

FCC RADIO TEST REPORT

For
FCC ID: 2BHEL-QB098

Report Reference No.: 24EFSS06089 04751

Date Sample(s) Received: 2024-06-27

Date of tested: From 2024-06-28 to 2024-07-04

Date of issue: 2024-07-05

Testing Laboratory: DongGuan ShuoXin Electronic Technology Co., Ltd.

Address: Zone A, 1F, No. 6, XinGang Road YuanGang Street, XinAn District, ChangAn Town, DongGuan City, GuangDong, China

Applicant's name: ZHEJIANG LAYMAS Health Technology Co., Ltd.

Address: No.1999 Songpudong Road, Yunjiang Standard Factory Building 2-1, Room 401, Nanbin Streets, Ruian City, Zhejiang, China

Test specification:

Test item description: remote control

Trade Mark: /

Model/Type reference: QB098, QB099, KS-3709B (The three prototypes are identical except for the model name and the logo printed on the silk)

Ratings: I/P: DC 3V Button Cell

Test Engineer:



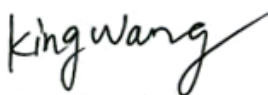
Jelena QuYang

Responsible Engineer :



Smile Wang

Authorized Signatory:



King Wang

TABLE OF CONTENTS

1. Summary of test Standards and results.....	3
2. General test information	4
2.1. Description of EUT	4
2.2. Accessories of EUT	4
2.3. Assistant equipment used for test	4
2.4. Block diagram of EUT configuration for test	4
2.5. Test environment conditions	5
2.6. Measurement uncertainty	5
3. 20dB Occupied Bandwidth	6
3.1. Test equipment.....	6
3.2. Block diagram of test setup	6
3.3. Limits.....	6
3.4 Test Procedure	6
3.5. Test Result.....	7
3.6. Original test data	7
4. Field Strength of Fundamental And Field Strength of Spurious Emissions	8
4.1. Test equipment.....	8
4.2. Block diagram of test setup	9
4.3. Limit.....	10
4.4. Test Procedure	11
4.5. Test result(For 15.205).....	12
4.6 Test result(For 15.231).....	17
5 Duration Time	20
5.1 Test equipment.....	20
5.2 Block diagram of test setup	20
5.3 Limits.....	20
5.4 Test Procedure	20
5.5 Test Result.....	20
5.6 Original test data	21
6. Antenna Requirements.....	22
6.1. Limit.....	22
6.2. Result.....	22

TEST REPORT DECLARE

Applicant	:	ZHEJIANG LAYMAS Health Technology Co., Ltd.
Address	:	No.1999 Songpudong Road, Yunjiang Standard Factory Building 2-1, Room 401, Nanbin Streets, Ruian City, Zhejiang, China
Manufacturer	:	Dongguan City Qinbo Electronics Co., Ltd.
Address	:	Third Floor, No.32, Xinglong 1st Road North, Miaobianwang Village, Shipai Town, Dongguan City, Guangdong Province, China
Equipment under Test	:	remote control
Test Model No	:	QB098
Rate	:	Input: DC 3V Button Cell

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C (15.231)

Test procedure used: ANSI C63.10:2013

We Declare:

The equipment described above is tested by DongGuan ShuoXin Electronic Technology Co., Ltd(ATT). and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and DongGuan ShuoXin Electronic Technology Co., Ltd.(ATT) is assumed of full responsibility for the accuracy and completeness of these tests.

ATT is not responsible for the sampling stage, so the results only apply to the sample as received.

ATT's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. ATT shall have no liability for any declarations, inferences or generalizations drawn by the client or others from ATT issued reports.

1. Summary of test Standards and results

The EUT have been tested according to the applicable standards as referenced below.

Description of Test Item	Standard	Results
20dB Occupied Bandwidth Occupied Bandwidth	FCC Part 15.231(c)	PASS
Field Strength of Fundamental and Field Strength of Spurious Emissions	FCC Part 15.209,15.231(b)	PASS
Duration Time	15.231(a)	PASS
Antenna requirement	FCC Part 15: 15.203	PASS

Test Facility:

The Test site used by DongGuanShuoXin Electronic Technology Co., Ltd. to collect test data is located on the Zone A, 1F, No. 6, XinGang Road YuanGang Street, XinAn District, ChangAn Town, DongGuan City, Guangdong, China

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

Item	Registration No.	Expiration Date
CNAS	L3098	2024-08-27
A2LA	4893.01	2026-06-30
Innovation, Science and Economic Development Canada (ISED)	11033A CAB identifier:CN0083	2026-06-30
Federal Communications Commission (FCC)	171688 Designation No.:CN1235	2026-06-30

2. General test information

2.1. Description of EUT

EUT* Name	remote control
Model Number	QB098
EUT function description	Please reference user manual of this device
Power supply	DC 3V
Radio Technology	SRD
Operation frequency	433.92 MHz
Modulation	ASK
Antenna Type	maximum PK gain: 2 dBi (Provided by manufacturer)
Date of Receipt	2024/06/28
Sample Type	Single production
Sample Number	A-NO.01
Hardware Version	V1.0
Software Version	V1.0

Note: EUT is the ab. of equipment under test.

