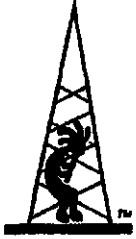


ATTACHMENT M
ANALYSIS OF RADIOFREQUENCY EFFECTS AT HOSPITAL



Pinnacle Telecom Group, LLC

Professional and Technical Services

www.pinnacletelecomgroup.com

October 27, 2011

Mr. Michael Quaglietta
Verizon Wireless

**SUBJECT: St. Lawrence Hospital – 55 Palmer Ave., Bronxville, NY;
Analysis of the Radiofrequency Effects on the Proposed
Roof Deck from Existing Cellular Antennas**

Mr. Quaglietta:

Pinnacle Telecom Group has been asked to provide an independent expert analysis of the radiofrequency (RF) effects of existing cellular antennas that will face generally over a proposed roof deck and garden area. The proposed roof deck will be more than 50 feet below panel antennas operated by Verizon Wireless, Nextel, and Sprint. Concerns may exist about the RF effects from the antennas relative to the safety limit for potential exposure to antenna emissions.

Attached are the details of our analysis, which we performed using the standard formula for such calculations, and we applied to the formula maximum (worst-case) transmission conditions for each of nearby antenna operations.

The result of the analysis is that the worst-case combined RF effect of the antennas is 2.2382 percent of the federal limit for safe, continuous exposure of the general public. In other words, the conservatively calculated maximum RF level anywhere on the roof deck will be at least 44 times below the safety limit. The analysis provides a clear demonstration of compliance with the federal safety limit for potential RF exposure.

Regards,


Daniel J. Collins
Chief Technical Officer


Terrence R. Lulay
Professional Engineer

Attachment



**FCC RF Compliance Analysis
St. Lawrence Hospital – Bronxville, NY**

**Examination of RF Levels and FCC Compliance
On the Proposed Roof Deck**

The following provides the details of an analysis of the radiofrequency (RF) levels that result on a proposed roof deck from the nearby existing cellular antenna operations. Directional panel antenna sectors by Verizon, Next and Sprint generally face over the proposed roof deck, but are more than 50 feet above that area, and a concern may exist about the potential RF exposure relative. Note that other antennas at the site are positioned or pointed in such a manner as to have no significant effect on the roof deck.

The Federal Communications Commission (FCC) regulates the wireless carriers and FCC regulations specify the limit for "maximum permissible exposure" (MPE) of the general public from the RF emissions from antennas. The FCC also provides a standard engineering formula to calculate the RF effects from antennas, based on the amount of RF power emitted, the vertical and horizontal distance from the antennas to the points of interest, and the directionality characteristics of the antennas.

Our analysis in this case is exceptionally conservative, as we automatically assume each of the cellular antenna operations involves the maximum number of channels and the maximum transmitter power per channel in all of each carrier's respective FCC-licensed frequency bands – as summarized in the table below.

Carrier	Frequency Band(s)	Max. RF Channels	Max. Transmitter Power
Verizon	700 MHz	1	40 watts
	869 MHz	8	20 watts
	1900 MHz	4	16 watts
Nextel	851 MHz	12	6 watts
Sprint	1900 MHz	6	16 watts

In the analysis, we further conservatively ignore the power-attenuation effects associated with the antenna cabling, and apply the worst-case factor related to signal reflections from the intervening ground that can enhance the RF level and the resulting exposure. As a result, the results of the analysis significantly overstate the RF levels that occur from the actual antenna operations, and the purpose of that conservative approach is to provide the greatest possible assurance of compliance.

The results of a compliance assessment can be described in layman's terms by expressing the calculated RF levels as simple percentages of the FCC MPE limit. If the normalized reference for that limit is 100 percent, then calculated RF levels higher than 100 percent indicate the MPE limit is exceeded and there is a need to mitigate the potential exposure. Conversely, calculated RF levels consistently below 100 percent serve as a clear and sufficient demonstration of compliance with the MPE limit. We can

also describe the overall worst-case result via the "plain-English" equivalent "times-below-the-limit" factor.

