

## Exhibit 13 (Amended)

### RF Exposure

#### 13.1 Determination of Need for Routine Environmental Evaluation for RF Exposure per §2.1091(c)

It is the view of MCC that the MCC-61201001 is not subject to routine environmental evaluation for RF exposure. While it is intended for use in Part 90 applications, it is not designed for use in the Specialized Mobile Radio Service.

#### 13.2 RF Exposure Environment

Per OET Bulletin 65, there are two environments relevant to RF exposure analysis:

***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 can not exercise control over their exposure.

As the MCC-6120 can be deployed in a mobile/vehicular installation, it is possible for both environments to apply. The radio operator may be considered to be in an occupational/controlled exposure environment if she or he is properly trained to be aware of exposures and to control emissions. Vehicle passengers and bystanders are generally considered to be in a general population/uncontrolled exposure environment. This being the case, vehicular antenna installation must take into account both environments, or, at the least, the more restrictive requirement, that being the general population/uncontrolled environment.

The occupational/controlled exposure limits generally apply to base station applications.

#### 13.3 RF Exposure Limit Calculations

The MCC-61201001 transmitter operates in three (3) frequency bands: 39-50 MHz, 151-162 MHz, and 2412-2462 MHz. Per Table 1 of OET Bulletin 65, Appendix A, the FCC limits for Maximum Permitted Exposure (MPE) in terms of power density, S, are shown below.

For an Occupational/Controlled Exposure environment:

$S = 1.0 \text{ mW/cm}^2$  for the frequency range of 30-300 MHz,

$S = f/300 \text{ mW/cm}^2$  for the frequency range of 300-1500 MHz,

$S = 5.0 \text{mW/cm}^2$  for the frequency range of 1500-3000 MHz,

For a General Population/Uncontrolled Exposure environment:

$S = 0.2 \text{mW/cm}^2$  for the frequency range of 30-300 MHz,

$S = f/1500 \text{ mW/cm}^2$  for the frequency range of 300-1500 MHz,

$S = 1.0 \text{mW/cm}^2$  for the frequency range of 1500-3000 MHz,

where  $f$  is expressed in MHz.

The FCC power density limits for each of the environments and subject transmit bands are expressed below.

Frequency Band (MHz)	Occupational/ Controlled Exposure	General Population/ Uncontrolled
	MPE Power Density Limit (mW/cm <sup>2</sup> )	MPE Power Density Limit (mW/cm <sup>2</sup> )
39 - 50	1.0	0.20
151 - 162	1.0	0.20
896 - 901	3.0	0.60
935 - 940	3.1	0.62
2412 - 2462	5.0	1.00

Note: A discussion of this subject as pertains to 896-901MHz and 935-940MHz is included here as the *RF Exposure Information* page from the Operators Manual will be common to all MCC-6100 variants as some versions of the 6100 family include these bands.

The minimum separation required between a human and an antenna connected to an active antenna can be determined by use of the power density expression:

$$S = \frac{PG}{4\pi R}$$

Where:  $S$  = power density in  $\text{mW/cm}^2$   
 $P$  = RF power into the antenna in mW  
 $G$  = antenna gain (unitless, linear)  
 $R$  = separation/distance between antenna and point of interest in cm

Solved for  $R$ , the formula becomes:

$$R = \sqrt{\frac{PG}{4\pi S}}$$

The charts below shows the maximum transmit power levels, duty cycles, maximum power densities and  $R$ , the calculated minimum human separation for each band. Several

example antenna types are shown. Antenna gains shown are relative to an isotropic radiator.

All calculations consider the allowed 20% power maximum over nominal power, per 47CFR§90.205(r)).

