

# FCC Maximum Permissible RF Exposure (MPE) Estimation Report

In accordance with the requirements of  
FCC 47 CFR Part 2(2.1091), ANSI/IEEE C95.1-1992 and  
KDB 447498 D01

**Product Name:** Formovie Mini Projector Dice

**Trademark:** FORMOVIE

**Model Name:** M055FGN

**Serial Model:** M055\*\*\*\*\*(\*=0-9,A-Z,- or blank, indicates for  
different market purposes)

**Report No.:** S19121200901005

**FCC ID:** 2AO2D-M055FGN

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## TEST RESULT CERTIFICATION

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### Product description

**Product name** ..... : Formovie Mini Projector Dice  
**Trademark** ..... : FORMOVIE  
**Model and/or type reference** : M055FGN  
**Serial Model** ..... : M055\*\*\*\*\*(\*=0-9,A-Z,- or blank, indicates for different market purposes)  
 FCC 47 CFR Part 1(1.1310)  
 FCC 47 CFR Part 2(2.1091)  
**Standards**..... : ANSI/IEEE C95.1-1992  
 KDB 447498 D01

This device described above has been tested by Shenzhen NTEK. Testing has shown that this device is capable of compliance with MPE specified in FCC 47 CFR Part 2(2.1091) and ANSI/IEEE C95.1-1992. The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

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### Date of Test

**Date (s) of performance of tests** ..... : 12 Dec. 2019 ~ 03 Jan, 2020

**Date of Issue**..... : 03 Jan, 2020

**Test Result**..... : **Pass**

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**※ ※ Revision History ※ ※**

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	03 Jan, 2020	Allen Liu

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# 1 General Information

## 1.1 RF Exposure Requirements

### 1.1.1 RF Exposure Limits

**Table - Limits For Maximum Permissible Exposure (MPE)**

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30
f = frequency in MHz * = Plane-wave equivalent power density				

A rough estimation of the expected exposure in power flux density on a given point can be made with the following equation:

$$S = \frac{P_t * G_t}{4 * \pi * R^2}$$

Where:

S = Power density (mW/cm<sup>2</sup>)

P<sub>t</sub> = Conducted output power (dBm)

G<sub>t</sub> = numeric gain of the antenna in the direction of interest relative to an isotropic radiator (dBi)

R = distance to the centre of radiation of the antenna (cm)

EIRP = P<sub>t</sub> \* G<sub>t</sub>

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. Therefore, the S of the device is calculated with R=20cm, and if it is below the limit S, then we can conclude the device complies with the rules.

### 1.1.2 Additional Description

An estimation of MPE in this application for product is used to ensure if it complies to the rules of the standard in the regulation list above.

Maximum permissible exposure (MPE) refers to the RF energy that is acceptable for human exposure. It is broken down into two categories, Occupational/controlled and General population/uncontrolled.

Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

We analysis if it comply with the limits for General population/uncontrolled exposure. The FCC's MPE limits for field strength and power density are given in 47CFR 1.1310(Table below).These limits are generally based on recommended exposure guidelines published by the National Council on Radiation Protection and Measurements (NCRP), and also partly based on guidelines recommended by the American National Standards Institute (ANSI) in Section 4.1 of ANSI/IEEE C95.1.

## 1.2 EUT Description

Device Information	
Product Name	Formovie Mini Projector Dice
Trade Name	FORMOVIE
Model Name	M055FGN
Serial Model	M055*****(*=0-9,A-Z,- or blank, indicates for different market purposes)
FCC ID	2AO2D-M055FGN
Device Phase	Identical Prototype
Exposure Category	General population / Uncontrolled environment
Antenna Type	See Note 1
Antenna Gain	See Note 1
Device Operating Configurations	
Operating Frequency	2412-2462MHz for 802.11b/g/11n(HT20); 2402MHz~2480MHz for BT V4.2(EDR+BR) U-NII-1: 5150 MHz ~5250MHz U-NII-2A: 5250MHz~5350MHz U-NII-2C: 5470MHz~5725MHz U-NII-3: 5725 MHz ~5850 MHz
Smart system	<input checked="" type="checkbox"/> SISO for 802.11a/b/g <input checked="" type="checkbox"/> MIMO for 802.11n/ac <input checked="" type="checkbox"/> SISO for BT V4.2(EDR+BR)
Modulation	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n; OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac; GFSK,π/4-DQPSK, 8-DPSK for BT V4.2(EDR+BR)

### Note 1:

The EUT has two types of antenna.