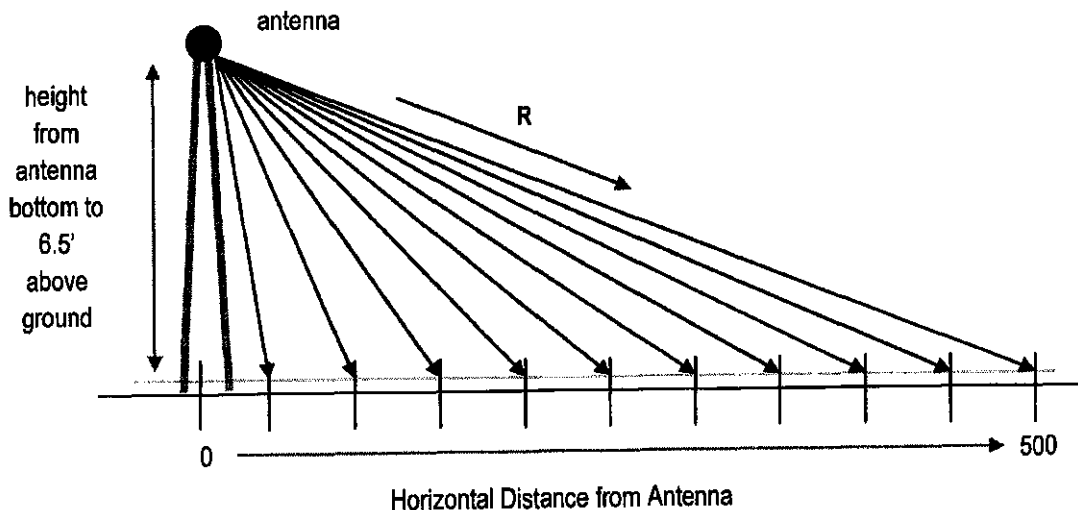
The FCC standard formula for compliance analysis is as follows:

$$\text{MPE}\% = (100 * \text{TxPower} * 10^{(\text{Gmax-Vdisc}/10)} * 4) / (\text{MPE} * 4\pi * R^2)$$

