



# **FCC Co-Location Test Report**

FCC ID	:	2AX7S-ACEP13M
Equipment	:	Digital Signage Display
Model No.	:	ACeP13M
Brand Name	:	AlMobile
Applicant	:	AlMobile Co., Ltd.
Address	:	6F, No. 166, Section 4, Chengde Road, Shilin District, Taipei City, 111
Standard	:	47 CFR FCC Part 15.247 47 CFR FCC Part 15.407 47 CFR FCC Part 15.225
<b>Received Date</b>	:	Feb. 25, 2022
Tested Date	:	Feb. 22 ~ Mar. 01,2023

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 shall not be reproduced except in full without the written approval of our laboratory.

**Reviewed by:** 

Approved by:

ong Cher

Along Chen/ Assistant Manager Gary Chang / Manager



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Appendix A. Unwanted Emissions Into Restricted Frequency Bands



# **Release Record**

Report No.	Version	Description	Issued Date
FR222501-01CO	Rev. 01	Initial issue	Jun. 21, 2023



# **Summary of Test Results**

FCC Rules	Test Items	Measured	Result
15.247(d)			
15.407(b)	Dedicted Emissions	[dBuV/m at 3m]: 39.70MHz	Deee
15.225(d)	Radiated Emissions	36.45 (Margin -3.55dB) - QP	Pass
15.209			

#### **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)

WLAN	
Operating Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5700 MHz, 5745 ~ 5825 MHz
Modulation Type	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n/ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
вт	
Operating Frequency	2402 MHz ~ 2480 MHz
Modulaton Type Bluetooth LE: GFSK Bluetooth BR(1Mbps): GFSK Bluetooth EDR (2Mbps): π/4-DQPSK Bluetooth EDR (3Mbps): 8-DPSK	
NFC	
Operating Frequency	13.553 – 13.567
Modulation Type	ASK

### 1.1.2 Antenna Details

WiFi

Ant.	Brand	Model	Type		Operating Frequencies (MHz) / Antenna Gain (dBi)				
No.	Drana	incuci	1900		2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	Pulse Electronics	ANTA0ZV1420124551	PIFA	UFL	2.81	3.25	3.49	3.73	3.97

ΒT

Ant. No.	Brand	Model	Туре	Connector	Gain (dBi)
1	Pulse Electronics	ANTA0ZV1420124551	PIFA	UFL	2.81

NFC

Ant. No.	Brand	Model	Туре	Connector	Gain (dBi)
1	WNC	6036B0264501	Loop		

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

Power Supply Type	5V/3A from adapter 9V/2A from adapter
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# 1.2 The Equipment List

Test Item	Radiated Emission							
Test Site	966 chamber3 / (03CH03-WS)							
Tested Date	Feb. 22 ~ Mar. 01,2023							
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until			
Receiver	R&S	ESR3	101657	Mar. 15, 2022	Mar. 14, 2023			
Spectrum Analyzer	R&S	FSV40	101499	Mar. 08, 2022	Mar. 07, 2023			
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 01, 2022	Oct. 31, 2023			
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Jun. 28, 2022	Jun. 27, 2023			
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Dec. 15, 2022	Dec. 14, 2023			
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 27, 2022	Oct. 26, 2023			
Preamplifier	EMC	EMC02325	980187	Jul. 16, 2022	Jul. 15, 2023			
Preamplifier	EMC	EMC184045SE	980897	Aug. 01, 2022	Jul. 31, 2023			
Preamplifier	EMC	EMC184045SE	980903	Jul. 16, 2022	Jul. 15, 2023			
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 04, 2022	Oct. 03, 2023			
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800 -001	Sep. 23, 2022	Sep. 22, 2023			
LF cable-3M	EMC	EMC8D-NM-NM-300 0	131103	Sep. 23, 2022	Sep. 22, 2023			
LF cable-13M	EMC	EMC8D-NM-NM-130 00	131104	Sep. 23, 2022	Sep. 22, 2023			
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Sep. 23, 2022	Sep. 22, 2023			
RF cable-8M	EMC	EMC104-SM-SM-80 00	181107	Sep. 23, 2022	Sep. 22, 2023			
Measurement Software	AUDIX	e3	6.120210g	NA	NA			
Note: Calibration Inter	rval of instruments liste	d above is one year.			•			



