

FCC Co-Location Test Report

FCC ID : ACQ-STREAMTV
Equipment : Stream TV
Model No. : Stream TV
Brand Name : Verizon
Applicant : ARRIS
Address : 101 Tournament Drive, Horsham
Pennsylvania, United States,19044
Standard : 47 CFR FCC Part 15.247
47 CFR FCC Part 15.407
Received Date : Mar. 11, 2021
Tested Date : Apr. 14 ~ Apr. 16, 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:



Along Chen / Assistant Manager

Approved by:



Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR131101CO	Rev. 01	Initial issue	May 13, 2021

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.247(d) 15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 30.97MHz 36.88 (Margin -3.12dB) - PK	Pass

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/ax: 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/ax: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)
BT	
Operating Frequency	2402 MHz ~ 2480 MHz
Modulation Type	Bluetooth 5.0 LE: GFSK Bluetooth BR(1Mbps): GFSK Bluetooth EDR (2Mbps): -DQPSK Bluetooth EDR (3Mbps): 8-DPSK

1.1.2 Antenna Details

For WLAN

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)				
				2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	Ant1	Chip	-	2.7	3.84	3.84	3.84	3.84
2	Ant2	PCB	i-pex(MHF)	3.02	3.82	3.82	3.82	3.82

For BT

Ant. No.	Type	Connector	Gain (dBi)	Remarks
1	Chip	N/A	2.7	---

1.1.3 USB chip

Two sources for USB chip

Source 1	IC PER 3.3V SMD QFN24 GP USB HUB Brand: GENESYS Model: GL852G
Source 2	IC PER 3.3V SMD QFN24 GP USB HUB Brand: GENESYS Model: GL850G

1.1.4 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc from adapter
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1.1.5 Accessories

Accessories		
No.	Equipment	Description
1	AC adapter	Brand: KUANTECH Model: KSC-10C-050200HU I/P: 100-120Vac, 47-63Hz, 0.3A O/P: 5Vdc, 2A Power Line: 1m non-shielded without core (USB-C cable)
2	HDMI	0.95m non-shielded without core
3	Remote control	Model: RC4513101/01BRP Brand: Verizon

1.2 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Apr. 14 ~ Apr. 16, 2021				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
Spectrum Analyzer	R&S	FSV40	101498	Dec. 04, 2020	Dec. 03, 2021
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 17, 2020	Nov. 16, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 10, 2020	Jul. 09, 2021
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 11, 2020	Dec. 10, 2021
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 06, 2020	Nov. 05, 2021
Preamplifier	EMC	EMC02325	980225	Jul. 03, 2020	Jul. 02, 2021
Preamplifier	Agilent	83017A	MY39501308	Sep. 26, 2020	Sep. 25, 2021
Preamplifier	EMC	EMC184045B	980192	Jul. 21, 2020	Jul. 20, 2021
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 06, 2020	Oct. 05, 2021
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 06, 2020	Oct. 05, 2021
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 06, 2020	Oct. 05, 2021
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 06, 2020	Oct. 05, 2021
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 06, 2020	Oct. 05, 2021
Measurement Software	AUDIX	e3	6.120210g	NA	NA

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

1.3 Test Standards

47 CFR FCC Part 15.247

47 CFR FCC Part 15.407

ANSI C63.10-2013

1.4 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

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
Radiated emission 1GHz	± 3.41 dB
Radiated emission > 1GHz	± 4.59 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	03CH01-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.)

Ø FCC Designation No.: TW2732

Ø FCC site registration No.: 181692

Ø ISED#: 10807A

Ø CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test mode
Radiated Emissions 1GHz	BT 8DPSK CH78 + 2.4G 11AX20 CH06	1, 2
	BT 8DPSK CH78 + 5G 11AX20 CH149	1, 2
Radiated Emissions > 1GHz	BT 8DPSK CH78 + 2.4G 11AX20 CH06	1
	BT 8DPSK CH78 + 5G 11AX20 CH149	1

NOTE:

- The selected channel is the maximum power channel of Wi-Fi / BT mode.
- The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement X, Y, and Z-plane. The **X-plane** results were found as the worst case and were shown in this report.
- There are two USB chips provided for the test:
 Test Configuration 1: USB chip 1, model GL852G
 Test Configuration 2: USB chip 2, model GL850G

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 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.