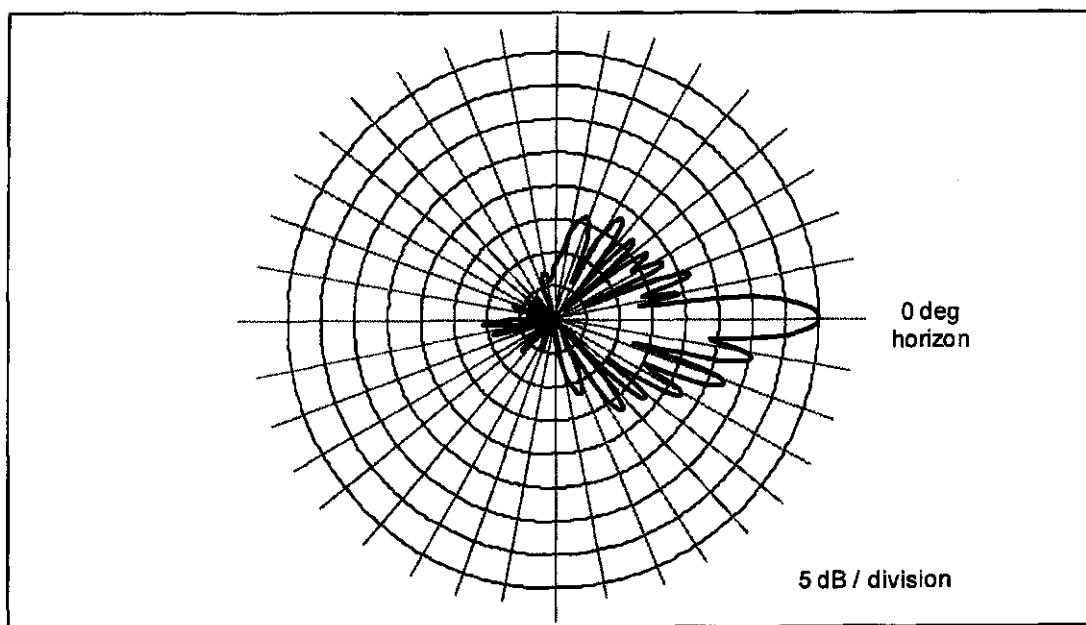
where

- MPE% = RF level, expressed as a percentage of the MPE limit applicable to continuous exposure of the general public
- 100 = factor to convert the raw result to a percentage
- TxPower = maximum net power into antenna sector, in milliwatts, a function of the number of channels per sector, the transmitter power per channel, and line loss
- $10^{(\text{Gmax-Vdisc}/10)}$ = numeric equivalent of the relative antenna gain in the downward direction of interest; data on the antenna vertical-plane pattern is taken from manufacturer specifications
- 4 = factor to account for a 100-percent-efficient energy reflection from the intervening ground, and the squared relationship between RF field strength and power density ($2^2 = 4$)
- MPE = FCC general population MPE limit
- R = straight-line distance from the RF source to the point of interest, centimeters

The formula is applied using the geometry shown below. Note that in this case, the maximum horizontal distance necessary to address the roof deck is 160 feet, not the 500 feet normally used for street-level calculations.



Note that the RF level as the horizontal distance increases is also affected by the antenna's vertical-plane emission pattern, i.e., the relative amount of RF energy emitted by the antenna at various "down-angles" below the horizon. By way of illustration, the diagram below shows the vertical-plane emission pattern of a typical wireless directional panel antenna. Note that in these types of antenna radiation pattern diagrams, the antenna is effectively pointed at the three o'clock position (the horizon) and the relative strength of the pattern at different angles is described using decibel units. Note, too, that the use of a decibel scale to describe the relative pattern at different angles incidentally serves to significantly understate the actual focusing effects of the antenna. Where the antenna pattern reads 20 dB, for example, the relative RF energy emitted at the corresponding downward angle is 1/100th of the maximum that occurs in the main beam (at 0 degrees); at the 30 dB point, it is 1/1,000th of the maximum.



FCC compliance involving multiple antenna operations is assessed in the following manner. At each horizontal distance point along the area of interest, an MPE% calculation is made for each antenna operation (including each frequency band of transmission), and the sum of the individual MPE% contributions at each point is compared to 100 percent, the normalized reference for compliance with the MPE limit. We refer to the sum of the individual MPE% contributions as "total MPE%", and any calculated total MPE% result exceeding 100 percent is, by definition, higher than the FCC limit and represents non-compliance and a need to mitigate the potential exposure. If all results are consistently below 100 percent, on the other hand, that set of results serves as a clear and sufficient demonstration of compliance with the MPE limit.

The table on the next page provides the results of the MPE% calculations for the rooftop deck for each cellular operator, with the "total MPE%" results out to a horizontal distance of 160 feet, which is sufficient to cover the proposed roof deck. The maximum (worst-case) overall "total MPE%" calculation result highlighted in bold in the last column.

Horizontal Distance ft)	Verizon MPE%	Nextel MPE%	Sprint MPE%	Total MPE%
0	1.1633	0.0063	0.0759	1.2455
20	1.7550	0.0052	0.1139	1.8741
40	0.5059	0.0481	0.0731	0.6271
60	0.4027	0.3938	0.1141	0.9106
80	2.0454	0.2072	0.0756	2.3282
100	1.4705	0.0398	0.0276	1.5379
120	0.5239	0.2904	0.2426	1.0569
140	0.2742	0.2647	0.2161	0.7550
160	0.8232	0.1499	0.0434	1.0165

As indicated, even with the significant conservatism built into the analysis, the worst-case calculated overall RF level on the proposed roof deck is only 2.2382 percent of the FCC MPE limit – well below the 100-percent reference for compliance with the safety limit.

In other words, the conservatively calculated maximum RF level from the combination of nearby antennas, all assumed to be operating at maximum possible power, is more than 44 times below the federal limit for safe, continuous exposure of the general public.

The results of the analysis provide a clear demonstration of compliance with the FCC regulations and limit concerning potential human exposure to RF emissions from antennas.