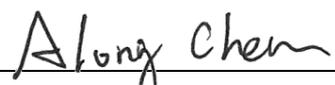


FCC Co-Location Test Report

FCC ID : MXF-WAPQ-245
Equipment : Router
Model No. : AC3000
Brand Name : Onelink
Applicant : Gemtek Technology Co., Ltd.
Address : No.15-1 Zhonghua Rd, Hsinchu Industrial
Park, Hukou, Hsinchu, Taiwan, R.O.C
Standard : 47 CFR FCC Part 15.247
47 CFR FCC Part 15.407
Received Date : Oct. 29, 2018
Tested Date : Nov. 01 ~ Nov. 09, 2018

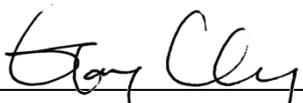
We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval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

Reviewed by:



Along Chen / Assistant Manager

Approved by:



Gary Chang / Manager



Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	The Equipment List	6
1.3	Test Standards	7
1.4	Measurement Uncertainty	7
2	TEST CONFIGURATION	8
2.1	Testing Condition	8
2.2	The Worst Test Modes and Channel Details	8
3	TRANSMITTER TEST RESULTS.....	9
3.1	Unwanted Emissions into Restricted Frequency Bands	9
4	TEST LABORATORY INFORMATION	16

Release Record

Report No.	Version	Description	Issued Date
FR8O3101CO	Rev. 01	Initial issue	Nov. 26, 2018

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.247(d) 15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 52.31MHz 36.87 (Margin -3.13dB) - PK	Pass

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

Operating Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5745 ~ 5825 MHz Bluetooth EDR: 2402 ~ 2480 MHz
Modulation Type	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n/ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM) Bluetooth EDR: GFSK / $\pi/4$ -DQPSK / 8DPSK

1.1.2 Antenna Details of Platform

Wi-Fi antenna

Ant. No.	Model	Type	Connector	Operating Frequency (MHz) / Gain (dBi)		
				2400~2483.5	5150~5250	5725~5850
1	2.4GHz,G1	PIFA	UFL	2.4	---	---
2	2.4GHz,G2	PIFA	UFL	2.1	---	---
3	5GHz, Low Band,A1	PIFA	UFL	5.1	---	---
4	5GHz, Low Band,A2	PIFA	UFL	3.7	---	---
5	5GHz, high Band,A3	PIFA	UFL	---	---	4.8
6	5GHz, high Band,A4	PIFA	UFL	---	---	3.5
7	5GHz, high Band,A5	PIFA	UFL	---	---	3.1
8	5GHz, high Band,A6	PIFA	UFL	---	---	3.8

Bluetooth Antenna

Ant. No.	Type	Gain (dBi)	Connector	Remark
1	Chip	0.7	UFL	---

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from adapter
--------------------------	--------------------

1.2 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Tested Date	Nov. 01 ~ Nov. 09, 2018				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Jan. 03, 2018	Jan. 02, 2019
Receiver	R&S	ESR3	101658	Nov. 20, 2017	Nov. 19, 2018
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 19, 2018	Apr. 18, 2019
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Jan. 18, 2018	Jan. 17, 2019
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 23, 2017	Nov. 22, 2018
Loop Antenna	TESEQ	HLA 6120	31244	Mar. 29, 2018	Mar. 28, 2019
Preamplifier	EMC	EMC02325	980187	Aug. 24, 2018	Aug. 23, 2019
Preamplifier	Agilent	83017A	MY53270014	Aug. 09, 2018	Aug. 08, 2019
Preamplifier	EMC	EMC184045B	980192	Aug. 09, 2018	Aug. 08, 2019
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Nov. 27, 2017	Nov. 26, 2018
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY32487/4	Nov. 27, 2017	Nov. 26, 2018
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Nov. 27, 2017	Nov. 26, 2018
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Nov. 27, 2017	Nov. 26, 2018
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Nov. 27, 2017	Nov. 26, 2018
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Nov. 27, 2017	Nov. 26, 2018
Measurement Software	AUDIX	e3	6.120210g	NA	NA

Note: Calibration Interval of instruments listed above is one year.

