

FCC RF Test Report

(FHSS)

Applicant: Hangzhou Roombanker Technology Co., Ltd

Address of Applicant: A#801 Wantong center, Hangzhou, China

Equipment Under Test (EUT)

Product Name: IoT Ceiling Edge Computer Gateway

Model No.: DSGW-230

FCC ID: 2AUXBDSGW-230

Applicable Standards: FCC CFR Title 47 Part 15C (§15.247)

Date of Sample Receipt: 10 May, 2022

Date of Test: 11 May, to 06 Jun., 2022

Date of Report Issued: 06 Jun., 2022

Test Result: PASS

Tested by:

Tanet Wei
Test Engineer

Date:

06 Jun., 2022

Reviewed by:

Wenwen Zhang
Project Engineer

Date:

06 Jun., 2022

Approved by:

Wenwen Zhang
Manager

Date:

06 Jun., 2022

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

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2 Version

Version No.	Date	Description
00	25 May, 2022	Original
01	06 Jun., 2022	Update Page 23~27

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4 General Information

4.1 Client Information

Applicant:	Hangzhou Roombanker Technology Co., Ltd.
Address:	A#801 Wantong center, Hangzhou, China
Manufacturer:	Hangzhou Roombanker Technology Co., Ltd.
Address:	A#801 Wantong center, Hangzhou, China

4.2 General Description of E.U.T.

Product Name:	IoT Ceiling Edge Computer Gateway
Model No.:	DSGW-230
Operation Frequency:	902.3MHz - 914.9MHz
Number of Channel:	64
Modulation Technology:	FSK
Antenna Type:	Internal Antenna
Antenna Gain:	-0.42 dBi (declare by applicant)
Power Supply:	AC/DC 12V or POE 44~57V
AC Adapter:	Model: KA1801A-1201500DE Input: AC100-240V, 50/60Hz, 0.55A Max Output: DC 12.0V, 1.5A 18W
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

4.3 Test Mode and Test Environment

Test Modes:	
Non-hopping mode:	Keep the EUT in continuous transmitting mode.
Hopping mode:	Keep the EUT in hopping mode.
Operating Environment:	
Temperature:	15°C ~ 35°C
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1010 mbar

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Conducted Emission for LISN (9kHz ~ 150kHz)	±3.11 dB
Conducted Emission for LISN (150kHz ~ 30MHz)	±2.62 dB
Radiated Emission (1GHz ~ 18GHz) (3m SAC)	±5.34 dB
Radiated Emission (18GHz ~ 40GHz) (3m SAC)	±5.34 dB
Radiated Emission (30MHz ~ 1GHz) (10m SAC)	±4.32 dB

Note: All the measurement uncertainty value were shown with a coverage $k=2$ to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

4.6 Additions to, Deviations, or Exclusions From the Method

No

4.7 Laboratory Facility

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

● **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

● **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

● **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

4.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.

Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info-JYTee@lets.com, Website: <http://jyt.lets.com>

4.9 Test Instruments List

Radiated Emission(3m SAC):					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	ETS	9m*6m*6m	WXJ001-1	01-19-2021	01-18-2024
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	02-17-2022	02-16-2023
Biconical Antenna	Schwarzbeck	VUBA9117	WXJ002-1	06-20-2021	06-19-2022
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	02-17-2022	02-16-2023
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-3	06-18-2021	06-17-2022
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-5	04-07-2022	04-06-2023
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-6	04-07-2022	04-06-2023
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	02-17-2022	02-16-2023
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXJ001-3	02-17-2022	02-16-2023
Pre-amplifier (18GHz ~ 40GHz)	RF System	TRLA-180400G45B	WXJ002-7	03-30-2022	03-29-2023
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	02-17-2022	02-16-2023
Spectrum Analyzer	KEYSIGHT	N9010B	WXJ004-2	11-27-2021	11-26-2022
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	02-17-2022	02-16-2023
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG001-5	02-17-2022	02-16-2023
Coaxial Cable (18GHz ~ 40GHz)	JYTSZ	JYT3M-40G-SS-8M	WXG001-7	02-17-2022	02-16-2023
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		

Radiated Emission(10m SAC):					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
10m SAC	ETS	RFSD-100-F/A	WXJ090	04-28-2021	04-27-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-1	03-30-2022	03-29-2023
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-2	03-30-2022	03-29-2023
EMI Test Receiver	R&S	ESR 3	WXJ090-3	03-30-2022	03-29-2023
EMI Test Receiver	R&S	ESR 3	WXJ090-4	03-30-2022	03-29-2023
Low Pre-amplifier	Bost	LNA 0920N	WXG002-3	03-30-2022	03-29-2023
Low Pre-amplifier	Bost	LNA 0920N	WXG002-4	03-30-2022	03-29-2023
Cable	Bost	JYT10M-1G-NN-10M	XG002-7	03-30-2022	03-29-2023
Cable	Bost	JYT10M-1G-NN-10M	XG002-8	03-30-2022	03-29-2023
Test Software	R&S	EMC32	Version: 10.50.40		

Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal.Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESR3	WXJ003-2	10-21-2021	10-20-2022
RF Switch	TOP PRECISION	RSU0301	WXG003	02-17-2022	02-16-2023
LISN	Schwarzbeck	NSLK 8127	QCJ001-13	02-17-2022	02-16-2023
LISN	Rohde & Schwarz	ESH3-Z5	WXJ005-1	06-18-2021	06-17-2022
LISN Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYTCE-1G-NN-2M	WXG003-1	02-17-2022	02-16-2023
Test Software	AUDIX	E3	Version: 6.110919b		

Conducted Method:					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
Spectrum Analyzer	Keysight	N9010B	WXJ004-3	10-25-2021	10-24-2022
Power Detector Box	MWRFTST	MW100-PSB	WXJ007-4	10-25-2021	10-24-2022
RF Control Unit	MWRFTST	MW100-RFCB	WXG006	N/A	
Test Software	MWRFTST	MTS 8310	Version: 2.0.0.0		

5 Measurement Setup and Procedure

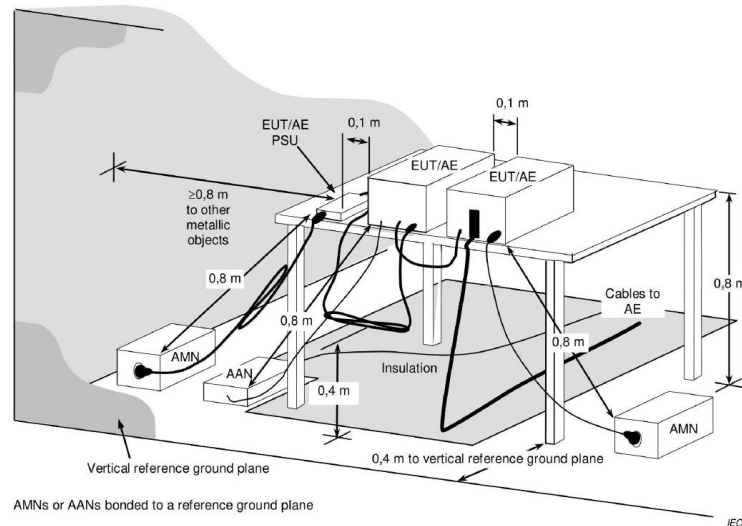
5.1 Test Channel

According to ANSI C63.10-2013 chapter 5.6.1 Table 4 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:

Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	902.3	32	908.5	64	914.9

5.2 Test Setup

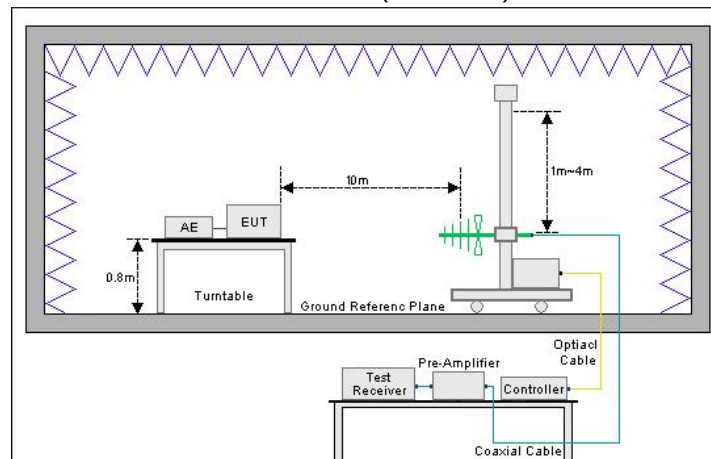
1) Conducted emission measurement:

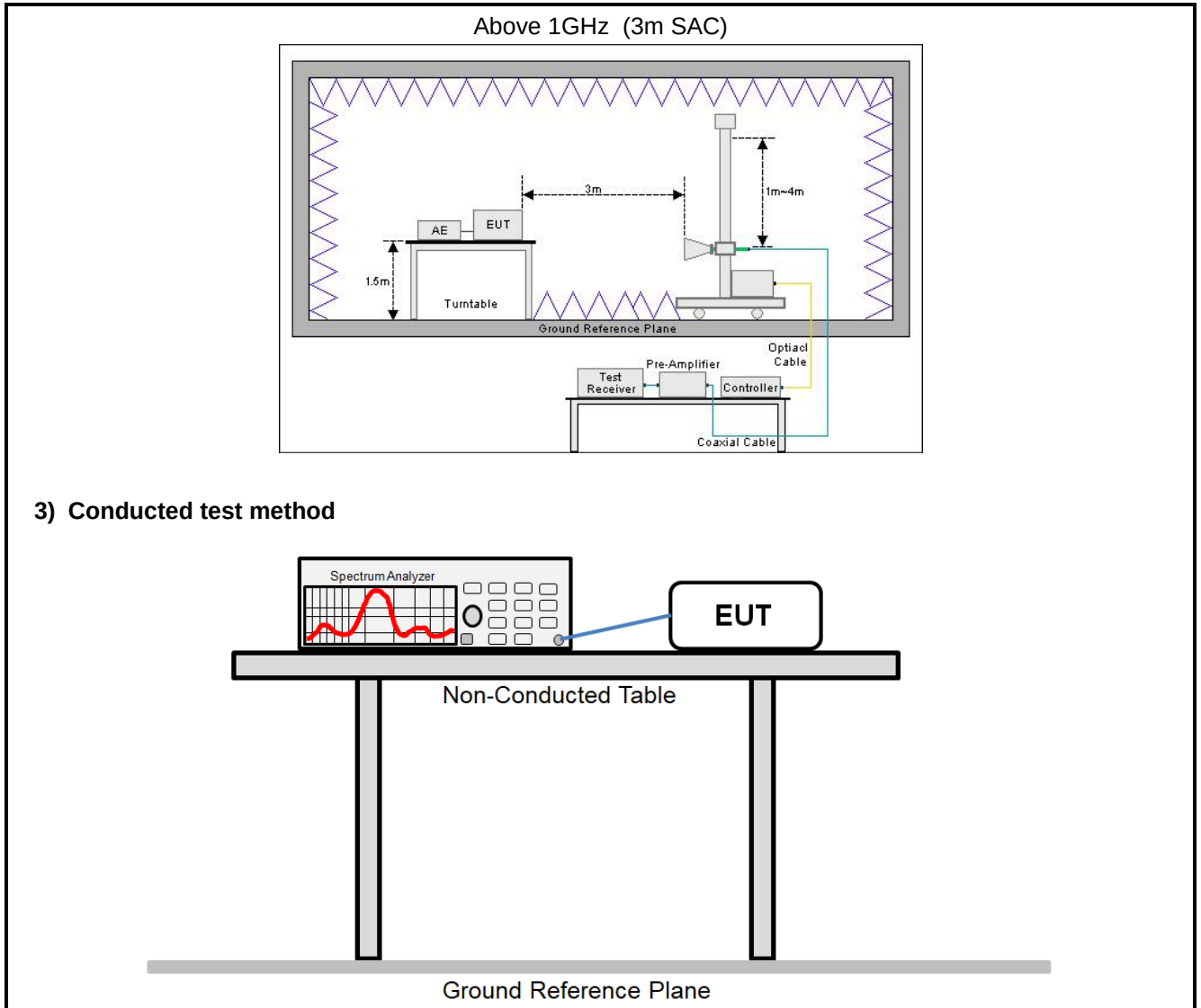


Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

2) Radiated emission measurement:

Below 1GHz (10m SAC)





5.3 Test Procedure

Test method	Test step
Conducted emission	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Radiated emission	For below 1GHz: 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 10 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 10 m. 2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data. For above 1GHz: 1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
Conducted test method	1. The antenna port of EUT was connected to the test port of the test system through an RF cable. 2. The EUT is keeping in continuous transmission mode and tested in all modulation modes. 3. Open the test software, prepare a test plan, and control the system through the software. After the test is completed, the test report is exported through the test software.

