FCC Co-Location Test Report

FCC ID	:	**HDC-17600074**
Equipment	:	**WiFi 7 10G Router**
Model No.	:	**SDG-8733, SDG-8734, SDG-8733v, SDG-8734v** **(Please refer to section 1.1.1 for more details)**
Brand Name	:	**Adtran**
Applicant	:	**Adtran**
Address	:	**901 Explorer Boulevard, Huntsville, Alabama, United States, 35806-2807**
Standard	:	**47 CFR FCC Part 15.247** **47 CFR FCC Part 15.407**
Received Date	:	**May 30, 2024**
Tested Date	:	**Jun. 03 ~ Jun. 17, 2024**

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:**
Along Chen / Assistant Manager	**Gary Chang / Manager**

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Release Record

Report No.	Version	Description	Issued Date
FR431301-01CO	Rev. 01	Initial issue	Oct. 08, 2024

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.247(d) 15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2488.00MHz 53.05 (Margin -0.95dB) - AV	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

This report is issued as a supplementary report to the original project no. FR431301CO. The difference is concerned with following items:

- ✧ Adding two models for configurations with VoIP function
- ✧ Version of I/O board is changed from V02 to V03.

Radiated emission tests had been re-tested and only its data was presented in the following sections.

1.1.1 Product Details (Adding models were marked in boldface.)

The following models are provided to this EUT.

Brand Name	Model Name	Product Name	Description
Adtran	SDG-8733	WiFi 7 10G Router	W/O VOIP, With 10G RJ45 WAN Port
	SDG-8734	WiFi 7 10G Router	W/O VOIP, With 10G SFP WAN Port
	SDG-8733v	**WiFi 7 10G Router**	**W/ VOIP, With 10G RJ45 WAN Port**
	SDG-8734v	**WiFi 7 10G Router**	**W/ VOIP, With 10G SFP WAN Port**

1.1.2 Specification of the Equipment under Test (EUT)

WLAN	
Operating Frequency	802.11b/g/n/ax/be: 2412 MHz ~ 2462 MHz 802.11a/n/ac/ax/be 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz, 5745 MHz ~ 5825 MHz 5955 MHz ~ 7115 MHz
Modulation Type	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n/ac/ax/be: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM / 4096QAM)

The device contains one certified BT module as below information.

BT	
FCC ID	Y82-DA14531MOD
Operating Frequency	2402 MHz ~ 2480 MHz
Modulation Type	GFSK

1.1.3 Antenna Details

Wi-Fi 2.4GHz / 5GHz

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)				
				2400~2483.5	5150~5250	5250~5350	5470~5725	5725 ~ 5850
1	DB1	Dipole	UFL	3.948	5.688	5.607	5.316	4.309
2	DB2	Dipole	UFL	4.92	4.627	4.569	5.03	5.17
3	DB3	Dipole	UFL	3.842	4.597	5.481	6.018	4.796
4	DB4	Dipole	UFL	5.006	6.346	6.51	5.997	5.982
5	SM-DFS	Dipole	UFL	4.092	5.909	5.909	5.159	5.526

Wi-Fi 6GHz

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Gain (dBi)			
				5925~6425	6425~6525	6525~6875	6875~7125
1	6G1	Dipole	UFL	3.633	3.27	5.028	3.521
2	6G2	Dipole	UFL	5.509	4.485	4.791	4.287
3	6G3	Dipole	UFL	2.745	2.99	2.441	2.648
4	6G4	Dipole	UFL	4.363	3.851	3.334	3.701
5	6G5	Dipole	UFL	5.989	4.635	4.055	4.055

