS
2	62.01	38.62	-11.76	26.86	40.00	13.14	100	207	PK	Vertical	PASS
3	125.545	40.46	-13.28	27.18	43.50	16.32	100	39	PK	Vertical	PASS
4	159.98	42.01	-13.21	28.80	43.50	14.70	100	253	PK	Vertical	PASS
5	430.125	31.46	-4.33	27.13	46.00	18.87	100	36	PK	Vertical	PASS
6	814.245	28.47	1.68	30.15	46.00	15.85	100	326	PK	Vertical	PASS

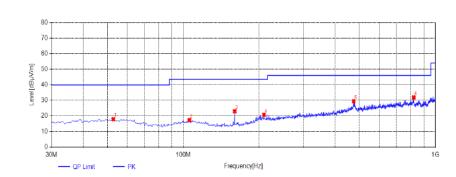
Note: 1. Result (dB $\mu$ V/m) = Reading(dB $\mu$ V/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

# **FPC Antenna:**

Test Graph

# Horizontal



QP Detector

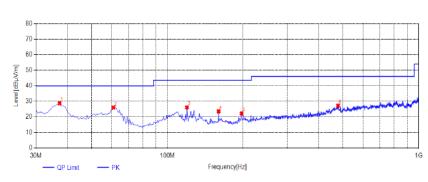
Susp	ected Lis	st									
NO.	Frequency [MHz]	Reading	Factor	Result	Limit	Margin	Height	Angle	Detector	Polarity	Remark
	[ <b>]</b>	[dBµV/m]	[dB]	[dBµV/m]	[dBµV/m]	[dB]	[cm]	[°]			
1	52.795	28.95	-11.02	17.93	40.00	22.07	100	265	PK	Horizonta	PASS
2	105.66	28.74	-11.39	17.35	43.50	26.15	100	275	PK	Horizonta	PASS
3	159.98	36.22	-13.21	23.01	43.50	20.49	100	328	PK	Horizonta	PASS
4	208.965	30.67	-9.96	20.71	43.50	22.79	100	272	PK	Horizonta	PASS
5	474.26	32.52	-3.08	29.44	46.00	16.56	100	90	PK	Horizonta	PASS
6	820.55	30.12	1.77	31.89	46.00	14.11	100	2	PK	Horizonta	PASS

Note: 1. Result (dB $\mu$ V/m) = Reading(dB $\mu$ V/m) + Factor (dB)

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

# Vertical

### Test Graph



QP Detector

Susp	ected Lis	st									
NO.	Frequency [MHz]	Reading	Factor	Result	Limit	Margin	Height	Angle	Detector	Polarity	Remark
	[]	[dBµV/m]	[dB]	[dBµV/m]	[dBµV/m]	[dB]	[cm]	[°]			
1	37.275	40.99	-12.15	28.84	40.00	11.16	100	345	PK	Vertical	PASS
2	61.04	37.55	-11.54	26.01	40.00	13.99	100	239	PK	Vertical	PASS
3	119.725	38.77	-12.64	26.13	43.50	17.37	100	357	PK	Vertical	PASS
4	159.98	36.75	-13.21	23.54	43.50	19.96	100	20	PK	Vertical	PASS
5	197.325	32.62	-10.43	22.19	43.50	21.31	100	132	PK	Vertical	PASS
6	477.655	30.19	-2.95	27.24	46.00	18.76	100	36	PK	Vertical	PASS

Note: 1. Result ( $dB\mu V/m$ ) = Reading( $dB\mu V/m$ ) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

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#### For 1GHz to 25GHz

IEEE 802.11b(Worst Case)

Channel 1 / 2412 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4824.00	50.32	32.44	30.25	7.95	60.46	74.00	-13.54	Peak	Horizontal
4824.00	35.94	32.44	30.25	7.95	46.08	54.00	-7.92	Average	Horizontal
4824.00	53.47	32.44	30.25	7.95	63.61	74.00	-10.39	Peak	Vertical
4824.00	35.90	32.44	30.25	7.95	46.04	54.00	-7.96	Average	Vertical

#### Channel 6 / 2437 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4874.00	49.24	32.52	30.31	8.12	59.57	74.00	-14.43	Peak	Horizontal
4874.00	36.64	32.52	30.31	8.12	46.97	54.00	-7.03	Average	Horizontal
4874.00	50.90	32.52	30.31	8.12	61.23	74.00	-12.77	Peak	Vertical
4874.00	36.44	32.52	30.31	8.12	46.77	54.00	-7.23	Average	Vertical

#### Channel 11 / 2462 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4924.00	50.39	32.68	30.27	7.88	60.68	74.00	-13.32	Peak	Horizontal
4924.00	35.02	32.68	30.27	7.88	45.31	54.00	-8.69	Average	Horizontal
4924.00	50.33	32.68	30.27	7.88	60.62	74.00	-13.38	Peak	Vertical
4924.00	32.05	32.68	30.27	7.88	42.34	54.00	-11.66	Average	Vertical

#### REMARKS:

- 1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
- 2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- 3. Margin value = Limit value- Emission level.
- 4. -- Mean the PK detector measured value is below average limit.
  5. The other emission levels were very low against the limit.