### 1.3 Test Standards

47 CFR FCC Part 15.247 47 CFR FCC Part 15.407 47 CFR FCC Part 15.225 ANSI C63.10-2013

### **1.4 Reference Guidance**

FCC KDB 558074 D01 15.247 Meas Guidance v05r02 FCC KDB 412172 D01 Determining ERP and EIRP v01r01 FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

### **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			
Unwanted Emission ≤ 1GHz	±3.96 dB			
Unwanted Emission > 1GHz	±4.51 dB			



# 2 Test Configuration

# 2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	03CH03-WS
Address of Test Site	No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)
FCC Designation No.:	TW0009

➢ FCC site registration No.: 207696

- ➢ ISED#: 10807C
- ➤ CAB identifier: TW2732

### 2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode
	1. WIFI 2.4G 11b CH6 +NFC
Unwanted Emissions	2. 5G 11a CH165 +NFC
	3. BT EDR GFSK CH0 + NFC



# **3** Transmitter Test Results

### 3.1 Unwanted Emissions into Restricted Frequency Bands

#### 3.1.1 Limit of Unwanted Emissions into Restricted Frequency Bands

	Restricted Band	Emissions Limit	
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.

#### 3.1.2 Test Procedures

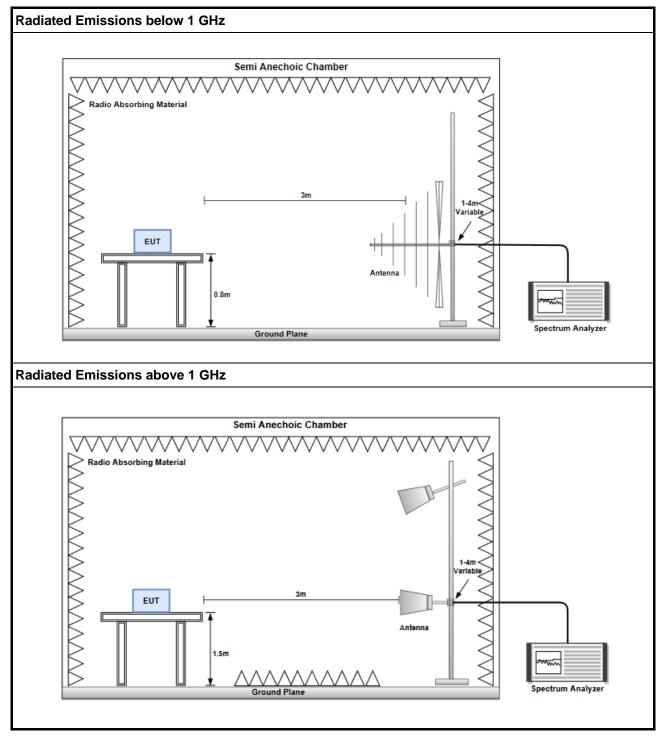
- Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission 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.
- 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:

- 1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
- 2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
- 3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.



#### 3.1.3 Test Setup



### 3.1.4 Test Results

Refer to Appendix A.



# 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.) No.2-1, 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 33381, Taiwan (R.O.C.)

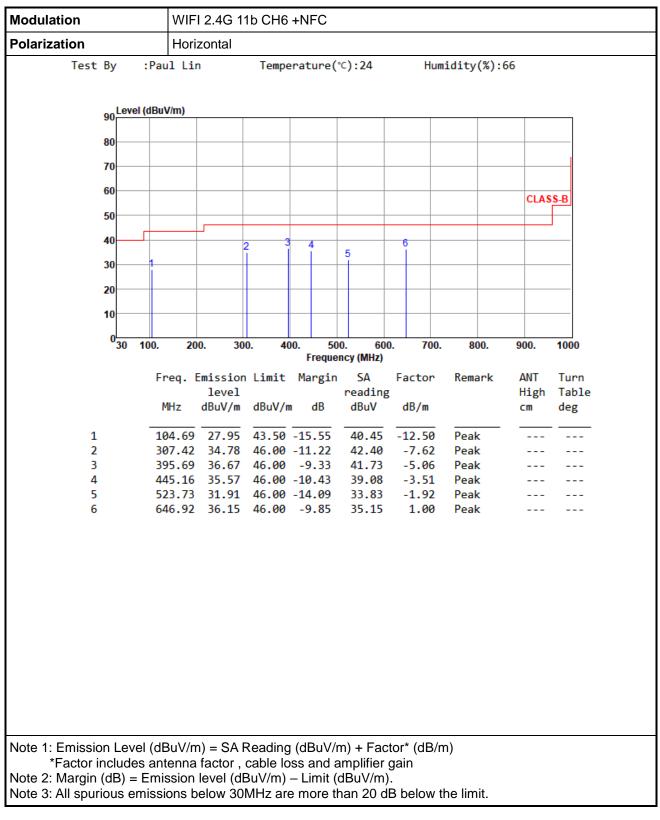
If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666 Fax: 886-3-318-0345 Email: ICC\_Service@icertifi.com.tw

