

EMF TEST REPORT

Test Report No. : OT-22O-RWD-024

Reception No. : 2209003110

Applicant : LG Electronics USA

Address : 111 Sylvan Avenue North Building, Englewood Cliffs, New Jersey, United States

Manufacturer : Hitachi-LG Data Storage Korea, Inc.

Address : (Gasan-dong), 189, Gasandigital1-ro, Geumcheon-gu, Seoul, Korea

Type of Equipment : Network Webcam

FCC ID. : BEJAN-VC22PR

Model Name : AN-VC22PR

Multiple Model Name : HL-GE1

Serial number : N/A

Total page of Report : 19 pages (including this page)

Date of Incoming : August 12, 2022

Date of issue : October 21, 2022

SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART C Section 15.247 and FCC PART 15 SUBPART E Section 15.407**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

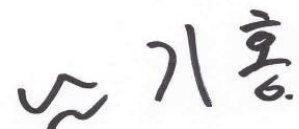
This report is not correlated with the "KS Q ISO/IEC 17025 and KOLAS accreditation" of Korean Laboratory Accreditation Scheme.



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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-22O-RWD-024	October 21, 2022	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : LG Electronics USA
 Address : 111 Sylvan Avenue North Building, Englewood Cliffs, New Jersey, United States
 Contact Person : Sung Soo, Kim / Director, Regulatory and Environmental Affairs
 Telephone No. : 201-266-2215
 FCC ID : BEJAN-VC22PR
 Model Name : AN-VC22PR
 Brand Name : LG
 Serial Number : N/A
 Date : October 21, 2022

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM DSS – PART 15 SPREAD SPECTRUM TRANSMITTER Unlicensed National Information infrastructure (UNII)
E.U.T. DESCRIPTION	Network Webcam
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247 KDB 558074 D01 15.247 Meas Guidance v05r02 FCC PART 15 SUBPART E Section 15.407 789033 D02 General UNII Test Procedures New Rules v02r01
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. GENERAL INFORMATION

2.1 Product Description

The LG Electronics USA, Model AN-VC22PR (referred to as the EUT in this report) is a Network Webcam. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Network Webcam	
OPERATING FREQUENCY	Bluetooth	2 402 MHz ~ 2 480 MHz
	WLAN 2.4 GHz	2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20))
		2 422 MHz ~ 2 452 MHz (802.11n(HT40))
	WLAN 5 150 MHz ~ 5 250 MHz Band	5 180 MHz ~ 5 240 MHz (802.11a/n(HT20)/ac(VHT20))
		5 190 MHz ~ 5 230 MHz (802.11n(HT40)/ac(VHT40))
		5 210 MHz (802.11ac(VHT80))
	WLAN 5 250 MHz ~ 5 350 MHz Band	5 260 MHz ~ 5 320 MHz (802.11a/n(HT20)/ac(VHT20))
		5 270 MHz ~ 5 310 MHz (802.11n(HT40)/ac(VHT40))
		5 290 MHz (802.11ac(VHT80))
	WLAN 5 470 MHz ~ 5 725 MHz Band	5 500 MHz ~ 5 720 MHz (802.11a/n(HT20)/ac(VHT20))
		5 510 MHz ~ 5 710 MHz (802.11n(HT40)/ac(VHT40))
		5 530 MHz ~ 5 690 MHz (802.11ac(VHT80))
	WLAN 5 725 MHz ~ 5 850 MHz Band	5 745 MHz ~ 5 825 MHz (802.11a/n(HT20)/ac(VHT20))
		5 755 MHz ~ 5 795 MHz (802.11n(HT40)/ac(VHT40))
		5 775 MHz (802.11ac(VHT80))
MODULATION TYPE	Bluetooth	GFSK for 1Mbps, $\pi/4$ -DQPSK for 2Mbps, 8-DPSK for 3Mbps
	WLAN 2.4 GHz	802.11b: DSSS Modulation(DBPSK/DQPSK/CCK)
		802.11g/n(HT20)/n(HT40): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)
	WLAN 5 GHz	802.11a/n(HT20)/n(HT40)/ac(VHT80): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)

