

### FCC/ISED - TEST REPORT

Report Number :	68.950.22.0769.01	Date of Issue:	October 25, 2022

Model : QS02

Product Type : BenQ HDMI Media Streaming

Applicant : Benq Corporation

Address : 16 Jihu Road, Neihu, Taipei 114, Taiwan

Manufacturers : Benq Corporation

Address : 16 Jihu Road, Neihu, Taipei 114, Taiwan

Test Result : n Positive o Negative

Total pages including

Appendices : 289

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## 2 Details about the Test Laboratory

## **Details about the Test Laboratory**

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch

Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint

Road 2, Nanshan District

Shenzhen 518052

P.R. China

Telephone: 86 755 8828 6998 Fax: 86 755 8288 5299

FCC Registration

514049

NO.:

ISED test site number: 10320A



# 3 Description of the Equipment Under Test

Description of the Equipment Under Test					
Product/PMN:	BenQ HDMI Media Streaming				
Model no/HVIN:	QS02				
FVIN:	11.1.7				
FCC ID:	JVPQS02				
IC:	6175A-QS02				
Options and accessories:	HDMI Cable, USB Cable				
Rating:	Input: 5.0VDC, 1.0A				
RF transmission frequency:	Bluetooth BR+EDR: 2402-2480MHz Bluetooth LE: 2402-2480MHz Wi-Fi 2.4G: 2412-2462MHz Wi-Fi 5G: 5150MHz~5350MHz; Wi-Fi 5G: 5470MHz – 5725MHz Wi-Fi 5G: 5725MHz – 5850MHz. Note: until further notice, device subject to this section shall not be capable of transmitting in the band 5600-5650MHz. This restriction is for the protection of Environment Canada's weather radars operating in this band.				
Antenna Type:	PIFA Antenna				
Antenna Gain:	Ant 1: 4.47dBi, Ant 2: 4.42dBi				
Description of the EUT	The EUT is a BenQ HDMI Media Streaming with Bluetooth, 2.4GHz Wi-Fi and 5GHz Wi-Fi function. Bluetooth TX and RX range is 2402-2480MHz, Wi-Fi TX and RX is 2412-2462MHz, 5150MHz~5350MHz; 5470MHz – 5725MHz, 5725MHz – 5850MHz.				



## **4 Summary of Test Standards**

Test Standards				
FCC Part 15 Subpart E	PART 15 - RADIO FREQUENCY DEVICES Subpart E - Intentional Radiators			
RSS-Gen Issue 5, Amendment 2, February 2021	General Requirements and Information for the Certification of Radio Apparatus			
RSS-247 Issue 2 February 2017	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and License-Exempt Local Area Network (LE-LAN) Devices			

### Test Method:

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices



# **5 Summary of Test Results**

Test Condition		Test Result		lt
		Pass	Fail	N/A
15.207	RSS-Gen Clause 8.8 Conducted Emission AC Power Port	$\boxtimes$	]	
Conducted Emission AC Power Port	Conducted Emission AC Power Port			
15.407 a(2), 15.407(e)	RSS-247 Clause 6.2 Emission	$\boxtimes$		
Emission bandwidth	bandwidth			
15.407(a)	RSS-247 Clause 6.2 Maximum			
Maximum Conducted Output Power	Conducted Output Power			
15.407(a)	RSS-247 Clause 6.2 Maximum			
Maximum Power Spectral	Power Spectral Density	$\boxtimes$		
Density				
15.407(b)(1),15.407(b)(2),	RSS-247 Clause 6.2			
15.407(b)(3),15.407(b)(4),				
15.407(b)(8),15.407(b)(9),	Unwanted Emissions			
15.209				
Unwanted Emissions				
15.407(b)(1),15.407(b)(2),	RSS-247 Clause 6.2			
15.407(b)(3),15.407(b)(4),	RSS-Gen Clause 8.9 Band edge	$\boxtimes$		
Band edge compliance	compliance			
15.407(g)	RSS-Gen Clause 6.11 Frequencies	$\square$		
Frequencies Stability	Stability			
15.407(h)	RSS-247 Clause 6.3 Dynamic			
Dynamic Frequency	Frequency Selection (DFS).			
Selection (DFS).				
15.203	RSS-GEN Clause 6.8 Antenna	$\boxtimes$		
Antenna Requirement	Requirement	See		Ш
		note1		

Note 1: The EUT uses an PIFA antenna, which gain is 4.47dBi for Ant1 and 4.42dBi for Ant2. It is considered sufficiently to comply with the provisions of this section.



