



**Radiofrequency Energy Survey**

**at One Financial Center**

**Boston, Mass.**

**August 8, 2023**

*For*

**WXRV Beanpot Broadcasting Corp.**

**Bedford, NH**

**Broadcast Signal Lab, LLC**

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Report: Radiofrequency Energy Survey at One Financial Center in Boston, Mass.1. Introduction

Broadcast Signal Lab, LLC performed a radiofrequency energy survey at One Financial Center in Boston, Massachusetts. Measurements were performed by David K. Peabody, on August 8, 2023. The survey was conducted to evaluate compliance with applicable Federal Communications Commission (FCC) and Commonwealth of Massachusetts regulations concerning exposure to radiofrequency energy. Measurements were made with special attention to the recently added W234DC(FX). The two main contributors of RF energy at this site, WERS and WHRB, were operating mode. Numerous other services on a variety of frequencies are in operation at this site. This report was prepared for Beanpot Broadcasting Corp. 288B South River Road, Bedford, NH 03110.

Testing was conducted using a Narda meter Model no. 8711, Serial no. 01001, factory calibrated in November 2021. This meter was coupled to an ultra-broadband isotropic probe Model no. 8722, Serial no. 06017, factory calibrated in November 2021. This configuration observes the electric ("E") field at all frequencies from 300 kHz to 40 GHz. This instrument outputs power density levels as a percentage of the American National Standards Institute (ANSI) standard C95.1-1982 Radiofrequency Protection Guide (RFPG). In the event that a variety of frequencies are in use, as at a collective or shared site, this instrument will automatically weight each component according to its relative share of the ANSI curve. Corrections as supplied by the instrument's manufacturer, the Narda Microwave Corporation, at the time of last calibration were applied to the data where appropriate. The instrument conforms to the ANSI curve within  $\pm 2$  dB without correction. This instrument has been demonstrated to be remarkably stable over time.

The electric ("E") field monitor-probe combination employed in making the measurements reads far-field equivalent plane-wave power density of the electric field. We did not make measurements of the magnetic field. Magnetic field readings as a

percentage of RFPG would be expected to differ significantly from electric field readings only in the innermost portions of the near fields of antennas. None of the measurement locations in the current survey were within such regions. The probe was positioned at heights between 3 and 7 feet unless otherwise stated.

Effective in 1997, per Report and Order 96-326, the FCC adopted the National Council on Radiation Protection and Measurements (NCRP) exposure guidelines per NCRP Report 86. For occupational/controlled exposure areas the NCRP limits are identical to the ANSI occupational limit at 100% of RFPG. 100% of RFPG also corresponds to the FCC maximum average for six-minute occupational exposure. For general public/uncontrolled exposure areas, the NCRP curve is at 20% of RFPG or greater, depending upon operating frequencies. In general, a facility that complies with the Massachusetts limits will automatically comply with the FCC limits. In the VHF range, which includes the FM Broadcast band, 20% of RFPG is the general public or public radiofrequency exposure limit under the ANSI (state) curve and the general population/uncontrolled maximum permissible exposure according to the NCRP (federal) guidelines. Due to the presence of multiple stations at this site, and utilizing the least lenient of the NCRP and ANSI guidelines, levels exceeding 20% of RFPG would indicate non-compliance with Massachusetts general public or public radiofrequency exposure limits and FCC federal general population/uncontrolled maximum permissible exposure guidelines. In terms of power density, at FM broadcast frequencies 100% of RFPG corresponds to 1 mW/cm<sup>2</sup> and 20% of RFPG corresponds to 0.2 mW/cm<sup>2</sup>.

The additional communications services can be grouped into several classes and the actual power density that corresponds to 100% of RFPG and 20% of RFPG can be calculated.

<u>Service</u>	<u>Frequency Range</u>	<u>Power density at 100% RFPG</u>	<u>Power density at 20% RFPG</u>
VHF paging and two-way	30 to 300 MHz	1 mW/cm <sup>2</sup>	0.2 mW/cm <sup>2</sup>
Low UHF two-way	300 to 900 MHz	1-3 mW/cm <sup>2</sup>	0.2-0.6 mW/cm <sup>2</sup>
Mid UHF paging	900 to 2000 MHz	3-5 mW/cm <sup>2</sup>	0.6-1 mW/cm <sup>2</sup>
SHF point to point $\mu$ wave	3 to 30 GHz	5 mW/cm <sup>2</sup>	1 mW/cm <sup>2</sup>

