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FCC ID: 2AAAS-CM01
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Rev.: 02

RF Exposure Evaluation Report

FCC 47 CFR § 2.1091

for

Ping Indoor Camera

Model Name.: CM01

Prepared for:

Vivint, Inc.

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Prepared by

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Issue Date: October 12, 2022

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Revision History

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
|------|------------------|---------------------------------|-------------|--------------|
| 00 | July 21, 2021 | Initial Issue | ALL | Allison Chen |
| 01 | August 18, 2021 | See the following note Rev.(01) | ALL | Allison Chen |
| 02 | October 12, 2022 | See the following note Rev.(02) | ALL | Doris Chu |

Note:

Rev.(01)

1. Applicant adds 2nd source DC/DC Regulator of EUT, please refer to the following table:

| Type | Vendor | Part number |
|-----------------|---------|-------------|
| DC/DC Regulator | Silergy | SY8030LDEC |

| DC/DC Regulator |
|---|
| Main Board 2CS6022M..A1G: U3 |
| Codec board 2CS6022C..A1G: U5 U6 U8 U10 |
| Sensor Board 1VIP5MST.B1G: U2 |

2. After verified radiated emission below 1GHz and conduction test data, the worst case is still original test data and power no change.
3. Other information, please refer to T210429W04 and this test report.

Rev.(02)

1. Applicant adds two Power IC PWM, please refer to the following table:


| Type | Vendor | Model |
|--------------|--------|--------------|
| Power IC PWM | TI | TPS62140RGTR |
| Power IC PWM | TI | TPS62150RGTR |

2. Base to FCC ID:2AAAS-CM01, date of grant:07/27/2021, after verified, only retest radiated emission below 1GHz and conduction, Since the verification result is worse than the original, C2PC is performed. Other test items are identical with the original report.
3. Other information, please refer to T210728W02 and this test report.

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1 Attestation of Test Results

| | |
|--|---|
| Applicant Name | Vivint, Inc. |
| Model Name | CM01 |
| Applicable Standards | FCC 47 CFR § 2.1091 KDB 447498 D04 FCC 47 CFR § 1.1307 FCC 47 CFR § 1.1310 Published RF exposure KDB procedures |
| Receive EUT Date: | August 26, 2022 |
| <p>Compliance Certification Services Inc. , tested the above equipment in accordance with the requirements set forth in the above standards. Determination of compliance is based on the results of the compliance measurement,not taking into account measurement instrumentation uncertainty.All indications of Pass/Fail in this report are opinions expressed by Compliance Certification Services Inc, based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> | |
| <p>Approved & Released By:</p>  | |
| <p>Sky Zhou Asst. Section Manager Compliance Certification Services Inc.</p> | |

2 Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1091, the following FCC Published RF exposure [KDB](#) procedures:

- 447498 D04 Interim General RF Exposure Guidance v01
- 865664 D02 RF Exposure Reporting v01r02

3 Device Under Test (DUT) Information

3.1 DUT Description

| | |
|-------------------|---------------------|
| Product | Ping Indoor Camera |
| Trade Name | Vivint |
| Model No. | CM01 |
| Model Discrepancy | N/A |
| Sample Stage | Identical prototype |