### **6 General Remarks**

#### **Remarks**

This submittal(s) (test report) is intended for FCC ID: JVPQS02, IC: 6175A-QS02 complies with the FCC Part 15.205, 15.207, 15.209,15.407 Subpart and RSS-247 issue 2 and RSS-Gen issue 5 rules.

This report is for the 5GHz Wi-Fi.

### **SUMMARY:**

All tests according to the regulations cited on page 5 were

- n Performed
- o Not Performed

The Equipment Under Test

- n Fulfills the general approval requirements.
- O Does not fulfill the general approval requirements.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch.

Sample Received Date: July 22, 2022

Testing Start Date: July 22, 2022

Testing End Date: October 21, 2022

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch.

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**EMC Project Manager** 

Prepared by:

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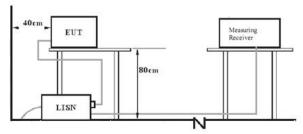
Carry Cai EMC Test Engineer

Tested by:



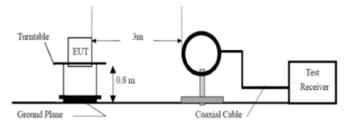
## 7 Test setups

## 7.1 AC Power Line Conducted Emission test setups

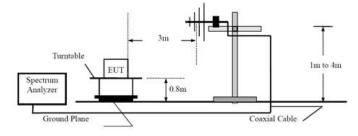


## 7.2 Radiated test setups

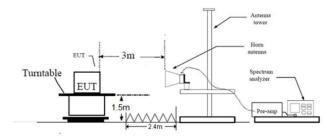
### 9KHz-30MHz



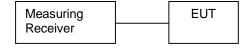
### Below 1GHz



## Above 1GHz



# 7.3 Conducted RF test setups





# 8. Systems test configuration

Characteristics	Description	
TX/RX Operating Band	5150 MHz to 5825 MHz	
IEEE 802.11 WLAN Mode	802.11a:	Support
Supported	802.11n20:	Support
	802.11n40:	Support
	802.11ac20:	Support
	802.11ac40:	Support
	802.11ac80:	Support
	802.11ax20:	Support
	802.11ax40:	Support
	802.11ax80:	Support
Channel Bandwidth	20MHz, 40MHz, 80MHz	

## The system was configured to channel:

Test Mode	Channel (MHz)				
		5G WI-FI-Band 1			
	CH36 (5180MHz)	CH40 (5200MHz)	CH46 (5240MHz)		
902.116	5G WIFI-Band 2				
802.11a, 802.11n20,	CH52 (5260MHz) CH56 (5280MHz)		CH64 (5320MHz)		
802.11ac20	5G WIFI-Band 3				
802.11ax20	302.11ax20 CH100 (5500MHz)		CH140 (5700MHz)		
	5G WIFI-Band 4				
	CH149 (5745MHz),	CH157(5785MHz)	CH165 (5825MHz)		

Test Mode	Channel (MHz)			
	5G WI-FI-Band 1			
	CH38(5190MHz)	CH38(5190MHz) CH46 (5230MHz)		
		5G WIFI-Band 2		
802.11n40,	CH54(5270MHz)	MHz) CH62(5310MHz)		
802.11ac40	5G WIFI-Band 3			
802.11ax40	CH102(5510MHz)	CH110(5550MHz)	CH134(5670MHz)	
	CH 142 (5710MHz)			
	5G WIFI-Band 4			
	CH151(5755MHz)	H151(5755MHz) CH159(5795MHz)		

Test Mode	Channel (MHz)				
	5G WI-FI-Band 1				
	CH42(5210MHz)				
	5G WI-FI-Band 2				
802.11ac80	CH58(5290MHz)				
802.11ax80	5G WIFI-Band 3				
	CH106(5530MHz)	CH138(5690MHz)			
-	5G WIFI-Band 4				
	CH155(5775MHz)				



### 9 Technical Requirement

### 9.1 Conducted emission AC power port

#### **Test Method**

- 1. The EUT was placed on a table, which is 0.8m above ground plane
- 2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
- 3. Maximum procedure was performed to ensure EUT compliance
- 4. A EMI test receiver is used to test the emissions from both sides of AC line

### Limit

Frequency	QP Limit	AV Limit
MHz	dΒμV	dΒμV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Remark: "\*" Decreasing linearly with logarithm of the frequency



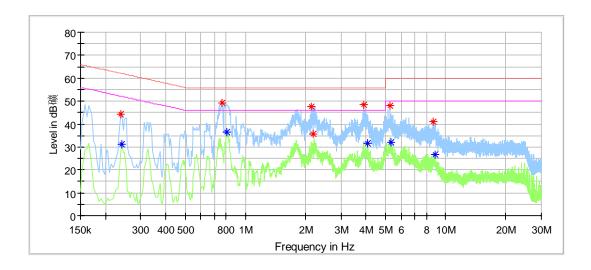
Product Type : BenQ HDMI Media Streaming

