

EMF TEST REPORT

Test Report No. : OT-25N-RWD-025
Reception No. : 2510003429
Applicant : Samsung Electronics Co Ltd
Address : 19 Chapin Rd., Building D, Pine Brook, New Jersey, 07058, United States
Manufacturer : Samsung Electronics Co Ltd
Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do 16677, Korea
Type of Equipment : Wi-Fi/BT Transceiver
FCC ID. : A3LWCH732M
Model Name : WCH732M
Multiple Model Name : N/A
Serial number : N/A
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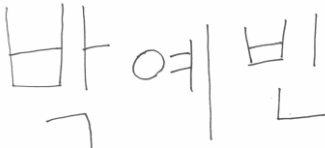
SUMMARY

The equipment complies with the regulation; **CFR §2.1093**

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 test report is not associated with the accreditation granted by the Korean Laboratory Accreditation Scheme (KOLAS).





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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-25N-RWD-025	November 18, 2025	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : Samsung Electronics Co Ltd

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FCC ID : A3LWCH732M

Model Name : WCH732M

Brand Name : 

Serial Number : N/A

Date : November 18, 2025

E.U.T. DESCRIPTION	Modular Transmitter, Wi-Fi/BT Transceiver
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	KDB 447498 D01 General RF Exposure Guidance v06
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
Modifications on the Equipment to Achieve Compliance	None

-. 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 Samsung Electronics Co Ltd, Model WCH732M (referred to as the EUT in this report) is a Wi-Fi/BT Transceiver. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Wi-Fi/BT Transceiver		
Temperature Range	-10 °C ~ 50 °C		
OPERATING FREQUENCY	Bluetooth LE	2 402 MHz ~ 2 480 MHz	
	Bluetooth	2 402 MHz ~ 2 480 MHz	
	WLAN 2.4 GHz	2 412 MHz ~ 2 472 MHz (802.11b/g/n(HT20))	
	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 LE	GFSK for 1 Mbps / 2 Mbps	
	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): 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 LE	1 Mbps	10.44 dBm
		2 Mbps	10.42 dBm
	Bluetooth	1 Mbps	9.52 dBm
		2 Mbps	10.52 dBm
		3 Mbps	10.51 dBm

RF OUTPUT POWER	WLAN 2.4 GHz [MT7668]	Antenna 2	19.99 dBm(802.11b) 17.11 dBm(802.11g) 14.60 dBm(802.11n_HT20)
		Antenna 3	8.98 dBm(802.11b) 14.13 dBm(802.11g) 13.31 dBm(802.11n_HT20)
		Multiple Antenna	17.01 dBm(802.11n_HT20)
	WLAN 2.4 GHz [DA16200]	Antenna 4	18.68 dBm(802.11b) 17.84 dBm(802.11g) 17.68 dBm(802.11n_HT20)
	WLAN 5 150 MHz ~ 5 250 MHz Band	Antenna 2	12.15 dBm(802.11a) 7.23 dBm(802.11ac_VHT20) 7.25 dBm(802.11ac_VHT40) 7.25 dBm(802.11ac_VHT80)
		Antenna 3	11.31 dBm(802.11a) 6.35 dBm(802.11ac_VHT20) 6.28 dBm(802.11ac_VHT40) 6.18 dBm(802.11ac_VHT80)
		Multiple Antenna	9.82 dBm(802.11ac_VHT20) 9.80 dBm(802.11ac_VHT40) 9.76 dBm(802.11ac_VHT80)
	WLAN 5 250 MHz ~ 5 350 MHz Band	Antenna 2	17.64 dBm(802.11a) 16.05 dBm(802.11ac_VHT20) 15.12 dBm(802.11ac_VHT40) 15.16 dBm(802.11ac_VHT80)
		Antenna 3	16.50 dBm(802.11a) 14.74 dBm(802.11ac_VHT20) 13.77 dBm(802.11ac_VHT40) 13.71 dBm(802.11ac_VHT80)
		Multiple Antenna	18.57 dBm(802.11ac_VHT20) 17.51 dBm(802.11ac_VHT40) 17.51 dBm(802.11ac_VHT80)