BT

Type	Connector	Gain (dBi)
PIFA	--	-0.5

1.1.4 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	15Vdc from adapter

1.2 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Jun. 03 ~ Jun. 17, 2024				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101657	Mar. 05, 2024	Mar. 04, 2025
Spectrum Analyzer	R&S	FSV40	101498	Nov. 23, 2023	Nov. 22, 2024
Loop Antenna	R&S	HFH2-Z2	100330	Oct. 31, 2023	Oct. 30, 2024
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 31, 2023	Jul. 30, 2024
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Nov. 27, 2023	Nov. 26, 2024
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 30, 2023	Oct. 29, 2024
Preamplifier	EMC	EMC02325	980225	Jun. 28, 2023	Jun. 27, 2024
Preamplifier	EMC	EMC118A45SE	980898	Jul. 14, 2023	Jul. 13, 2024
Preamplifier	EMC	EMC184045SE	980903	Jul. 17, 2023	Jul. 16, 2024
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 03, 2023	Oct. 02, 2024
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 03, 2023	Oct. 02, 2024
LF cable 11M	EMC	EMCCFD400-NW-NW-11000	200801	Oct. 03, 2023	Oct. 02, 2024
LF cable 1M	EMC	EMCCFD400-NM-NM-1000	160502	Oct. 03, 2023	Oct. 02, 2024
RF Cable	EMC	EMC104-35M-35M-8000	210920	Oct. 03, 2023	Oct. 02, 2024
RF Cable	EMC	EMC104-35M-35M-3000	210922	Oct. 03, 2023	Oct. 02, 2024
Attenuator	Pasternack	PE7005-10	10-1	Oct. 05, 2023	Oct. 04, 2024
HIGHPASS FILTER 3.1-18G	WHK	WHK3.1/18G-10SS	39	Oct. 05, 2023	Oct. 04, 2024
HIGHPASS FILTER 7.5-18G	STI	STI15-9722	STI-HP7.5G-A	Oct. 05, 2023	Oct. 04, 2024
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
FCC KDB 987594 D02 U-NII 6GHz EMC Measurement 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	±3.41 dB
Unwanted 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.)

- 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	Modulation Mode	Test Configuration
Unwanted Emissions≤ 1GHz	2.4G 11b CH06 + BLE 1M CH39+ 5G 11a CH149 + 6G 11be EHT320 CH95	1, 2
Unwanted Emissions >1GHz		1

NOTE:

1. The selected channel is the maximum power channel of Wi-Fi mode + BT mode.
2. Two adapters (LUCENT TRANS & PHIHONG) had been covered during the pretest and found that PHIHONG adapter was the worst case.
3. 4 configurations were assessed and found Model: SDG-8733v is worst of configurations with 10G RJ45 Wan port and Model: SDG-8734v is worst of configurations with 10G SFP Wan port.
4. The EUT had been tested by following test configurations.
   1) Configuration 1: Model: SDG-8733v
   2) Configuration 2: Model: SDG-8734v

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.

Un-restricted band emissions above 1GHz Limit	
Operating Band	**Limit**
5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.850 GHz	All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).	

Un-restricted band emissions above 1GHz Limit		
Operating Band	**PK Limit**	**AV Limit**
5.925 – 7.125 GHz	e.i.r.p. -7 dBm [88.2 dBuV/m@3m]	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).		

3.1.2 Test Procedures

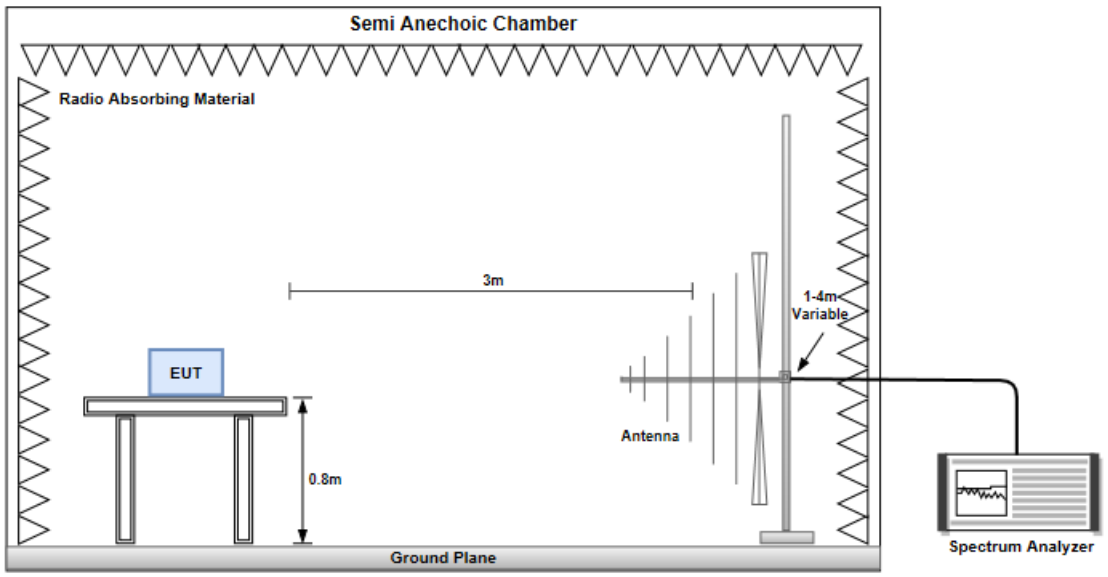
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