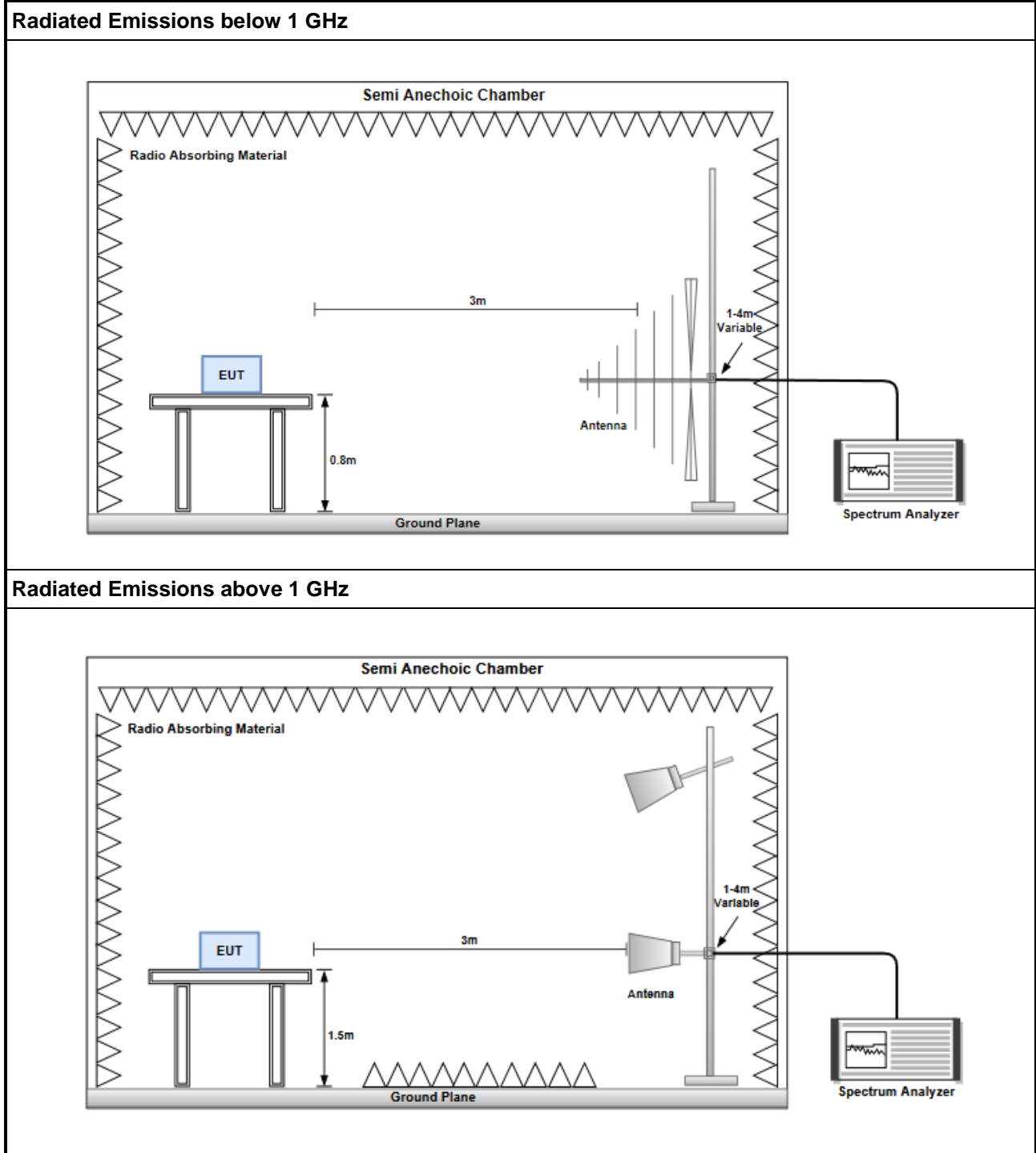
3.1.2 Test Procedures

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



3.1.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Test Mode	Mode 1: BT 8DPSK CH78 + 2.4G 11AX20 CH06
Polarization	Horizontal
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *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>	

Test Mode	Mode 1: BT 8DPSK CH78 + 2.4G 11AX20 CH06
Polarization	Vertical
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *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>	