2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number or Type	Serial number
/	/	/	/

2.3. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Other
/	/	/	/

2.4. Block diagram of EUT configuration for test



New battery is used during all test

EUT enters the engineering interface by clicking the system version to control EUT work in test mode as blow table.

2.5. Test environment conditions

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

Temperature range:	21-25℃
Humidity range:	40-75%
Pressure range:	86-106kPa

2.6. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test (9kHz-150kHz)	3.7 dB
Uncertainty for Conduction emission test (150kHz-30MHz)	3.3 dB
Uncertainty for Radiation Emission test (9kHz-30MHz)	3.6 dB
Uncertainty for Radiation Emission test (30MHz-200MHz)	4.60 dB (Polarize: V)
	4.60 dB (Polarize: H)
Uncertainty for Radiation Emission test (200MHz-1GHz)	6.10 dB (Polarize: V)
	5.08 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz-6GHz)	5.01 dB (Polarize: V)
	5.01 dB (Polarize: H)
Uncertainty for Radiation Emission test (6GHz-18GHz)	5.26 dB (Polarize: V)
	5.26 dB (Polarize: H)
Uncertainty for Radiation Emission test (18GHz-40GHz)	5.06 dB (Polarize: V)
	5.06 dB (Polarize: H)
Uncertainty for radio frequency	$\pm 0.048\text{kHz}$
Uncertainty for conducted RF Power	$\pm 0.32\text{dB}$
Uncertainty for conducted Occupied Bandwidth	2.43%

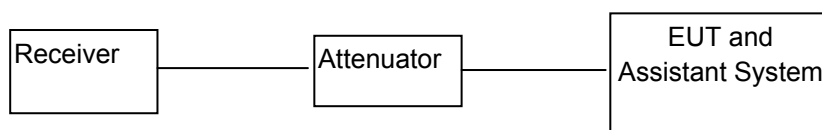
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

3. 20dB Occupied Bandwidth

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until	Calibrated Date
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2025/05/22	2024/05/23
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A	N/A
3	RF Cable	Micable	C10-01-01-1	100309	N/A	N/A

3.2. Block diagram of test setup



3.3. Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

3.4 Test Procedure

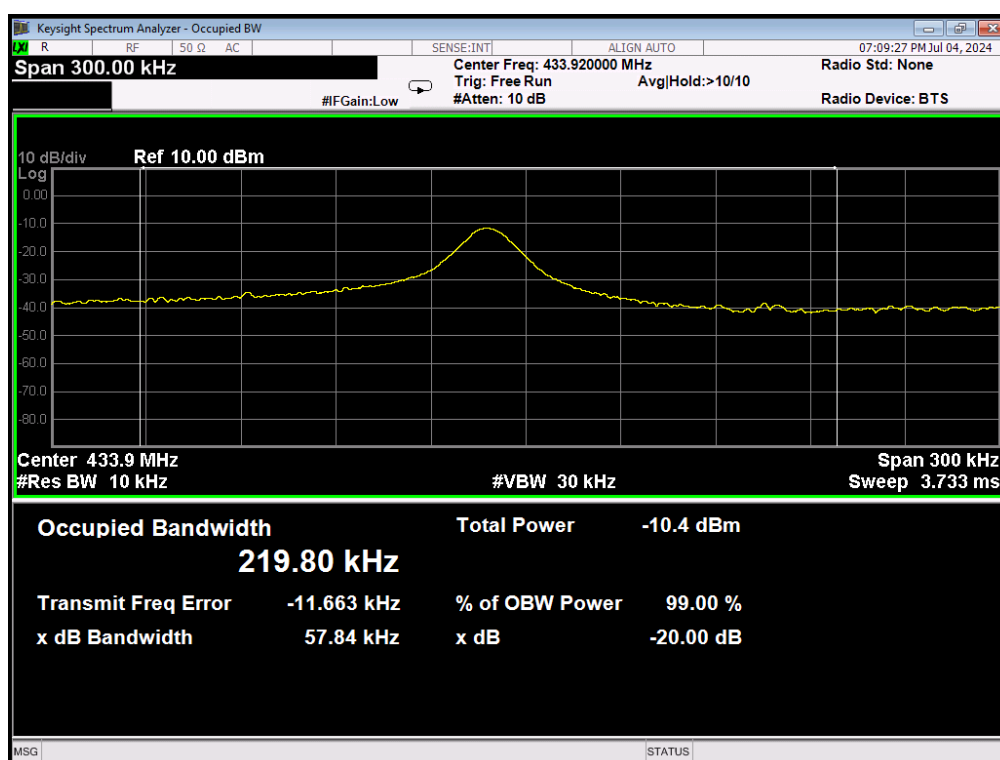
- (1) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- (2) Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- (3) The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied, video bandwidth (VBW) shall not be smaller than three times the RBW value
- (4) Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