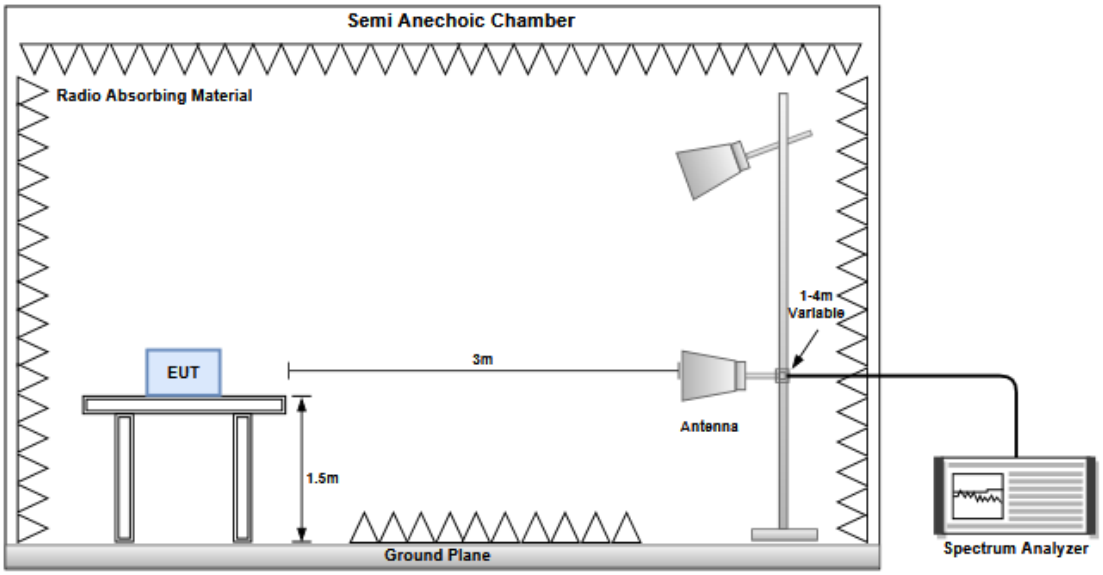
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.1.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



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 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

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

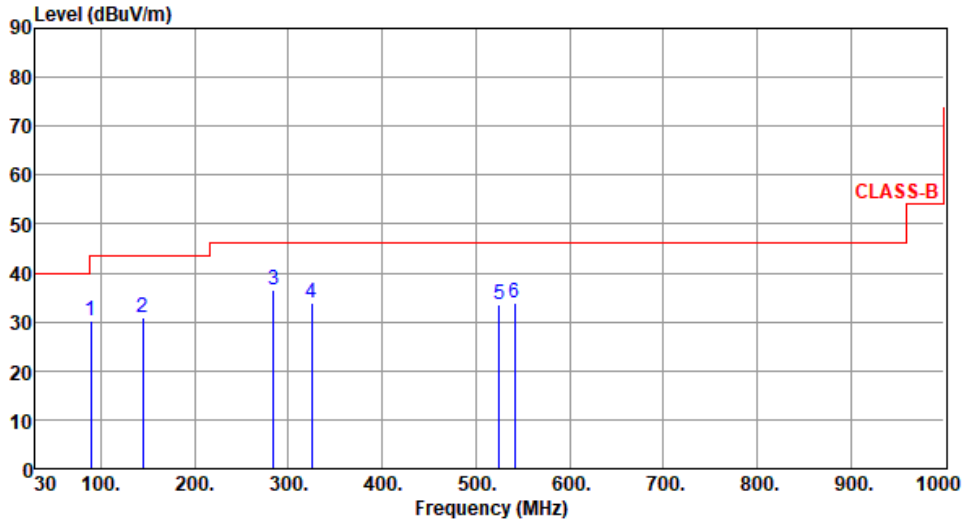
==END==

Unwanted Emissions (Below 1GHz)

Configuration 1: Model: SDG-8733v

Modulation	2.4G 11b CH06 + BLE 1M CH39+ 5G 11a CH149 + 6G 11be EHT320 CH95
Polarization	Horizontal