RF OUTPUT POWER	WLAN 5 470 MHz ~ 5 725 MHz Band	Antenna 2	18.15 dBm(802.11a) 17.19 dBm(802.11ac_VHT20) 16.38 dBm(802.11ac_VHT40) 16.30 dBm(802.11ac_VHT80)
		Antenna 2_Straddle	15.36 dBm(802.11a) 14.50 dBm(802.11ac_VHT20) 13.86 dBm(802.11ac_VHT40) 14.34 dBm(802.11ac_VHT80)
		Antenna 3	16.18 dBm(802.11a) 15.08 dBm(802.11ac_VHT20) 14.28 dBm(802.11ac_VHT40) 14.34 dBm(802.11ac_VHT80)
		Antenna 3_Straddle	13.79 dBm(802.11a) 12.69 dBm(802.11ac_VHT20) 11.94 dBm(802.11ac_VHT40) 12.40 dBm(802.11ac_VHT80)
		Multiple Antenna	19.27 dBm(802.11ac_VHT20) 18.45 dBm(802.11ac_VHT40) 18.44 dBm(802.11ac_VHT80)
		Multiple Antenna _Straddle	16.70 dBm(802.11ac_VHT20) 16.02 dBm(802.11ac_VHT40) 16.49 dBm(802.11ac_VHT80)

RF OUTPUT POWER	WLAN 5 725 MHz ~ 5 850 MHz Band	Antenna 2	17.61 dBm(802.11a) 16.46 dBm(802.11ac_VHT20) 15.79 dBm(802.11ac_VHT40) 15.76 dBm(802.11ac_VHT80)
		Antenna 2_Straddle	7.64 dBm(802.11a) 7.26 dBm(802.11ac_VHT20) 2.01 dBm(802.11ac_VHT40) -0.27 dBm(802.11ac_VHT80)
		Antenna 3	16.11 dBm(802.11a) 15.04 dBm(802.11ac_VHT20) 14.21 dBm(802.11ac_VHT40) 14.26 dBm(802.11ac_VHT80)
		Antenna 3_Straddle	6.16 dBm(802.11a) 5.56 dBm(802.11ac_VHT20) 0.32 dBm(802.11ac_VHT40) -1.81 dBm(802.11ac_VHT80)
		Multiple Antenna	18.82 dBm(802.11ac_VHT20) 18.08 dBm(802.11ac_VHT40) 18.08 dBm(802.11ac_VHT80)
		Multiple Antenna _Straddle	9.50 dBm(802.11ac_VHT20) 4.26 dBm(802.11ac_VHT40) 2.04 dBm(802.11ac_VHT80)

ANTENNA TYPE	PIFA Antenna, Patch Antenna		
ANTENNA TRANSMIT TYPE	WLAN 5 GHz[MT7668]: 2T2R WLAN 2.4 GHz[MT7668]: 2T2R WLAN 2.4 GHz[DA16200]: 1T1R Bluetooth / Bluetooth LE[MT7668]: 1T1R		
ANTENNA GAIN	Bluetooth LE	1.43 dBi	
	Bluetooth	1.43 dBi	
	WLAN 2.4 GHz	Antenna 2	1.65 dBi
		Antenna 3	1.20 dBi
		Multiple Antenna	4.44 dBi
		Antenna 4	1.44 dBi
	5 150 MHz ~ 5 250 MHz Band	Antenna 2	1.52 dBi
		Antenna 3	1.38 dBi
		Multiple Antenna	4.46 dBi
	5 250 MHz ~ 5 350 MHz Band	Antenna 2	1.52 dBi
		Antenna 3	1.44 dBi
		Multiple Antenna	4.49 dBi
	5 470 MHz ~ 5 725 MHz Band	Antenna 2	1.31 dBi
		Antenna 3	1.57 dBi
		Multiple Antenna	4.45 dBi
	5 725 MHz ~ 5 850 MHz Band	Antenna 2	1.21 dBi
		Antenna 3	1.50 dBi
		Multiple Antenna	4.37 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)		40 MHz	