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Nov. 01 ~ Nov. 09, 2018				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Apr. 16, 2018	Apr. 15, 2019
Power Meter	Anritsu	ML2495A	1241002	Oct. 09, 2018	Oct. 08, 2019
Power Sensor	Anritsu	MA2411B	1207366	Oct. 09, 2018	Oct. 08, 2019
AC POWER SOURCE	APC	AFC-500W	F312060012	Dec. 01, 2017	Nov. 30, 2018
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA

Note: Calibration Interval of instruments listed above is one year.

1.3 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247

47 CFR FCC Part 15.407

ANSI C63.10-2013

FCC KDB 558074 D01 15.247 Meas Guidance v05

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

FCC KDB 412172 D01 Determining ERP and EIRP v01r01

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty	
Parameters	Uncertainty
Radiated emission \leq 1GHz	± 3.66 dB
Radiated emission $>$ 1GHz	± 5.37 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
Radiated Emissions	03CH03-WS	24-25°C / 66%	Akun Chung Roger Lu
Conducted Emissions	TH01-WS	24°C / 66%	Akun Chung

➤ FCC site registration No.: 207696

➤ IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Channel	Data Rate	Test Configuration
Radiated Emissions	2.4G 11b + 5G B1 11ac VHT40 + 5G B4 11a	CH11 + CH46 + CH165	6Mbps + MCS 0 + 6Mbps	---
Conducted Emissions				

NOTE:

1. The selected channel is the maximum power channel of Wi-Fi mode.
2. Only 2.4GHz Wi-Fi and 5 GHz Wi-Fi can transmit simultaneously.

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

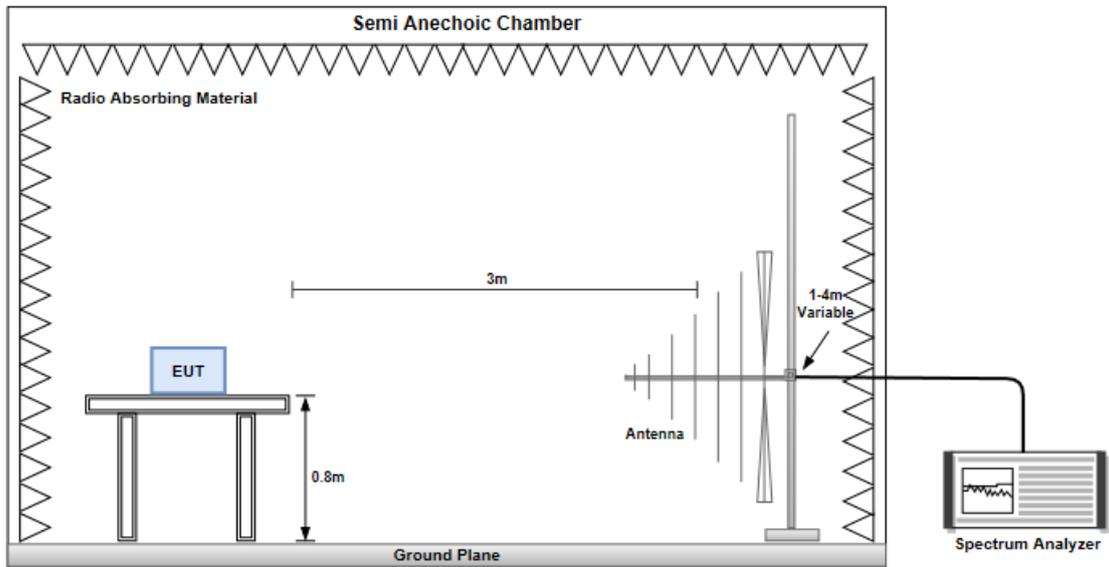
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