Test By :Allen Lee Temperature(℃):22 Humidity(%):64

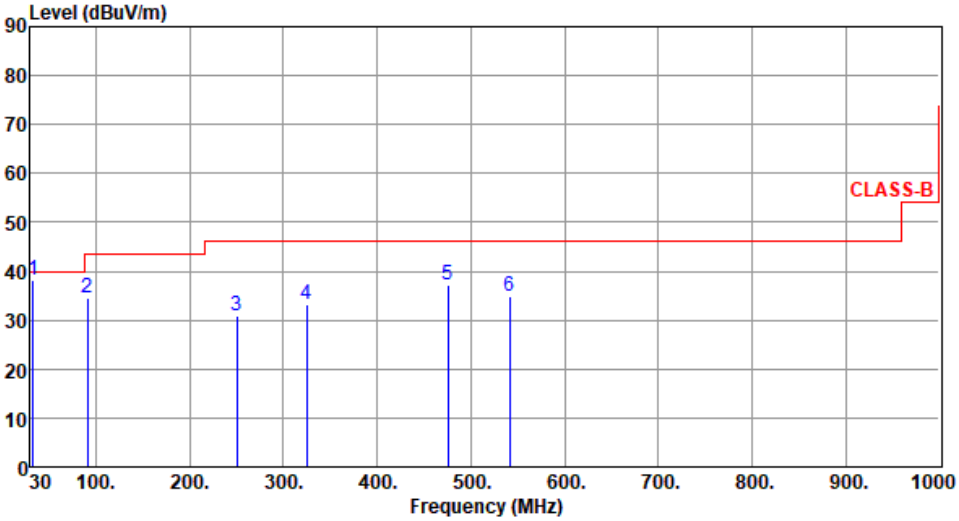


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	89.17	30.06	43.50	-13.44	44.56	-14.50	Peak	---	---
2	144.46	30.94	43.50	-12.56	39.92	-8.98	Peak	---	---
3	284.14	36.41	46.00	-9.59	44.78	-8.37	Peak	---	---
4	324.88	33.93	46.00	-12.07	41.23	-7.30	Peak	---	---
5	524.70	33.69	46.00	-12.31	36.30	-2.61	Peak	---	---
6	541.19	33.94	46.00	-12.06	36.38	-2.44	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + 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.

Modulation	2.4G 11b CH06 + BLE 1M CH39+ 5G 11a CH149 + 6G 11be EHT320 CH95
Polarization	Vertical

Test By :Allen Lee Temperature(℃):22 Humidity(%):64



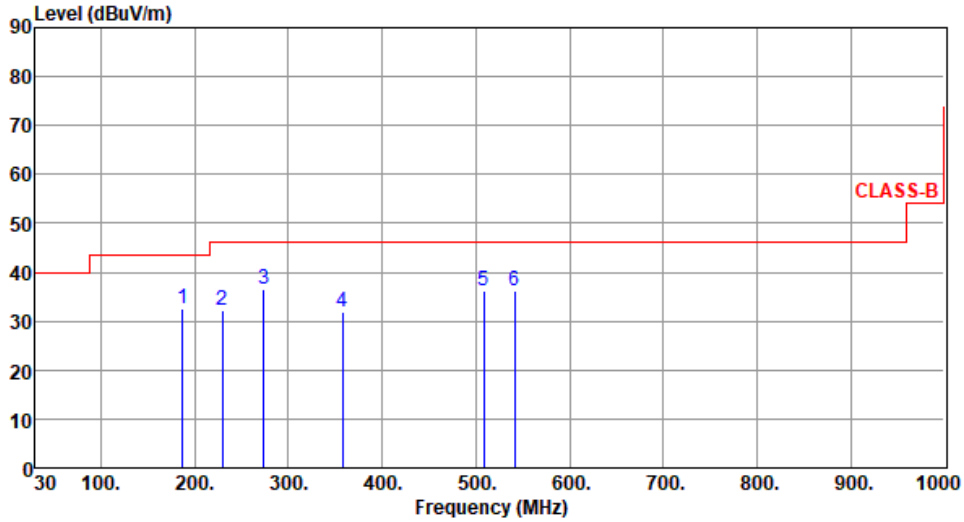
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	33.20	38.09	40.00	-1.91	47.90	-9.81	QP	100	247
2	91.11	34.67	43.50	-8.83	49.09	-14.42	Peak	---	---
3	250.19	30.92	46.00	-15.08	40.87	-9.95	Peak	---	---
4	324.88	33.30	46.00	-12.70	40.60	-7.30	Peak	---	---
5	475.23	37.32	46.00	-8.68	40.90	-3.58	Peak	---	---
6	541.19	34.86	46.00	-11.14	37.30	-2.44	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + 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.