RF OUTPUT POWER	Bluetooth	1 Mbps		8.01 dBm
		2 Mbps		7.60 dBm
		3 Mbps		7.89 dBm
	WLAN 2.4 GHz	Antenna 1		17.75 dBm(802.11b) 15.27 dBm(802.11g) 14.52 dBm(802.11n_HT20) 14.54 dBm(802.11n_HT40)
		Antenna 2		18.81 dBm(802.11b) 16.59 dBm(802.11g) 15.56 dBm(802.11n_HT20) 16.44 dBm(802.11n_HT40)
		Multiple Transmit	Antenna 1	11.57 dBm(802.11n_HT20) 12.02 dBm(802.11n_HT40)
			Antenna 2	12.90 dBm(802.11n_HT20) 13.22 dBm(802.11n_HT40)
			Antenna 1 + Antenna 2	15.30 dBm(802.11n_HT20) 15.60 dBm(802.11n_HT40)
		Antenna 1		16.73 dBm(802.11a) 16.62 dBm(802.11n_HT20) 15.99 dBm(802.11n_HT40) 14.35 dBm(802.11ac_VHT80)
		Antenna 2		15.77 dBm(802.11a) 15.62 dBm(802.11n_HT20) 15.13 dBm(802.11n_HT40) 12.96 dBm(802.11ac_VHT80)
	WLAN 5 150 MHz ~ 5 250 MHz Band	Multiple Transmit	Antenna 1	13.48 dBm(802.11n_HT20) 13.01 dBm(802.11n_HT40) 11.60 dBm(802.11ac_VHT80)
			Antenna 2	12.61 dBm(802.11n_HT20) 12.07 dBm(802.11n_HT40) 10.25 dBm(802.11ac_VHT80)
			Antenna 1 + Antenna 2	16.08 dBm(802.11n_HT20) 15.58 dBm(802.11n_HT40) 13.99 dBm(802.11ac_VHT80)

RF OUTPUT POWER	WLAN 5 250 MHz ~ 5 350 MHz Band	Antenna 1		17.43 dBm(802.11a) 17.35 dBm(802.11n_HT20) 13.64 dBm(802.11n_HT40) 13.94 dBm(802.11ac_VHT80)
		Antenna 2		16.61 dBm(802.11a) 16.41 dBm(802.11n_HT20) 13.35 dBm(802.11n_HT40) 12.73 dBm(802.11ac_VHT80)
		Multiple Transmit	Antenna 1	14.26 dBm(802.11n_HT20) 13.26 dBm(802.11n_HT40) 11.76 dBm(802.11ac_VHT80)
			Antenna 2	13.65 dBm(802.11n_HT20) 12.93 dBm(802.11n_HT40) 10.67 dBm(802.11ac_VHT80)
			Antenna 1 + Antenna 2	16.93 dBm(802.11n_HT20) 16.11 dBm(802.11n_HT40) 14.26 dBm(802.11ac_VHT80)
	WLAN 5 470 MHz ~ 5 725 MHz Band	Antenna 1		16.54 dBm(802.11a) 16.21 dBm(802.11n_HT20) 15.83 dBm(802.11n_HT40) 14.47 dBm(802.11ac_VHT80)
		Antenna 1_Straddle		15.10 dBm(802.11a) 14.87 dBm(802.11n_HT20) 15.08 dBm(802.11n_HT40) 13.68 dBm(802.11ac_VHT80)
		Antenna 2		15.22 dBm(802.11a) 15.10 dBm(802.11n_HT20) 15.08 dBm(802.11n_HT40) 13.63 dBm(802.11ac_VHT80)
		Antenna 2_Straddle		13.92 dBm(802.11a) 13.62 dBm(802.11n_HT20) 13.67 dBm(802.11n_HT40) 12.03 dBm(802.11ac_VHT80)