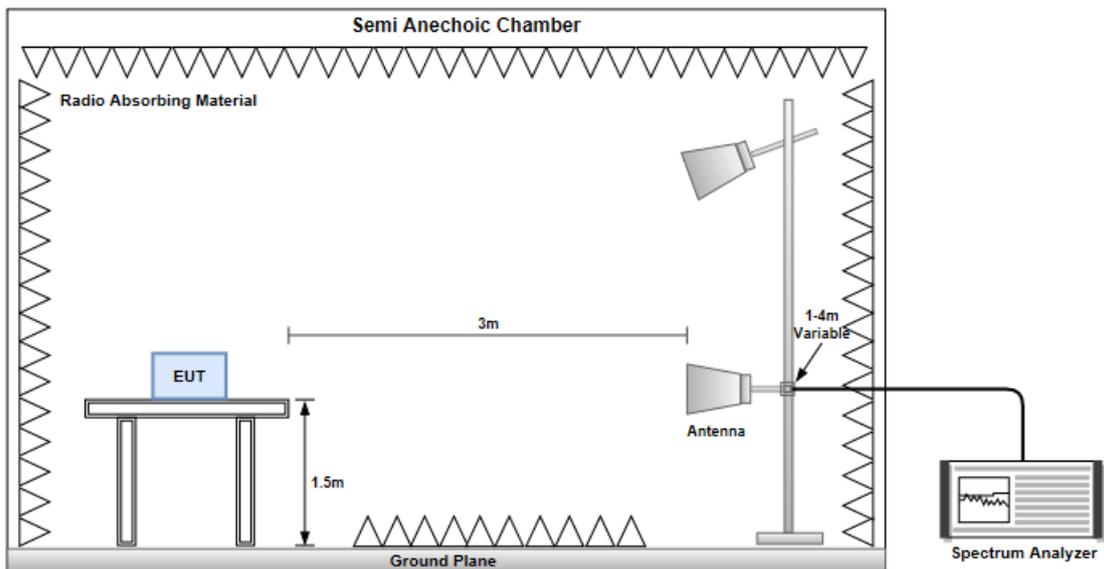
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.1.3 Test Setup

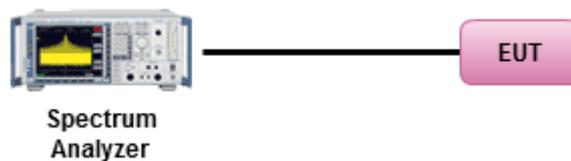
Radiated Emissions below 1 GHz



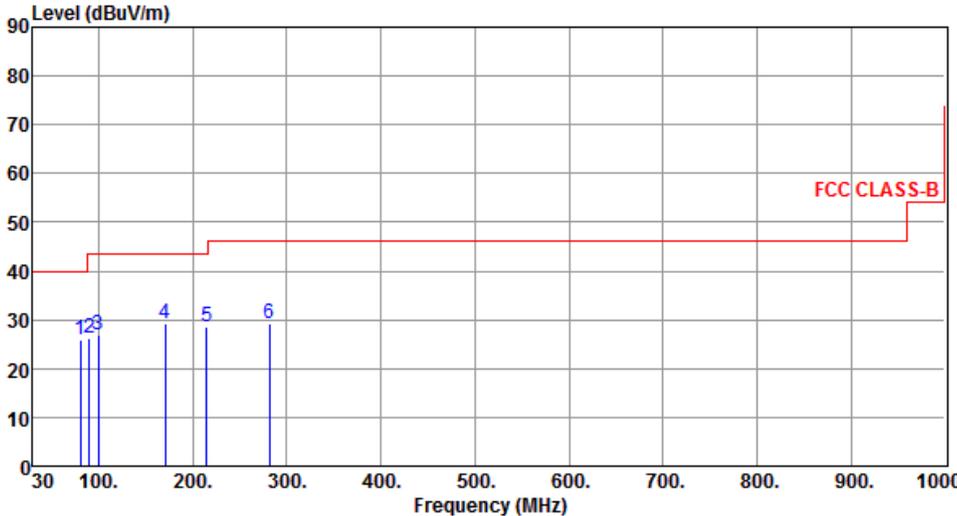
Radiated Emissions above 1 GHz



Transmitter Conducted Unwanted Emissions (30MHz~40GHz)

