

# **FCC Test Report**

FCC ID	:	JVPCR20CCTR
Equipment	:	ScreenBar Halo Controller
Model No.	:	CR20_C controller
Brand Name	:	BenQ
Qisda Ref. No	:	AL-27599
Applicant	:	BenQ Corporation
Address	:	16 Jihu Road, Neihu, Taipei 114, Taiwan
Standard	:	47 CFR FCC Part 15.249
<b>Received Date</b>	:	Feb. 04, 2021
Tested Date	:	Mar. 08, 2021

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

**Reviewed by:** 

Approved by:

Along Chen// Assistant Manager

Gary Chang / Manager





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# **Release Record**

Report No.	Version	Description	Issued Date
FR120403-01	Rev. 01	Initial issue	Mar. 30, 2021



## **Summary of Test Results**

FCC Rules	Test Items	Measured	Result		
15.207	AC Power Line Conducted Emissions	Note <sup>1</sup>	N/A		
15.249(a)	Field Strength of Fundamental	Meet the requirement of limit	Pass		
15.249(a)(d)	Field Strength of Harmonics and Emissions Radiated outside of the Specified Frequency Bands	Meet the requirement of limit	Pass		
15.215(c)	20dB bandwidth	Meet the requirement of limit	Pass		
15.203	Antenna Requirement	Meet the requirement of limit	Pass		
N/A means Not Applicable.					

Note<sup>1</sup>: The EUT consumes DC power from battery, so the test is not required.

#### **Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

#### **Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



### 1 General Description

### 1.1 Information

### **1.1.1** Specification of the Equipment under Test (EUT)

RF General Information				
Frequency Range (MHz)ModulationCh. Freq. (MHz)Channel NumberData Rate				
2400-2483.5	GFSK	2405-2475	0-2 [3]	125kbps

#### 1.1.2 Antenna Details

Ant. No.	Туре	Connector	Gain (dBi)
1	PIFA	No	-4.09

### 1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	1.5Vdc, 0.2A (AAA battery*3)
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#### 1.1.4 Channel List

Channel	Frequency (MHz)
0	2405
1	2446
2	2475

#### 1.1.5 Test Tool and Duty Cycle

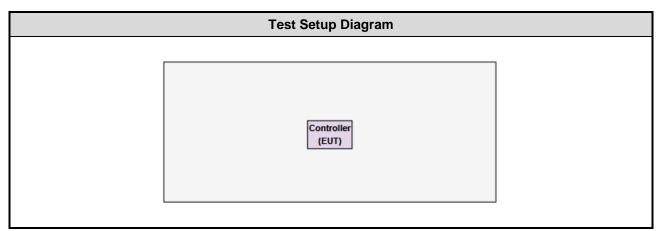
Test Tool	Hardware control	
Duty Cycle and Duty Easter	Duty Cycle (%)	Duty Factor (dB)
Duty Cycle and Duty Factor	42.91%	3.67

#### 1.1.6 Power Index of Test Tool

Power Index			
Modulation Mode	Test Frequency (MHz)		
would for wode	2405	2446	2475
GFSK	Default	Default	Default