RF OUTPUT POWER	WLAN 5 470 MHz ~ 5 725 MHz Band	Multiple Transmit	Antenna 1	13.19 dBm(802.11n_HT20) 12.61 dBm(802.11n_HT40) 11.54 dBm(802.11ac_VHT80)
			Antenna 2	12.27 dBm(802.11n_HT20) 12.00 dBm(802.11n_HT40) 10.54 dBm(802.11ac_VHT80)
			Antenna 1 + Antenna 2	15.76 dBm(802.11n_HT20) 15.33 dBm(802.11n_HT40) 14.08 dBm(802.11ac_VHT80)
		Multiple Transmit _Straddle	Antenna 1	11.69 dBm(802.11n_HT20) 11.65 dBm(802.11n_HT40) 11.09 dBm(802.11ac_VHT80)
			Antenna 2	10.91 dBm(802.11n_HT20) 10.87 dBm(802.11n_HT40) 9.37 dBm(802.11ac_VHT80)
			Antenna 1 + Antenna 2	14.33 dBm(802.11n_HT20) 14.29 dBm(802.11n_HT40) 13.32 dBm(802.11ac_VHT80)
	WLAN 5 725 MHz ~ 5 850 MHz Band	Antenna 1		15.92 dBm(802.11a) 15.56 dBm(802.11n_HT20) 15.00 dBm(802.11n_HT40) 14.39 dBm(802.11ac_VHT80)
		Antenna 1_Straddle		8.87 dBm(802.11a) 9.05 dBm(802.11n_HT20) 4.69 dBm(802.11n_HT40) -0.56 dBm(802.11ac_VHT80)
		Antenna 2		14.31 dBm(802.11a) 14.01 dBm(802.11n_HT20) 13.63 dBm(802.11n_HT40) 13.07 dBm(802.11ac_VHT80)
		Antenna 2_Straddle		7.52 dBm(802.11a) 7.72 dBm(802.11n_HT20) 2.92 dBm(802.11n_HT40) -2.64 dBm(802.11ac_VHT80)

RF OUTPUT POWER	WLAN 5 725 MHz ~ 5 850 MHz Band	Multiple Transmit	Antenna 1	12.57 dBm(802.11n_HT20) 11.97 dBm(802.11n_HT40) 10.44 dBm(802.11ac_VHT80)
			Antenna 2	11.25 dBm(802.11n_HT20) 11.03 dBm(802.11n_HT40) 9.05 dBm(802.11ac_VHT80)
			Antenna 1 + Antenna 2	14.92 dBm(802.11n_HT20) 14.54 dBm(802.11n_HT40) 12.81 dBm(802.11ac_VHT80)
		Multiple Transmit _Straddle	Antenna 1	5.84 dBm(802.11n_HT20) 1.19 dBm(802.11n_HT40) -2.93 dBm(802.11ac_VHT80)
			Antenna 2	4.86 dBm(802.11n_HT20) 0.04 dBm(802.11n_HT40) -5.19 dBm(802.11ac_VHT80)
			Antenna 1 + Antenna 2	8.39 dBm(802.11n_HT20) 3.66 dBm(802.11n_HT40) -0.90 dBm(802.11ac_VHT80)

ANTENNA TYPE	SLOT Antenna		
ANTENNA GAIN	Bluetooth	-0.71 dBi	
	WLAN 2.4 GHz	Antenna 1	-0.71 dBi
		Antenna 2	1.11 dBi
		Multiple Transmit	3.30 dBi
	5 150 MHz ~ 5 250 MHz Band	Antenna 1	2.48 dBi
		Antenna 2	0.71 dBi
		Multiple Transmit	4.69 dBi
	5 250 MHz ~ 5 350 MHz Band	Antenna 1	2.48 dBi
		Antenna 2	0.71 dBi
		Multiple Transmit	4.69 dBi
	5 470 MHz ~ 5 725 MHz Band	Antenna 1	2.78 dBi
		Antenna 2	0.51 dBi
		Multiple Transmit	4.80 dBi
	5 725 MHz ~ 5 850 MHz Band	Antenna 1	2.32 dBi
		Antenna 2	1.02 dBi
		Multiple Transmit	4.73 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)		48 MHz, 27 MHz, 38.4 MHz	

2.2 Alternative type(s)/model(s); also covered by this test report.

-. The following lists consist of the added model and their differences.