Configuration 2: Model: SDG-8734v

Modulation	2.4G 11b CH06 + BLE 1M CH39+ 5G 11a CH149 + 6G 11be EHT320 CH95
Polarization	Horizontal

Test By :Allen Lee Temperature(℃):22 Humidity(%):64

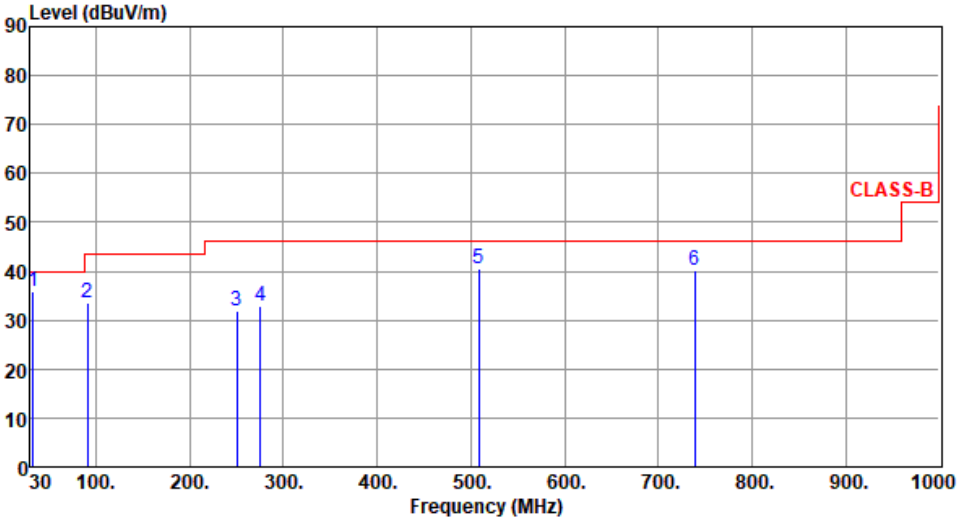


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	187.14	32.45	43.50	-11.05	43.40	-10.95	Peak	---	---
2	229.82	32.33	46.00	-13.67	43.86	-11.53	Peak	---	---
3	273.47	36.61	46.00	-9.39	45.47	-8.86	Peak	---	---
4	357.86	31.91	46.00	-14.09	38.65	-6.74	Peak	---	---
5	508.21	36.19	46.00	-9.81	38.98	-2.79	Peak	---	---
6	541.19	36.35	46.00	-9.65	38.79	-2.44	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + 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.

Modulation	2.4G 11b CH06 + BLE 1M CH39+ 5G 11a CH149 + 6G 11be EHT320 CH95
Polarization	Vertical

Test By :Allen Lee Temperature(℃):22 Humidity(%):64



	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	33.19	35.99	40.00	-4.01	45.80	-9.81	QP	100	155
2	91.11	33.60	43.50	-9.90	48.02	-14.42	Peak	---	---
3	250.19	31.82	46.00	-14.18	41.77	-9.95	Peak	---	---
4	275.41	32.80	46.00	-13.20	41.54	-8.74	Peak	---	---
5	508.21	40.61	46.00	-5.39	43.40	-2.79	Peak	---	---
6	739.07	40.02	46.00	-5.98	38.17	1.85	Peak	---	---