M/N : QS02

Operating Condition : Normal working with transmitting

Test specification : Live

Comment : AC 120V/60Hz



## Critical\_Freqs

• · · · · · • · · · · · · · · · · · · ·	9 -					
Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB/m)
0.238000	44.27		62.17	17.90	L1	9.23
0.242000		31.31	62.03	30.71	L1	9.23
0.766000	49.12		56.00	6.88	L1	9.20
0.806000		36.48	56.00	19.52	L1	9.20
2.134000	47.55		56.00	8.45	L1	9.23
2.178000	35.59		56.00	20.41	L1	9.23
3.902000	48.37		56.00	7.63	L1	9.28
4.094000		31.60	56.00	24.40	L1	9.28
5.266000	47.90		60.00	12.10	L1	9.31
5.362000		32.02	60.00	27.98	L1	9.32
8.674000	41.17		60.00	18.83	L1	9.38
8.870000		26.47	60.00	33.53	L1	9.38

#### Remark:

Level=Reading Level + Correction Factor Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)



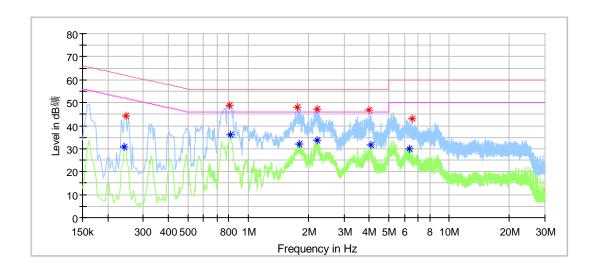
Product Type : BenQ HDMI Media Streaming

M/N : QS02

Operating Condition : Normal working with transmitting

Test specification : Neutral

Comment : AC 120V/60Hz



## Critical\_Freqs

Frequency	MaxPeak	Average	Limit	Margin	Line	Corr.
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)		(dB/m)
0.242000		30.68	62.03	31.35	N	9.39
0.246000	44.40		61.89	17.50	N	9.39
0.806000	48.88		56.00	7.12	N	9.39
0.818000		36.02	56.00	19.98	N	9.39
1.762000	47.83		56.00	8.17	N	9.41
1.798000		32.08	56.00	23.92	N	9.41
2.206000		33.53	56.00	22.47	N	9.42
2.210000	47.12		56.00	8.88	N	9.42
3.994000	46.85		56.00	9.15	N	9.47
4.090000		31.53	56.00	24.47	N	9.47
6.334000		30.06	60.00	29.94	N	9.54
6.530000	43.01		60.00	16.99	N	9.54

#### Remark:

Level=Reading Level + Correction Factor Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)



#### 9.2 Emission bandwidth

The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.

### 1. Test Method of 26dB Bandwidth

According to C63.10

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Limit: No limit

### 2 Test Method of 6dB Bandwidth

According to C63.10

- a) Set RBW = 100KHz
- b) Set the video bandwidth (VBW) ≥ 3 x RBW
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) 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: ≥500KHz

#### 3. Test Method of 99% Bandwidth

According to C63.10

- a) Set center frequency to the nominal EUT channel center frequency
- b) Set span = 1.5 times to 5.0 times the OBW.
- c) Set RBW = 1 % to 5 % of the OBW
- d) Set VBW ≥ 3 · RBW
- e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- f) Use the 99 % power bandwidth function of the instrument (if available).
- g) If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