6 Test Results

6.1 Summary

6.1.1 Clause and data summary

Test items	Standard clause	Test data	Result
Antenna Requirement	15.203 15.247 (b)(4)	See Section 6.2	Pass
AC Power Line Conducted Emission	15.207	See Section 6.3	Pass
Conducted Output Power	15.247 (b)(2)	See Section 6.4	Pass
20dB Occupied Bandwidth	15.247 (a)(1)(i)	See Section 6.5	Pass
Carrier Frequencies Separation	15.247 (a)(1)	See Section 6.6	Pass
Hopping Channel Number	5.247 (a)(1)(i)	See Section 6.7	Pass
Dwell Time	15.247 (a)(1)(i)	See Section 6.8	Pass
Spurious Emission	15.205 15.209 15.247 (d)	See Section 6.9	Pass
Remark: 1. Pass: The EUT complies with the essential requirements in the standard. 2. The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).			
Test Method:	ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02		

6.1.2 Test Limit

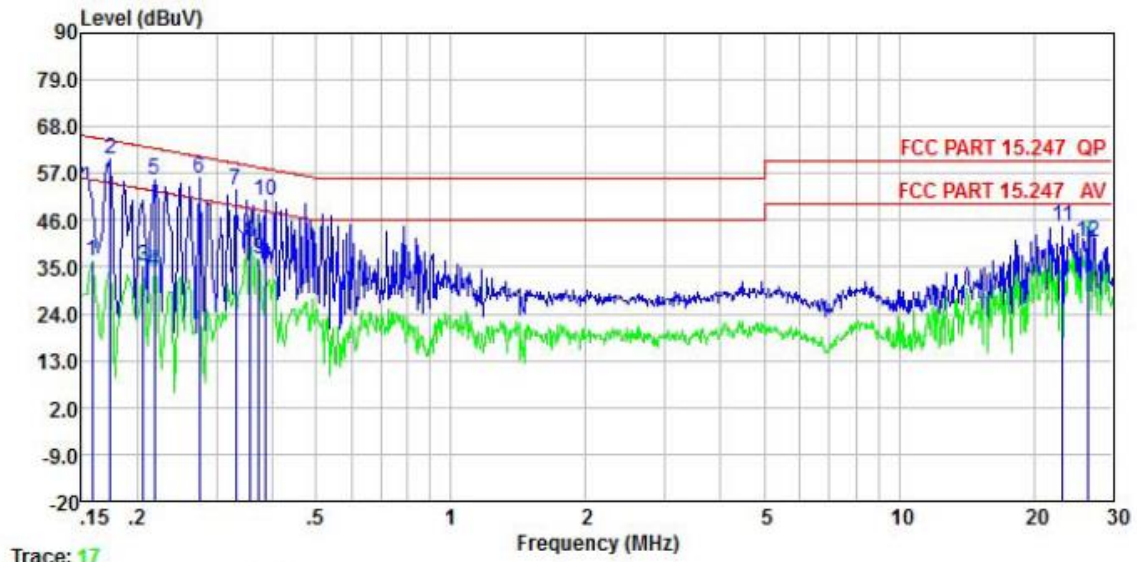
Test items	Limit																														
AC Power Line Conducted Emission	<table><tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBμV)</th></tr><tr><th>Quasi-Peak</th><th>Average</th></tr><tr><td>0.15 – 0.5</td><td>66 to 56 Note 1</td><td>56 to 46 Note 1</td></tr><tr><td>0.5 – 5</td><td>56</td><td>46</td></tr><tr><td>5 – 30</td><td>60</td><td>50</td></tr></table> Note 1: The limit level in dBμV decreases linearly with the logarithm of frequency. Note 2: The more stringent limit applies at transition frequencies.	Frequency (MHz)	Limit (dBμV)		Quasi-Peak	Average	0.15 – 0.5	66 to 56 Note 1	56 to 46 Note 1	0.5 – 5	56	46	5 – 30	60	50																
Frequency (MHz)	Limit (dBμV)																														
	Quasi-Peak	Average																													
0.15 – 0.5	66 to 56 Note 1	56 to 46 Note 1																													
0.5 – 5	56	46																													
5 – 30	60	50																													
Conducted Output Power	For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.																														
20dB Occupied Bandwidth Hopping Channel Number Dwell Time	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.																														
Carrier Frequencies Separation	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater																														
Spurious Emission	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)): <table><tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBμV/m)</th><th rowspan="2">Detector</th></tr><tr><th>@ 3m</th><th>@ 10m</th></tr><tr><td>30 – 88</td><td>40.0</td><td>30.0</td><td>Quasi-peak</td></tr><tr><td>88 – 216</td><td>43.5</td><td>33.5</td><td>Quasi-peak</td></tr><tr><td>216 – 960</td><td>46.0</td><td>36.0</td><td>Quasi-peak</td></tr><tr><td>960 – 1000</td><td>54.0</td><td>44.0</td><td>Quasi-peak</td></tr></table> Note: The more stringent limit applies at transition frequencies. <table><tr><th rowspan="2">Frequency</th><th colspan="2">Limit (dBμV/m) @ 3m</th></tr><tr><th>Average</th><th>Peake</th></tr><tr><td>Above 1 GHz</td><td>54.0</td><td>74.0</td></tr></table> Note: The measurement bandwidth shall be 1 MHz or greater.	Frequency (MHz)	Limit (dBμV/m)		Detector	@ 3m	@ 10m	30 – 88	40.0	30.0	Quasi-peak	88 – 216	43.5	33.5	Quasi-peak	216 – 960	46.0	36.0	Quasi-peak	960 – 1000	54.0	44.0	Quasi-peak	Frequency	Limit (dBμV/m) @ 3m		Average	Peake	Above 1 GHz	54.0	74.0
Frequency (MHz)	Limit (dBμV/m)		Detector																												
	@ 3m	@ 10m																													
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216 – 960	46.0	36.0	Quasi-peak																												
960 – 1000	54.0	44.0	Quasi-peak																												
Frequency	Limit (dBμV/m) @ 3m																														
	Average	Peake																													
Above 1 GHz	54.0	74.0																													

6.2 Antenna Requirement

Standard requirement:	FCC Part 15 C Section 15.203 & 247(b)
15.203 requirement: 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
E.U.T Antenna:	
The EUT antenna is an Internal antenna which permanently attached, and the best case gain of the antenna is -0.42 dBi. See product internal photos for details.	