### 1.2 Test Setup Chart



### 1.3 The Equipment List

and A (03CH03 and A A A A A A A A A A A A A A A A A A A	3-WS) Model No. FSV40 ESR3 VULB9168 BBHA 9120 D BBHA 9170 HFH2-Z2	Serial No.        101499        101658        VULB9168-685        BBHA 9120 D 1200        BBHA 9170517        100330	Calibration Date        Mar. 02, 2021        Feb. 08, 2021        Apr. 29, 2020        Dec. 22, 2020        Nov. 06, 2020	Calibration Until        Mar. 01, 2022        Feb. 07, 2022        Apr. 28, 2021        Dec. 21, 2021        Nov. 05, 2021
AS A	FSV40 ESR3 VULB9168 BBHA 9120 D BBHA 9170	101499 101658 VULB9168-685 BBHA 9120 D 1206 BBHA 9170517	Mar. 02, 2021 Feb. 08, 2021 Apr. 29, 2020 Dec. 22, 2020	Mar. 01, 2022 Feb. 07, 2022 Apr. 28, 2021 Dec. 21, 2021
SS RZBECK RZBECK RZBECK SS	ESR3 VULB9168 BBHA 9120 D BBHA 9170	101658 VULB9168-685 BBHA 9120 D 1206 BBHA 9170517	Feb. 08, 2021 Apr. 29, 2020 Dec. 22, 2020	Feb. 07, 2022 Apr. 28, 2021 Dec. 21, 2021
RZBECK RZBECK RZBECK	VULB9168 BBHA 9120 D BBHA 9170	VULB9168-685 BBHA 9120 D 1206 BBHA 9170517	Apr. 29, 2020 Dec. 22, 2020	Apr. 28, 2021 Dec. 21, 2021
RZBECK RZBECK &S	BBHA 9120 D BBHA 9170	BBHA 9120 D 1206 BBHA 9170517	Dec. 22, 2020	Dec. 21, 2021
RZBECK	BBHA 9170	BBHA 9170517		
\$S			Nov. 06, 2020	Nov. 05, 2021
	HFH2-Z2	100220		1
KAREI		100330	Nov. 17, 2020	Nov. 16, 2021
	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021
ЛС	EMC02325	980187	Aug. 05, 2020	Aug. 04, 2021
lent	83017A	MY39501309	Sep. 02, 2020	Sep. 01, 2021
ЛС	EMC184045B	980192	Jul. 21, 2020	Jul. 20, 2021
SUHNER	SUCOFLEX104	MY22620/ <b>4</b>	Sep. 26, 2020	Sep. 25, 2021
IC EN	MC104-SM-SM-80 00	181107	Sep. 26, 2020	Sep. 25, 2021
SUHNER	SUCOFLEX104	MY22624/4	Sep. 26, 2020	Sep. 25, 2021
IC EN	MC8D-NM-NM-800	EMC8D-NM-NM-800 -001	Sep. 26, 2020	Sep. 25, 2021
IC EN	MC8D-NM-NM-300 0	131103	Sep. 26, 2020	Sep. 25, 2021
/IC EN	MC8D-NM-NM-130 00	131104	Sep. 26, 2020	Sep. 25, 2021
	e3	6.120210g	NA	NA
		IC 0 IC EMC8D-NM-NM-130 00	IC      0      131103        IC      EMC8D-NM-NM-130 00      131104        DIX      e3      6.120210g	IC      0      131103      Sep. 26, 2020        IC      EMC8D-NM-NM-130 00      131104      Sep. 26, 2020



### 1.4 Test Standards

47 CFR FCC Part 15.249 ANSI C63.10-2013

### **1.5** Deviation from Test Standard and Measurement Procedure

None

### **1.6 Measurement Uncertainty**

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Measurement Uncertainty			
Parameters	Uncertainty		
Bandwidth	±34.130 Hz		
AC conducted emission	±2.92 dB		
Radiated emission ≤ 1GHz	±3.96 dB		
Radiated emission > 1GHz	±4.51 dB		



# 2 Test Configuration

### 2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	03CH01-WS, TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)
ECC Designation No :	T/W0722

➢ FCC Designation No.: TW2732

➢ FCC site registration No.: 181692

➢ ISED#: 10807A

➤ CAB identifier: TW2732

### 2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Field Strength of Fundamental	GFSK	2405 / 2446 / 2475	125kbps	
Radiated Emissions ≤ 1GHz	GFSK	2446	125kbps	
Radiated Emissions > 1GHz	GFSK	2405 / 2446 / 2475	125kbps	
20dB bandwidth	GFSK	2405 / 2446 / 2475	125kbps	



### **3** Transmitter Test Results

### 3.1 Radiated Emission

This section includes field strength of fundamental, field strength of harmonics and emissions radiated outside of the operating frequency bands.

#### 3.1.1 Limit of field strength of fundamental and field strength of harmonics

Fundamental Frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)	
2400–2483.5 MHz	50	500	

#### 3.1.2 Limit of Unwanted Emissions

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in below table, whichever is the lesser attenuation.

Radiated emission limits			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:

Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit **Note 2:** 

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.