Model Name	Differences	Tested
AN-VC22PR	Basic Model	☒
HL-GE1	This model is identical to the basic model except for the model name.	☐

Note: 1. Applicant consigns only basic model to test. Therefore, this test report just guarantees the units, which have been tested.

2. The Applicant/manufacturer is responsible for the compliance of all variants.

3. EUT MODIFICATIONS

-. None

4. MAXIMUM PERMISSIBLE EXPOSURE

4.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are $f/1500$ mW/cm² for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm² for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm² exposure is calculated as follows:

$$E = \sqrt{(30 * P * G) / d}, \text{ and } S = E^2 / Z = E^2 / 377, \text{ because } 1 \text{ mW/cm}^2 = 10 \text{ W/m}^2$$

Where

S = Power density in mW/cm², Z = Impedance of free space, 377 Ω

E = Electric field strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combining equations and rearranging the terms to express the distance as a function of the remaining variable

$$d = \sqrt{(30 * P * G) / (377 * 10 S)}$$

Changing to units of mW and cm, using $P \text{ (mW)} = P \text{ (W)} / 1\,000$, $d \text{ (cm)} = 0.01 * d \text{ (m)}$

$$d = 0.282 * \sqrt{(P * G) / S}$$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm²

4.2 EUT Description

Kind of EUT	Network Webcam
Device Category	☐ Portable (< 20 cm separation) ☐ Mobile (> 20 cm separation) ☒ Others
Exposure Evaluation Applied	☒ MPE ☐ SAR ☐ N/A

4.3 Calculated MPE Safe Distance

4.3.1 Bluetooth

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance (dBm)	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
			(dBm)	(mW)	Log	Linear			
2 402 ~ 2 480	1 Mbps	8.01 ± 1.0	9.01	7.96	-0.71	0.85	0.73	0.001 3	1.00
	2 Mbps	7.60 ± 1.0	8.60	7.24			0.70	0.001 2	1.00
	3 Mbps	7.89 ± 1.0	8.89	7.74			0.72	0.001 3	1.00

According to above table, for 2 402 ~ 2480 MHz Band(1 Mbps), safe distance,

$$D = 0.282 * \sqrt{(7.96 * 0.85)/1.00} = 0.73 \text{ cm.}$$

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 7.96 * 0.85 / (4 * \pi * 20^2) = 0.001 3$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

4.3.2 WLAN

4.3.2.1 DATA for Antenna 1

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance (dBm)	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
			(dBm)	(mW)	Log	Linear			
2 400 ~ 2 483.5	802.11b	17.75 ± 1.0	18.75	74.99	-0.71	0.76	2.25	0.012 7	1
	802.11g	15.27 ± 1.0	16.27	42.36			1.69	0.007 2	1
	802.11n_HT20	14.52 ± 1.0	15.52	35.65			1.55	0.006 0	1
	802.11n_HT40	14.54 ± 1.0	15.54	35.81			1.56	0.006 0	1
5 150 ~ 5 250	802.11a	16.73 ± 1.0	16.62	45.92	2.48	1.77	2.54	0.016 2	1
	802.11n_HT20	16.62 ± 1.0	15.84	38.37			2.32	0.013 5	1
	802.11n_HT40	15.99 ± 1.0	14.51	28.25			1.99	0.009 9	1
	802.11ac80	14.35 ± 1.0	11.45	13.96			1.40	0.004 9	1
5 250 ~ 5 350	802.11a	17.43 ± 1.0	18.43	69.66	2.48	1.77	3.13	0.024 5	1
	802.11n_HT20	17.35 ± 1.0	18.35	68.39			3.10	0.024 1	1
	802.11n_HT40	13.64 ± 1.0	14.64	29.11			2.02	0.010 3	1
	802.11ac80	13.94 ± 1.0	14.94	31.19			2.10	0.011 0	1
5 470 ~ 5 725	802.11a	16.54 ± 1.0	17.54	56.75	2.78	1.90	2.93	0.021 4	1
	802.11n_HT20	16.21 ± 1.0	17.21	52.60			2.82	0.019 8	1
	802.11n_HT40	15.83 ± 1.0	16.83	48.19			2.70	0.018 2	1
	802.11ac80	14.47 ± 1.0	15.47	35.24			2.31	0.013 3	1
5 725 ~ 5 850	802.11a	15.92 ± 1.0	16.92	49.20	2.32	1.71	2.58	0.016 7	1
	802.11n_HT20	15.56 ± 1.0	16.56	45.29			2.48	0.015 4	1
	802.11n_HT40	15.00 ± 1.0	16.00	39.81			2.32	0.013 5	1
	802.11ac80	14.39 ± 1.0	15.39	34.59			2.17	0.011 7	1