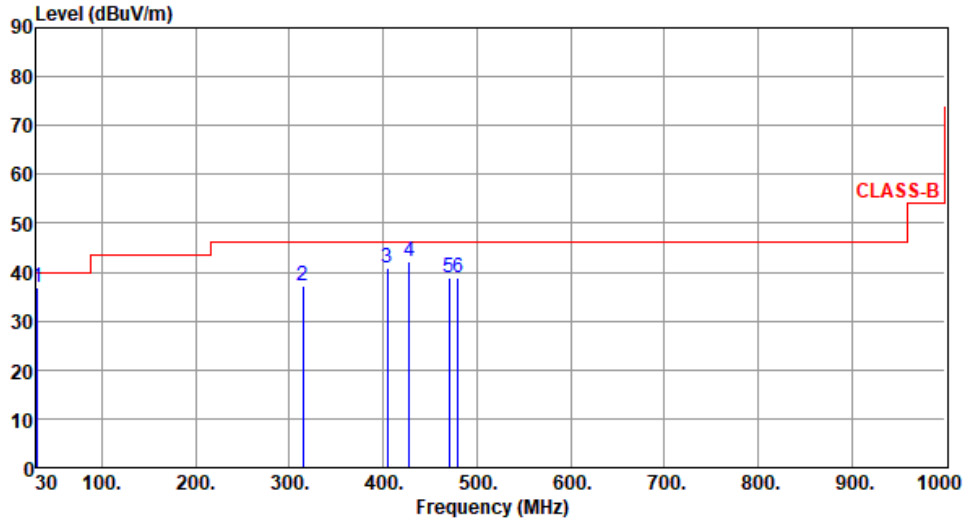
Test Mode	Mode 1: BT 8DPSK CH78 + 5G 11AX20 CH149
Polarization	Horizontal
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain</p> <p>Note 2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m).</p> <p>Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.</p>	

Test Mode	Mode 1: BT 8DPSK CH78 + 5G 11AX20 CH149
Polarization	Vertical
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *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>	

Test Mode	Mode 2: BT 8DPSK CH78 + 2.4G 11AX20 CH06
Polarization	Horizontal
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *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>	

Test Mode	Mode 2: BT 8DPSK CH78 + 2.4G 11AX20 CH06
Polarization	Vertical

Test By :Akun Chung Temperature(°C):22 Humidity(%):65



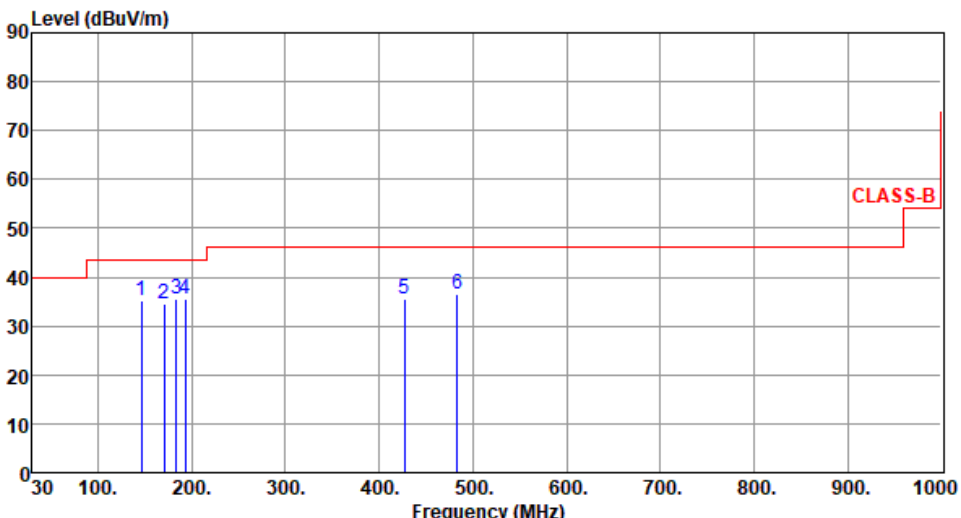
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	30.97	36.88	40.00	-3.12	46.64	-9.76	Peak	---	---
2	314.21	37.14	46.00	-8.86	44.71	-7.57	Peak	---	---
3	404.42	40.92	46.00	-5.08	46.62	-5.70	Peak	---	---
4	427.70	42.31	46.00	-3.69	47.21	-4.90	Peak	---	---
5	470.38	38.83	46.00	-7.17	42.70	-3.87	Peak	---	---
6	480.08	38.82	46.00	-7.18	42.47	-3.65	Peak	---	---