Transmitter owners' names and frequencies used were obtained by viewing equipment racks and cases, and additional information was provided by site management. Per the combined data, the communications services active at the One Financial Center site are as follows✱:

<u>Location</u>	<u>Owner/operator</u>	<u>Frequency in MHz</u>
44 <sup>th</sup> floor radio room		
Row A	WERS	88.9
	WHRB	95.3
Row B	US Customs	165.2375
	Spok (was USA Mobility)	929.6125
		929.5875
		929.3875
Row C	Next Link 3	28,000...
		80,000...
	U.S.Secret Service Baker	165.7875
	XRay	164.650
	Mike	165.2125
	Charlie	164.375
Row D&E	High & Low Frequency Combiner	Various
Row F	Comtronics (entire row)	151.5275
		151.7900
		152.3525
		152.5275
		152.9225
		153.0275
		153.2525
		451.3375
		470.6625
		471.8875
		484.6125
		486.4875
		486.5125
		487.1125
		487.5125
		935.4625
		936.1375
		936.1500

<u>Location</u>	<u>44<sup>th</sup> fl cont.</u>	<u>Owner/operator</u>	<u>Frequency in MHz</u>
	Row F, continued	Comtronics	936.1625
			936.1750
			936.6750
			936.7500
			938.3875
			938.6500
			939.4625
	Row G	MBTA	151.5275
		Boston Water & Sewer	453.3375
		Total Traffic & Weather Network	450.1125
		Critical Alert (was UComm Paging)	152.60
		American Medical Response	153.515
		WCVB	450.2875
	Row H	Metro Cab	451.325
		Comtronics	935.9000
			937.1375
			937.1500
			937.1625
			937.1750
			937.1875
			938.2375
			939.7000
			939.7125
			956.3125
			935.3250
			936.3000
			936.3375
			936.3750
			936.3500
			938.3875
			936.73??
		WRDZ277	860.4375
	Row I	WBWL (back-up transmitter)	101.7 (not operating)

\* A full listing if necessary is available from manager Peter Kovaleski of US Rooftops or from Dewey Square Monopole Associates, LLC; a division of Jones Lang LaSalle Americas, Inc.

<u>Location</u>	<u>Owner/operator</u>	<u>Frequency in MHz</u>
47 <sup>th</sup> floor radio room		
Row A	Minutemen Repeater Associates	927.775
	WCVB ENG fiber & μwave hub	13,150 -13,175
	WCG738	Labeled as 13,162.5
	WBS374	Labeled as 13,121.5
	Next Nav. Part 90 M-LMS service	900 band, spread spectrum
Row B	Electrical, northeast wall	---
<u>Location</u> 47 <sup>th</sup> Cont.	<u>Owner/operator</u>	<u>Frequency in MHz</u>
Row C	FBI Boston C1	172.0750
	FBI Boston C2 (labeled "A2")	167.4875
	FBI Boston C3 (labeled "A3")	167.7875
	FBI Boston C4 (labeled "A4")	169.6250
	FBI Boston C5 (labeled "A5")	167.4375
	FBI Boston C6 (labeled "L1")	167.5750
	FBI Boston C7 (labeled "N")	168.1125
	FBI Boston box (not connected)	---
	FBI Boston, N's filter network	---
	USAi.net Boston Mainstreets WiFi	5,000...
		13,000...
		60,000...
		80,000...
	W234DC(FX).	96.5
Row D (cage)	Storage space	---
Row E	Electrical northwest wall	---
Row F	Emerson Network Power conditioners	---

## 2. Description of site



One Financial Center

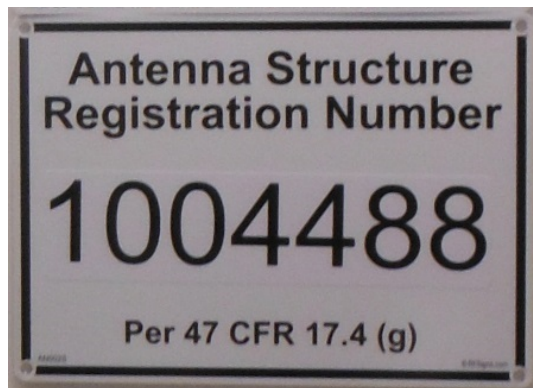
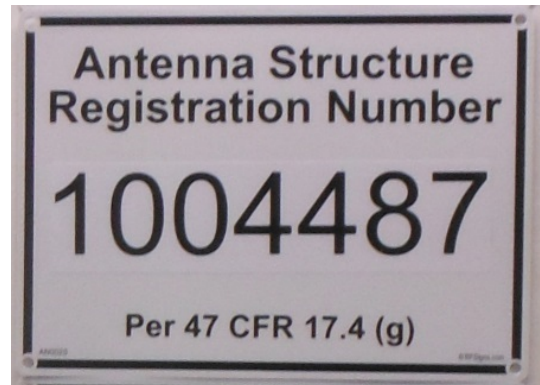
One Financial Center is a 47 story office building located opposite south Station in Boston's financial district.