#### 2.4G/5G

Antenna	Brand	Model Name (P/N)	Antenna Type	Connector	Antenna Gain(dBi)	
					2.4G	5.82
1(main)	N/A	N/A	FPCB	I-PEX	4.64	5.82
2(aux)	N/A	N/A	FPCB	I-PEX	4.57	5.57

For 2.4GHz mode, Antenna 1,2 are transmitting, each with the same directional gain.

For MIMO mode, Directional gain= $[10\log(10G1/20+10G2/20)/2/N_{ANT}]dBi = 7.62$  dBi in 2.4GHz  
802.11n(20/40) 2.4GHz has MIMO mode.

For 5GHz mode, Antenna 1,2 are transmitting, each with the same directional gain.

For MIMO mode, Directional gain= $[10\log(10G1/20+10G2/20)/2/N_{ANT}]dBi = 8.71$  dBi in 5GHz  
the 802.11n(20/40) ac(20/40/80) 5GHz has MIMO mode.

Note: G1 means antenna gain for ANT 1 in dBi.

G2 means antenna gain for ANT 2 in dBi.

$N_{ANT}$  means the number of Antennas.

### 1.3 Test specification(s)

FCC 47 CFR Part 1(1.1310)
FCC 47 CFR Part 2(2.1091)
ANSI/IEEE C95.1-1992
KDB 447498 D01 General RF Exposure Guidance

### 1.4 Ambient Condition

Ambient temperature	20°C – 24°C
Relative Humidity	30% – 70%



## 2 RF Output Power

### 2.1 BT&WIFI Output Power

BT(EDR+BR)

Condition	Mode	Frequency (MHz)	Antenna	Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	Ant 1	6.227	30	Pass
NVNT	1-DH5	2441	Ant 1	6.92	30	Pass
NVNT	1-DH5	2480	Ant 1	5.778	30	Pass
NVNT	2-DH5	2402	Ant 1	6.632	20.97	Pass
NVNT	2-DH5	2441	Ant 1	8.386	20.97	Pass
NVNT	2-DH5	2480	Ant 1	8.187	20.97	Pass
NVNT	3-DH5	2402	Ant 1	7.263	20.97	Pass
NVNT	3-DH5	2441	Ant 1	8.887	20.97	Pass
NVNT	3-DH5	2480	Ant 1	8.716	20.97	Pass

BT(BLE)

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE	2402	Ant 1	3.015	30	Pass
NVNT	BLE	2440	Ant 1	1.831	30	Pass
NVNT	BLE	2480	Ant 1	3.071	30	Pass

2.4G WIFI:

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	802.11b	2412	Ant 1	15.84	-	30	Pass
NVNT	802.11b	2437	Ant 1	16.4	-	30	Pass
NVNT	802.11b	2462	Ant 1	17.07	-	30	Pass
NVNT	802.11b	2412	Ant 2	15.54	-	30	Pass
NVNT	802.11b	2437	Ant 2	16.32	-	30	Pass
NVNT	802.11b	2462	Ant 2	16.52	-	30	Pass
NVNT	802.11g	2412	Ant 1	14.5	-	30	Pass
NVNT	802.11g	2437	Ant 1	15.24	-	30	Pass
NVNT	802.11g	2462	Ant 1	15.42	-	30	Pass
NVNT	802.11g	2412	Ant 2	14.18	-	30	Pass
NVNT	802.11g	2437	Ant 2	14.91	-	30	Pass
NVNT	802.11g	2462	Ant 2	15.09	-	30	Pass
NVNT	802.11n(HT20)	2412	Ant 1	14.49	17.34	28.38	Pass
NVNT	802.11n(HT20)	2412	Ant 2	14.17			
NVNT	802.11n(HT20)	2437	Ant 1	15.04	17.97	28.38	Pass
NVNT	802.11n(HT20)	2437	Ant 2	14.88			
NVNT	802.11n(HT20)	2462	Ant 1	15.33	18.17	28.38	Pass
NVNT	802.11n(HT20)	2462	Ant 2	14.98			