According to above table, for 5 250 ~ 5 350 MHz Band(802.11 a), safe distance,

$$D = 0.282 * \sqrt{(69.66 * 1.77/1.00)} = 3.13 \text{ cm.}$$

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 69.66 * 1.77 / (4 * \pi * 20^2) = 0.024 5$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

4.3.2.2 DATA for Antenna 2

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance (dBm)	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
			(dBm)	(mW)	Log	Linear			
2 400 ~ 2 483.5	802.11b	18.81 ± 1.0	19.81	95.72	1.11	1.29	3.14	0.024 6	1
	802.11g	16.59 ± 1.0	17.59	57.41			2.43	0.014 7	1
	802.11n_HT20	15.56 ± 1.0	16.56	45.29			2.16	0.011 6	1
	802.11n_HT40	16.44 ± 1.0	17.44	55.46			2.39	0.014 2	
5 150 ~ 5 250	802.11a	15.77 ± 1.0	15.66	36.81	0.71	1.18	1.86	0.008 6	1
	802.11n_HT20	15.62 ± 1.0	14.84	30.48			1.69	0.007 1	1
	802.11n_HT40	15.13 ± 1.0	13.65	23.17			1.47	0.005 4	1
	802.11ac80	12.96 ± 1.0	10.06	10.14			0.97	0.002 4	1
5 250 ~ 5 350	802.11a	16.61 ± 1.0	17.61	57.68	0.71	1.18	2.32	0.013 5	1
	802.11n_HT20	16.41 ± 1.0	17.41	55.08			2.27	0.012 9	1
	802.11n_HT40	13.35 ± 1.0	14.35	27.23			1.60	0.006 4	1
	802.11ac80	12.73 ± 1.0	13.73	23.60			1.49	0.005 5	1
5 470 ~ 5 725	802.11a	15.22 ± 1.0	16.22	41.88	0.51	1.12	1.94	0.009 4	1
	802.11n_HT20	15.10 ± 1.0	16.10	40.74			1.91	0.009 1	1
	802.11n_HT40	15.08 ± 1.0	16.08	40.55			1.90	0.009 1	1
	802.11ac80	13.63 ± 1.0	14.63	29.04			1.61	0.006 5	1
5 725 ~ 5 850	802.11a	14.31 ± 1.0	15.31	33.96	1.02	1.26	1.85	0.008 5	1
	802.11n_HT20	14.01 ± 1.0	15.01	31.70			1.79	0.008 0	1
	802.11n_HT40	13.63 ± 1.0	14.63	29.04			1.71	0.007 3	1
	802.11ac80	13.07 ± 1.0	14.07	25.53			1.60	0.006 4	1

According to above table, for 2 400 ~ 2 480 MHz Band(802.11 b), safe distance,

$$D = 0.282 * \sqrt{(95.72 * 1.29)/1.00} = 3.14 \text{ cm.}$$

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 95.72 * 1.29 / (4 * \pi * 20^2) = 0.024 6$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