3.2 Wireless Technologies

| | | | | | | | | | | | | | | | | | | |
|--------------------------------|---|--------------|--|--------|--|--|--------------------|-----------|--------------|--------------------|-----------|-------------|--------------------------|-----------|-------------|--------------------------|-----------|-------------|
| Frequency bands | <input checked="" type="checkbox"/> 802.11b/g/n HT20: 2412 MHz ~ 2462 MHz <input checked="" type="checkbox"/> 802.11n HT40: 2422 MHz ~ 2452MHz <input type="checkbox"/> Others | | | | | | | | | | | | | | | | | |
| Exposure classification | <input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²) | | | | | | | | | | | | | | | | | |
| Antenna Specification | FPC Antenna x 1, Antenna 1(Chain 0) PIFA Antenna x 1, Antenna 2(Chain 1) Antenna 1(Chain 0), Antenna Gain: 2.61dBi Antenna 2(Chain 1), Antenna Gain: 2.46dBi Direction Gain: 5.55dBi WIFI 2.4GHz Direction Gain : 5.55 dBi (Numeric gain: 3.59) Worst | | | | | | | | | | | | | | | | | |
| Maximum tune up power | <table border="1"> <tr> <td>2.4GHz</td> <td></td> <td></td> </tr> <tr> <td>IEEE 802.11b Mode:</td> <td>22.00 dBm</td> <td>(158.489 mW)</td> </tr> <tr> <td>IEEE 802.11g Mode:</td> <td>18.50 dBm</td> <td>(70.795 mW)</td> </tr> <tr> <td>IEEE 802.11n HT 20 Mode:</td> <td>17.50 dBm</td> <td>(56.234 mW)</td> </tr> <tr> <td>IEEE 802.11n HT 40 Mode:</td> <td>17.50 dBm</td> <td>(56.234 mW)</td> </tr> </table> | | | 2.4GHz | | | IEEE 802.11b Mode: | 22.00 dBm | (158.489 mW) | IEEE 802.11g Mode: | 18.50 dBm | (70.795 mW) | IEEE 802.11n HT 20 Mode: | 17.50 dBm | (56.234 mW) | IEEE 802.11n HT 40 Mode: | 17.50 dBm | (56.234 mW) |
| 2.4GHz | | | | | | | | | | | | | | | | | | |
| IEEE 802.11b Mode: | 22.00 dBm | (158.489 mW) | | | | | | | | | | | | | | | | |
| IEEE 802.11g Mode: | 18.50 dBm | (70.795 mW) | | | | | | | | | | | | | | | | |
| IEEE 802.11n HT 20 Mode: | 17.50 dBm | (56.234 mW) | | | | | | | | | | | | | | | | |
| IEEE 802.11n HT 40 Mode: | 17.50 dBm | (56.234 mW) | | | | | | | | | | | | | | | | |

Notes:

- For more details, please refer to the User's manual of the EUT.
- Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
- The tune up power referred the AVG power of the test report T210728W02-RP for RF Exposure assessment purpose.

4 Maximum Permissible Exposure

4.1 Limits for Maximum Permissible Exposure (MPE)

Table 1 - Limits for Maximum Permissible Exposure (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm ²) | 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 ² | 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 ² | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1,500 | | | f/1500 | 30 |
| 1,500-100,000 | | | 1.0 | 30 |

4.2 MPE Calculation Method

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \text{ Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

If, Substituting the MPE safe distance using d = 20 cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Calculation(continued)

Given $R = R_3 + 40 \log(3 / 0.2)$ or $R = R_3 + 40 \log(3 / 0.15)$ ↵

$$E = 10^{((R-12)/20)} \text{↵}$$

Where E = E field Strength↵

R₃ = Result Power on 3m↵

R = Result Power on 0.2m or 0.15m↵

4.3 MPE EXEMPTION

- (A) The available maximum time-averaged power is no more than 1 mW
- (B) The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}}(d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

- (C) Using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

| Single RF Sources Subject to Routine Environmental Evaluation | |
|---|--|
| RF Source frequency (MHz) | Threshold ERP (watts) |
| 0.3-1.34 | 1,920 R ² . |
| 1.34-30 | 3,450 R ² /f ² . |
| 30-300 | 3.83 R ² . |
| 300-1,500 | 0.0128 R ² f. |
| 1,500-100,000 | 19.2R ² . |

Note: R is in meters, f is in MHz.

4.4 Multiple RF sources

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation),

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

5 MPE Exemption Option B

WIFI 2.4GHz

| Mode | Frequency (MHz) | R(m) | Max Tune-up EIRP(dBm) | Max Tune-up ERP(dBm) | Max Tune-up ERP(mW) | ERP Threshold(mW) | MPE Exemption |
|--------------------|-----------------|------|-----------------------|----------------------|---------------------|-------------------|---------------|
| IEEE 802.11b | 2462.00 | 0.2 | 27.55 | 25.40 | 346.737 | 3060 | Complies |
| IEEE 802.11g | 2462.00 | 0.2 | 24.05 | 21.90 | 154.882 | 3060 | Complies |
| IEEE 802.11n HT 20 | 2462.00 | 0.2 | 23.05 | 20.90 | 123.027 | 3060 | Complies |
| IEEE 802.11n HT 40 | 2452.00 | 0.2 | 23.05 | 20.90 | 123.027 | 3060 | Complies |



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6 Facilities

All measurement facilities used to collect the measurement data are located at

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)

END OF REPORT