### 3.1.3 Test Procedures

- Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
- 2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
- 3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

- Radiated emission below 1GHz
  120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission
- 2. Radiated emission above 1GHz / Peak value except fundamental RBW=1MHz, VBW=3MHz and Peak detector
- 3. Radiated emission above 1GHz / Average value for field strength of fundamental and harmonics The average value is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

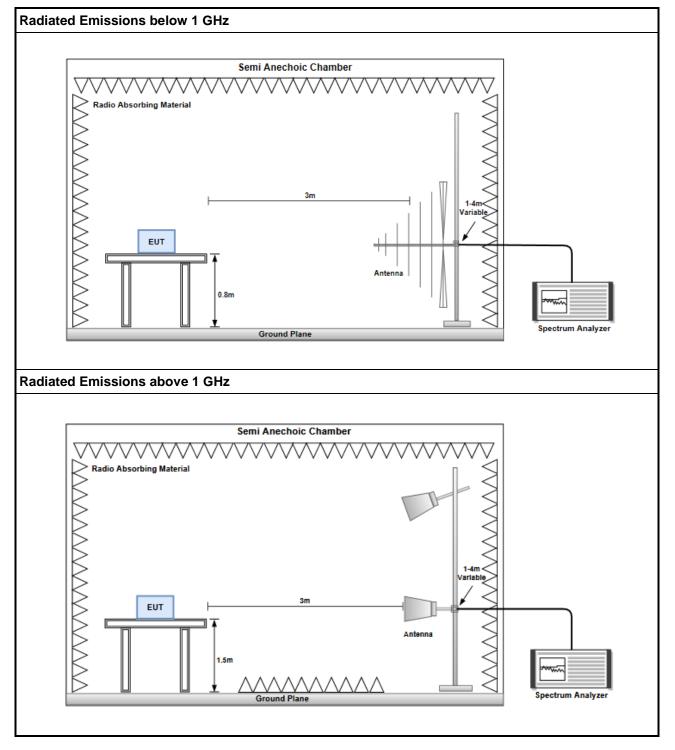
20log (Duty cycle) = 20log  $\frac{0.76232 \text{ x7ms}}{100 \text{ ms}}$  = -25.46dB

Please see page 20 for plotted duty

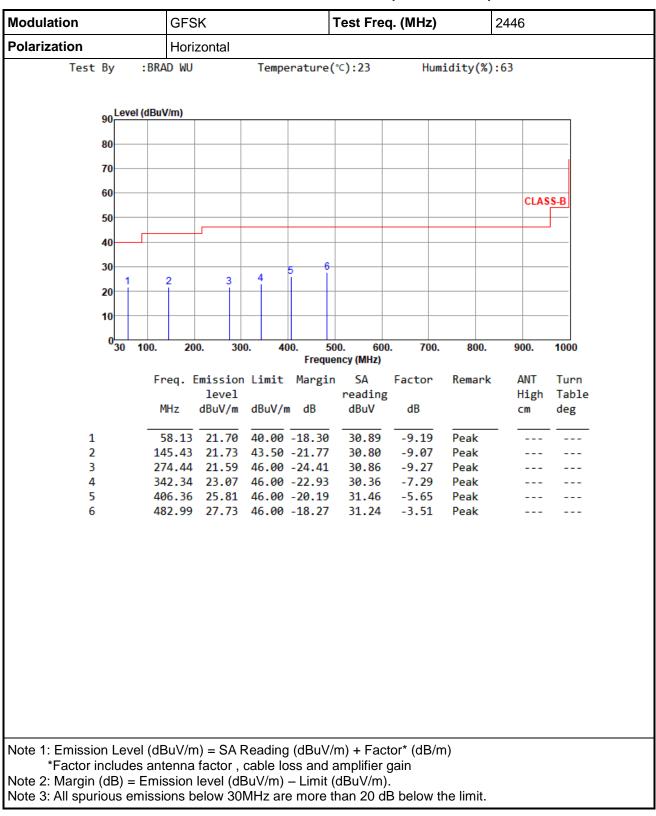
- 4. Radiated emission above 1GHz / Average value for other emissions RBW=1MHz, VBW=10Hz and Peak detector
- 5. Radiated emission Peak value for fundamental RBW=3MHz, VBW=10MHz and Peak detector