3.5. Test Result

99% bandwidth (MHz)	-20dB bandwidth (MHz)	Limit (MHz)	Results
0.2198	0.05784	1.0848	Pass

Note: Limit= Fundamental frequency \times 0.25%=433.92 \times 0.25%=1.0848MHz

3.6. Original test data



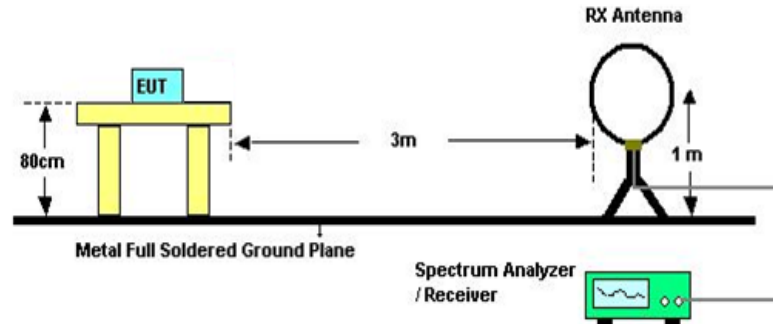
4. Field Strength of Fundamental And Field Strength of Spurious Emissions

4.1. Test equipment

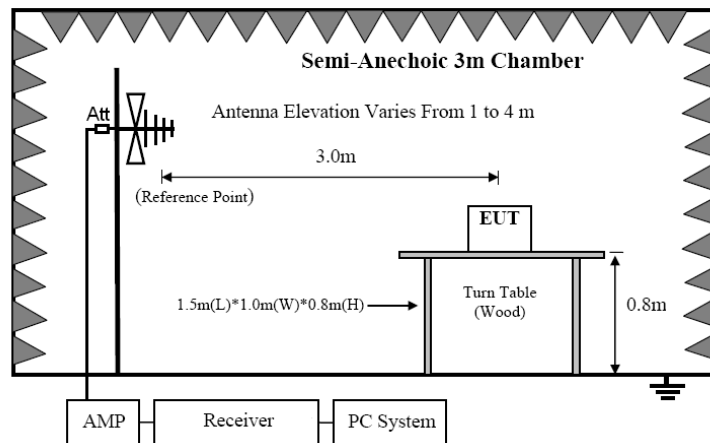
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	101307	06/05/2025
2	Spectrum Analyzer	Agilent	E4407B	US40240708	11/06/2024
3	Loop antenna	SCHWARZBECK	FMZB1519	1519-062	01/14/2025
4	Broadband antenna	SCHWARZBECK	VULB9168	VULB9168-192	03/29/2025
5	HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D 1065	03/29/2025
6	Preamplifier Amplifier	HP	8447F	3113A05680	12/04/2024
7	PRE-AMPLIFIER	EMEC	EM01G26G	060679	03/29/2025
8	RF Cable	N/A	Test Cable 4	4	12/11/2024
9	RF Cable	N/A	Test Cable 5	5	12/11/2024
10	RF Cable	N/A	Test Cable 8	8	04/17/2025
11	RF Cable	N/A	Test Cable 9	9	04/17/2025
12	Measurement Software	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A

4.2. Block diagram of test setup

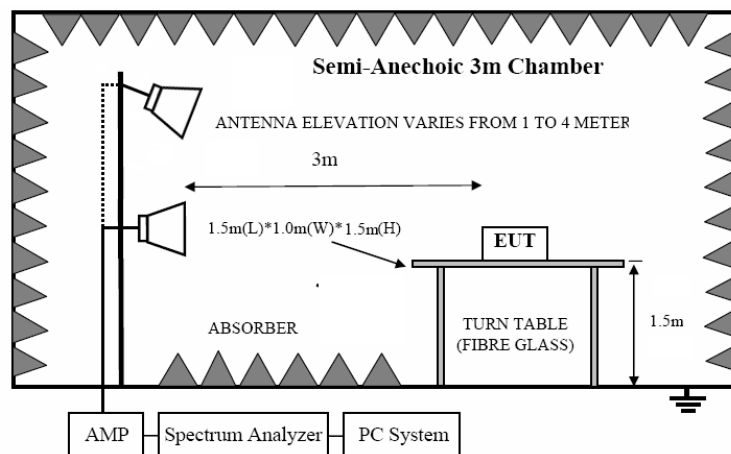
In 3m Anechoic Chamber Test Setup Diagram for 9kHz-30MHz



In 3m Anechoic Chamber Test Setup Diagram for 30MHz-1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

4.3. Limit

FCC 15.209 Limit

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

FCC 15.231(b) Limit

Fundamental Frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of spurious emissions (millivolts/meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750(see Note 1)	125 to 375(see Note 1)
174-260	3750	375
260-470	3750 to 12500(see Note 1)	375 to 1250(see Note 1)
Above 470	12500	1250

Note 1:For 130MHz-174MHz:Field Strength(uV/m)=(56.82*f)-6136

For 260MHz-470MHz:Field Strength(uV/m)=(41.67*f)-7083

dBuV/m=20loguV/m

Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions.