### 44<sup>th</sup> floor Radio Room

The primary transmitting equipment room is on the 44<sup>th</sup> floor of One Financial Center. The antennas for all equipment at this site are located on top level of the rooftops. Access to this area is strictly controlled. The site is well maintained. The transmitter room has a security door one must pass through to enter the room. .



Posted on the inside door is a "No Smoking" sign.



Inside the second door, posted on a column facing the door is a blue RF Notice sign which reads, “Notice / Radio Frequency Energy Source Nearby / Follow all posted instructions / Comply with safety policies.”, a sign which reads, “Antenna Structure Registration Number 1004487. Per 47 CFR 14.7(g).”, a sign that reads “Antenna Structure Registration Number 1004488. Per 47 CFR 14.7(g).”, and a yellow “RF



Guidelines” placard that reads, “Notice: Guidelines For Working In Radiofrequency Environments: All personnel should have electromagnetic energy (EME) awareness training. All personnel entering this site must be authorized. Obey all posted signs. Assume all antennas are active. Before working on antennas, notify owners and disable appropriate transmitters. Maintain minimum 3 feet clearance from all antennas. Do not stop in front of antennas. Use personal RF monitors while working near antennas. Never operate transmitters without shields during normal operation. Do not operate base station antennas in equipment room.”

#### 47<sup>th</sup> floor Radio Room

The 47<sup>th</sup> floor of One Financial Center has two rooms. One room contains radio equipment, the other contains building HVAC and power controls. Access to this area is strictly controlled.



The security door to the 47<sup>th</sup> floor radio room is posted with several signs.





The signs posted read, “Notice Radio Frequency Energy Sources Nearby. Follow all posted instructions. Comply with safety policies”, a sign which reads, “Not An Exit”; a sign which reads, “No Smoking. Warning... Smoking in this area could set off smoke detector alarms. This door must remain locked at all times!”; and a sign which reads, “Caution: Area protected by FM-200 Fire Suppression System. In the event of a fire all unauthorized personnel should exit protected area. Keep all doors closed”.

#### 47<sup>th</sup> floor landing (lower roof access)

Access to the Main Roof is via a staircase above the 46th floor and through locked doors. This door is locked. Access to this area is strictly controlled.

#### 47<sup>th</sup> floor landing (penthouse roof access)

Access to the Penthouse roof is via ladder and locked hatch. Access to this area is strictly controlled.





At the top of the stairs to the 47th floor, behind and adjacent to the ladder to the upper roof hatch, are several signs. Posted on the wall behind the ladder and viewable best when climbing the ladder is a sign which read, "Notice, Radio frequency fields beyond this point may exceed the FCC general public exposure limit / Obey all posted signs and site guidelines for working in radio frequency environments. In accordance with Federal Communications Commission rules for radio frequency emissions 47 CFR 1.1307(b)." Posted beside the ladder is an RF Guidelines placard which read, "Notice: Guidelines For Working In Radiofrequency Environments: All personnel should have electromagnetic energy (EME) awareness training. All personnel entering this site must be authorized. Obey all posted signs. Assume all antennas are active. Before working on antennas, notify owners and disable appropriate transmitters. Maintain minimum 3 feet clearance from all antennas. Do not stop in front of antennas. Use personal RF monitors while working near antennas. Never operate transmitters without shields during normal operation. Do not operate base station antennas in equipment room.". To the left of the ladder is a sign which reads, "Antenna Monopole Registration Number 1004487. Per 47 CFR 14.7(g).", and a sign that reads "Antenna Monopole Registration Number 1004488. Per 47 CFR 14.7(g)."

The Penthouse Roof is occupied by broadcast, land mobile, paging, cellular and other communications antennas.