Limit: No limit



### 26dB Bandwidth Test result:

Test Mode	Antenna	Channel	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdic
		5180	21.480	5169.160	5190.640		PASS
		5200	21.360	5189.360	5210.720		PASS
		5240	22.280	5228.320	5250.600		PASS
11A	Ant1	5260	21.000	5249.400	5270.400		PASS
		5280	21.200	5269.440	5290.640		PASS
		5320	21.320	5309.280	5330.600		PASS
		5500	24.800	5485.880	5510.680		PASS
		5580	21.320	5569.360	5590.680		PASS
		5700	21.080	5689.440	5710.520		PASS
		5720	21.440	5709.200	5730.640		PASS
		5720_UNII-2C	15.8	5709.200	5725		PASS
		5720_UNII-3	5.64	5725	5730.640		PASS
		5180	21.520	5169.200	5190.720		PASS
		5200	21.560	5189.120	5210.680		PASS
	Ant1	5240	21.440	5229.280	5250.720		PASS
		5260	21.800	5249.000	5270.800		PASS
		5280	21.800	5268.960	5290.760		PASS
		5320	22.120	5308.640	5330.760		PASS
11N20SISO		5500	21.640	5489.200	5510.840		PASS
		5580	21.720	5569.280			PASS
					5591.000		
		5700	21.600	5689.120	5710.720		PASS
		5720	21.600	5709.160	5730.760		PASS
		5720_UNII-2C	15.84	5709.160	5725		PASS
		5720_UNII-3	5.76	5725	5730.760		PASS
11N40SISO		5190	40.640	5169.520	5210.160		PASS
	Ant1	5230	40.080	5210.080	5250.160		PASS
		5270	40.400	5249.840	5290.240		PASS
		5310	45.440	5284.720	5330.160		PASS
		5510	40.560	5489.760	5530.320		PASS
		5550	40.400	5529.760	5570.160		PASS
		5670	43.840	5649.840	5693.680		PASS
		5710	40.720	5689.600	5730.320		PASS
		5710_UNII-2C	35.4	5689.600	5725		PASS
		5710_UNII-3	5.32	5725	5730.320		PASS
		5180	21.640	5169.120	5190.760		PASS
		5200	22.120	5188.680	5210.800		PASS
	Ant1	5240	21.560	5229.280	5250.840		PASS
11AC20SISO		5260	21.520	5249.120	5270.640		PASS
		5280	22.560	5268.320	5290.880		PASS
		5320	21.440	5309.240	5330.680		PASS
		5500	21.640	5489.200	5510.840		PASS
		5580	21.520	5569.280	5590.800		PASS
		5700	21.600	5689.160	5710.760		PASS
		5720					
			21.760	5709.000	5730.760		PASS
		5720_UNII-2C	16	5709.000	5725		PASS
		5720_UNII-3	5.76	5725	5730.760		PASS
11AC40SISO	Ant1	5190	40.640	5169.520	5210.160		PASS
		5230	40.640	5209.600	5250.240		PASS
		5270	40.480	5249.840	5290.320		PASS
		5310	42.640	5287.520	5330.160		PASS
		5510	41.040	5489.840	5530.880		PASS
		5550	40.640	5529.600	5570.240		PASS
		5670	48.560	5649.680	5698.240		PASS
		5710	40.400	5689.760	5730.160		PASS
		5710_UNII-2C	35.24	5689.760	5725		PASS
		5710_UNII-3	5.16	5725	5730.160		PASS
	Ant1	5210	82.560	5168.720	5251.280		PASS
4440000000		5290	82.400	5249.040	5331.440		PASS
11AC80SISO		5530	82.240	5489.040	5571.280		PASS
		5690	82.720	5648.720	5731.440	ł	PASS



		5690 UNII-2C	76.28	5648.720	5725	 PASS
		5690 UNII-3	6.44	5725	5731.440	 PASS
11AX20SISO	Ant1	5180	21.320	5169.360	5190.680	 PASS
		5200	21.560	5189.280	5210.840	 PASS
		5240	21.400	5229.280	5250.680	 PASS
		5260	21.400	5249.200	5270.600	 PASS
		5280	21.320	5269.280	5290.600	 PASS
		5320	21.560	5309.160	5330.720	 PASS
		5500	21.360	5489.360	5510.720	 PASS
		5580	21.360	5569.360	5590.720	 PASS
		5700	21.440	5689.280	5710.720	 PASS
		5720	21.960	5708.880	5730.840	 PASS
		5720_UNII-2C	16.12	5708.880	5725	 PASS
		5720_UNII-3	5.84	5725	5730.840	 PASS
11AX40SISO	Ant1	5190	40.560	5169.840	5210.400	 PASS
		5230	40.480	5209.840	5250.320	 PASS
		5270	40.560	5249.760	5290.320	 PASS
		5310	40.400	5289.840	5330.240	 PASS
		5510	40.720	5489.600	5530.320	 PASS
		5550	40.640	5529.680	5570.320	 PASS
		5670	40.480	5649.840	5690.320	 PASS
		5710	40.560	5689.760	5730.320	 PASS
		5710_UNII-2C	35.24	5689.760	5725	 PASS
		5710_UNII-3	5.32	5725	5730.320	 PASS
11AX80SISO	Ant1	5210	82.560	5168.880	5251.440	 PASS
		5290	95.520	5235.760	5331.280	 PASS
		5530	82.080	5489.040	5571.120	 PASS
		5690	82.720	5648.720	5731.440	 PASS
		5690_UNII-2C	76.28	5648.720	5725	 PASS
		5690_UNII-3	6.44	5725	5731.440	 PASS