433.92MHz limit=20log(41.67*433.92)-7083≈80.82dBuV/m

Duty cycle= ON TIME/TOTAL TIME = 19.95ms/36.16ms ≈0.509

AVG = Peak +20*log(duty cycle) = Peak-5.86

4.4. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and assistant system according clause 2.4 and 8.2
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) Change power supply range from 85% to 115% of the rated supply voltage
 - (d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9MHz to 4GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9KHz to 30MHz, so below final test was performed with frequency range from 30MHz to 4GHz.
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on Radiated Emission test.
- (6) For emissions from 9kHz to 30MHz, Peak values were measured with EMI Receiver and the bandwidth of Receiver is 200Hz for 9kHz-150kHz, 9kHz for 150kHz-30MHz.
- (7) For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 KHz.
- (8) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure, Detector is at PK; RBW is set at 1MHz, VBW is set at 3MHz for Average measure, Detector is at RMS..
- (9) For Field Strength of Fundamental were measured with Spectrum Analyzer, and the RBW is set at above 99% Occupied Bandwidth , VBW is set at equal to RBW for Peak measure, Detector is at PK

4.5. Test result(For 15.205)**Below 30M**

EUT:	remote control	Model No.:	QB098
Temperature:	24℃	Relative Humidity:	55%
Distance:	3m	Test Power:	DC 3V
Polarization:	--	Test Result:	Pass
Test Mode:	Keeping TX mode	Test By:	Jelena

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	P
--	--	--	--	P

Note:

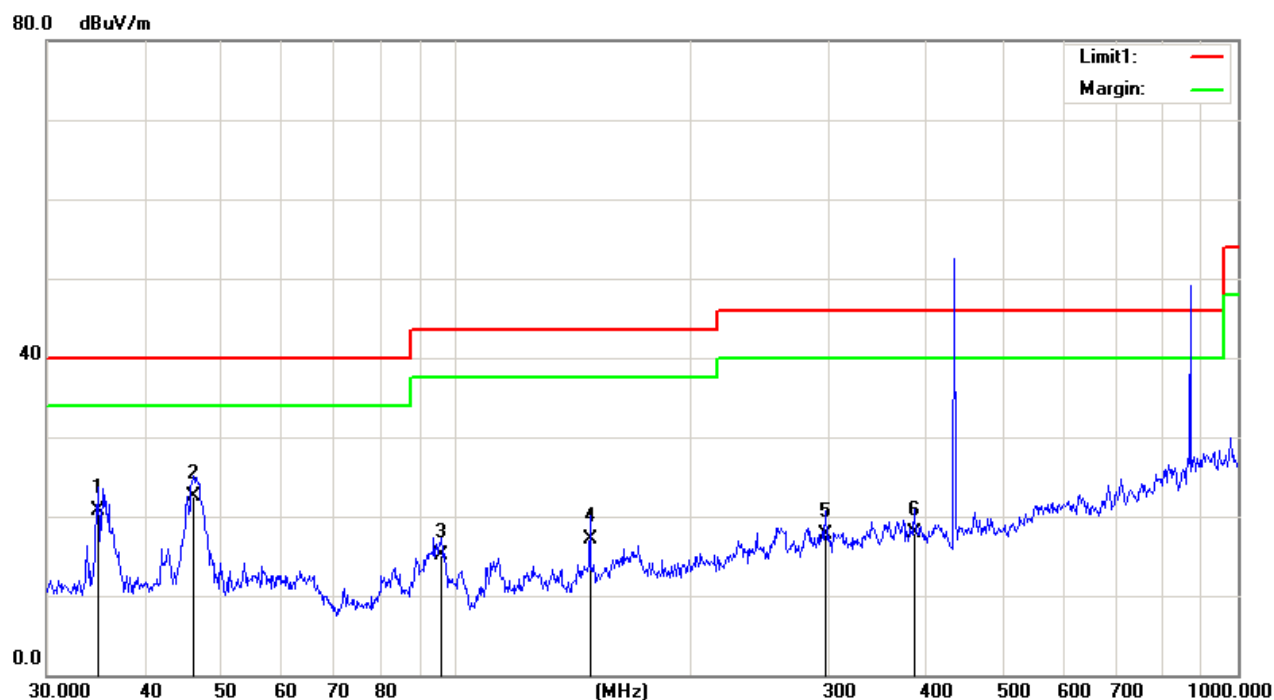
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $20 \log (\text{specific distance/test distance})$ (dB);

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

Between 30M – 1000 MHz

EUT:	remote control	Model No.:	QB098
Temperature:	24.2	Relative Humidity:	59%
Distance:	3m	Test Power:	DC 3V
Polarization:	Vertical	Test Result:	Pass
Test Time:	2024/07/02	Test By:	Jelena
Test Mode:	TX		