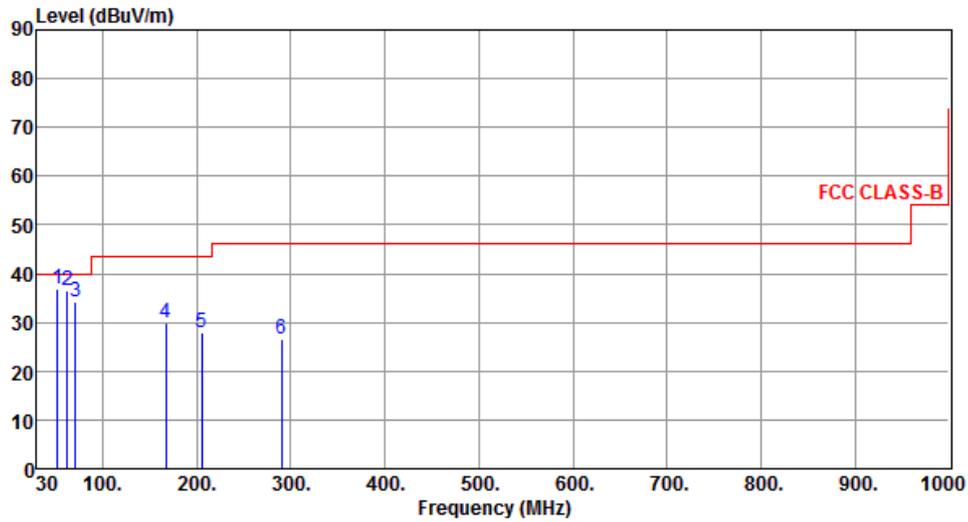


3.1.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	2.4G 11b + 5G B1 11ac VHT40 + 5G B4 11a	Test Channel	CH11 + CH46 + CH165						
Polarization	Horizontal								
 <p>The graph plots Level (dBuV/m) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (30 to 1000). A red line represents the FCC CLASS-B limit, which is 40 dBuV/m from 30 to 100 MHz, 45 dBuV/m from 100 to 200 MHz, 46 dBuV/m from 200 to 1000 MHz, and 75 dBuV/m at 1000 MHz. Six blue vertical lines indicate emission peaks at 80.44, 90.14, 99.84, 170.65, 215.27, and 281.23 MHz, labeled 1 through 6 respectively.</p>									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	80.44	25.84	40.00	-14.16	38.86	-13.02	Peak	---	---
2	90.14	26.15	43.50	-17.35	40.61	-14.46	Peak	---	---
3	99.84	27.04	43.50	-16.46	40.57	-13.53	Peak	---	---
4	170.65	29.07	43.50	-14.43	37.64	-8.57	Peak	---	---
5	215.27	28.53	43.50	-14.97	39.50	-10.97	Peak	---	---
6	281.23	29.31	46.00	-16.69	37.44	-8.13	Peak	---	---
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m). Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.</p>									

Modulation	2.4G 11b + 5G B1 11ac VHT40 + 5G B4 11a	Test Channel	CH11 + CH46 + CH165
-------------------	---	---------------------	---------------------

Polarization	Vertical
---------------------	----------



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	52.31	36.87	40.00	-3.13	44.92	-8.05	Peak	---	---
2	62.01	36.53	40.00	-3.47	45.56	-9.03	Peak	---	---
3	70.74	34.35	40.00	-5.65	45.03	-10.68	Peak	---	---
4	166.77	29.85	43.50	-13.65	38.26	-8.41	Peak	---	---
5	205.57	28.03	43.50	-15.47	39.04	-11.01	Peak	---	---
6	289.96	26.43	46.00	-19.57	34.35	-7.92	Peak	---	---