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

-. None

2.3 Antenna Configurations

MT7668

Band	SISO		MIMO
	ANT 2	ANT 3	ANT 2 + ANT 3
802.11 b	O	O	X
802.11 g	O	O	X
802.11 a	O	O	X
802.11 n(HT20/40)	O	O	O
802.11 ac(VHT20/40/80)	O	O	O

Note

- 1) O : Support, X : Not Support
- 2) SISO : Single Input Single Output
- 3) MIMO : Multiple Input Multiple Output

DA16200

Band	SISO
	ANT 4
802.11 b	O
802.11 g	O
802.11 n(HT20)	O

Note

- 1) O : Support, X : Not Support
- 2) SISO : Single Input Single Output

Directional Gain Calculation

According to KDB 662911 D01 Multiple Transmitter Output v02r01 F,2),f),ii)

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

Technology	ANT 2	ANT 3	Directional Gain
	Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)
WLAN 2.4G	1.65	1.20	4.44
WLAN 5G UNII1	1.52	1.38	4.46
WLAN 5G UNII2A	1.52	1.44	4.49
WLAN 5G UNII2C	1.31	1.57	4.45
WLAN 5G UNII3	1.21	1.50	4.37

Note

According to Ansi C63.10-2020 Section 14.6.3, the directional gain is calculated using the formula, where N_{ANT} is the total number of antennas used.

Directional Gain = $10 \cdot \log(((10^{(ANT1 \text{ Gain}/20)} + 10^{(ANT2/20)})^2 / N_{ANT}))$ dBi

Band	SISO		MIMO
	ANT 2	ANT 3	ANT 2 + ANT 3
WLAN 2.4G	O	O	X
WLAN 5G UNII1	O	O	O
WLAN 5G UNII2A	O	O	O
WLAN 5G UNII2C	O	O	O
WLAN 5G UNII3	O	O	O

Sample Calculation:

ANT 1 Gain : 1.65 dBi, ANT 2 Gain : 1.20 dBi

$10 \cdot \log(((10^{(1.65/20)} + 10^{(1.20/20)})^2 / 2)) = 4.44$ dBi

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	Wi-Fi/BT Transceiver
Device Category	☐ Portable (< 20 cm separation) ☐ Mobile (> 20 cm separation) ☒ Others
Exposure Evaluation Applied	☒ MPE ☐ SAR ☐ N/A

4.3 Calculated MPE Safe Distance for WLAN

4.3.1 DATA for Antenna 2 [Module: MT7668]

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	19.99 ± 2.0	21.99	158.12	1.65	1.46	4.29	0.046 0	1
	802.11g	17.11 ± 2.0	19.11	81.47			3.08	0.023 7	1
	802.11n_HT20	14.60 ± 2.0	16.60	45.71			2.31	0.013 3	1
5 150 ~ 5 250	802.11a	12.15 ± 2.0	14.15	26.00	1.52	1.42	1.71	0.007 3	1
	802.11ac20	7.23 ± 2.0	9.23	8.38			0.97	0.002 4	1
	802.11ac40	7.25 ± 2.0	9.25	8.41			0.97	0.002 4	1
	802.11ac80	7.25 ± 2.0	9.25	8.41			0.97	0.002 4	1
5 250 ~ 5 350	802.11a	17.64 ± 2.0	19.64	92.04	1.52	1.42	3.22	0.026 0	1
	802.11ac20	16.05 ± 2.0	18.05	63.83			2.68	0.018 0	1
	802.11ac40	15.12 ± 2.0	17.12	51.52			2.41	0.014 5	1
	802.11ac80	15.16 ± 2.0	17.16	52.00			2.42	0.014 7	1
5 470 ~ 5 725	802.11a	18.15 ± 2.0	20.15	103.51	1.31	1.35	3.34	0.027 8	1
	802.11ac20	17.19 ± 2.0	19.19	82.99			2.99	0.022 3	1
	802.11ac40	16.38 ± 2.0	18.38	68.87			2.72	0.018 5	1
	802.11ac80	16.30 ± 2.0	18.30	67.61			2.70	0.018 2	1
5 725 ~ 5 850	802.11a	17.61 ± 2.0	19.61	91.41	1.21	1.32	3.10	0.024 0	1
	802.11ac20	16.46 ± 2.0	18.46	70.15			2.71	0.018 4	1
	802.11ac40	15.79 ± 2.0	17.79	60.12			2.51	0.015 8	1
	802.11ac80	15.76 ± 2.0	17.76	59.70			2.50	0.015 7	1