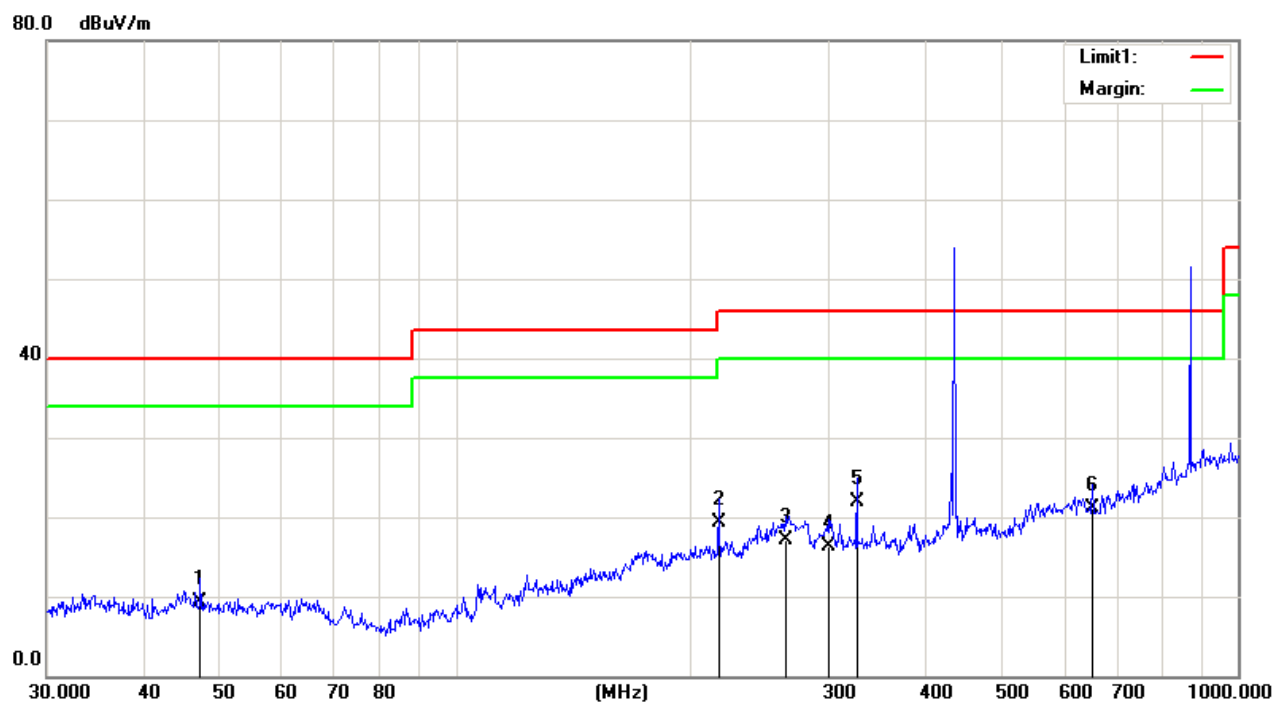


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	34.8823	35.11	-14.46	20.65	40.00	-19.35	QP
2	46.1779	37.61	-15.15	22.46	40.00	-17.54	QP
3	95.7622	30.29	-15.14	15.15	43.50	-28.35	QP
4	148.4410	28.34	-11.19	17.15	43.50	-26.35	QP
5	297.2241	24.95	-7.32	17.63	46.00	-28.37	QP
6	385.2805	23.64	-5.75	17.89	46.00	-28.11	QP

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result - Limit

EUT:	remote control	Model No.:	QB098
Temperature:	24.2	Relative Humidity:	59%
Distance:	3m	Test Power:	DC 3V
Polarization:	Horizontal	Test Result:	Pass
Test Time:	2024/07/02	Test By:	Jelena
Test Mode:	TX		