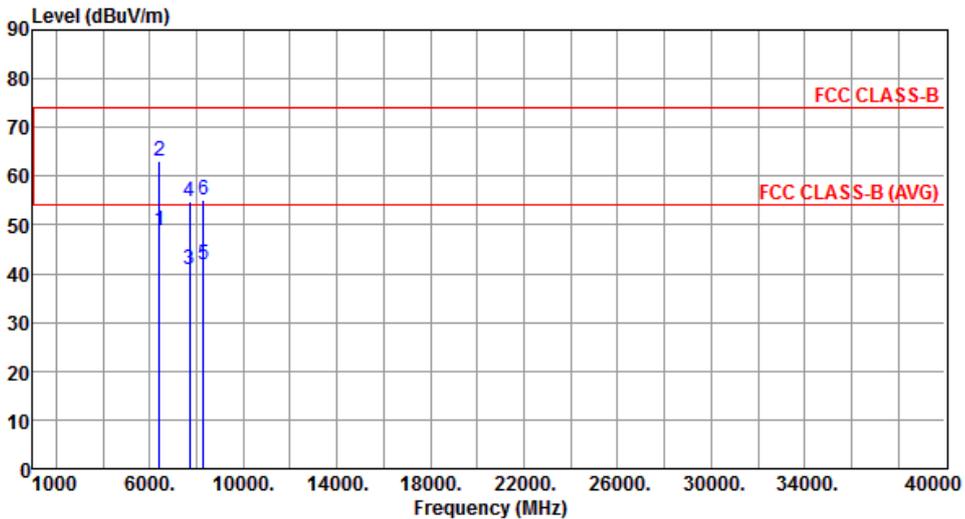
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

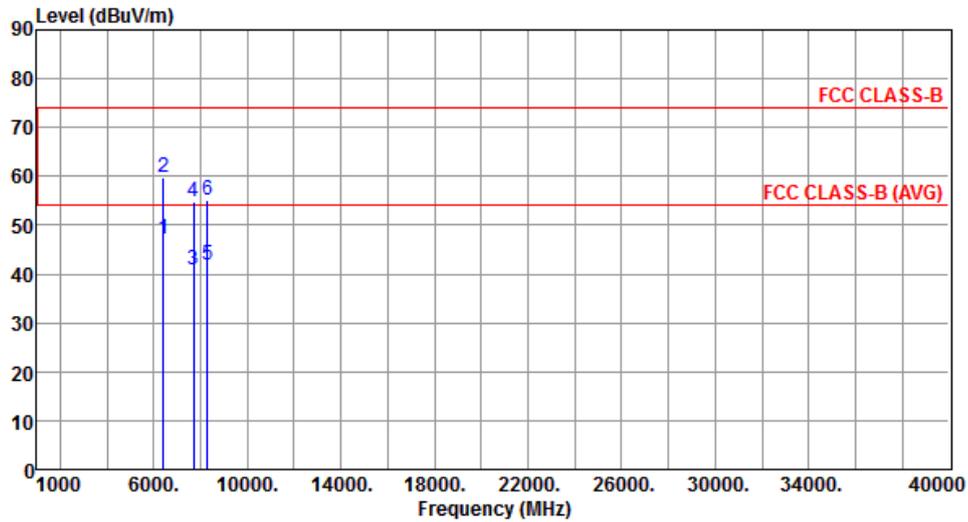
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

