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Electromagnetic Compatibility
MPE Calculation

For the

Openpath Security Inc.
Model Smart Reader & Mullion Smart Reader

MET Report: EMCS101883-MPE HF

May 20, 2019

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Electromagnetic Compatibility Criteria for Intentional Radiators

RF Exposure

Purpose: Co-location of two modules, Taiyo Yuden Model EYSGJN (FCC ID: RYYEYSGJN) and Rigado BMD-340 (FCC ID: 2AA9B10).

RF Exposure Requirements: **§1.1307(b)(1) and §1.1307(b)(2):** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

RF Radiation Exposure Limit: **§1.1310:** As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

Limits for General Population/Uncontrolled Exposure				
Frequency range (MHz)	**Electric field strength (V/m)**	**Magnetic field strength (A/m)**	**Power density (mW/cm^2)**	**Averaging time (minutes)**
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

Limits for Maximum Permissible Exposure (MPE)

Individual Modules

Taiyo Yuden Model EYSGJN	2402-2480 MHz
Rigado BMD-340	2402-2480 MHz
Mullion Smart Reader HF	13.56MHz

Co-Located Modules

Module 1	Module 2	Module 3
Taiyo Yuden Model EYSGJN	Rigado BMD-340	Mullion Smart Reader

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0
MPE ratio = MPE / MPE Limit @ Frequency

Total Percentage of Exposure: 0.08%

$S=PG/4.\pi R^2$
P= Power to antenna (mW)
G= Antenna gain (numeric)
R= Distance (cm)

Rigado BMD-340 FCC ID: 2AA9B10								
Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)	Percent Limit
	(dBi)	(numeric)	(dBm)	(mW)				
2402	-1	0.79	4.579	2.87	20	0.00045	1.0	0.045

Taiyo Yuden Model EYSGJN FCC ID: RYYEYSGJN								
Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)	Percent Limit
	(dBi)	(numeric)	(dBm)	(mW)				
2402	-1.5	0.71	3.90	2.455	20	0.00035	1.0	0.035

Smart Reader HF						
Frequency (MHz)	EIRP		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)	Percent Limit
	(dBm)	(mW)				
13.56	-52.4	0.000006	20	1.2×10^{-9}	0.98	<0.01