The Main Roof is the lower level, occupied by satellite dishes, the window washer's trolley/crane, and the cooling monopole well for the building's HVAC.



Posted on the Main Roof at four locations along the walls of the Penthouse are signs which read, “Caution / Radio Frequency Energy May Exceed Occupational Safety Limits / Training required to enter / Use proper exposure controls / Refer to site policy”

Access to the Penthouse Roof is inside the Penthouse via a ladder and through a locked roof hatch.

WERS broadcasts from the west monopole, ASRN 1004487, with an ERP of 4 kW, horizontal and vertical, from an antenna centered 53 feet (16.1 meters) above penthouse roof level. WHRB broadcasts from the east monopole, ASRN 1004488, with an ERP of 1.45 kW, horizontal and vertical, from an antenna centered 44 feet (13.4 meters) above penthouse roof level. WBWL also broadcasts from the east monopole, with an ERP of 1.7 kW, horizontal and vertical, from an antenna centered 64 feet (19.5 meters) above penthouse roof level, but ONLY for back-up purposes. The most recent addition is W234DC(FX)a single bay SWR FM1R/1 antenna operating at 99 Watts ERP.



This antenna is mounted about 20' above the roof deck facing approximately 75° east on an outrigger on the East Monopole.





Posted adjacent the ClimbSafe and ladder on the both the West Monopole and the East Monopole is a sign that reads, "Warning / Beyond this point radio frequency energy fields at this site exceed FCC rules for human exposure. Failure to obey all posted signs and site guidelines for working in radio frequency energy environments could result in serious injury. In accordance with Federal Communications Commission rules for radio frequency emissions 47 CFR 1.1307(b)"

### .3. Survey data of electric "E" field data

<u>44<sup>th</sup> floor</u>	<u>Location</u>	<u>Measurement in percentage of RFPG</u>
Row A	WERS	<1% at 20 centimeters *
	WHRB	<1% at 20 centimeters
Row B	US Customs	<1% at 20 centimeters
	Spok (was USA Mobility) KNKM899	<1% at 20 centimeters
Row C	Verizon WNZ5949 Next Link 3	<1% at 20 centimeters
	U.S.Secret Service Baker	<1% at 20 centimeters
	XRay	<1% at 20 centimeters
	Mike	<1% at 20 centimeters
	Charlie	<1% at 20 centimeters
	Tango	<1% at 20 centimeters
Row F	Comtronics	<1% at 20 centimeters
Row G	MBTA	<1% at 20 centimeters
	Unknown	<1% at 20 centimeters
	Boston Water & Sewer	<1% at 20 centimeters
	Metro Traffic	<1% at 20 centimeters
	Critical Alert (was UComm Paging)	<1% at 20 centimeters
	American Medical Response	<1% at 20 centimeters

<u>44<sup>th</sup> fl cont</u>	<u>Location</u>	<u>Measurement in percentage of RFPG</u>
	WEEI Sports Marti455	<1% at 20 centimeters
	WCVB	<1% at 20 centimeters
	Unknown owner	<1% at 20 centimeters
	Comtronics	<1% at 20 centimeters
Row H	Unknown	<1% at 20 centimeters
	Metro Cab	<1% at 20 centimeters
	Comtronics	<1% at 20 centimeters
Row I	WBWL (back-up transmitter)	<1% at 20 centimeters

Monitor levels of <1% of RFPG were observed throughout the room. No hot spots or points of leakage were found.

<u>47<sup>th</sup> floor</u>	<u>Location</u>	<u>Measurement in percentage of RFPG</u>
Row A	Minutemen Repeater Assoc.	<1% at 20 centimeters
	WCVB ENG hub	<1% at 20 centimeters
	WCG738	<1% at 20 centimeters
	WBS374	<1% at 20 centimeters
	Next Nav. M-LMS service	<1% at 20 centimeters
Row B	Electrical northeast wall	<1% at 20 centimeters
Row C	FBI Boston C1	<1% at 20 centimeters
	FBI Boston C2	<1% at 20 centimeters
	FBI Boston C3	<1% at 20 centimeters
	FBI Boston C4	<1% at 20 centimeters
	FBI Boston C5	<1% at 20 centimeters
	FBI Boston C6	<1% at 20 centimeters
	FBI Boston C7	<1% at 20 centimeters
	FBI Boston equipment box	<1% at 20 centimeters
	FBI Boston transmitter feeding	<1% at 20 centimeters
	USAi.net Boston Mainstreets	<1% at 20 centimeters
	W234DC(FC)	<1% at 20 centimeters
Row D	MediaFlo cage	<1% at 20 centimeters
Row E	Electrical northwest wall	<1% at 20 centimeters
Row F	Emerson Network Power	<1% at 20 centimeters

Monitor levels of <1% of RFPG were observed throughout the room. No hot spots or points of leakage were found.