3.1.5 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation	2.4G 11b + 5G B1 11ac VHT40 + 5G B4 11a	Test Channel	CH11 + CH46 + CH165						
Polarization	Horizontal								
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	6420.00	48.89	54.00	-5.11	40.24	8.65	Average	100	18
2	6420.00	63.08	74.00	-10.92	54.43	8.65	Peak	100	18
3	7692.00	40.86	54.00	-13.14	29.50	11.36	Average	100	20
4	7692.00	54.94	74.00	-19.06	43.58	11.36	Peak	100	20
5	8287.00	41.85	54.00	-12.15	29.86	11.99	Average	100	145
6	8287.00	55.00	74.00	-19.00	43.01	11.99	Peak	100	145
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).</p>									

Modulation	2.4G 11b + 5G B1 11ac VHT40 + 5G B4 11a	Test Channel	CH11 + CH46 + CH165
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Polarization	Vertical
---------------------	----------



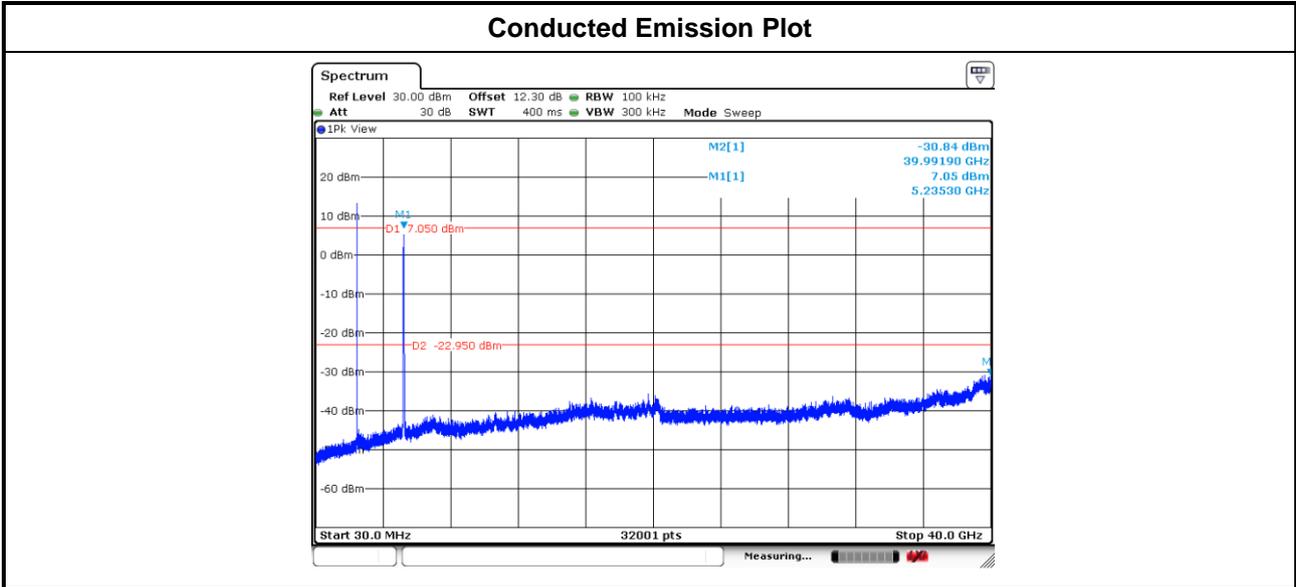
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	6420.00	47.11	54.00	-6.89	38.46	8.65	Average	100	20
2	6420.00	59.88	74.00	-14.12	51.23	8.65	Peak	100	20
3	7692.00	40.84	54.00	-13.16	29.48	11.36	Average	100	50
4	7692.00	54.63	74.00	-19.37	43.27	11.36	Peak	100	50
5	8287.00	41.73	54.00	-12.27	29.74	11.99	Average	100	123
6	8287.00	55.24	74.00	-18.76	43.25	11.99	Peak	100	123

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

3.1.6 Conducted Emissions (30MHz~40GHz)



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 Corp (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 <http://www.icertifi.com.tw>.

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Kwei Shan District, Tao Yuan City
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Kwei Shan Site II

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St., Kwei Shan District, Tao Yuan
City 333, Taiwan, R.O.C..

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==END==