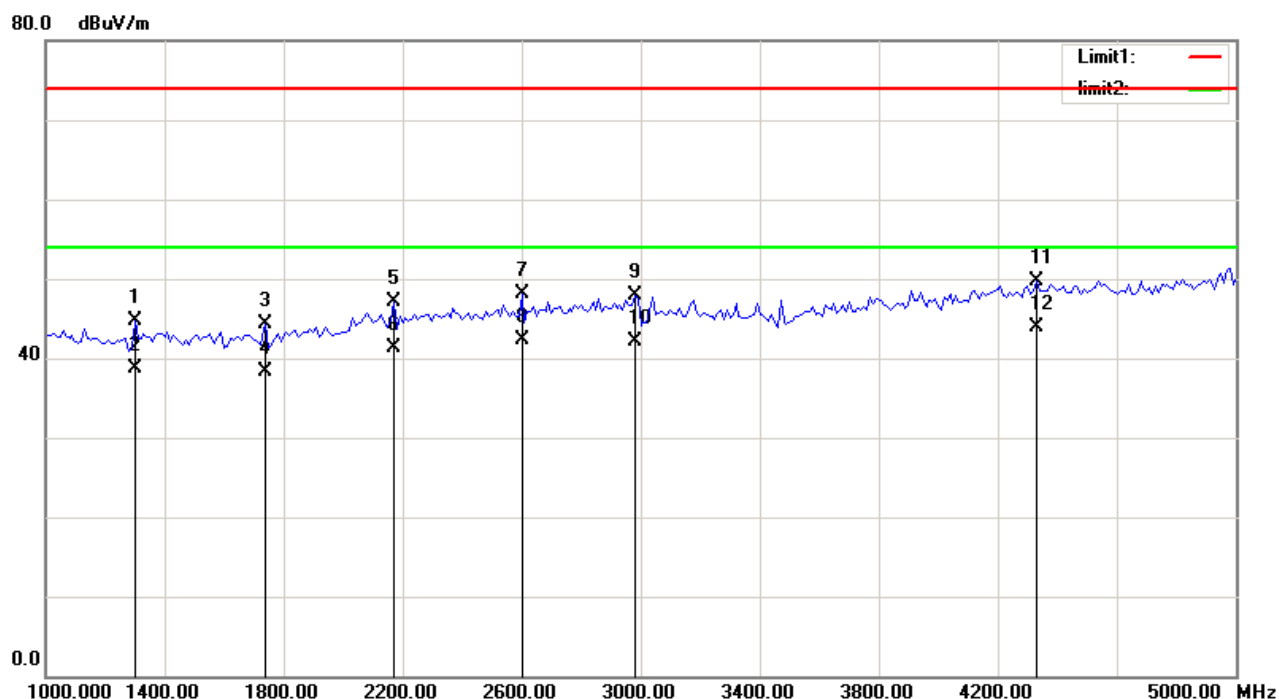
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	47.1599	25.21	-15.85	9.36	40.00	-30.64	QP
2	216.7828	28.25	-8.90	19.35	46.00	-26.65	QP
3	263.8190	21.50	-4.30	17.20	46.00	-28.80	QP
4	299.3158	21.29	-4.95	16.34	46.00	-29.66	QP
5	325.5957	29.44	-7.50	21.94	46.00	-24.06	QP
6	651.9415	25.87	-4.76	21.11	46.00	-24.89	QP

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result - Limit

Between 1000M – 5000 MHz

EUT:	remote control	Model No.:	QB098
Temperature:	24.2	Relative Humidity:	59%
Distance:	3m	Test Power:	DC 3V
Polarization:	Vertical	Test Result:	Pass
Test Time:	2024/07/02	Test By:	Jelena
Test Mode:	TX		