5.2G WIFI:

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	802.11a	5180	Ant 1	12.17	-	24	Pass
NVNT	802.11a	5200	Ant 1	12.66	-	24	Pass
NVNT	802.11a	5240	Ant 1	11.92	-	24	Pass
NVNT	802.11a	5180	Ant 2	11.68	-	24	Pass
NVNT	802.11a	5200	Ant 2	12.15	-	24	Pass
NVNT	802.11a	5240	Ant 2	12.35	-	24	Pass
NVNT	802.11ac20	5180	Ant 1	13.55	15.49	21.29	Pass
NVNT	802.11ac20	5180	Ant 2	11.05			
NVNT	802.11ac20	5200	Ant 1	12.1	14.88	21.29	Pass
NVNT	802.11ac20	5200	Ant 2	11.62			
NVNT	802.11ac20	5240	Ant 1	12.75	15.21	21.29	Pass
NVNT	802.11ac20	5240	Ant 2	11.57			
NVNT	802.11ac40	5190	Ant 1	8.45	11.46	21.29	Pass
NVNT	802.11ac40	5190	Ant 2	8.44			
NVNT	802.11ac40	5230	Ant 1	8.25	11.01	21.29	Pass
NVNT	802.11ac40	5230	Ant 2	7.74			
NVNT	802.11ac80	5210	Ant 1	10.47	13.02	21.29	Pass
NVNT	802.11ac80	5210	Ant 2	9.49			
NVNT	802.11n(HT20)	5180	Ant 1	13.66	15.70	21.29	Pass
NVNT	802.11n(HT20)	5180	Ant 2	11.45			
NVNT	802.11n(HT20)	5200	Ant 1	12.63	15.44	21.29	Pass

NVNT	802.11n(HT20)	5200	Ant 2	12.21			
NVNT	802.11n(HT20)	5240	Ant 1	12.01	15.13	21.29	Pass
NVNT	802.11n(HT20)	5240	Ant 2	12.23			
NVNT	802.11n(HT40)	5190	Ant 1	7.29	11.34	21.29	Pass
NVNT	802.11n(HT40)	5190	Ant 2	9.16			
NVNT	802.11n(HT40)	5230	Ant 1	8.84	12.07	21.29	Pass
NVNT	802.11n(HT40)	5230	Ant 2	9.26			

5.3G WIFI:

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	802.11a	5260	Ant 1	13.62	-	24	Pass
NVNT	802.11a	5280	Ant 1	13.72	-	24	Pass
NVNT	802.11a	5320	Ant 1	12.4	-	24	Pass
NVNT	802.11a	5260	Ant 2	9.24	-	24	Pass
NVNT	802.11a	5280	Ant 2	10.24	-	24	Pass
NVNT	802.11a	5320	Ant 2	10.51	-	24	Pass
NVNT	802.11ac20	5260	Ant 1	12.87	14.28	21.29	Pass
NVNT	802.11ac20	5260	Ant 2	8.7			Pass
NVNT	802.11ac20	5280	Ant 1	12.91	14.88	21.29	Pass
NVNT	802.11ac20	5280	Ant 2	10.5			Pass
NVNT	802.11ac20	5320	Ant 1	11.75	13.97	21.29	Pass
NVNT	802.11ac20	5320	Ant 2	9.99			Pass
NVNT	802.11ac40	5270	Ant 1	10.85	12.99	21.29	Pass
NVNT	802.11ac40	5270	Ant 2	8.88			Pass
NVNT	802.11ac40	5310	Ant 1	10.18	12.78	21.29	Pass
NVNT	802.11ac40	5310	Ant 2	9.32			Pass
NVNT	802.11ac80	5290	Ant 1	8.17	11.46	21.29	Pass
NVNT	802.11ac80	5290	Ant 2	8.71			Pass
NVNT	802.11n(HT20)	5260	Ant 1	13.39	14.77	21.29	Pass
NVNT	802.11n(HT20)	5260	Ant 2	9.12			Pass
NVNT	802.11n(HT20)	5280	Ant 1	13.7	15.60	21.29	Pass
NVNT	802.11n(HT20)	5280	Ant 2	11.09			Pass
NVNT	802.11n(HT20)	5320	Ant 1	12.37	14.57	21.29	Pass
NVNT	802.11n(HT20)	5320	Ant 2	10.56			Pass
NVNT	802.11n(HT40)	5270	Ant 1	10.44	13.11	21.29	Pass
NVNT	802.11n(HT40)	5270	Ant 2	9.74			Pass
NVNT	802.11n(HT40)	5310	Ant 1	9.6	12.81	21.29	Pass
NVNT	802.11n(HT40)	5310	Ant 2	9.99			Pass