4.3.2.3 DATA for Multiple Transmit

4.3.2.3.1 DATA for Antenna 1

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance (dBm)	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
			(dBm)	(mW)	Log	Linear			
2 400 ~ 2 483.5	802.11n_HT20	11.57 ± 1.0	12.57	18.07	-0.71	0.85	1.10	0.003 1	1
	802.11n_HT40	12.02 ± 1.0	13.02	20.04			1.16	0.003 4	1
5 150 ~ 5 250	802.11n_HT20	13.48 ± 1.0	14.48	28.05	2.48	1.77	1.99	0.009 9	1
	802.11n_HT40	13.01 ± 1.0	14.01	25.18			1.88	0.008 9	1
	802.11ac80	11.60 ± 1.0	12.60	18.20			1.60	0.006 4	1
5 250 ~ 5 350	802.11n_HT20	14.26 ± 1.0	15.26	33.57	2.48	1.77	2.17	0.011 8	1
	802.11n_HT40	13.26 ± 1.0	14.26	26.67			1.94	0.009 4	1
	802.11ac80	11.76 ± 1.0	12.76	18.88			1.63	0.006 6	1
5 470 ~ 5 725	802.11n_HT20	13.19 ± 1.0	14.19	26.24	2.78	1.90	1.99	0.009 9	1
	802.11n_HT40	12.61 ± 1.0	13.61	22.96			1.86	0.008 7	1
	802.11ac80	11.54 ± 1.0	12.54	17.95			1.65	0.006 8	1
5 725 ~ 5 850	802.11n_HT20	12.57 ± 1.0	13.57	22.75	2.32	1.71	1.76	0.007 7	1
	802.11n_HT40	11.97 ± 1.0	12.97	19.82			1.64	0.006 7	1
	802.11ac80	10.44 ± 1.0	11.44	13.93			1.37	0.004 7	1

According to above table, for 5 250 ~ 5 350 MHz Band(802.11 a), safe distance,

$$D = 0.282 * \sqrt{(33.57 * 1.18)/1.00} = 2.17 \text{ cm.}$$

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 33.57 * 1.18 / (4 * \pi * 20^2) = 0.011 8$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

4.3.2.3.2 DATA for Antenna 2

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance (dBm)	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
			(dBm)	(mW)	Log	Linear			
2 400 ~ 2 483.5	802.11n_HT20	12.90 ± 1.0	13.90	24.55	1.11	1.29	1.59	0.006 3	1
	802.11n_HT40	13.22 ± 1.0	14.22	26.42			1.65	0.006 8	1
5 150 ~ 5 250	802.11n_HT20	12.61 ± 1.0	13.61	22.96	0.71	1.18	1.47	0.005 4	1
	802.11n_HT40	12.07 ± 1.0	13.07	20.28			1.38	0.004 8	1
	802.11ac80	10.25 ± 1.0	11.25	13.34			1.12	0.003 1	1
5 250 ~ 5 350	802.11n_HT20	13.65 ± 1.0	14.65	29.17	0.71	1.18	1.65	0.006 8	1
	802.11n_HT40	12.93 ± 1.0	13.93	24.72			1.52	0.005 8	1
	802.11ac80	10.67 ± 1.0	11.67	14.69			1.17	0.003 4	1
5 470 ~ 5 725	802.11n_HT20	12.27 ± 1.0	13.27	21.23	0.51	1.12	1.38	0.004 8	1
	802.11n_HT40	12.00 ± 1.0	13.00	19.95			1.34	0.004 5	1
	802.11ac80	10.54 ± 1.0	11.54	14.26			1.13	0.003 2	1
5 725 ~ 5 850	802.11n_HT20	11.25 ± 1.0	12.25	16.79	1.02	1.26	1.30	0.004 2	1
	802.11n_HT40	11.03 ± 1.0	12.03	15.96			1.27	0.004 0	1
	802.11ac80	9.05 ± 1.0	10.05	10.12			1.01	0.002 5	1

According to above table, for 5 250 ~ 5 350 MHz Band(802.11 a), safe distance,

$$D = 0.282 * \sqrt{(29.17 * 1.18)/1.00} = 1.65 \text{ cm.}$$

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 29.17 * 1.18 / (4 * \pi * 20^2) = 0.006 8$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