Application Environment	Mobile		Base			
	General Population	Occupational	Occupational			
<b>For 39-50MHz</b>	with 1/4wave dipole mounted to roof or trunk lid of automobile		5-element yagi mounted to top of fixed antenna tower		half wave dipole mounted to fixed antenna tower leg	
	mW	dBm	mW	dBm	mW	dBm
Transmitter power	100000	50	100000	50	100000	50
120% of peak transmit power			120000		120000	
max duty cycle	15.00%		15.00%		15.00%	
Time averaged max peak power	P	18000		18000		18000
antenna gain (lin/dB)	G	1.64	2.15	10.00	10	3.31
max power density, mW/cm <sup>2</sup> , limit per Figure 1 App A OET65	S	0.20		1.00		1.00
R=sqrt(P*G/4*pi*S), cm		108.40		119.68		68.87
Minimum separation between humans and transmit antenna		108.4 cm		119.7 cm		68.9 cm
		42.7 in.		47.1 in.		27.1 in.

Application Environment	Mobile			Base		
	General Population		Occupational	Occupational		
<b>For 151-162 MHz</b>	with 1/4wave dipole mounted to roof or trunk lid of automobile			5-element yagi mounted to top of antenna tower		half wave dipole mounted on antenna tower leg
	mW	dBm		mW	dBm	mW
Transmitter power	33000	45.2	33000	45.2	33000	45.2
120% of peak transmit power	39600		39600		39600	
max duty cycle	50%		50%		50%	
Time averaged max peak power	P	19800		19800		19800
antenna gain (lin/dB)	G	1.64	2.15	13.65	11.35	2.85
max power density, mW/cm <sup>2</sup> , limit per Table 1 App A OET65	S	0.20		1.00		1.00
R=sqrt(P*G/4*pi*S), cm		113.69		146.63		67.02
Minimum separation between humans and transmit antenna	113.7 cm			146.6 cm		67.0 cm
	44.8 in.			57.7 in.		26.4 in.

Application Environment	Mobile			Base		
	General Population			Occupational		
<b>For 896-901 MHz</b>	1/4wave dipole mounted to roof or trunk of automobile			5/8wave over a 1/4wave colinear mounted to roof or trunk of automobile		6-element yagi mounted to top of antenna tower
	mW	dBm		mW	dBm	mW
Transmitter power	30000	44.8	30000	44.8	30000	44.8
120% of peak transmit power	36000		36000		36000	
max duty cycle	50%		50%		50%	
Time averaged max peak power	18000			18000		18000
	P					
antenna gain (lin/dB)	G	1.64	2.15	3.27	5.15	26.00
max power density, mW/cm <sup>2</sup> , limit per Table 1 App A OET65		0.60		0.60		3.00
R=sqrt(P*G/4*pi*S), cm		62.58		88.40		111.42
Minimum separation between humans and transmit antenna	62.6 cm			88.4 cm		111.4 cm
	24.6 in.			34.8 in.		43.9 in.

Application Environment	Mobile				Base	
	General Population			Occupational		
<b>For 935 - 940 MHz</b>	1/4wave dipole mounted to roof or fender of automobile			5/8wave over a 1/4wave colinear mounted to roof or trunk of automobile		6-element yagi mounted to top of antenna tower
	mW	dBM		mW	dBM	mW
Transmitter power	20000	43.0		20000	43.0	20000
120% of peak transmit power	24000			24000		24000
max duty cycle	50%			50%		50%
Time averaged max peak power	P	12000		12000		12000
antenna gain (lin/dB)	G	1.64	2.15	3.27	5.15	26.00
max power density, mW/cm <sup>2</sup> , limit per Table 1 App A OET65		0.62		0.62		3.12
R=sqrt(P*G/4*pi*S), cm		50.27		71.01		89.26
Minimum separation between humans and transmit antenna		50.3 cm		71.0 cm		89.3 cm
		19.8 in.		28.0 in.		35.1 in.

Application Environment	Mobile or Base		
	General Population		
<b>For 2412-2462 MHz</b>	3dBi omni antenna		
	mW	dBM	
Transmitter power		32.66	15.1
120% of peak transmit power		39	
max duty cycle		100%	
Time averaged max peak power	P	39	
antenna gain (lin/dB)	G	1.64	2.15
max power density, mW/cm <sup>2</sup> , limit per Table 1 App A OET65	S	1.00	
R=sqrt(P*G/4*pi*S), cm		2.26	
Minimum separation between humans and transmit antenna		2.3 cm	
		0.9 in.	