6.3 AC Power Line Conducted Emission

Product name:	IoT Ceiling Edge Computer Gateway	Product model:	DSGW-230
Test by:	Janet	Test mode:	Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Line
Test voltage:	AC 120 V/60 Hz		

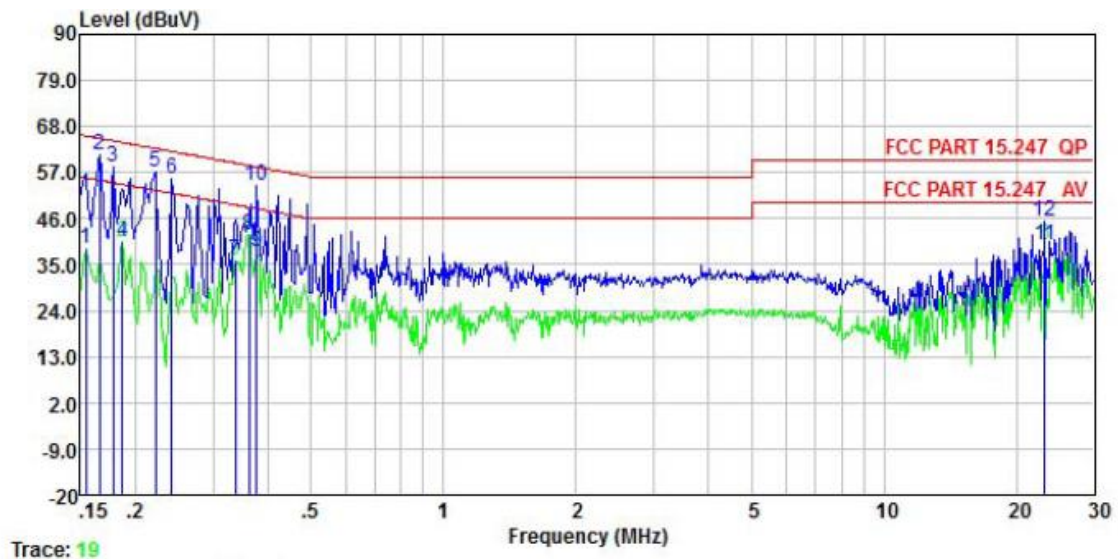


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.158	36.28	0.04	0.01	36.33	55.56	-19.23	Average
2	0.174	60.48	0.04	0.01	60.53	64.77	-4.24	QP
3	0.206	35.15	0.04	0.04	35.23	53.36	-18.13	Average
4	0.219	34.04	0.04	0.03	34.11	52.88	-18.77	Average
5	0.219	55.33	0.04	0.03	55.40	62.88	-7.48	QP
6	0.274	55.69	0.04	0.02	55.75	60.98	-5.23	QP
7	0.330	53.19	0.04	0.02	53.25	59.44	-6.19	QP
8	0.358	40.65	0.04	0.02	40.71	48.78	-8.07	Average
9	0.373	36.95	0.04	0.03	37.02	48.43	-11.41	Average
10	0.385	50.62	0.04	0.03	50.69	58.17	-7.48	QP
11	23.140	44.01	0.35	0.17	44.53	60.00	-15.47	QP
12	26.418	40.35	0.37	0.21	40.93	50.00	-9.07	Average

Remark:

1. Level = Read level + LISN Factor + Cable Loss.

Product name:	IoT Ceiling Edge Computer Gateway	Product model:	DSGW-230
Test by:	Janet	Test mode:	Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz		



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	38.91	0.05	0.01	38.97	55.78	-16.81	Average
2	0.166	61.03	0.05	0.01	61.09	65.16	-4.07	QP
3	0.178	58.42	0.04	0.01	58.47	64.59	-6.12	QP
4	0.186	40.57	0.04	0.02	40.63	54.20	-13.57	Average
5	0.222	56.88	0.04	0.03	56.95	62.74	-5.79	QP
6	0.242	55.32	0.04	0.01	55.37	62.04	-6.67	QP
7	0.337	36.00	0.04	0.02	36.06	49.27	-13.21	Average
8	0.361	42.03	0.04	0.02	42.09	48.69	-6.60	Average
9	0.377	38.12	0.04	0.03	38.19	48.34	-10.15	Average
10	0.377	53.68	0.04	0.03	53.75	58.34	-4.59	QP
11	23.140	39.05	0.34	0.17	39.56	50.00	-10.44	Average
12	23.140	44.84	0.34	0.17	45.35	60.00	-14.65	QP

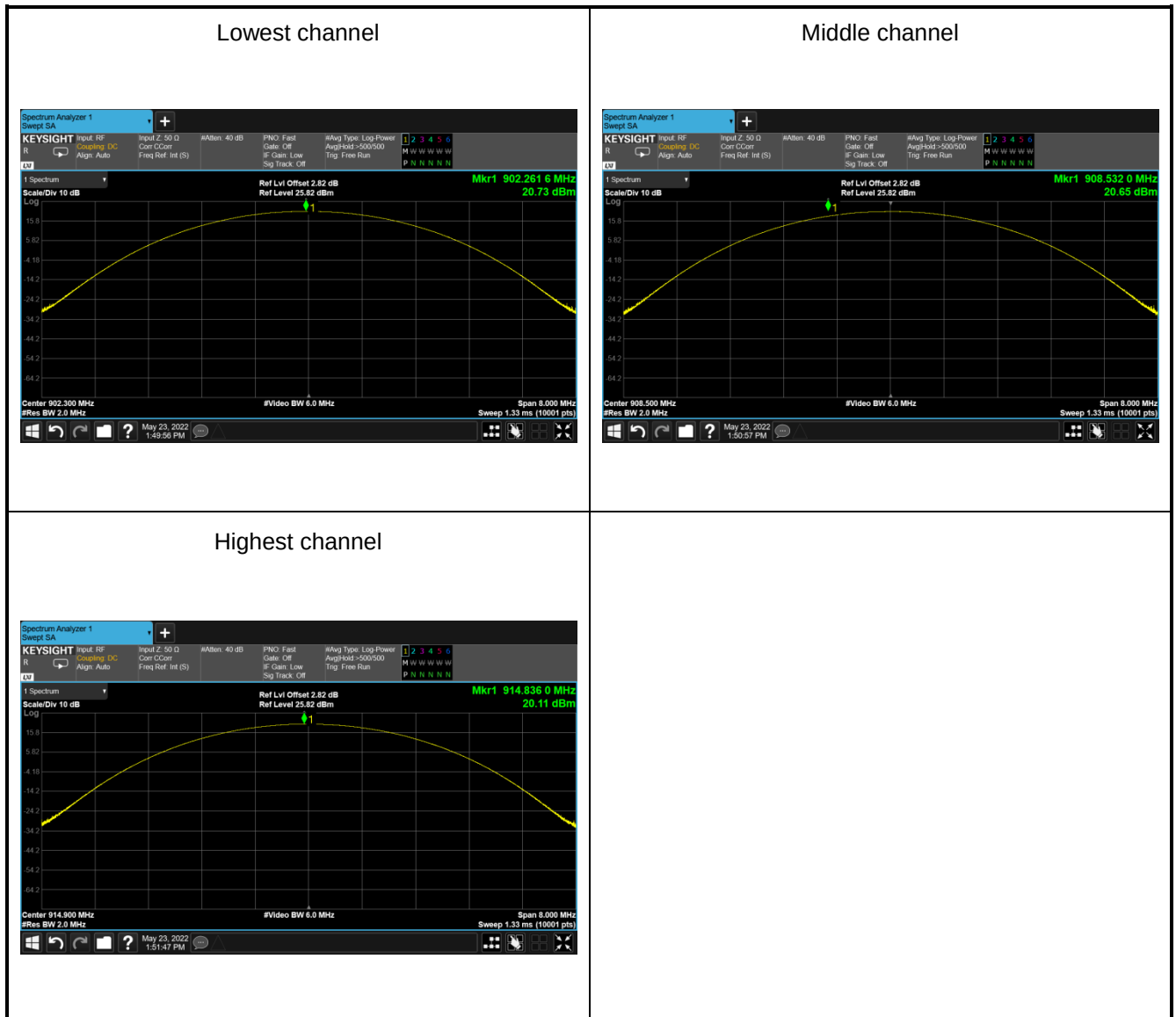
Remark:

1. Level = Read level + LISN Factor + Cable Loss.

6.4 Conducted Output Power

Test channel	Maximum Output Power (dBm)	Limit (dBm)	Result
Lowest channel	20.73	30.00	Pass
Middle channel	20.65	30.00	Pass
Highest channel	20.11	30.00	Pass

Test plot as follows:



6.5 20dB Occupied Bandwidth

Test channel	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Result
Lowest channel	135.8	$BW_{20dB} \leq 250$	Pass
Middle channel	137.7	$BW_{20dB} \leq 250$	Pass
Highest channel	134.8	$BW_{20dB} \leq 250$	Pass

Test plot as follows:



6.6 Carrier Frequencies Separation

Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest channel	146.3	135.8	Pass
Middle channel	226.8	137.7	Pass
Highest channel	212.1	134.8	Pass

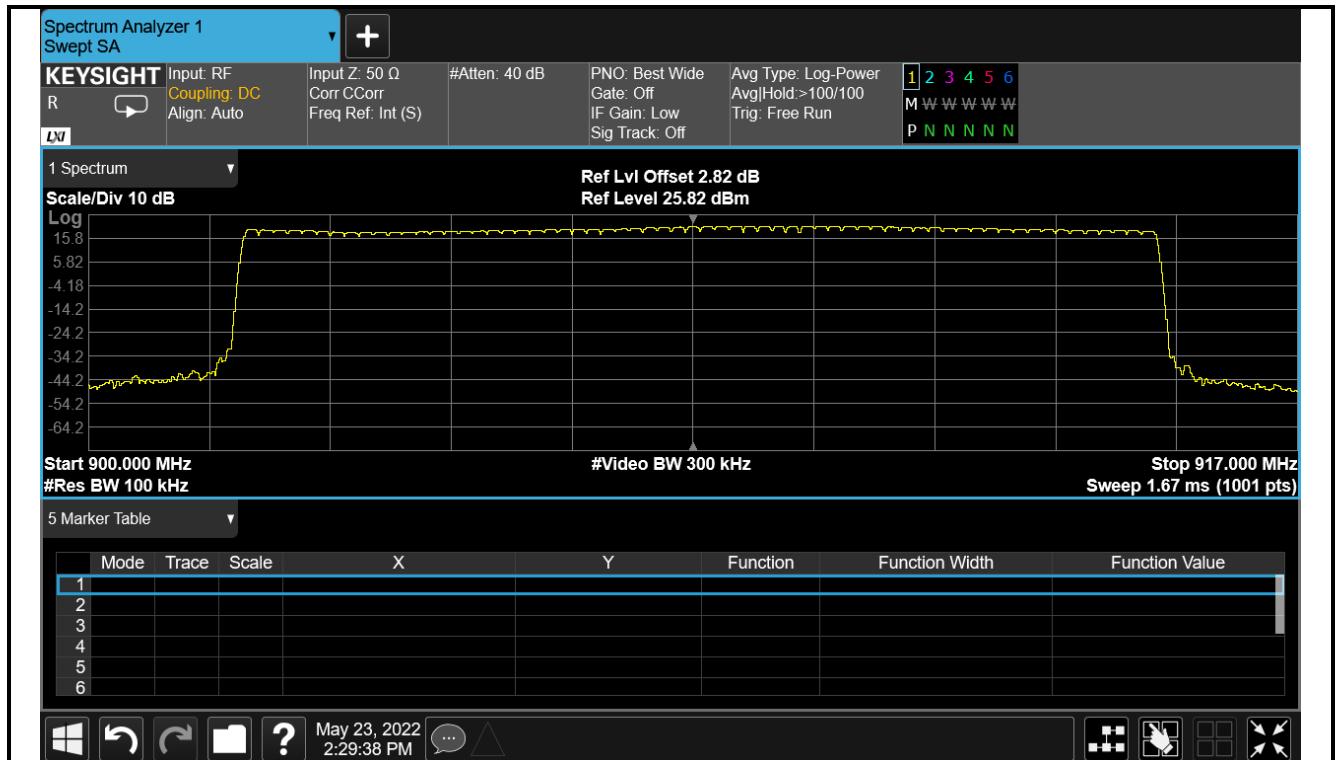
Test plot as follows:



6.7 Hopping Channel Number

Hopping channel numbers	Limit	Result
64	$N_{ch} \geq 50$	Pass

Test plot as follows:



6.8 Dwell Time

T_{on} (s)	Hopping numbers (20 s period)	Dwell time (s)	Limit (s)	Result
0.0365	3	0.1095	0.4	Pass

Note:

- T_{on} is time per hop.
- Dwell time = $T_{on} * \text{Hopping numbers}$.

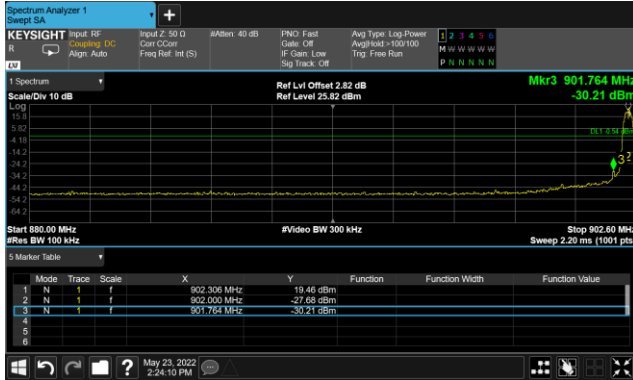
Test plot as follows:



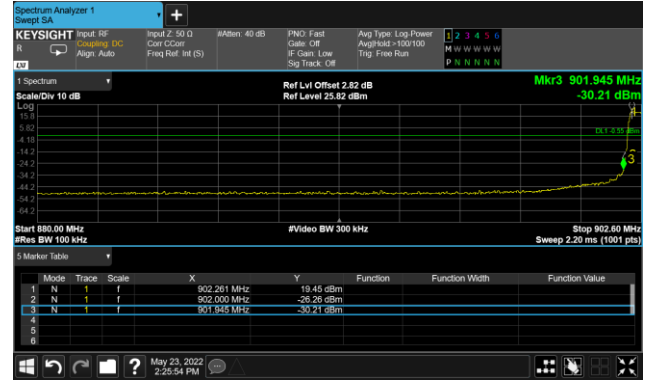
6.9 Spurious Emission

6.9.1 Band-edge Emission

Lowest Channel

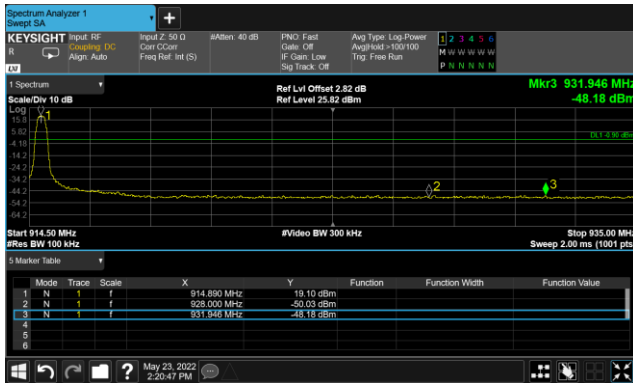


No-hopping mode

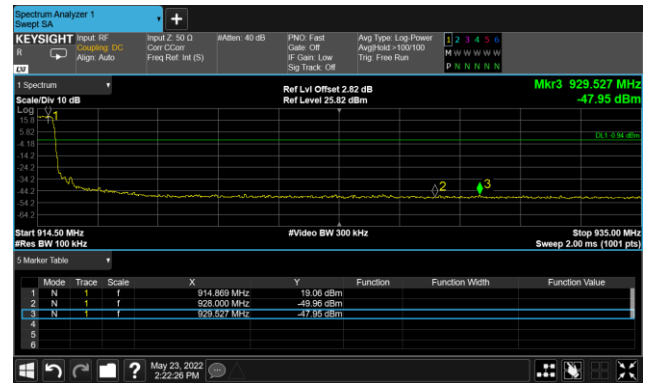


Hopping mode

Highest Channel



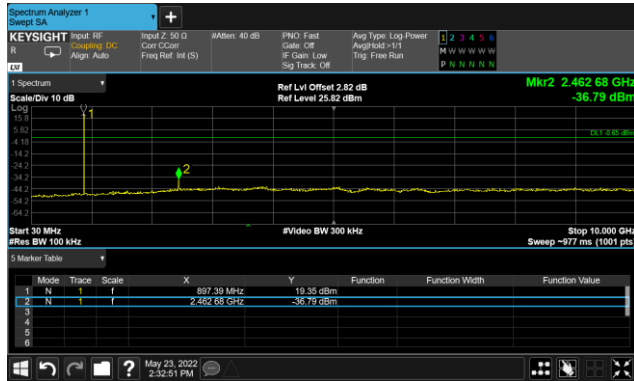
No-hopping mode



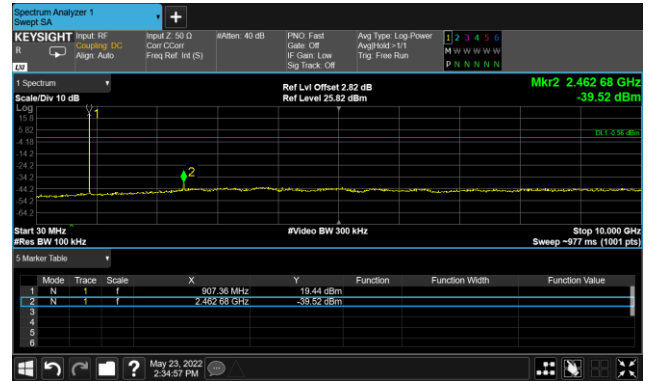
Hopping mode

6.9.2 Conducted Spurious Emission

Lowest channel



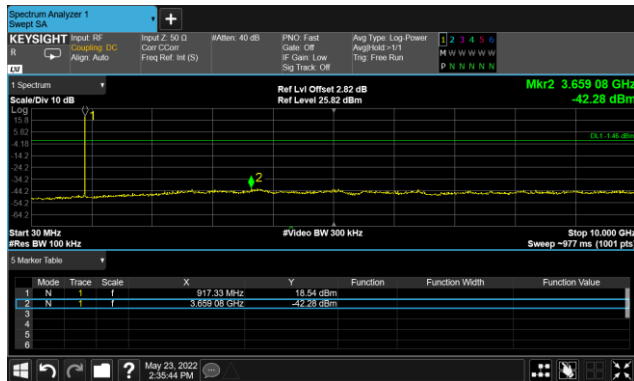
Middle channel



30MHz~10GHz

30MHz~10GHz

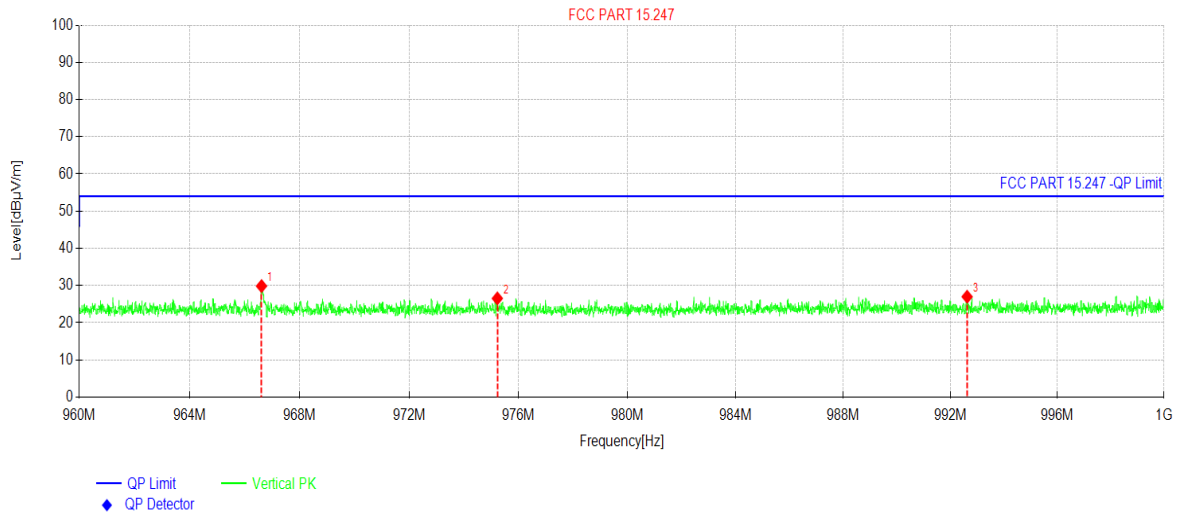
Highest channel



30MHz~10GHz

6.9.3 Emissions in Restricted Frequency Bands

Product Name:	IoT Ceiling Edge Computer Gateway	Product Model:	DSGW-230
Test By:	Janet	Test mode:	Tx mode
Test Channel:	Lowest channel	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		