5.6G WIFI:

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	802.11a	5500	Ant 1	12.9	-	24	Pass
NVNT	802.11a	5600	Ant 1	13.29	-	24	Pass
NVNT	802.11a	5700	Ant 1	11.75	-	24	Pass
NVNT	802.11a	5500	Ant 2	11.35	-	24	Pass
NVNT	802.11a	5600	Ant 2	11.13	-	24	Pass
NVNT	802.11a	5700	Ant 2	10.46	-	24	Pass
NVNT	802.11ac20	5500	Ant 1	7.76	12.44	21.29	Pass
NVNT	802.11ac20	5500	Ant 2	10.64			Pass
NVNT	802.11ac20	5600	Ant 1	8.62	12.60	21.29	Pass
NVNT	802.11ac20	5600	Ant 2	10.39			Pass
NVNT	802.11ac20	5700	Ant 1	6.89	11.55	21.29	Pass
NVNT	802.11ac20	5700	Ant 2	9.73			Pass
NVNT	802.11ac40	5510	Ant 1	10.08	12.10	21.29	Pass
NVNT	802.11ac40	5510	Ant 2	7.81			Pass
NVNT	802.11ac40	5590	Ant 1	11.87	13.78	21.29	Pass
NVNT	802.11ac40	5590	Ant 2	9.29			Pass
NVNT	802.11ac40	5670	Ant 1	10.18	12.34	21.29	Pass
NVNT	802.11ac40	5670	Ant 2	8.26			Pass
NVNT	802.11ac80	5530	Ant 1	8.28	11.45	21.29	Pass
NVNT	802.11ac80	5530	Ant 2	8.6			Pass
NVNT	802.11ac80	5610	Ant 1	9.78	12.79	21.29	Pass
NVNT	802.11ac80	5610	Ant 2	9.78			Pass
NVNT	802.11n(HT20)	5500	Ant 1	13.67	15.60	21.29	Pass
NVNT	802.11n(HT20)	5500	Ant 2	11.16			Pass
NVNT	802.11n(HT20)	5600	Ant 1	13.13	15.28	21.29	Pass
NVNT	802.11n(HT20)	5600	Ant 2	11.2			Pass
NVNT	802.11n(HT20)	5700	Ant 1	11.74	14.10	21.29	Pass
NVNT	802.11n(HT20)	5700	Ant 2	10.33			Pass
NVNT	802.11n(HT40)	5510	Ant 1	12.02	14.42	21.29	Pass
NVNT	802.11n(HT40)	5510	Ant 2	10.7			Pass
NVNT	802.11n(HT40)	5590	Ant 1	12.85	14.64	21.29	Pass
NVNT	802.11n(HT40)	5590	Ant 2	9.94			Pass
NVNT	802.11n(HT40)	5670	Ant 1	11.53	13.55	21.29	Pass
NVNT	802.11n(HT40)	5670	Ant 2	9.26			Pass