NOTE: All the modes have been tested and recorded worst mode in the report (Omni Antenna).

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# 4.3. On Time and Duty Cycle

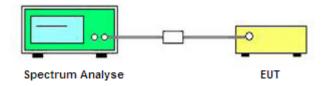
# **LIMIT**

None; for reporting purpose only.

# **TEST PROCEDURE**

- 1. Set the center frequency of the spectrum analyzer to the transmitting frequency;
- 2. Set the span=0MHz, RBW=8MHz, VBW=50MHz, Sweep time=5ms;
- 3. Detector = peak;
- 4. Trace mode = Single hold.

# **TEST CONFIGURATION**



# **TEST RESULTS**

For reporting purpose only.

Please refer to Appendix B.8.

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### 4.4. Maximum Peak Output Power

#### **TEST CONFIGURATION**



#### **TEST PROCEDURE**

According to KDB558074 D01 DTS Measurement Guidance Section 9.1 Maximum peak conducted output power, 9.1.2. and Average conducted output power, 9.2.3.1.

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

The maximum Average conducted output power may be measured using a wideband RF power meter with a thermocouple derector or equivalent. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

#### **LIMIT**

The Maximum Peak Output Power Measurement is 30dBm.

#### **TEST RESULTS**

For reporting purpose only.

Please refer to Appendix B.3.

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# 4.5. Power Spectral Density

#### **TEST CONFIGURATION**



# **TEST PROCEDURE**

According to KDB 558074 D01 Method PKPSD (peak PSD) This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to 1.5 times the DTS bandwidth.
- 3. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- 4. Set the VBW ≥ 3 RBW.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode =  $\max$  hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level within the RBW.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

#### **LIMIT**

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### **TEST RESULTS**

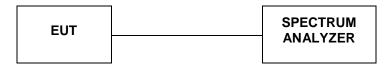
For reporting purpose only.

Please refer to Appendix B.4.

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#### 4.6. 99% and 6dB Bandwidth

#### **TEST CONFIGURATION**



#### **TEST PROCEDURE**

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=100 KHz and VBW=300KHz. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB. According to KDB558074 D01 for one of the following procedures may be used to determine the modulated DTS device signal bandwidth.

- 1. Set RBW = 100 kHz.
- 2. Set the video bandwidth (VBW) ≥ 3 RBW.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.
- 7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### LIMIT

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

#### **TEST RESULTS**

For reporting purpose only.

Please refer to Appendix B.1.

Please refer to Appendix B.2.

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# 4.7. Conducted Spurious Emissions and Band Edge Compliance of RF Emission TEST REQUIREMENT

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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

#### **TEST PROCEDURE**

According to KDB 558074 D01 for Antenna-port conducted measurement. Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a
  EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low
  Channel and High Channel within its operating range, and make sure the instrument is operated in its
  linear range.
- Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=10Hz for average detector.
- 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 5. Repeat above procedures until all measured frequencies were complete.
- 6. Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency (see 12.2.2, 12.2.3, and 12.2.4 for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
- 7. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)
- 8. Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
- 9. For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
- 10. Convert the resultant EIRP level to an equivalent electric field strength using the following relationship: E = EIRP 20log D + 104.8

#### where:

E = electric field strength in dBµV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

- 11. Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.
- 12. Compare the resultant electric field strength level to the applicable regulatory limit.
- 13. Perform radiated spurious emission test dures until all measured frequencies were complete.

#### <u>LIMIT</u>

Below -20dB of the highest emission level in operating band.

Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).

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# **TEST RESULTS**

# 4.6.1 For Conducted at Restricted Band Measurement

For reporting purpose only.

Please refer to Appendix B.7.

# 4.6.2 For Conducted Bandedge Measurement

For reporting purpose only.

Please refer to Appendix B.5.

# 4.6.3 For Conducted Spurious Emissions Measurement

For reporting purpose only.

Please refer to Appendix B.6.

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# 4.8. Antenna Requirement

#### Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

#### **Antenna Information**

The antenna is Omni&FPC Aantenna, through the buckle stretched out, The directional gains of antenna used for transmitting is 2.91dBi&3.82dBi.

Reference to the Test Report: GTS20231020001-1-82.

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# 5. TEST SETUP PHOTOS OF THE EUT

Reference to the Test Report: GTS20231020001-1-82.

# 6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Reference to the Test Report: GTS20231020001-1-82.
End of Report