### 3c. Main Roof

The main roof was examined in a 6 foot grid pattern. Where elevated levels were observed, more extensive localized examinations were made to determine the peak level. Monitor levels of between <1% and 9% of RFPG were observed overall.

No other hot spots or points of leakage were found on the Main Roof. See page XX.

### 3d. Penthouse Roof

The penthouse roof was examined in a 6 foot grid pattern. Where elevated levels were observed, more extensive localized examinations were made to determine peak levels. In general, monitor levels between 2% and 12% of RFPG were observed, with some peaks exceeding 20% of RFPG (see points noted in graphic on page XX). Four peaks exceeded 20% of RFPG. These readings were obtained at 20 centimeters (8 inches) from the objects specified.

<u>Location</u>	<u>Peak % of RFPG raw</u>	<u>% of RFPG wba</u>
1m north of East Monopole above cable cover	Peak of 38%	15.3
1m east of ventilation hood/fan	Peak of 25%	14.3
1m southwest of cable conduit	Peak of 21%	13.6
20cm from mount GG2	Peak of 25%	12.5

Note: when monitor levels exceed the acceptable occupational exposure (controlled access only) limit of 100% of RFPG or the acceptable public exposure (uncontrolled access) of 20% of RFPG, another kind of examination is required. A spatial sweep is made to determine the whole body average (wba). Measurements are made with the probe at heights of 1.8 meters (6 feet), 1.5 meters (5 feet), 1.2 meters (4 feet), 0.9 meters (3 feet), 0.6 meters (2 feet), and 0.3 meters (1 foot) above the surface. The sum of these observations is divided by 6. The result is the whole body average. Such measurements are annotated in percentage of wba.

Most of the antennas on the penthouse roof are mounted on extension poles, placing their emitting elements above head level. For head level we use a typical value of 1.7 meters (5 feet 6 inches) above the roof deck. Several antennas are mounted low to the

roof with radiating elements at or below head level. A few of the antennas did not appear to be active at the time of examination but have required whole body averaging in the past. Levels did not exceed the general public/uncontrolled maximum exposure limit.

### 3e. Monopoles

During the overall rooftop survey, the monopoles were observed from roof level only. No data were collected higher than 1.8 meters (6 feet) above penthouse (upper) roof level.

### 3f. Transmission lines

Transmission lines were examined as part of the overall rooftop examination and were observed from roof level only.

### 3g. Guy lines and guy line anchors

The guy lines and their anchors were examined as part of the overall rooftop examination and were observed from the roof level only. All guy line readings were taken at 20 centimeters (8 inches) from each group of guy lines. Upper portions of the guy lines are non-conductive. Energy levels of 3 to 8% of RFPG were observed.

### 3h. Observation surrounding the new W234DC(FX)antenna

The single bay antenna did make RF level slightly elevated over past surveys. However, the additional RF energy observed on the Penthouse Roof and on the Lower Roof are still below the General Public / Uncontrolled Maximum Permissible Exposure Limit.

### 3i. Allowance for WBWL operation

WBWL maintains a backup facility at the site. Were this facility in use, the highest RF energy level produced anywhere on the rooftop areas would be  $31 \mu\text{W}/\text{cm}^2$  per the FCC's FM Model utility. Assuming as a worst case that this amount is superimposed on the measured levels everywhere on the rooftops (which it would not be), we add 3% of RFPG to the highest measured levels. On the main roof, the highest level becomes



14%, which remains well within the established 20% limit. On the penthouse roof, where the highest measured levels are less than 20%, the predicted amount would become, at most, 23%, the established limit being 100%. Thus the predicted levels with WBWL included would likely remain below 20% of RFPG, even with whole body averaging employed of the aforementioned “hot” spots.