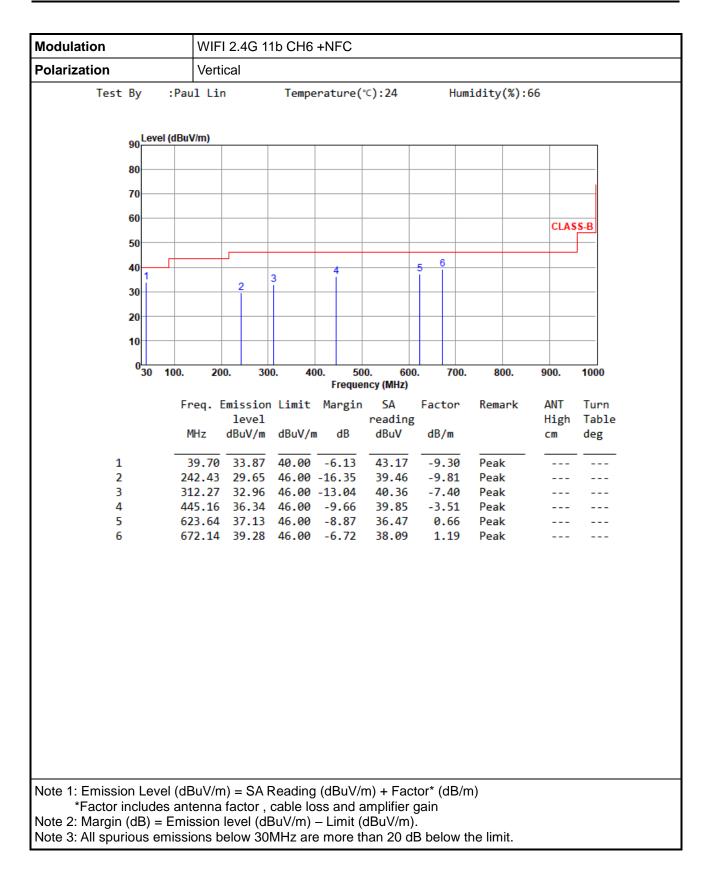
—END—



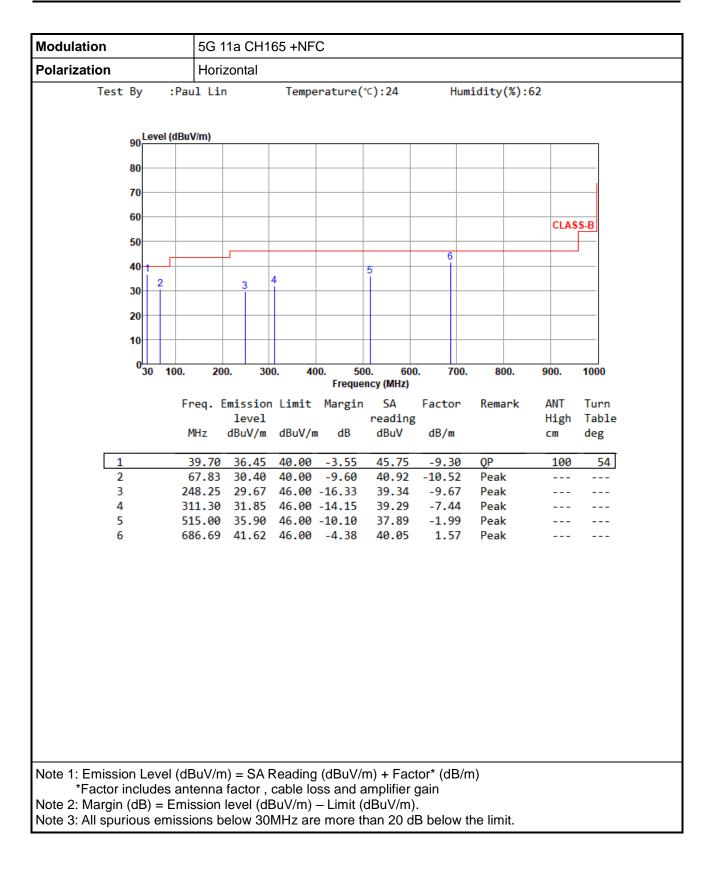
### Unwanted Emissions (Below 1GHz)