4.3.2.3.3 DATA for Antenna 1 + Antenna 2

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance (dBm)	Max tune up power		Power Density (mW/cm ²) @ 20 cm Separation	Sum Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
			(dBm)	(mW)			
2 400 ~ 2 483.5	802.11n_HT20	11.57 ± 1.0	12.57	18.07	0.003 1	0.009 4	1
		12.90 ± 1.0	13.90	24.55	0.006 3		
	802.11n_HT40	12.02 ± 1.0	13.02	20.04	0.003 4	0.010 2	1
		13.22 ± 1.0	14.22	26.42	0.006 8		
5 150 ~ 5 250	802.11n_HT20	13.48 ± 1.0	14.48	28.05	0.009 9	0.015 3	1
		12.61 ± 1.0	13.61	22.96	0.005 4		
	802.11n_HT40	13.01 ± 1.0	14.01	25.18	0.008 9	0.013 6	1
		12.07 ± 1.0	13.07	20.28	0.004 8		
	802.11ac80	11.60 ± 1.0	12.60	18.20	0.006 4	0.009 5	1
		10.25 ± 1.0	11.25	13.34	0.003 1		
5 250 ~ 5 350	802.11n_HT20	14.26 ± 1.0	15.26	33.57	0.011 8	0.018 7	1
		13.65 ± 1.0	14.65	29.17	0.006 8		
	802.11n_HT40	13.26 ± 1.0	14.26	26.67	0.009 4	0.015 2	1
		12.93 ± 1.0	13.93	24.72	0.005 8		
	802.11ac80	11.76 ± 1.0	12.76	18.88	0.006 6	0.010 1	1
		10.67 ± 1.0	11.67	14.69	0.003 4		
5 470 ~ 5 725	802.11n_HT20	13.19 ± 1.0	14.19	26.24	0.009 9	0.014 7	1
		12.27 ± 1.0	13.27	21.23	0.004 8		
	802.11n_HT40	12.61 ± 1.0	13.61	22.96	0.008 7	0.013 1	1
		12.00 ± 1.0	13.00	19.95	0.004 5		
	802.11ac80	11.54 ± 1.0	12.54	17.95	0.006 8	0.010 0	1
		10.54 ± 1.0	11.54	14.26	0.003 2		
5 725 ~ 5 850	802.11n_HT20	12.57 ± 1.0	13.57	22.75	0.007 7	0.011 9	1
		11.25 ± 1.0	12.25	16.79	0.004 2		
	802.11n_HT40	11.97 ± 1.0	12.97	19.82	0.006 7	0.010 7	1
		11.03 ± 1.0	12.03	15.96	0.004 0		
	802.11ac80	10.44 ± 1.0	11.44	13.93	0.004 7	0.007 3	1
		9.05 ± 1.0	10.05	10.12	0.002 5		

$$5\ 250 \sim 5\ 350\ \text{MHz Band}(802.11n_HT20), = (0.011\ 8/1) + (0.006\ 8/1) = 0.018\ 7$$

4.3.3 Intermodulation Transmitt

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance (dBm)	Max tune up power		Power Density (mW/cm ²) @ 20 cm Separation	Sum Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/ cm ²)
			(dBm)	(mW)			
Bluetooth + WLAN 2G	Bluetooth (1 Mbps)	8.01 ± 1.0	9.01	7.96	0.001 3	0.025 9	1.00
	WLAN 2 G (802.11b_Ant 2)	18.81 ± 1.0	19.81	95.72	0.024 6		
Bluetooth + WLAN 5G	Bluetooth (1 Mbps)	8.01 ± 1.0	9.01	7.96	0.001 3	0.014 8	1.00
	WLAN 5 G (UNII 2A 802.11a Ant 2)	16.61 ± 1.0	17.61	57.68	0.013 5		
WLAN 2 G + WLAN 5 G	WLAN 2 G (802.11b_Ant 2)	18.81 ± 1.0	19.81	95.72	0.024 6	0.049 1	1.00
	WLAN 5 G (UNII 2A 802.11a Ant 1)	17.43 ± 1.0	18.43	69.66	0.024 5		