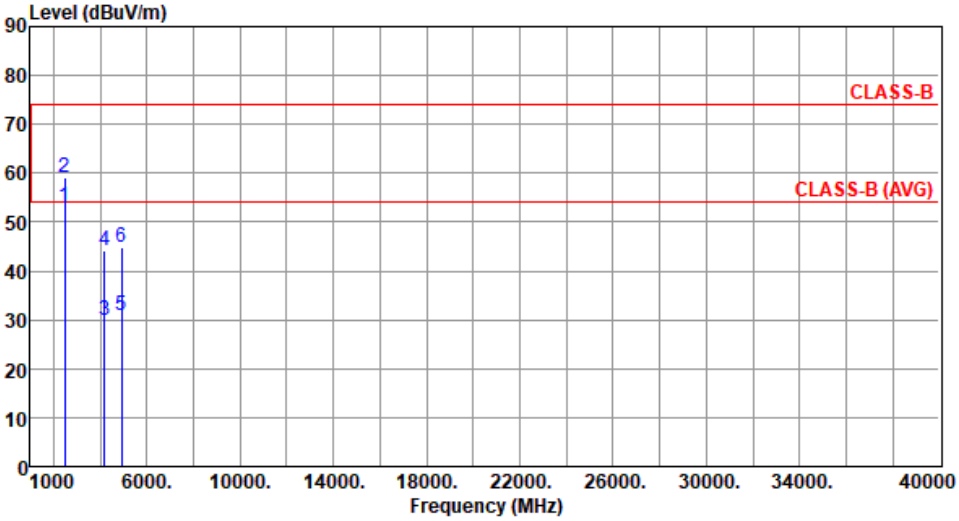
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB/m)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Unwanted Emissions (Above 1GHz)

Configuration 1: Model: SDG-8733v

Modulation	2.4G 11b CH06 + BLE 1M CH39+ 5G 11a CH149 + 6G 11be EHT320 CH95
Polarization	Horizontal

Test By :Sean Yu Temperature(℃):26 Humidity(%):61

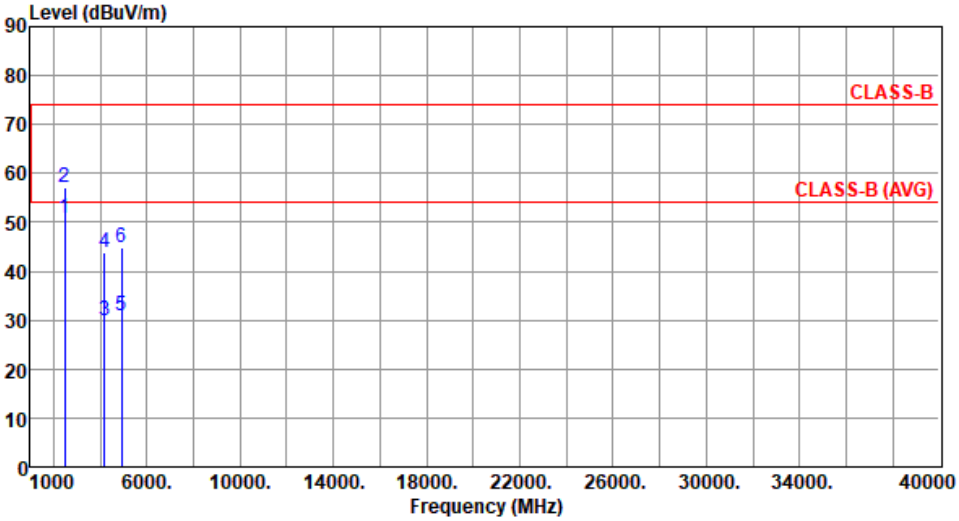


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2488.00	53.05	54.00	-0.95	57.79	-4.74	Average	100	196
2	2488.00	59.07	74.00	-14.93	63.81	-4.74	Peak	100	196
3	4179.00	29.88	54.00	-24.12	31.45	-1.57	Average	100	278
4	4179.00	44.04	74.00	-29.96	45.61	-1.57	Peak	100	278
5	4917.00	31.02	54.00	-22.98	31.49	-0.47	Average	100	117
6	4917.00	44.95	74.00	-29.05	45.42	-0.47	Peak	100	117

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB/m)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	2.4G 11b CH06 + BLE 1M CH39+ 5G 11a CH149 + 6G 11be EHT320 CH95
Polarization	Vertical

Test By :Sean Yu Temperature(℃):26 Humidity(%):61



	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	2488.00	50.67	54.00	-3.33	55.41	-4.74	Average	100	48
2	2488.00	57.15	74.00	-16.85	61.89	-4.74	Peak	100	48
3	4179.00	29.75	54.00	-24.25	31.32	-1.57	Average	100	248
4	4179.00	43.85	74.00	-30.15	45.42	-1.57	Peak	100	248
5	4917.00	31.04	54.00	-22.96	31.51	-0.47	Average	100	220
6	4917.00	44.86	74.00	-29.14	45.33	-0.47	Peak	100	220

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB/m)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).