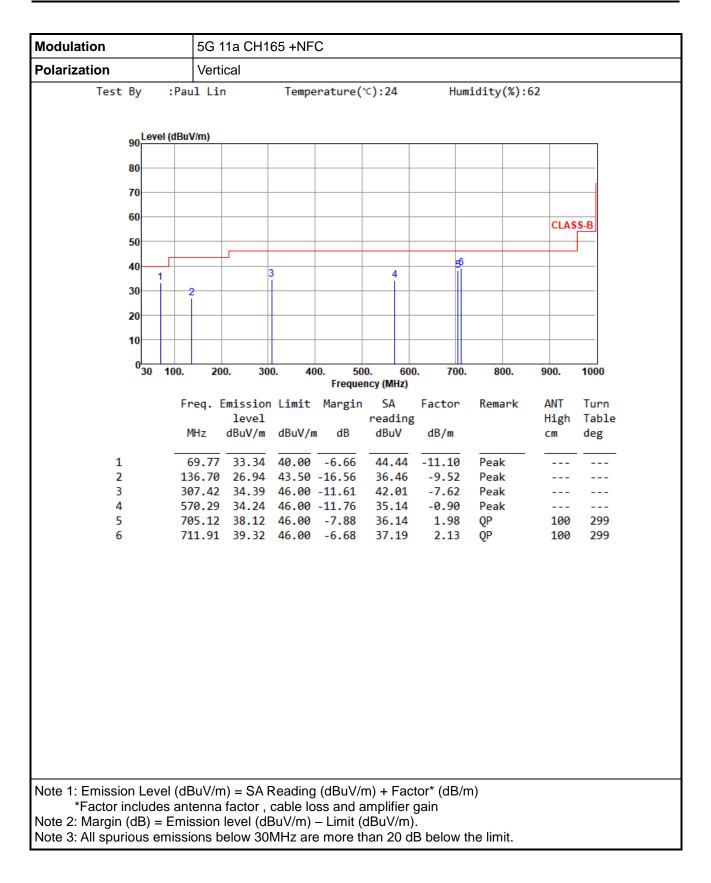




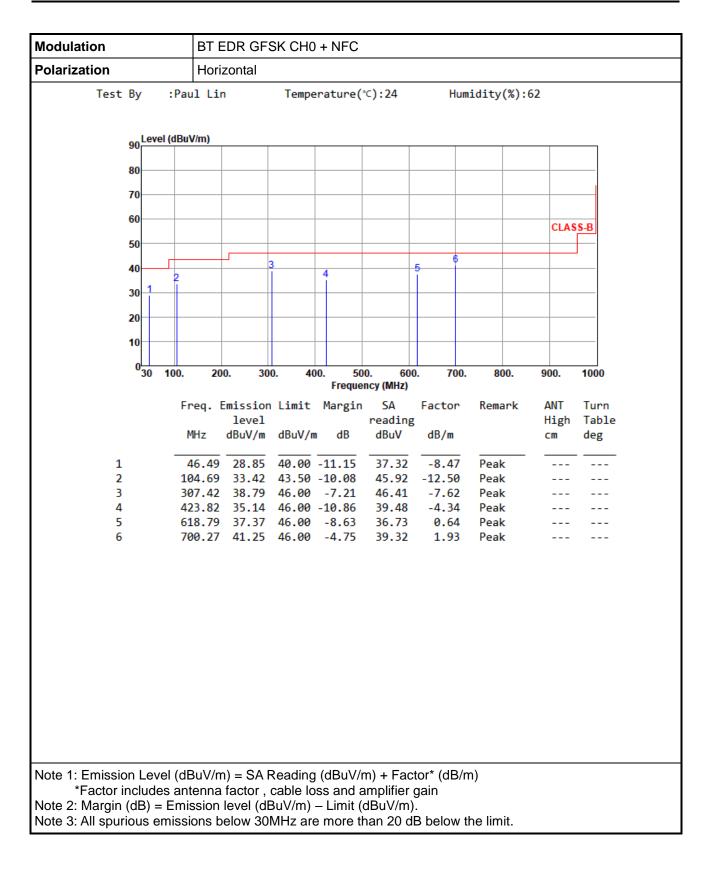