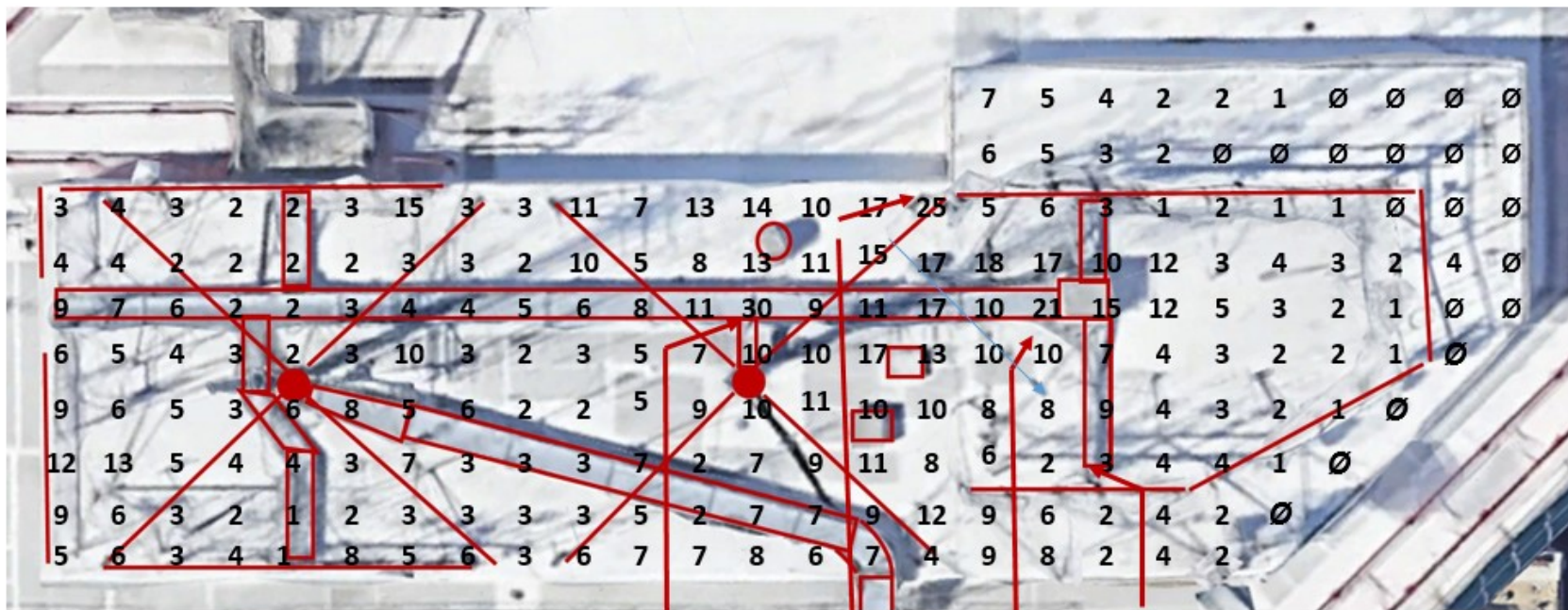
### 3j. Measured RF from adjacent buildings

Measurements were made from The 18<sup>th</sup> floor of the uncompleted South Station Tower and from the 36<sup>th</sup> floor rooftop of the Federal Reserve Bank. Both buildings are in the main lobe of the W234DC(FX). In the South Station Tower no deflection of the meter was detected at it most sensitive setting. From the Federal Reserve Bank 36<sup>th</sup> floor roof the new antenna is clearly visible . Using the 37<sup>th</sup> floor elevator structure as a blind a deflection of 1 increment was observed, attributable to One Financial Center, on the times 0.01 scale of the Narda 8711 meter. This is not the sensitivity normally used. It is however the highest sensitivity possible with this instrument. At this sensitivity a deflection of 1 increment equals 0.1 % of RFPG. Allowing for the inherent possible error of  $\pm 0.05\%$  at this sensitivity, accounting for the possible error the sensed level could be a maximum of 0.15% of RFPG is 0.75% of 20% RFPG. Stated another way the total observed RF energy emanating from One Financial Center, as observed from the rooftop of the Federal Reserve Bank is equal to or less than 0.75% of the General Public / Uncontrolled Maximum Permissible Exposure Limit.

An aerial photograph of a large, rectangular building with a flat roof. The roof is covered with a grid of red numbers, likely representing solar radiation data. The numbers are arranged in a grid that follows the shape of the building, with some areas missing due to structural elements like chimneys and skylights. A north arrow is located in the top left corner of the image. The surrounding area shows other buildings and streets.