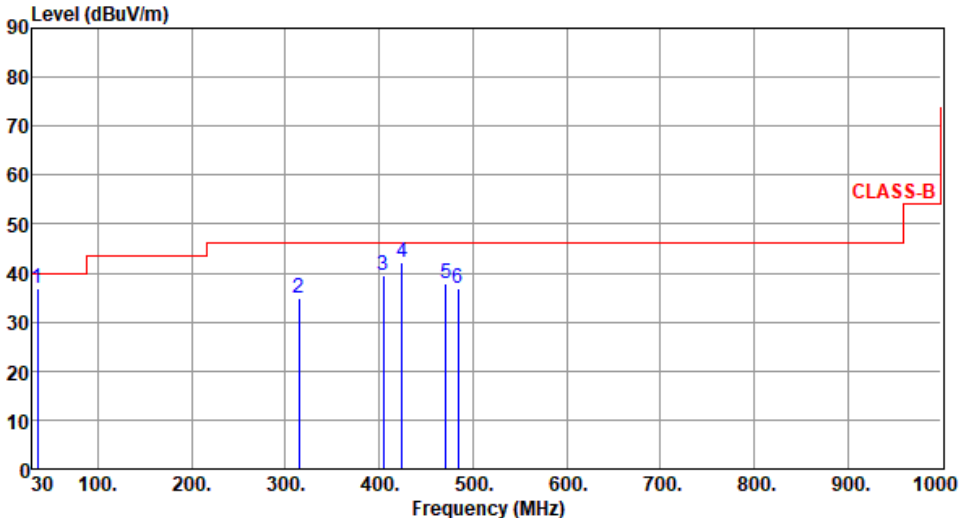
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

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

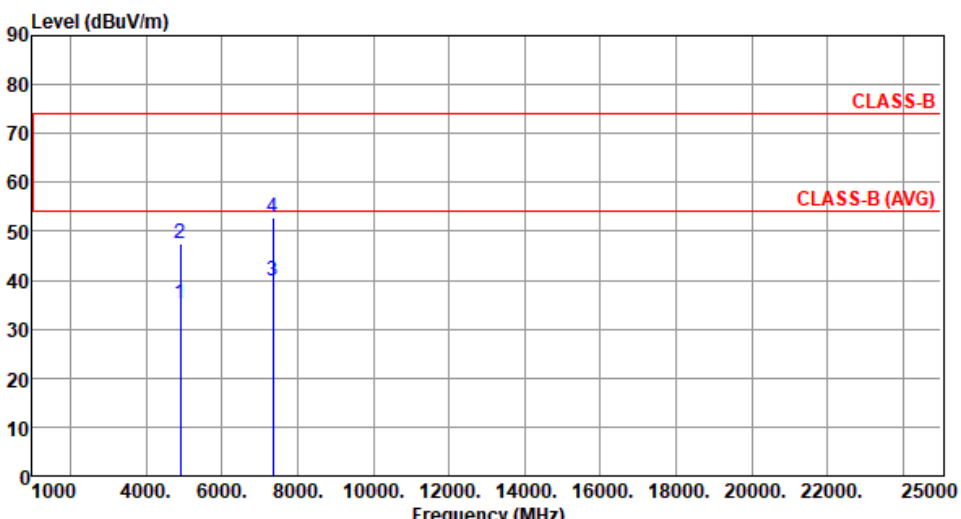
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Test Mode	Mode 2: BT 8DPSK CH78 + 5G 11AX20 CH149									
Polarization	Horizontal									
Test By : Akun Chung			Temperature(°C): 22			Humidity(%): 65				
										