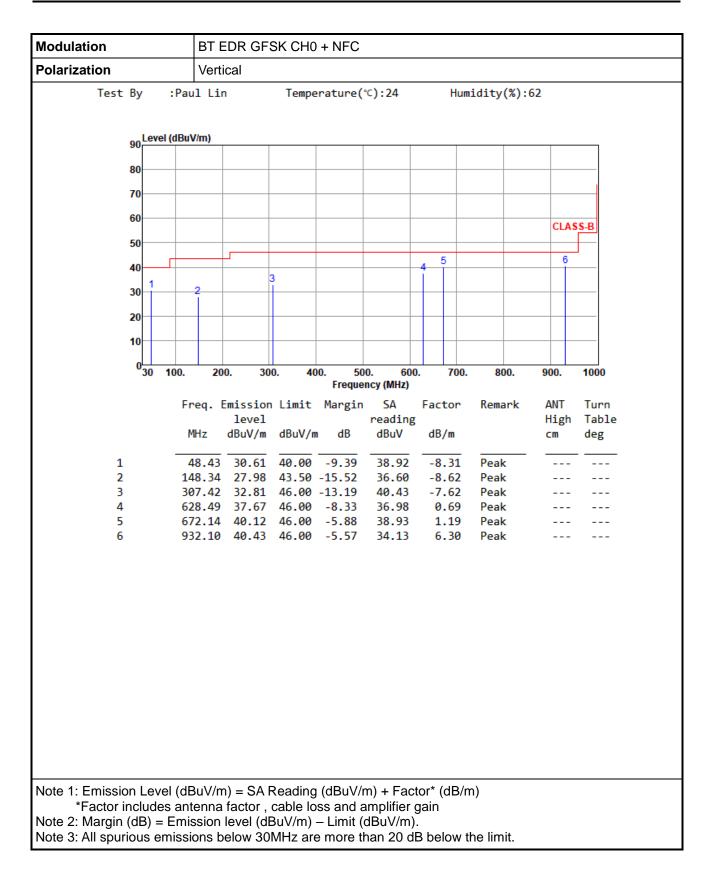






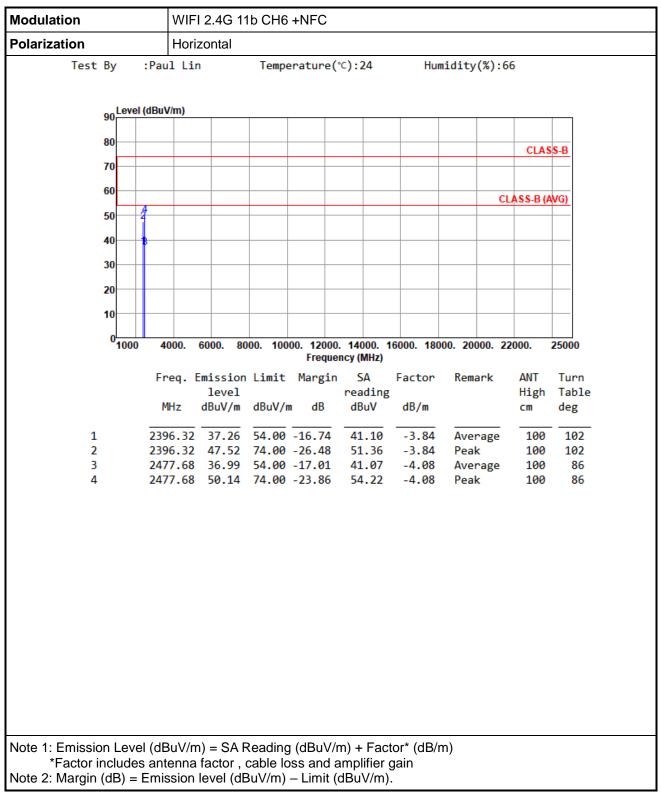




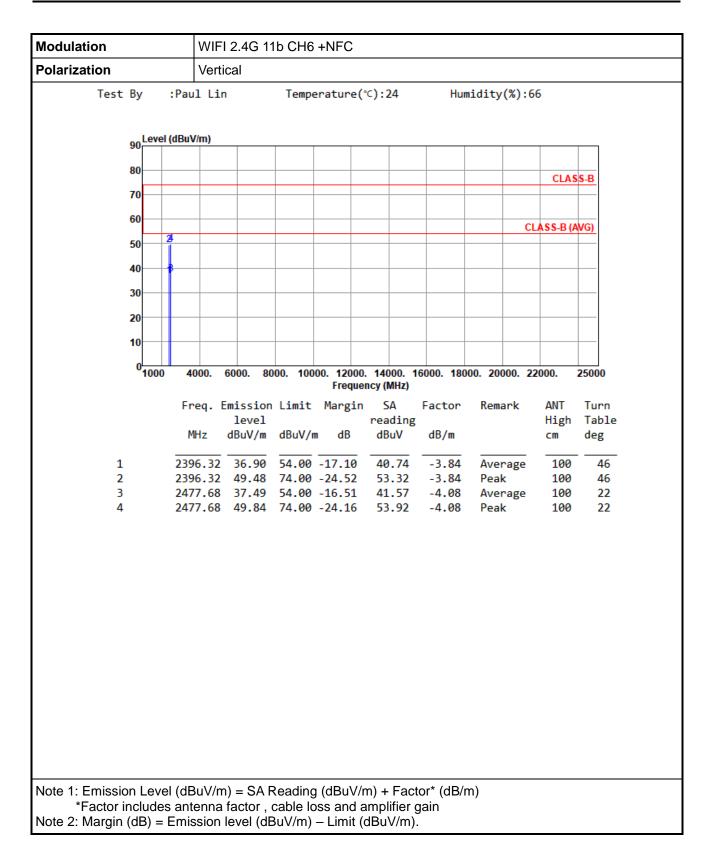