### 13.4 Calculated Limits Applied to Mobile Installations

The calculated separation distances for mobile installations are summarized below.

Frequency Band Antenna	Antenna type	maximum duty cycle	Minimum Separation Distance	
			cm	in
39 - 50 MHz	1/4 wave dipole mounted to roof or trunk lid of vehicle	15.00%	109.2	43.0
151 - 162 MHz	1/4 wave dipole mounted to roof or trunk lid of vehicle	50.00%	114.3	45.0
896-901MHz/935-940 MHz	1/4 wave dipole mounted to roof or trunk lid of vehicle	50.00%	63.5	25.0
896-901MHz/935-940 MHz	5/8 wave over 1/4 wave colinear mounted to roof or trunk lid of vehicle	50.00%	88.9	35.0
2412 - 2462 MHz	3 dBi omnidirectional	100.00%	20	7.9

### 13.5 Summary and Discussion

The above calculations result in values of separation that are incorporated into the *RF Exposure Information* included in the User Manual. Note the 896-901MHz and 935-940MHz bands share a single antenna (Note: unused on MCC-61201001). Since the band 896-901 MHz operates at a higher power, calculations for that band result in more restrictive separations and therefore its figures will be used in the Manual.

For 2412-2462 MHz, the EUT will only be used with a separation of **20cm** or greater between the antenna and any nearby persons and can therefore be considered a mobile transmitter per 47CFR§2.1091(b).

The *RF Exposure Information* page from the Manual is included here for reference.

**Important Safety Instructions for Installers and Users**  
**RF Exposure Information**

**IMPORTANT**

**Before installation and/or use of the radio, read the following important RF exposure safety information.**

In order to comply with Federal Communications Commission safety standards for human exposure to radio frequency (RF) energy, the following precautions must be taken.

#### 1. MOBILE ANTENNA INSTALLATION

- The following instructions apply to antenna mounting on metal-body vehicles or those equipped with a suitable ground plane.
- Mount antennas in the following areas:
  - The center of the roof of the vehicle or,
  - The center of the trunk lid of the vehicle, provided the Minimum Separation Distance (see chart below) between the antenna and rear seat passengers is maintained.

Frequency Band Antenna	Antenna type	maximum duty cycle	Minimum Separation Distance	
			cm	in
39 - 50 MHz	1/4 wave dipole mounted to roof or trunk lid of vehicle	15.00%	109.2	43.0
151 - 162 MHz	1/4 wave dipole mounted to roof or trunk lid of vehicle	50.00%	114.3	45.0
896-901MHz/935-940 MHz	1/4 wave dipole mounted to roof or trunk lid of vehicle	50.00%	63.5	25.0
896-901MHz/935-940 MHz	5/8 wave over 1/4 wave colinear mounted to roof or trunk lid of vehicle	50.00%	88.9	35.0
2412 - 2462 MHz	3 dBi omnidirectional	100.00%	20	7.9

- Install all antennas in accordance with manufacturer's instructions.
- Always disable the transmitter when installing or servicing an antenna or transmission line or when working near an installed antenna.

## 2. MOBILE OPERATION

- The user should be fully trained in the operation of the radio, including factors that influence RF exposure, such as the proximity of people to an antenna during transmission times.
- Do not operate the voice-enabled transmitters more than 50% of the time.
- Operate the voice-enabled transmitters only when people outside of the vehicle are located at least the Minimum Separation Distance from the transmitting antenna.

When these precautions are taken, an installation with this device satisfies the FCC requirements for RF Exposure.

## 3. BASE INSTALLATION

- Base antennas should be installed on permanent outdoor structures. RF Exposure compliance at such sites must be addressed on a site-by-site basis.