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn	
	MHz	level	dBuV/m	dB	reading	dB/m		High	Table	
		dBuV/m			dBuV			cm	deg	
1	146.40	35.18	43.50	-8.32	44.21	-9.03	Peak	---	---	
2	170.65	34.53	43.50	-8.97	43.80	-9.27	Peak	---	---	
3	183.26	35.65	43.50	-7.85	46.35	-10.70	Peak	---	---	
4	192.96	35.58	43.50	-7.92	47.23	-11.65	Peak	---	---	
5	426.73	35.58	46.00	-10.42	40.53	-4.95	Peak	---	---	
6	482.99	36.59	46.00	-9.41	40.24	-3.65	Peak	---	---	
<p>Note 1: Emission Level (dBUV/m) = SA Reading (dBUV) + Factor* (dB/m) *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>										

Test Mode	Mode 2: BT 8DPSK CH78 + 5G 11AX20 CH149								
Polarization	Vertical								
Test By	:Akun Chung			Temperature(°C)	:22		Humidity(%)	:65	
									
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level	dBuV/m	dB	reading	dB/m		High	Table
		dBuV/m			dBuV			cm	deg
1	35.82	36.85	40.00	-3.15	46.07	-9.22	Peak	---	---
2	314.21	34.87	46.00	-11.13	42.44	-7.57	Peak	---	---
3	404.42	39.44	46.00	-6.56	45.14	-5.70	Peak	---	---
4	424.79	42.10	46.00	-3.90	47.13	-5.03	Peak	---	---
5	471.35	37.85	46.00	-8.15	41.69	-3.84	Peak	---	---
6	483.96	36.70	46.00	-9.30	40.35	-3.65	Peak	---	---

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

Test Mode	Mode 1: BT 8DPSK CH78 + 2.4G 11AX20 CH06									
Polarization	Horizontal									
Test By : Akun Chung			Temperature(°C): 25			Humidity(%): 66				
										
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg	
1	4917.00	35.08	54.00	-18.92	31.56	3.52	Average	100	109	
2	4917.00	47.35	74.00	-26.65	43.83	3.52	Peak	100	109	
3	7354.00	39.93	54.00	-14.07	30.88	9.05	Average	100	101	
4	7354.00	52.74	74.00	-21.26	43.69	9.05	Peak	100	101	
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) Limit (dBuV/m).</p>										

Test Mode	Mode 1: BT 8DPSK CH78 + 2.4G 11AX20 CH06									
Polarization	Vertical									
Test By : Akun Chung			Temperature(°C): 25			Humidity(%): 66				
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn	
	MHz	level	dBuV/m	dB	reading	dB/m		High	Table	
		dBuV/m			dBuV			cm	deg	
1	4917.00	34.27	54.00	-19.73	30.75	3.52	Average	100	29	
2	4917.00	46.16	74.00	-27.84	42.64	3.52	Peak	100	29	
3	7354.00	39.38	54.00	-14.62	30.33	9.05	Average	100	115	
4	7354.00	51.63	74.00	-22.37	42.58	9.05	Peak	100	115	
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) Limit (dBuV/m).</p>										

Test Mode	Mode 1: BT 8DPSK CH78 + 5G 11AX20 CH149									
Polarization	Horizontal									
Test By : Akun Chung			Temperature(°C): 25			Humidity(%): 66				
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn	
	MHz	level	dBuV/m	dB	reading	dB/m		High	Table	
		dBuV/m			dBuV			cm	deg	
1	4960.00	35.30	54.00	-18.70	31.62	3.68	Average	105	313	
2	4960.00	47.28	74.00	-26.72	43.60	3.68	Peak	105	313	
3	8225.00	40.40	54.00	-13.60	30.98	9.42	Average	100	328	
4	8225.00	52.29	74.00	-21.71	42.87	9.42	Peak	100	328	
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m).</p>										

Test Mode	Mode 1: BT 8DPSK CH78 + 5G 11AX20 CH149								
Polarization	Vertical								
Test By	:Akun Chung			Temperature(°C):	25		Humidity(%):	66	
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level	dBuV/m	dB	reading	dB/m		High	Table
		dBuV/m			dBuV			cm	deg
1	4960.00	33.55	54.00	-20.45	29.87	3.68	Average	102	6
2	4960.00	46.55	74.00	-27.45	42.87	3.68	Peak	102	6
3	8225.00	39.78	54.00	-14.22	30.36	9.42	Average	100	15
4	8225.00	52.07	74.00	-21.93	42.65	9.42	Peak	100	15
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) Limit (dBuV/m).</p>									

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

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

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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 333, 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

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