5.8G WIFI

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	802.11a	5745	Ant 1	13.65	-	30	Pass
NVNT	802.11a	5785	Ant 1	13.34	-	30	Pass
NVNT	802.11a	5825	Ant 1	13.28	-	30	Pass
NVNT	802.11a	5745	Ant 2	13.3	-	30	Pass
NVNT	802.11a	5785	Ant 2	11.79	-	30	Pass
NVNT	802.11a	5825	Ant 2	13.57	-	30	Pass
NVNT	802.11ac20	5745	Ant 1	13.1	16.01	27.29	Pass
NVNT	802.11ac20	5745	Ant 2	12.89			Pass
NVNT	802.11ac20	5785	Ant 1	12.52	14.91	27.29	Pass
NVNT	802.11ac20	5785	Ant 2	11.18			Pass
NVNT	802.11ac20	5825	Ant 1	12.61	15.83	27.29	Pass
NVNT	802.11ac20	5825	Ant 2	13.02			Pass
NVNT	802.11ac40	5755	Ant 1	12.72	15.51	27.29	Pass
NVNT	802.11ac40	5755	Ant 2	12.26			Pass
NVNT	802.11ac40	5795	Ant 1	12.44	15.05	27.29	Pass
NVNT	802.11ac40	5795	Ant 2	11.59			Pass
NVNT	802.11ac80	5775	Ant 1	12.43	14.97	27.29	Pass
NVNT	802.11ac80	5775	Ant 2	11.44			Pass
NVNT	802.11n(HT20)	5745	Ant 1	13.82	16.53	27.29	Pass
NVNT	802.11n(HT20)	5745	Ant 2	13.2			Pass
NVNT	802.11n(HT20)	5785	Ant 1	13.12	15.42	27.29	Pass
NVNT	802.11n(HT20)	5785	Ant 2	11.55			Pass
NVNT	802.11n(HT20)	5825	Ant 1	13.42	16.47	27.29	Pass
NVNT	802.11n(HT20)	5825	Ant 2	13.49			Pass
NVNT	802.11n(HT40)	5755	Ant 1	13.83	16.46	27.29	Pass
NVNT	802.11n(HT40)	5755	Ant 2	13.03			Pass
NVNT	802.11n(HT40)	5795	Ant 1	13.34	15.93	27.29	Pass
NVNT	802.11n(HT40)	5795	Ant 2	12.46			Pass

### 3 RF Exposure Evaluation

#### 3.1 Operation in BT(EDR+BR) FOR SISO MODE

ANT 1:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
9	3.17	12.17	16.48	20	0.003219	1.000	Pass

#### 3.2 Operation in BT(BLE) FOR SISO MODE

ANT 1:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
4	3.17	7.17	5.21	20	0.001037	1.000	Pass

#### 3.3 Operation in WLAN 2.4G FOR SISO MODE

ANT 1:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
18	4.64	22.64	183.65	20	0.036536	1.000	Pass

ANT 2:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
17	4.57	21.57	143.55	20	0.028557	1.000	Pass

#### 3.4 Operation in WLAN 5.2G FOR SISO MODE

ANT 1:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
14	5.82	19.82	95.94	20	0.019086	1.000	Pass

ANT 2:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
13	5.57	18.57	71.94	20	0.014313	1.000	Pass

#### 3.5 Operation in WLAN 5.3G FOR SISO MODE

ANT 1:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
16	5.82	21.82	152.05	20	0.030250	1.000	Pass

ANT 2:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
16	5.57	21.57	143.55	20	0.028557	1.000	Pass

### 3.6 Operation in WLAN 5.6G FOR SISO MODE

ANT 1:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
16	5.82	21.82	152.05	20	0.030250	1.000	Pass

ANT 2:

Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
16	5.57	21.57	143.55	20	0.028557	1.000	Pass

### 3.7 Operation in WLAN 5.8G FOR SISO MODE

ANT 1:

Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
17	5.82	22.82	191.43	20	0.038082	1.000	Pass

ANT 2:

Tune-up limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
17	5.57	22.57	180.72	20	0.035952	1.000	Pass

## 4 Exposure calculations for multiple sources

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE in accordance with the provisions of Table (A) and Table (B). To comply with the MPE, the fraction of the MPE in terms of E<sup>2</sup>, H<sup>2</sup> (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity.