According to above table, for 2 400 ~ 2483.5 MHz Band(802.11 b), safe distance,

$$D = 0.282 * \sqrt{(158.12 * 1.46)/1.00} = 4.29 \text{ cm.}$$

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

$$S = P * G / (4\pi * R^2) = 158.12 * 1.46 / (4 * \pi * 20^2) = 0.046 0$$

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 DATA for Antenna 3 [Module: MT7668]

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	8.98 ± 2.0	10.98	12.53	1.20	1.32	1.15	0.003 3	1
	802.11g	14.13 ± 2.0	16.13	41.02			2.07	0.010 8	1
	802.11n_HT20	13.31 ± 2.0	15.31	33.96			1.89	0.008 9	1
5 150 ~ 5 250	802.11a	11.31 ± 2.0	13.31	21.43	1.38	1.37	1.53	0.005 9	1
	802.11ac20	6.35 ± 2.0	8.35	6.84			0.86	0.001 9	1
	802.11ac40	6.28 ± 2.0	8.28	6.73			0.86	0.001 8	1
	802.11ac80	6.18 ± 2.0	8.18	6.58			0.85	0.001 8	1
5 250 ~ 5 350	802.11a	16.50 ± 2.0	18.50	70.79	1.44	1.39	2.80	0.019 6	1
	802.11ac20	14.74 ± 2.0	16.74	47.21			2.29	0.013 1	1
	802.11ac40	13.77 ± 2.0	15.77	37.76			2.05	0.010 5	1
	802.11ac80	13.71 ± 2.0	15.71	37.24			2.03	0.010 3	1
5 470 ~ 5 725	802.11a	16.18 ± 2.0	18.18	65.77	1.57	1.44	2.74	0.018 8	1
	802.11ac20	15.08 ± 2.0	17.08	51.05			2.41	0.014 6	1
	802.11ac40	14.28 ± 2.0	16.28	42.46			2.20	0.012 1	1
	802.11ac80	14.34 ± 2.0	16.34	43.05			2.22	0.012 3	1
5 725 ~ 5 850	802.11a	16.10 ± 2.0	18.10	64.57	1.50	1.41	2.69	0.018 1	1
	802.11ac20	15.04 ± 2.0	17.04	50.58			2.38	0.014 2	1
	802.11ac40	14.21 ± 2.0	16.21	41.78			2.17	0.011 7	1
	802.11ac80	14.26 ± 2.0	16.26	42.27			2.18	0.011 9	1

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

$$D = 0.282 * \sqrt{(70.79 * 1.39)/1.00} = 2.80 \text{ cm.}$$

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

$$S = P * G / (4\pi * R^2) = 70.79 * 1.39 / (4 * \pi * 20^2) = 0.019 6$$

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

4.3.3 DATA for Multiple Transmit [Module: MT7668]

According to above equation, the following result was obtained.

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	17.01 ± 2.0	19.01	79.67	4.44	2.78	4.20	0.044 1	1
5 150 ~ 5 250	802.11ac20	9.82 ± 2.0	11.82	15.21	4.46	2.79	1.84	0.008 5	1
	802.11ac40	9.80 ± 2.0	11.80	15.14			1.83	0.008 4	1
	802.11ac80	9.76 ± 2.0	11.76	14.99			1.82	0.008 3	1
5 250 ~ 5 350	802.11ac20	18.45 ± 2.0	20.45	111.03	4.49	2.81	4.98	0.062 1	1
	802.11ac40	17.51 ± 2.0	19.51	89.28			4.47	0.049 9	1
	802.11ac80	17.51 ± 2.0	19.51	89.24			4.47	0.049 9	1
5 470 ~ 5 725	802.11ac20	19.27 ± 2.0	21.27	134.04	4.45	2.79	5.45	0.074 3	1
	802.11ac40	18.47 ± 2.0	20.47	111.33			4.97	0.061 7	1
	802.11ac80	18.44 ± 2.0	20.44	110.66			4.95	0.061 3	1
5 725 ~ 5 850	802.11ac20	18.82 ± 2.0	20.82	120.73	4.37	2.74	5.12	0.065 7	1
	802.11ac40	18.08 ± 2.0	20.08	101.90			4.71	0.055 5	1
	802.11ac80	18.08 ± 2.0	20.08	101.97			4.71	0.055 5	1

