MPE/RF EXPOSURE REPORT

FCC CFR 47 Part 1.1310

Report No.: LYFT21-U10 MPE FCC Rev A

Company: Lyft, Inc

Model Name: BIT042N

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To: FCC CFR 47 Part 1.1310

Report Serial No.: LYFT21-U10 FCC MPE Rev A

This report supersedes: NONE

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1. MAXIMUM PERMISSABLE EXPOSURE

Calculations for Maximum Permissible Exposure Levels
Power Density = Pd (mW/cm^2) = EIRP/(4*π*d^2)
EIRP = P * G
P = Peak output power (mW)
G = Antenna numeric gain (numeric)
d = Separation distance (cm)
Numeric Gain = 10 ^ (G (dBi)/10)

FCC CFR 47 Part 1.1310 Power Density Limits for General Population/Uncontrolled Exposure:

1.34-30	Power Density = (180/f^2)
300-1,500 MHz;	Power Density = f/1500 mW/cm^2
1,500-100,000 MHz;	Power Density = 1.0 mW/cm^2

Reference reports.
The Lyft BIT042N product contains 3 pre-certified Radio modules. The following MPE assessment reports were referenced in performing this assessment of MPE Exposure

LTE Module EC21-A MINIPCIE; Tested by TA Technology Co., Ltd Shanghai; Report numbers:

R1805A0226-R1V3
R1805A0226-R2V3
R1805A0226-R3V2

Wi-Fi Module ESP32-S2-MINI-1; Tested by TA Technology Co., Ltd Shanghai; Report number R2009A0623-R1V2.

The BLE Module used in this equipment was previously tested in MiCOM Labs Report # LYFT06-U5 Rev A, Date 20th April 2021.

The calculations in the table below use the highest measured conducted power values together with the antenna gain specified for the EUT.

Specification - Maximum Permissible Exposure Limits.
The Limit is defined in Table 1 of FCC §1.1310.

Freq. Band (MHz)	Ant Gain (dBi)	Numeric Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Calculated Power Density (mW/cm^2) @ 20cm	Power Density Limit (mW/cm^2)	Min Calculated safe distance for Limit (cm)
LTE 707.5 MHz	2.98	1.99	23.14	206.06	0.0814	0.472	8.307
2.4 DTS	3.92	2.47	18.55	71.61	0.0351	1.0	3.749
2.4 BLE	2.5	1.78	6.87	4.86	0.0017	1.0	0.830
NFC	0.0	1.0	26.0	398.11	0.0410	0.98	5.689

Worst Case Simultaneous Operation

These calculations represent worst case in terms of the exposure levels and assume all radio transmitters i.e. LTE Cellular, 2.4GHz Wi-Fi; BLE, NFC radios are operating simultaneously.

Freq. Band (MHz)	Ant Gain (dBi)	Numeric Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Calculated Safe Distance for Summation (cm)	Power Density Limit (mW/cm^2) @ 20cm Pd_{Limit}	Calculated Power Density (mW/cm^2) Pd_{Calc}	Pd_{Calc}/ Pd_{Limit}
2.4 BLE	2.50	1.78	6.87	4.86	0.830	1.00	0.002	0.0017
2.4 DTS	3.92	2.47	18.55	71.61	3.749	1.00	0.035	0.0351
NFC	0.00	1.00	26.00	398.11	5.689	0.98	0.079	0.0809
LTE 779.50	2.98	1.99	23.14	206.06	8.307	0.47	0.081	0.1725
						Summation Pd_{Calc}/ Pd_{Limit} @ 20 cm distance:		**0.2903**

Evaluation for compliance of simultaneous transmission where the power density limits are different is performed by the summation of ratios;

Calculated Power Density/Power Density Limit

$Pd_{Calc1}/Pd_{Limit1} + Pd_{Calc2}/Pd_{Limit2} + Pd_{Calc3}/Pd_{Limit3}$ + etc. < 1.

SUMMARY; Minimum safe distance to meet the RF exposure requirements = 20cm

Note: for mobile or fixed location transmitters the minimum separation distance is 20cm, even if calculations indicate the MPE distance to be less.

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