Ø - represents no deflection on meter, a value of Less than one

## One Financial Center Penthouse Roof



Several location exceeded the General Public Exposure Limit, Whole Body Averaging used at these points.

Peak of 38%  
wba 15.3%

Peak of 25%  
wba 14.3%

Peak of 21%  
wba 13.6%

GG2 Peak of 25%  
wba 12.5%



## 5. Discussions and Recommendations

Radiofrequency energy exposure is governed federally by FCC regulations, and in Massachusetts, by Massachusetts Department of Public Health (DPH) regulations.

In Massachusetts, regulation is found in 105 CMR 122.000 *et seq.* Each owner of a “radiofrequency machine” at a site maintains a separate “facility”, and is individually responsible for compliance<sup>1</sup>. The Massachusetts DPU has suspended the provision requiring that the licensee must notify the Massachusetts DPH and must apply for facility approval if ERP is greater than 7 watts<sup>2</sup>, pending an update of the rules. Additional notification requirements still apply, including documentation with respect to employee safety, if antenna inputs exceed 100 watts<sup>3</sup>. The regulations separately consider exposure to members of the public and to those whose employment involves exposure to radiofrequency energy<sup>4</sup>. The licensee of any facility requiring notification shall designate a RF Safety Officer<sup>5</sup>. The RF Safety Officer will give written notification to any individuals whose exposure may exceed public levels<sup>6</sup> of their designation as NIR workers<sup>7</sup>. Such designations are subject to a 30-year record-keeping requirement<sup>8</sup>. There are annual survey and inspection requirements<sup>9</sup>. Signs of a specific nature are required to mark any area where NIR levels may exceed 100 % of RFBG<sup>10</sup>.

The FCC, having adopted exposure guidelines in Report and Order 96-326, and pursuant to 47 CFR 1.1310, offers guidance in dealing with general population/uncontrolled exposure and occupational/controlled exposure in its Office of Engineering and Technology Bulletin 65 (OET65)<sup>11</sup>. Under OET-65 the acceptable methods for controlling exposures range in complexity, with no requirement or

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<sup>1</sup> 105 CMR 122.006 (1997)

<sup>2</sup> 105 CMR 122.010(B)(3) (1997)

<sup>3</sup> 105 CMR 122.101 (1997)

<sup>4</sup> 105 CMR 122.100(A) (1997)

<sup>5</sup> 105 CMR 122.106 (1997)

<sup>6</sup> 105 CMR 122.015 (1997)

<sup>7</sup> 105 CMR 122.102 (1997)

<sup>8</sup> 105 CMR 122.105 (1997)

<sup>9</sup> 105 CMR 122.104 (1997)

<sup>10</sup> 105 CMR 122.103 (1997)

<sup>11</sup> Page numbers cited correspond to those in the version found online at

[https://transition.fcc.gov/Bureaus/Engineering\\_Technology/Documents/bulletins/oet65/oet65.pdf](https://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet65/oet65.pdf)

preference for any particular means of compliance in any situation, except to effectiveness to the given site<sup>12</sup>. Simple barriers such as “fencing and posting or locking out unauthorized persons”, are acknowledged as sufficient in general population/uncontrolled exposure”<sup>13</sup> areas, to prevent the exposures levels from exceeding the federal general population/uncontrolled exposure limits. In occupational /controlled exposure areas, where exposure levels may exceed the occupational limits (equal to 100% of RFPG), controlling exposure may consist of any or all of the following: simple posting (e.g., “Keep Back X feet”), non-conductive physical barriers (additional fencing), individual training; or while work is being performed in those areas, lowering transmitter power, protective clothing, or shutting transmitter off (Lockout-Tagout) <sup>14</sup>. Planning to avoid exposure beyond the maximum permissible exposure levels (MPE)<sup>15</sup> may include limiting actual time spent in the restricted area for an acceptable time-averaged exposure.<sup>16</sup>

As previously mentioned, the Massachusetts public radiofrequency exposure limit is 20% of the state occupational limit. The federal general population/uncontrolled maximum permissible exposure (MPE) limit is 20% of the federal occupational/controlled exposure limit. The state occupational and the federal occupational/controlled exposure limit are the same at 100% of RFPG.