### 3.1.4 Test Setup

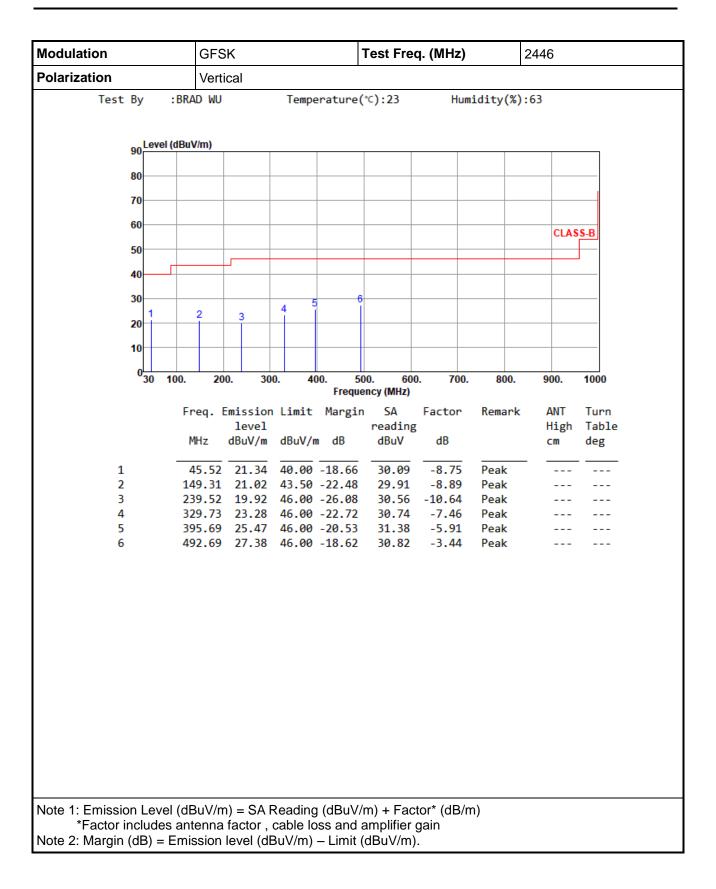




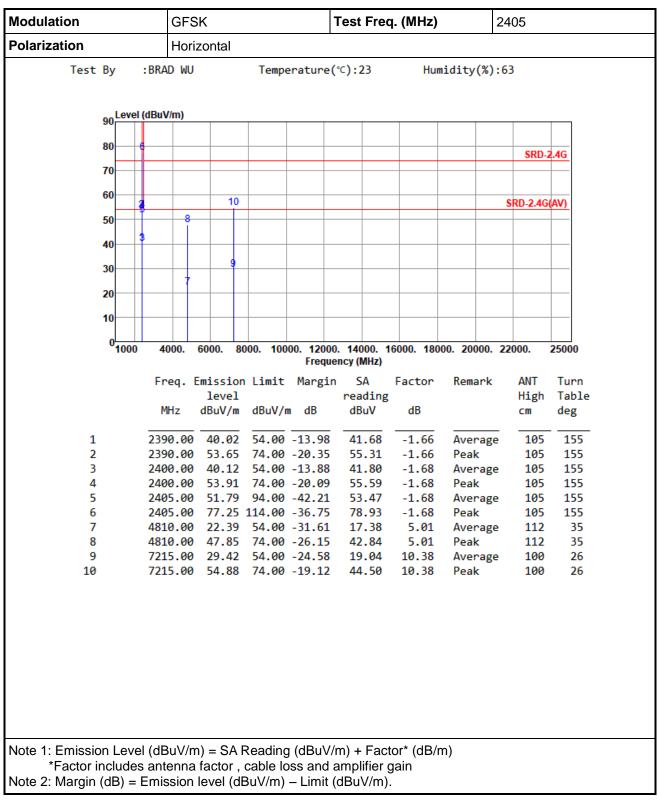


### 3.1.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)



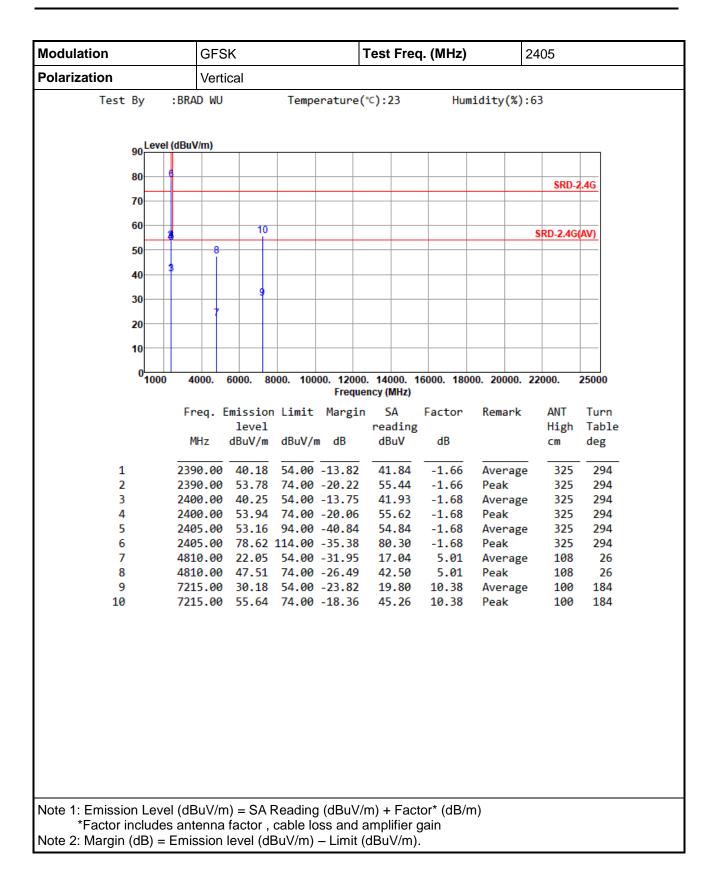




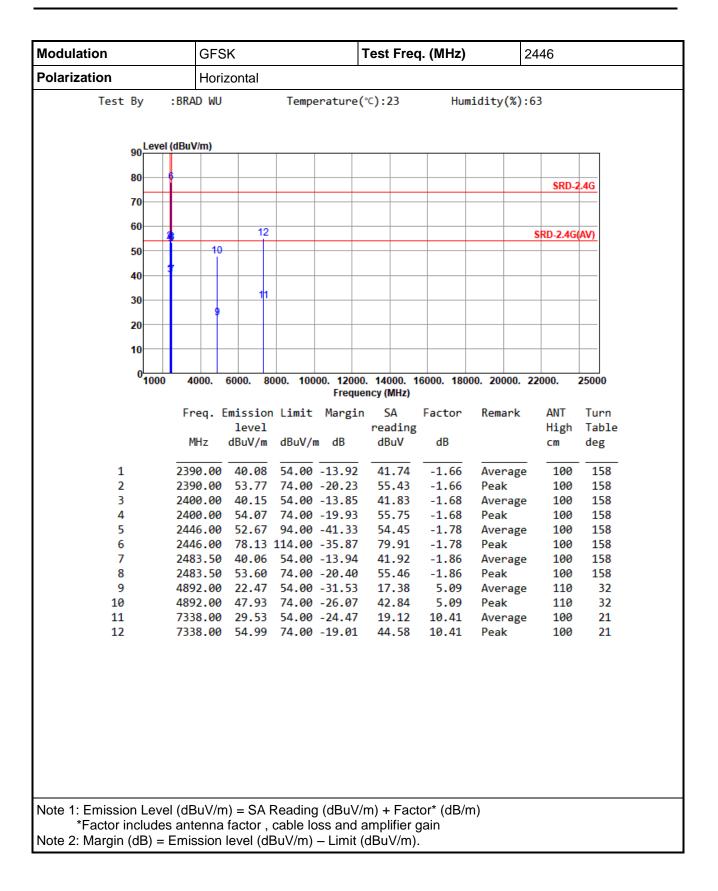