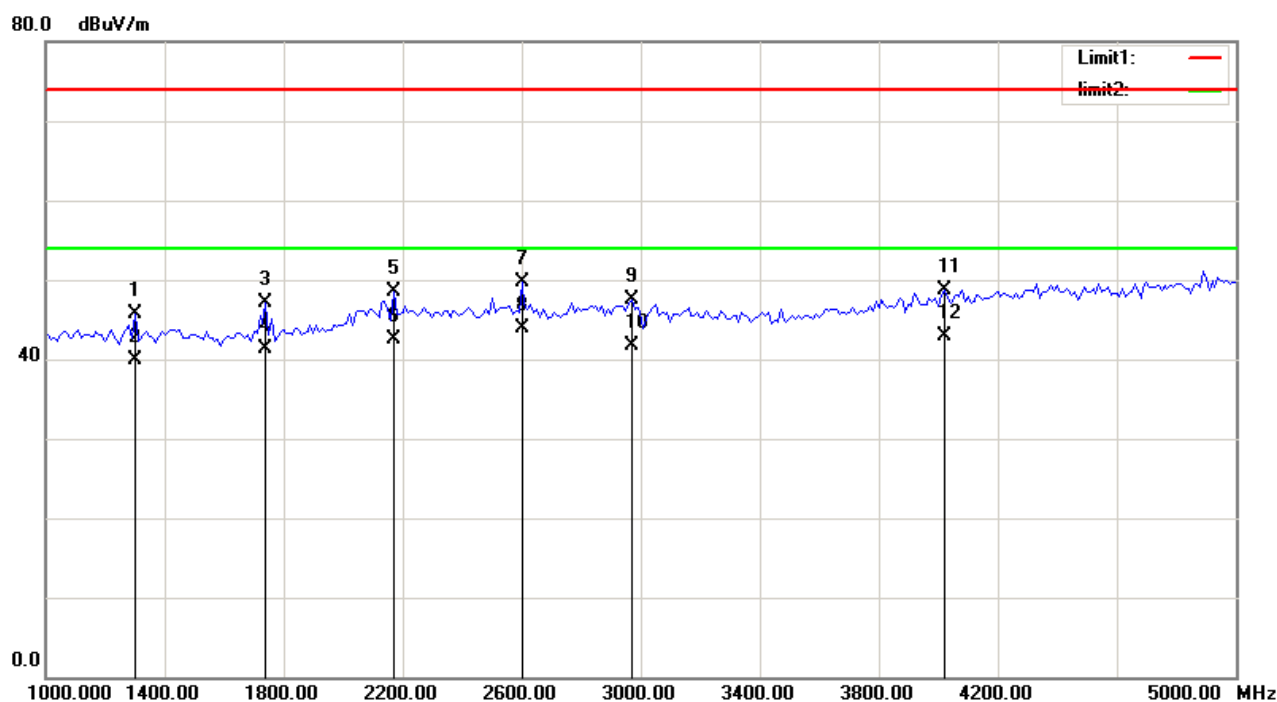


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1300.000	64.87	-20.24	44.63	74.00	-29.37	peak
2	1300.000			38.77	54.00	-15.23	AVG
3	1740.000	65.17	-20.96	44.21	74.00	-29.79	peak
4	1740.000			38.35	54.00	-15.65	AVG
5	2170.000	65.59	-18.44	47.15	74.00	-26.85	peak
6	2170.000			41.29	54.00	-12.71	AVG
7	2600.000	65.31	-17.23	48.08	74.00	-25.92	peak
8	2600.000			42.22	54.00	-11.78	AVG
9	2980.000	65.17	-17.21	47.96	74.00	-26.04	peak
10	2980.000			42.12	54.00	-11.88	AVG
11	4330.000	62.50	-12.85	49.65	74.00	-24.35	peak
12	4330.000			43.97	54.00	-10.03	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result - Limit

EUT:	remote control	Model No.:	QB098
Temperature:	24.2	Relative Humidity:	59%
Distance:	3m	Test Power:	DC 3V
Polarization:	Horizontal	Test Result:	Pass
Test Time:	2024/07/02	Test By:	Jelena
Test Mode:	TX		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1300.000	66.01	-20.24	45.77	74.00	-28.23	peak
2	1300.000			39.91	54.00	-14.09	AVG
3	1740.000	68.04	-20.96	47.08	74.00	-26.92	peak
4	1740.000			41.22	54.00	-12.78	AVG
5	2170.000	66.89	-18.44	48.45	74.00	-25.55	peak
6	2170.000			42.59	54.00	-11.41	AVG
7	2600.000	66.97	-17.23	49.74	74.00	-24.26	peak
8	2600.000			43.88	54.00	-10.12	AVG
9	2970.000	64.69	-17.22	47.47	74.00	-26.53	peak
10	2970.000			41.61	54.00	-12.39	AVG
11	4020.000	63.10	-14.33	48.77	74.00	-25.23	peak
12	4020.000			42.91	54.00	-11.09	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result - Limit

4.6 Test result(For 15.231)

EUT:	remote control	Model No.:	QB098
Temperature:	24.2℃	Relative Humidity:	59%
Distance:	3m	Test Power:	DC 3V
Polarization:	Vertical	Test Result:	Pass
Test Time:	2024/07/02	Test By:	Jelena
Test Mode:	TX		

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	434.0649	59.44	-7.01	52.43	100.82	-48.39	peak
2	434.0649			46.44	80.82	-34.38	AVG
3	869.1299	48.75	0.34	49.09	80.82	-31.73	peak
4	869.1299			43.23	60.82	-17.59	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result - Limit

EUT:	remote control	Model No.:	QB098
Temperature:	24.2℃	Relative Humidity:	59%
Distance:	3m	Test Power:	DC 3V
Polarization:	Horizontal	Test Result:	Pass
Test Time:	2024/07/02	Test By:	Jelena
Test Mode:	TX		

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	434.0649	59.84	-6.01	53.83	100.82	-46.99	peak
2	434.0649			47.97	80.82	-32.85	AVG
3	869.1299	51.24	0.34	51.58	80.82	-29.24	peak
4	869.1299			45.72	60.82	-15.10	AVG

The test result is calculated as the following:

- (1) Result = Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
- (3) Margin = Result - Limit