According to the measurements reported here, utilizing the least lenient standard (20% of RFPG), the only locations at the One Financial Center site where this public exposure limit is exceeded are already secured as occupational areas. These areas are on the Penthouse Roof. For federal compliance, these areas are secured by locked doors and hatches and both active and passive security measures, and are considered occupational/controlled exposure areas, rather than general population/uncontrolled

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<sup>12</sup> Federal Communication Commission, Office of Engineering and Technology, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*, OET Bulletin 65 (Edition 97-01), Section 4: Controlling, pp. 55-57

<[fcc.gov/Bureaus/Engineering/\\_Technology/Documents/bulletins/oet65.pdf](http://fcc.gov/Bureaus/Engineering/_Technology/Documents/bulletins/oet65.pdf)>

<sup>13</sup> *ibid.*, Section 4: Controlling, pp. 52-53

<sup>14</sup> Federal Communication Commission, Office of Engineering and Technology, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*, OET Bulletin 65 (Edition 97-01), Section 4: Controlling, pp. 55-57

<sup>15</sup> *ibid.*, Appendix A., pp. 64-66

<sup>16</sup> *ibid.*, Section 4 Controlling., pp. 55-56

exposure areas. For Massachusetts compliance these areas are considered secure and only employees who have been suitably notified and trained as NIR workers may be allowed access to these areas.

The Massachusetts occupational radiofrequency exposure limit and the federal occupational/controlled maximum permissible exposure limit for this site are the same, 100% of RFG. According to the measurements reported here, the One Financial Center site and facility do not have any areas where either the Massachusetts occupational limit or the federal occupational/controlled limit is exceeded.

In accordance with OET-65, any area where an individual may be exposed in excess of the general population/uncontrolled exposure limit must be designated a “restricted area” and be accessible only to workers who are “aware of” and can “exercise control over” their exposure. Even persons who are only transient visitors to these locations, such as electricians, painters, and landscapers, could be allowed access under the occupational/controlled exposure criteria as long as they are “made aware” of their exposure and “exercise control” over their exposure.<sup>17</sup>

The only other area at the One Financial Center site in which radiofrequency energy levels are likely to exceed 100% of RFG is on the monopoles. It is recommended that for compliance with the FCC and DPH requirements, standard “RF radiation area” warning signs be maintained around each monopole, with explicit instructions to stay off the monopole unless exercising appropriate exposure control. Again, the RF Safety Officer is required to give written notification to any individuals whose exposure may exceed public levels of their designation as NIR workers<sup>18</sup>. Incident reporting requirements apply whenever an individual or NIR worker is suspected of exposure to electromagnetic radiation in excess of the applicable limits contained in 105 CMR.100<sup>19</sup>. The record-keeping requirement would appear to apply in connection with climbing of a monopole. A notation should be made in a special log, indicating what actions were

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<sup>17</sup> *ibid.*, Section 4: Controlling., p. 55.

<sup>18</sup> 105 CMR 122.102(1997)

<sup>19</sup> 105 CMR 122.106(A)(1997)

taken to limit the exposure of workers while work was performed on the monopole. See Mass. DPH regulation 105 CMR 122.105 for specific details regarding required logging.

The criteria for complying with state and federal RF exposure standards which involve training, notification, and record-keeping requirements are not within the scope of this report. This report evaluates the site and facility for areas of possible exposure and considers only the criteria that relate to securing and posting relevant areas. For training, notification, and recordkeeping compliance, Broadcast Signal Lab stands ready to assist the facility operator. Other guidance may be obtained from proper regulatory authorities or, where available, corporate engineering and legal sources.

Broadcast Signal Lab, LLC recommends the adoption of a radiofrequency exposure policy and the familiarization of all employees with that policy. Such a policy should include detailed descriptions of the site and any exposure hazards contained therein as well as procedures for minimizing exposure in at-risk areas. The policy should be written, maintained, and posted where relevant employees have easy access to it.

Broadcast Signal Lab, LLC recommends the maintenance of all existing signs, locked entries, security, and entry/exit logs. We also recommend the addition of an RF Caution Sign, stating that the Occupational MPE may be exceeded and permitting monopole access by RF-qualified persons only, be placed in an area directly viewable by persons climbing the access ladder to the Penthouse Roof.

The collective radio facilities at One Financial Center in Boston, Mass. appear to be in compliance with all applicable statutory and regulatory requirements for radiofrequency exposure.

The preceding report is to my information and belief true and correct.

August 23, 2023



David K. Peabody  
Broadcast Engineer  
Broadcast Signal Lab, LLC