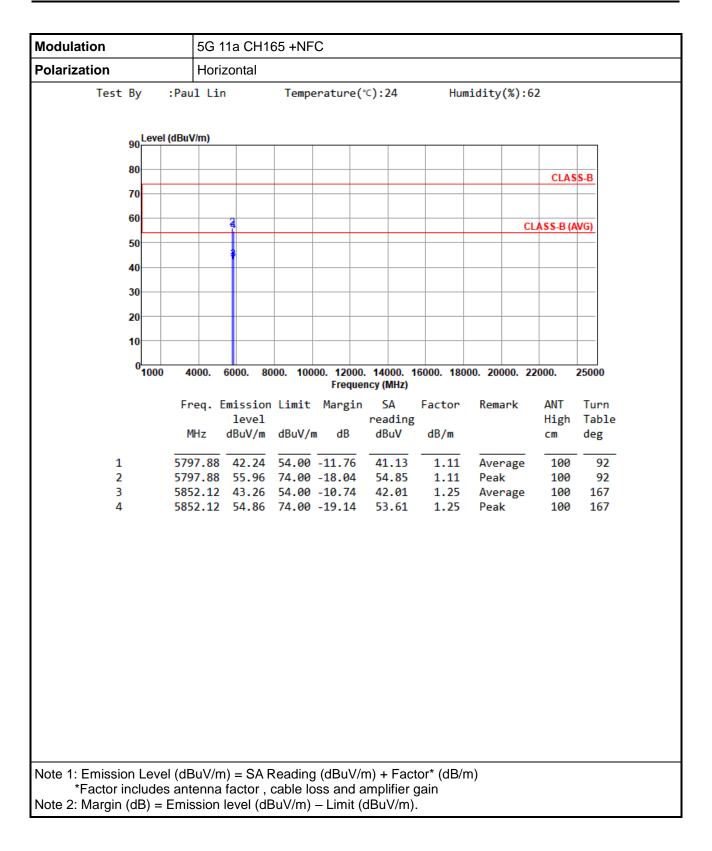
#### **Unwanted Emissions (Above 1GHz)**