### 3.1.6 Transmitter Radiated Unwanted Emissions (Above 1GHz)

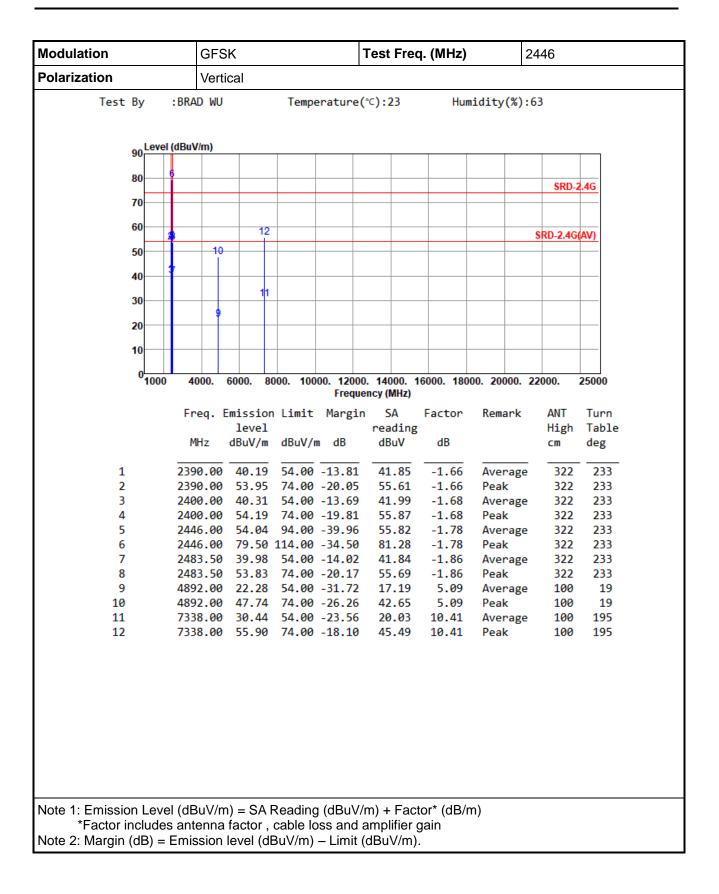




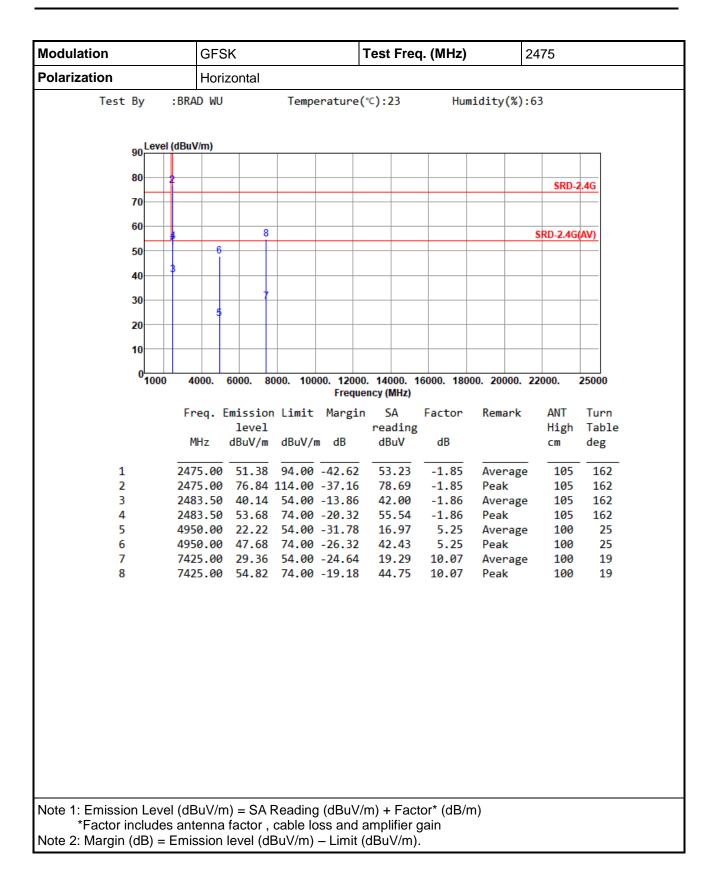




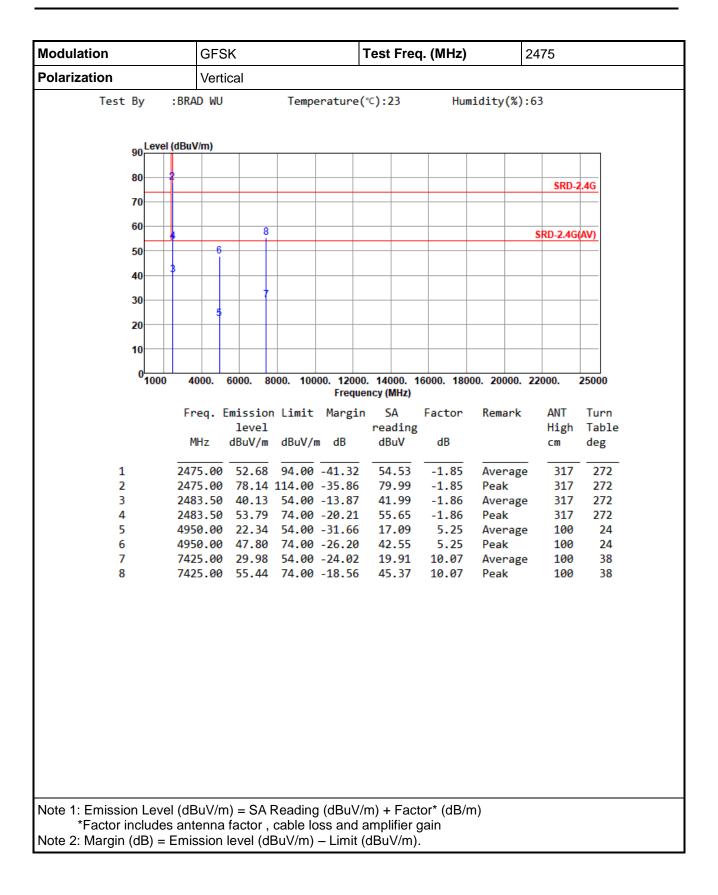




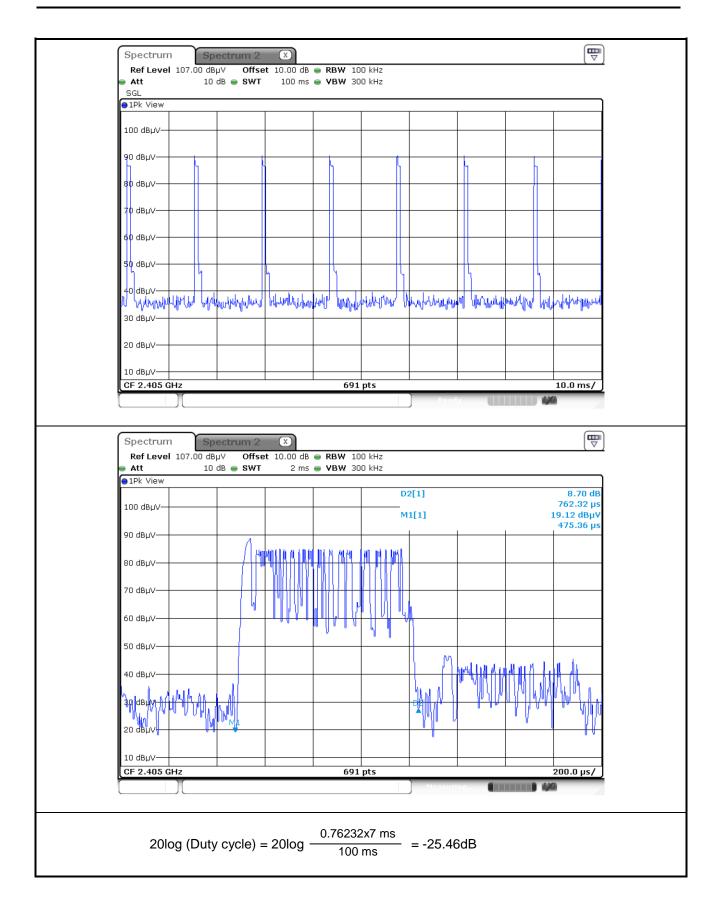












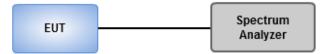


### 3.2 20dB and Occupied Bandwidth

#### 3.2.1 Test Procedures

- 1. Set resolution bandwidth (RBW) = 20 kHz, Video bandwidth = 100 kHz.
- 2. Detector = Peak, Trace mode = max hold
- 3. Sweep = auto couple, Allow the trace to stabilize.
- 4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20dB relative to the maximum level measured in the fundamental emission.
- 5. Use the occupied measurement function of specturm analyzer to measure 99% occupied bandwidth.