According to above table, for 5 470 ~ 5 725 MHz Band(802.11 ac20), safe distance,

$$D = 0.282 * \sqrt{(134.04 * 2.79)/1.00} = 5.45 \text{ cm.}$$

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

$$S = P * G / (4\pi * R^2) = 134.04 * 2.79 / (4 * \pi * 20^2) = 0.074 3$$

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

4.3.4 DATA for Antenna 4 [Module: DA16200]

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	18.68 ± 2.0	20.68	116.95	1.44	1.39	3.60	0.032 4	1
	802.11g	17.84 ± 2.0	19.84	96.38			3.27	0.026 7	1
	802.11n_HT20	17.68 ± 2.0	19.68	92.90			3.21	0.025 7	1

According to above table, for 2 400 ~ 2483.5 MHz Band(802.11 b), safe distance,

$$D = 0.282 * \sqrt{(116.98 * 1.39)/1.00} = 3.60 \text{ cm.}$$

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

$$S = P * G / (4\pi * R^2) = 116.98 * 1.39 / (4 * \pi * 20^2) = 0.032 4$$

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

4.4 Calculated MPE Safe Distance for Bluetooth LE

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	10.44 ± 2.0	12.44	17.54	1.43	1.39	1.39	0.004 8	1
	2 Mbps	10.42 ± 2.0	12.42	17.46			1.39	0.004 8	1

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

$$D = 0.282 * \sqrt{(17.54 * 1.39)/1.00} = 1.39 \text{ cm.}$$

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

$$S = P * G / (4\pi * R^2) = 17.54 * 1.39 / (4 * \pi * 20^2) = 0.004 8$$

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

4.5 Calculated MPE Safe Distance for 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	9.52 ± 2.0	11.52	14.19	1.43	1.39	1.25	0.003 9	1
	2 Mbps	10.52 ± 2.0	12.52	17.86			1.41	0.004 9	1
	3 Mbps	10.51 ± 2.0	12.51	17.82			1.40	0.004 9	1

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

$$D = 0.282 * \sqrt{(17.86 * 1.39)/1.00} = 1.41 \text{ cm.}$$

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

$$S = P * G / (4\pi * R^2) = 17.86 * 1.39 / (4 * \pi * 20^2) = 0.004 9$$

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

4.6 DATA for Intermodulation Transmit

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 2 G + WLAN 2 G + WLAN 5 G	Bluetooth (1 Mbps)	10.52 ± 2.0	12.52	17.86	0.004 9	0.103 0	1.00
	WLAN 2 G (802.11 b_Ant 2)	19.99 ± 2.0	21.99	158.12	0.046 0		
	WLAN 2 G (802.11 b_Ant4)	18.68 ± 2.0	20.68	116.95	0.032 4		
	WLAN 5 G (UNII2A_802.11 a_ANT3)	16.50 ± 2.0	18.50	70.79	0.019 6		
Bluetooth LE + WLAN 2 G + WLAN 2 G + WLAN 5 G	Bluetooth LE (1 Mbps)	10.44 ± 2.0	12.44	17.54	0.004 8	0.102 9	1.00
	WLAN 2 G (802.11 b_Ant 0)	19.99 ± 2.0	21.99	158.12	0.046 0		
	WLAN 2 G (802.11 b_Ant 4)	18.68 ± 2.0	20.68	116.95	0.032 4		
	WLAN 5 G (UNII2A_802.11 a_ANT3)	16.50 ± 2.0	18.50	70.79	0.019 6		