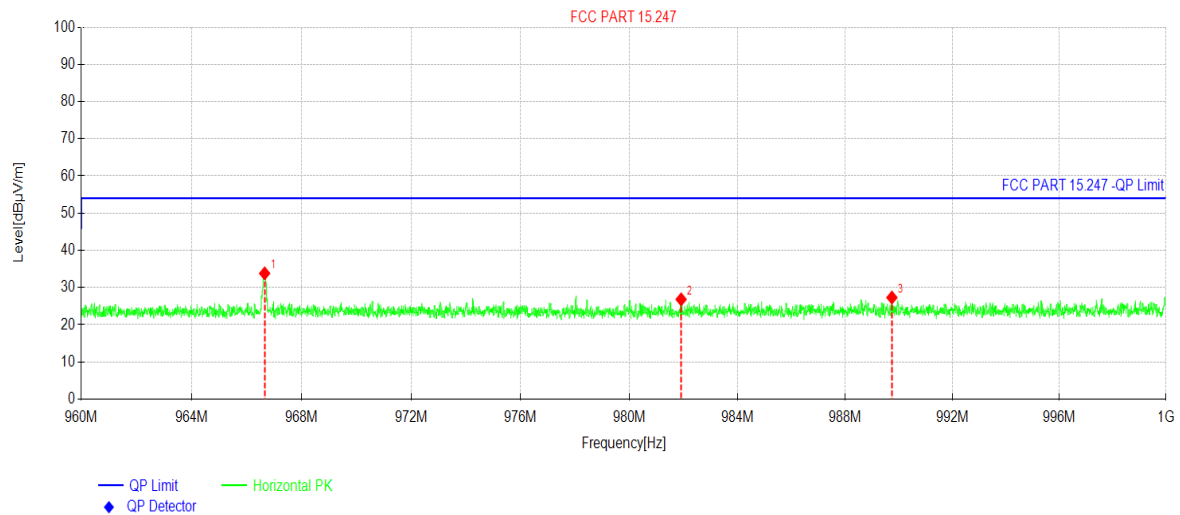
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	966.608	30.72	29.85	-0.87	54.00	24.15	PK	Vertical
2	975.225	27.44	26.54	-0.90	54.00	27.46	PK	Vertical
3	992.619	27.63	26.99	-0.64	54.00	27.01	PK	Vertical

Remark:

1. Level = Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	IoT Ceiling Edge Computer Gateway	Product Model:	DSGW-230
Test By:	Janet	Test mode:	Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



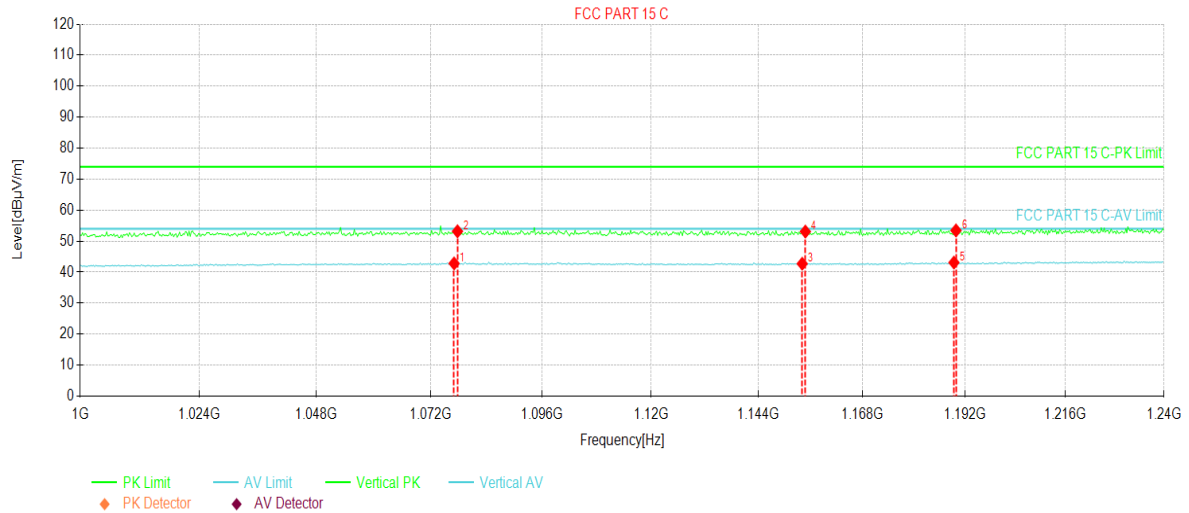
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	966.648	34.68	33.81	-0.87	54.00	20.19	PK	Horizontal
2	981.918	27.69	26.82	-0.87	54.00	27.18	PK	Horizontal
3	989.739	28.00	27.31	-0.69	54.00	26.69	PK	Horizontal

Remark:

1. Level = Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	IoT Ceiling Edge Computer Gateway	Product Model:	DSGW-230
Test By:	Janet	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	AC 120/60Hz		



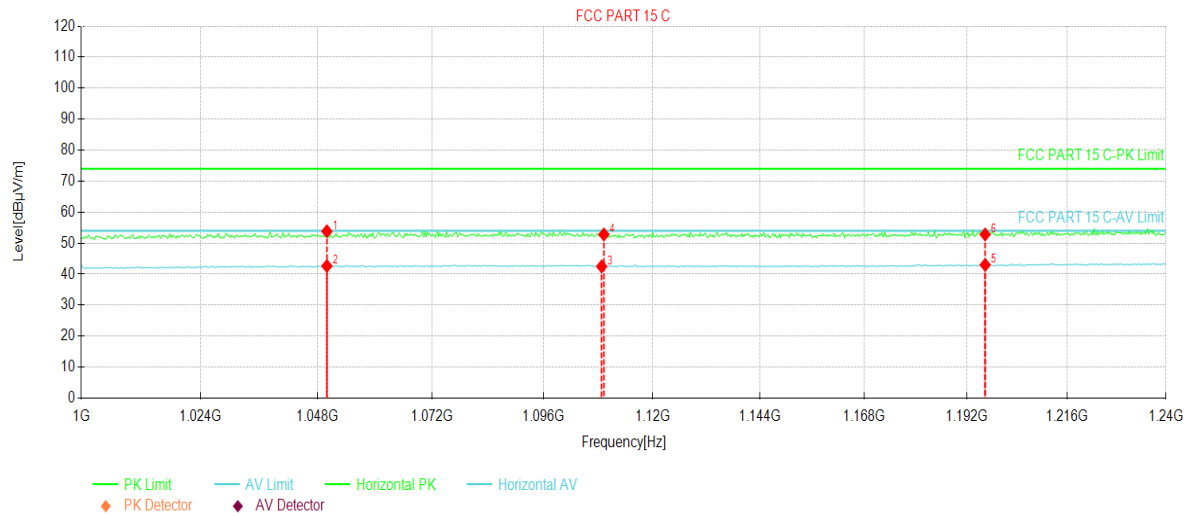
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1077.04	12.76	42.81	30.05	54.00	11.19	AV	Vertical
2	1077.76	23.12	53.17	30.05	74.00	20.83	PK	Vertical
3	1154.08	12.49	42.72	30.23	54.00	11.28	AV	Vertical
4	1154.80	22.85	53.08	30.23	74.00	20.92	PK	Vertical
5	1189.36	12.82	43.09	30.27	54.00	10.91	AV	Vertical
6	1189.84	23.18	53.45	30.27	74.00	20.55	PK	Vertical