### 3.2.2 Test Setup

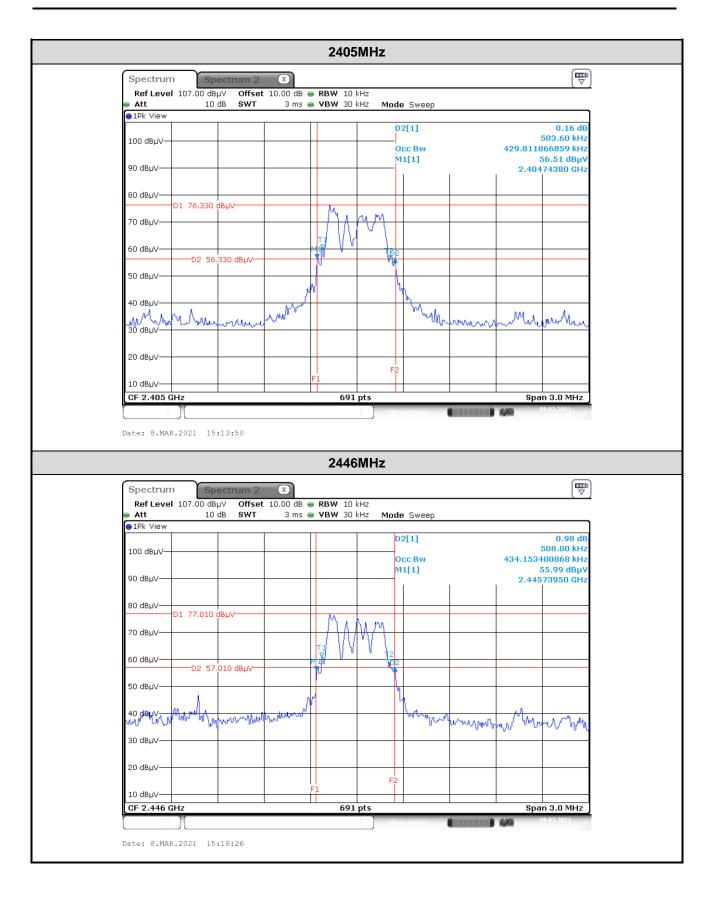


#### 3.2.3 20dB and Occupied Bandwidth

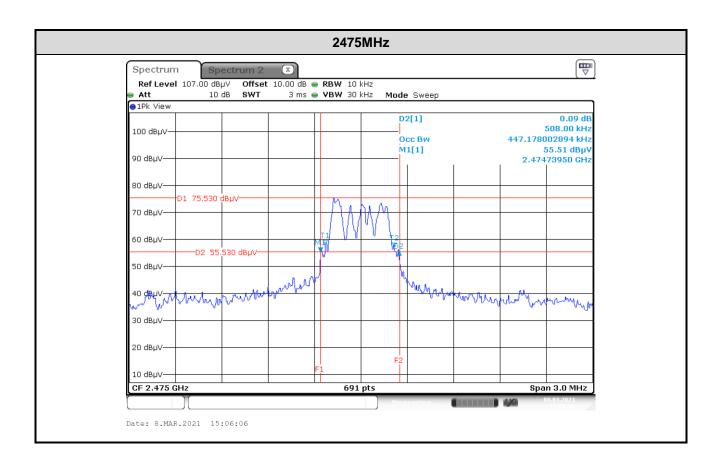
Ambient Condition	23°C / 63%	Tested By	Brad Wu
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Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW
2405	0.504	0.430
2446	0.508	0.434
2475	0.508	0.447











### 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <u>http://www.icertifi.com.tw</u>.

#### Linkou

Tel: 886-2-2601-1640 No.30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan (R.O.C.) Kwei Shan Tel: 886-3-271-8666 No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.) Kwei Shan Site II Tel: 886-3-271-8640 No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 333, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information

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