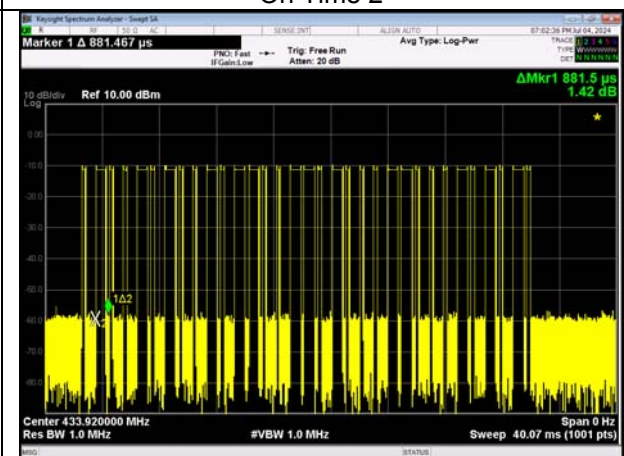
Duty Cycle

Duty cycle= ON TIME/TOTAL TIME = 19.95ms/39.16ms ≈0.509

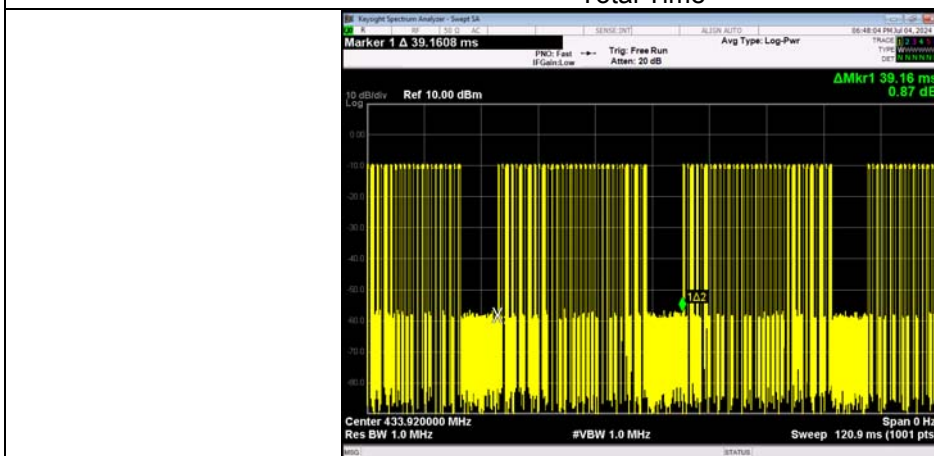
ON Time 1



On Time 2



Total Time

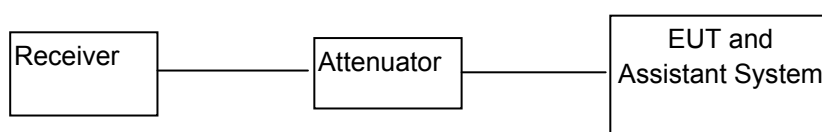


5 Duration Time

5.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until	Calibrated Date
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2025/05/22	2024/05/23
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A	N/A
3	RF Cable	Micable	C10-01-01-1	100309	N/A	N/A

5.2 Block diagram of test setup



5.3 Limits

Not more than 5 seconds

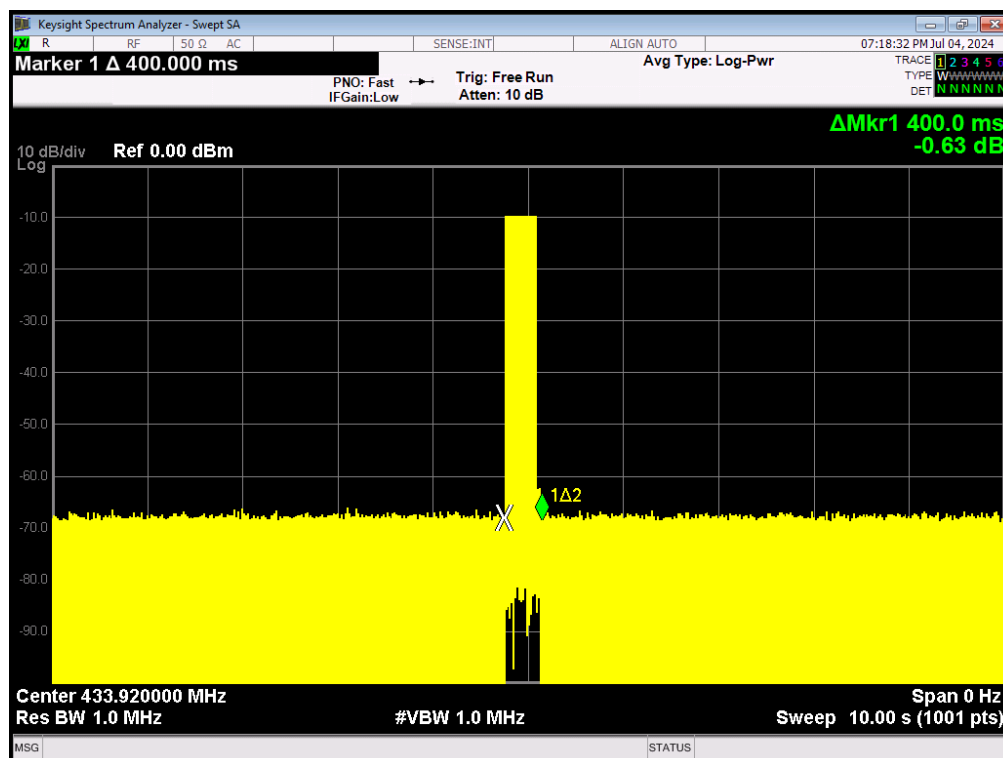
5.4 Test Procedure

1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.
2. Set the EUT to proper test channel.
3. Single scan the transmission, and read the transmission time.

5.5 Test Result

Duration time (second)	Limit (second)	Result
0.4	5	pass

5.6 Original test data



6. Antenna Requirements

6.1. Limit

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 15.231 (b), 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.

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

6.2. Result

The antennas used for this product are built-in undetachable dipole antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 2 dBi. The EUT has an internal antenna, the directional gain of antenna is 2 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

End of Report