In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i}$$

The product also has multiple transmitters The Simultaneous Transmission Possibilities are as below:

Simultaneous Tx Combination	Configuration
1	WLAN 2.4G MIMO
2	WLAN 5.2G MIMO
3	WLAN 5.3G MIMO
4	WLAN 5.6G MIMO
5	WLAN 5.8G MIMO
6	WLAN 5.2G+BT(EDR+BR)
7	WLAN 5.3G+BT(EDR+BR)
8	WLAN 5.6G+BT(EDR+BR)
9	WLAN 5.8G+BT(EDR+BR)
10	WLAN 5.2G+BT(BLE)
11	WLAN 5.3G+BT(BLE)
12	WLAN 5.6G+BT(BLE)
13	WLAN 5.8G+BT(BLE)



#### 4.1 Estimation for WLAN MIMO 2.4G

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
1	18	4.64	22.64	183.65	20	0.036536	0.065093	1.000	Pass
2	17	4.57	21.57	143.55		0.028557			

#### 4.2 Estimation for WLAN MIMO 5.2G

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
1	14	5.82	19.82	95.94	20	0.019086	0.033399	1.000	Pass
2	13	5.57	18.57	71.94		0.014313			

#### 4.3 Estimation for WLAN MIMO 5.3G

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
1	16	5.82	21.82	152.05	20	0.030250	0.058807	1.000	Pass
2	16	5.57	21.57	143.55		0.028557			

#### 4.4 Estimation for WLAN MIMO 5.6G

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
1	16	5.82	21.82	152.05	20	0.030250	0.058807	1.000	Pass
2	16	5.57	21.57	143.55		0.028557			

#### 4.5 Estimation for WLAN MIMO 5.8G

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
1	17	5.82	22.82	191.43	20	0.038082	0.074034	1.000	Pass
2	17	5.57	22.57	180.72		0.035952			

**4.6 Estimation for WLAN 5.2G+BT(EDR+BR)**

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
2	14	5.82	19.82	95.94	20	0.019086	0.22305	1.000	Pass
1	9	3.17	12.17	16.48		0.003219			

**4.7 Estimation for WLAN 5.3G+BT(EDR+BR)**

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
2	16	5.82	21.82	152.05	20	0.030250	0.033469	1.000	Pass
1	9	3.17	12.17	16.48		0.003219			

**4.8 Estimation for WLAN 5.6G+BT(EDR+BR)**

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
2	16	5.82	21.82	152.05	20	0.030250	0.033469	1.000	Pass
1	9	3.17	12.17	16.48		0.003219			

**4.9 Estimation for WLAN 5.8G+BT(EDR+BR)**

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
2	17	5.82	22.82	191.43	20	0.038082	0.041301	1.000	Pass
1	9	3.17	12.17	16.48		0.003219			

**4.10 Estimation for WLAN 5.2G+BT(BLE)**

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
2	14	5.82	19.82	95.94	20	0.019086	0.020123	1.000	Pass
1	4	3.17	7.17	5.21		0.001037			

**4.11 Estimation for WLAN 5.3G+BT(BLE)**

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
2	16	5.82	21.82	152.05	20	0.030250	0.031287	1.000	Pass
1	4	3.17	7.17	5.21		0.001037			

**4.12 Estimation for WLAN 5.6G+BT(BLE)**

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
2	16	5.82	21.82	152.05	20	0.030250	0.031287	1.000	Pass
1	4	3.17	7.17	5.21		0.001037			

**4.13 Estimation for WLAN 5.8G+BT(BLE)**

ANT	Max Tune-up (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm <sup>2</sup> )	Total S (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Conclusion
2	17	5.82	22.82	191.43	20	0.038082	0.040156	1.000	Pass
1	4	3.17	7.17	5.21		0.001037			

According to the Table above, we can conclude that the calculation results of all simultaneous transmission possibilities are less than 1, so it is into compliance.

Therefore the product also meets the requirements under multiple sources condition.

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