Remark:

1. Level = Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	IoT Ceiling Edge Computer Gateway	Product Model:	DSGW-230
Test By:	Janet	Test mode:	Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz		



Suspected Data List

NO.	Freq. [MHz]	Reading [dBuV/m]	Level [dBuV/m]	Factor [dB]	Limit [dBuV/m]	Margin [dB]	Trace	Polarity
1	1049.92	23.94	53.84	29.90	74.00	20.16	PK	Horizontal
2	1049.92	12.72	42.62	29.90	54.00	11.38	AV	Horizontal
3	1108.72	12.31	42.49	30.18	54.00	11.51	AV	Horizontal
4	1109.20	22.63	52.81	30.18	74.00	21.19	PK	Horizontal
5	1196.32	12.71	42.99	30.28	54.00	11.01	AV	Horizontal
6	1196.32	22.53	52.81	30.28	74.00	21.19	PK	Horizontal

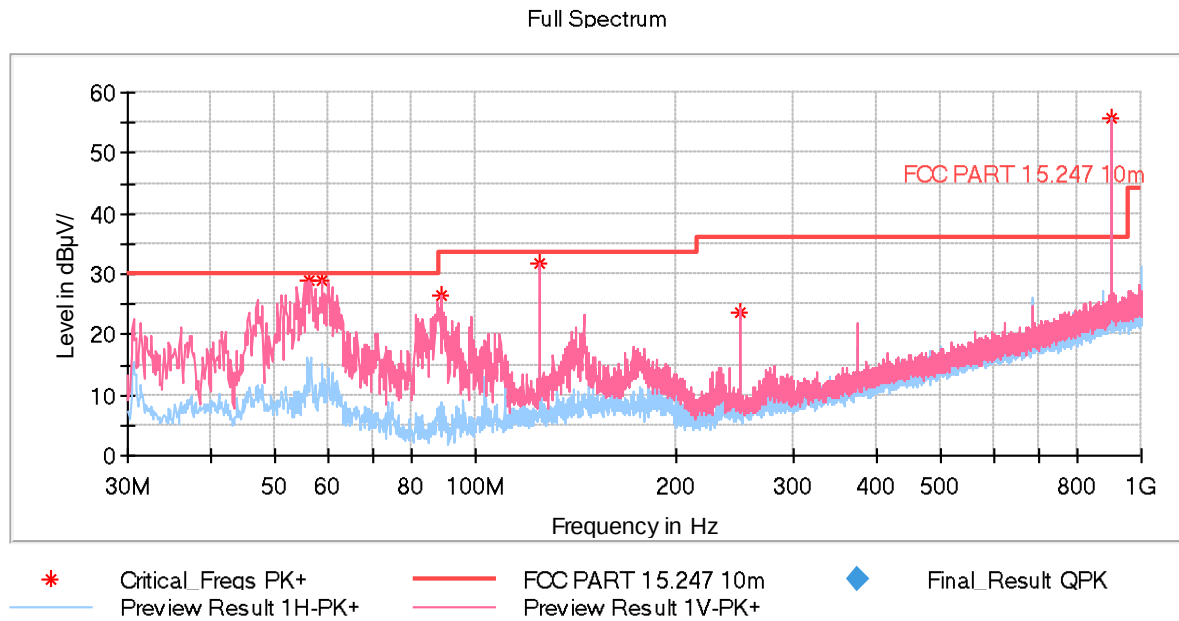
Remark:

1. Level = Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

6.9.4 Emissions in Non-restricted Frequency Bands

Below 1GHz:

Product Name:	LTE Indoor CPE	Product Model:	EG2260H
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical & Horizontal
Test Voltage:	AC 120/60Hz		



Frequency↓ (MHz)↵	MaxPeak↓ (dBμ V/m)↵	Limit↓ (dBμ V/m)↵	Margin↓ (dB)↵	Height↓ (cm)↵	Pol↵	Azimuth↓ (deg)↵	Corr.↓ (dB/m)↵
55.996000↵	28.95↵	30.00↵	1.05↵	100.0↵	V↵	79.0↵	-16.1↵
58.712000↵	28.86↵	30.00↵	1.14↵	100.0↵	V↵	224.0↵	-16.3↵
88.782000↵	26.43↵	33.50↵	7.07↵	100.0↵	V↵	15.0↵	-20.0↵
124.963000↵	31.69↵	33.50↵	1.81↵	100.0↵	V↵	270.0↵	-16.7↵
249.899000↵	23.79↵	36.00↵	12.21↵	100.0↵	V↵	221.0↵	-15.8↵
902.321000↵	55.89↵	36.00↵	-19.89↵	100.0↵	H↵	154.0↵	-1.2↵

Remark:

1. Level = Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Above 1GHz:

Lowest channel						
Peak Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1846.60	55.12	-20.77	34.35	74.00	39.65	Vertical
1846.60	55.40	-20.77	34.63	74.00	39.37	Horizontal
Average Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1846.60	47.62	-20.77	26.85	54.00	27.15	Vertical
1846.60	47.84	-20.77	27.07	54.00	26.93	Horizontal
Middle channel						
Peak Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1851.40	54.76	-20.75	34.01	74.00	39.99	Vertical
1851.40	55.47	-20.75	34.72	74.00	39.28	Horizontal
Average Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1851.40	47.48	-20.75	26.73	54.00	27.27	Vertical
1851.40	47.97	-20.75	27.22	54.00	26.78	Horizontal
Highest channel						
Peak Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1855.00	55.19	-20.73	34.46	74.00	39.54	Vertical
1855.00	55.07	-20.73	34.34	74.00	39.66	Horizontal
Average Value						
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarization
1855.00	47.80	-20.73	27.07	54.00	26.93	Vertical
1855.00	48.39	-20.73	27.66	54.00	26.34	Horizontal
Remark: 1. Level = Read level + Factor.						

-----End of report-----