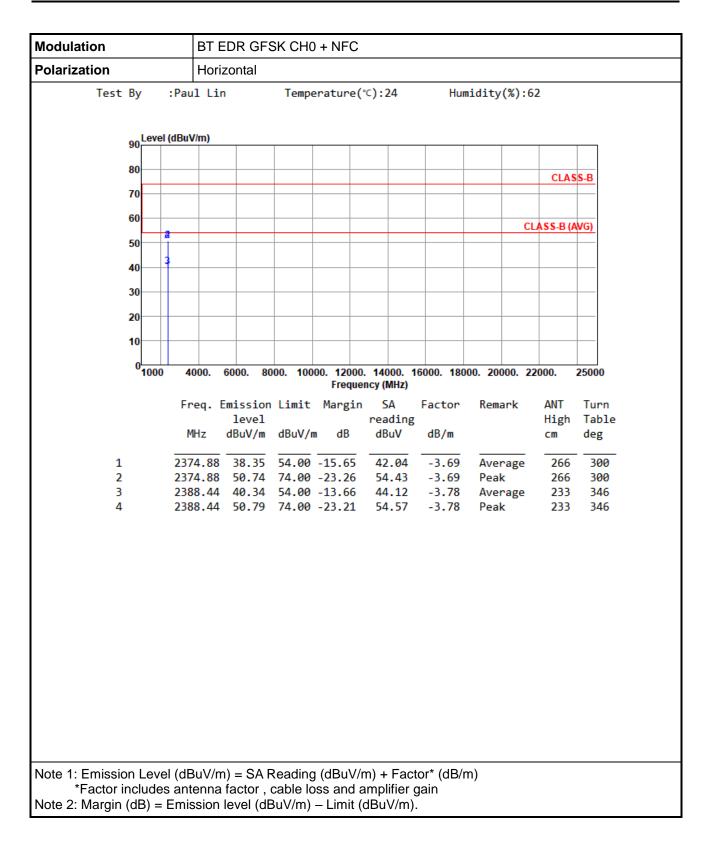






Iodulation		11a CH	165 +NF	C					
Polarization	Ve	rtical							
Test By	:Paul L	in	Temp	erature(	℃):24	Hu	midity(%):6	52	
90 Level	(dBuV/m)								
80									
70								CLAS	S-B
60		4					С	LASS-B (A	WG)
50		3							
40									
30									
20									
10									
0 <mark></mark> 1000	4000.	6000. 8	3000. 100		. 14000. 1 ncy (MHz)	6000. 18	000. 20000. 2	2000.	25000
	Freq.	Emissio	n limit	Margin		Factor	Remark	ANT	Turn
		level		-	reading		include in	High	Table
	MHz	dBuV/m	dBuV/ı	m dB	dBuV	dB/m		cm	deg
1		8 42.49		-11.51	41.38	1.11	-	100	102
2 3		8 56.37 2 42.95			55.26 41.70	1.11 1.25		100 100	102 122
4		2 54.76			53.51	1.25	-	100	122







Polarization    Vertical      Test By    Paul Lin    Temperature("c):24    Humidity(%):62				) + NFC					
0	Polarization	Vertical							
90  1	Test By :	Paul Lin	Temp	erature(°	c):24	Hur	nidity(%):6	2	
Image: Classe of the second	90 Level (d	lBuV/m)							
70  70 <td< td=""><td>80</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	80								
60  2								CLAS	S-B
$\begin{array}{c c c c c c c c c c c c c c c c c c c $									
40  30 <td< td=""><td>60</td><td></td><td></td><td></td><td></td><td></td><td>CL</td><td>ASS-B (A</td><td>VG)</td></td<>	60						CL	ASS-B (A	VG)
30  30 <td< td=""><td>50 #</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	50 #								
20  10  10  100  1000  4000. 6000. 8000. 10000. 12000. 14000. 16000. 18000. 20000. 22000. 25000    Freq. Emission Limit Margin SA Factor Remark ANT Turn level reading MHz dBuV/m dB uV/m dB dBuV dB/m    1  2374.88  37.70  54.00  -16.30  41.39  -3.69  Average  100  315    2  2374.88  49.96  74.00  -24.04  53.65  -3.69  Peak  100  315    3  2388.44  38.32  54.00  -15.68  42.10  -3.78  Average  100  329	40								
10  10  100  4000. 6000. 8000. 10000. 12000. 14000. 16000. 18000. 20000. 22000. 25000    Freq. Emission Limit Margin SA Factor Remark ANT Turn level reading MHz dBuV/m dB uV/m dB dBuV dB/m    1  2374.88  37.70  54.00  -16.30  41.39  -3.69  Average  100  315    2  2374.88  49.96  74.00  -24.04  53.65  -3.69  Peak  100  315    3  2388.44  38.32  54.00  -15.68  42.10  -3.78  Average  100  329	30								
0 1000 4000. 6000. 8000. 10000. 12000. 14000. 16000. 18000. 20000. 22000. 25000 Frequency (MHz) Freq. Emission Limit Margin SA Factor Remark ANT Turn level reading MHz dBuV/m dB dBuV dB/m cm deg 1 2374.88 37.70 54.00 -16.30 41.39 -3.69 Average 100 315 2 2374.88 49.96 74.00 -24.04 53.65 -3.69 Peak 100 315 3 2388.44 38.32 54.00 -15.68 42.10 -3.78 Average 100 329	20								
0 1000 4000. 6000. 8000. 10000. 12000. 14000. 16000. 18000. 20000. 22000. 25000 Frequency (MHz) Freq. Emission Limit Margin SA Factor Remark ANT Turn level reading MHz dBuV/m dB dBuV dB/m cm deg 1 2374.88 37.70 54.00 -16.30 41.39 -3.69 Average 100 315 2 2374.88 49.96 74.00 -24.04 53.65 -3.69 Peak 100 315 3 2388.44 38.32 54.00 -15.68 42.10 -3.78 Average 100 329	10								
1000  4000.  6000.  8000.  12000.  14000.  16000.  18000.  20000.  22000.  25000    Freq. Emission Limit Margin SA Factor Remark ANT Turn level reading MHz dBuV/m dB uV/m dB dBuV dB/m cm deg    1  2374.88  37.70  54.00  -16.30  41.39  -3.69  Average  100  315    2  2374.88  49.96  74.00  -24.04  53.65  -3.69  Peak  100  315    3  2388.44  38.32  54.00  -15.68  42.10  -3.78  Average  100  329									
Freq. Emission Limit Margin level  SA reading reading  Factor reading dB/m  Remark dB/m  ANT Turn High Table deg    1  2374.88  37.70  54.00  -16.30  41.39  -3.69  Average  100  315    2  2374.88  49.96  74.00  -24.04  53.65  -3.69  Peak  100  315    3  2388.44  38.32  54.00  -15.68  42.10  -3.78  Average  100  329	<sup>0</sup> 1000	4000. 6000	). 8000. 100			6000. 180	00. 20000. 22	000.	25000
level    reading    High    Table      MHz    dBuV/m    dBuV/m    dBuV    dBn    cm    deg      1    2374.88    37.70    54.00    -16.30    41.39    -3.69    Average    100    315      2    2374.88    49.96    74.00    -24.04    53.65    -3.69    Peak    100    315      3    2388.44    38.32    54.00    -15.68    42.10    -3.78    Average    100    329		Freq. Emis	sion Limit			Factor	Remark	ANT	Turn
1  2374.88  37.70  54.00  -16.30  41.39  -3.69  Average  100  315    2  2374.88  49.96  74.00  -24.04  53.65  -3.69  Peak  100  315    3  2388.44  38.32  54.00  -15.68  42.10  -3.78  Average  100  329		16	evel	_	reading				
2 2374.88 49.96 74.00 -24.04 53.65 -3.69 Peak 100 315 3 2388.44 38.32 54.00 -15.68 42.10 -3.78 Average 100 329		MHZ dBu	IV/m dBuV/	m dB	dBuV	dB/m		cm	deg
3 2388.44 38.32 54.00 -15.68 42.10 -3.78 Average 100 329							_		
							_		