WAPA RADIO

Extensión San Agustín, Calle 3 #1210, Río Piedras PR 00926-1837 • Tel. (787) 763-1066 • Fax (787) 763-4195 • **E-mail: wapa680@gmail.com**

December 16, 2018

Mrs. Marlene H. Dortch, Secretary
FEDERAL COMMUNICATIONS COMMISSION
445 12th. St. SW
Washington, D. C. 20554

RE: CURATIVE AMMENDMENT to BL-20180911ADH
as requested by Audio Division (LETTER NOV. 29/2018)
WVOZ(AM) Aguadilla, P. R.

Dear Mrs. Dortch:

Enclosed please find in triplicate (original and two copies) of an ammendment to license application BL-20180911ADH as requested by Audio Division of the Media Bureau by November 29, 2018 to licensee. The filing is made within the 30 days opportunity to file a curative ammendment.

Please send me back enclosed copy of this tramittal letter signed as receipt. I am enclosing a pre-postaged envelope.

Thanks,

Wifredo G. Blanco Pi

ENG. WIFREDO G. BLANCO-PI
Licensee WVOZ-AM

CURATIVE AMMENDMENT FOR APPLICATION FOR LICENSE (302-AM)

WVOZ-AM AGUADILLA, PUERTO RICO

1580 KHz., 1.0 KW DA-D / 1.0 KW NDA-N, U

BL-20180911ADH (CP: 20170327AAF)

December 16, 2018

ENGINEERING EXHIBIT - APPLICATION FOR LICENSE -CURATIVE AMMENDMENT
RADIO STATION WVOZ-AM AGUADILLA, P.R.
1580 KHz., 1.0 KW-DA-D , 1.0 KW-NDA-N
BL-20180911ADH (BP-20170327AAF) **December 16, 2018 (curative ammendment)**

ENGINEERING STATEMENT ADDDENDUM: December 16, 2018

By November 29, 2018 letter the Audio Division gives us an opportunity to file a curative ammendment to application for license BL-20180911ADH. A 30 (thirty) day term is given to file such a curative ammendment.

FCC letter states in (1) that the values of the analyzed measured non-directional inverse distance fields in Figure 2 (Sheet 2 of 2), Summary of Measured Field Strength Data are different from the values specified on the non-directional conductivity graphs.

RESPONSE: The Inverse Distance field for each azimuth in the non-directional is 299.7 mv/m/kw @ 1km, theoretically, as specified in each of the graphs. The other values included and titled: "Measured Non Directional Inverse Distance Field values" should be most correctly titled as "Measured Radiation from attenuation graphs at 1km.-NDA"

This concept is discussed in the book *Directional Broadcast Antennas (A guide to adjustment, measurement and testing) by Jack Layton* page 12-13. Copies of those pages are included. It was mentioned in this engineering just to establish that the actual non-directional pattern due to poor conductivity is quite different than the theoretical pattern.

We double checked the values for *Measured Radiation from attenuation graphs:* Please make this minor changes: 171 degrees - 240 instead of 245
196 degrees - 270 instead of 265
351 degrees - 125 instead of 130

Two pages, one including the "Measured Radiation from atten. graphs" column and one without it are included in this curative ammendment.

If you consider unnecessary to include the column "Measured radiation from attenuated graphs", please discard the page were it appears.

FCC letter states in (2) that the conductiviy of the non-directional and directional measurement graph analysis should be the same and do not match on the 81, 132 and 351

directions.

The graphs traced are the same for NDA and DA. However, by mistake they were incorrectly labeled in four instances on the mentioned azimuths. A copy of the page submitted in the previous curative ammendement with the corrections made is included. For azimuth 132 degree a segment of the #3 conductivity between 10 and 18 miles was omitted by mistake for the DA graph. In the corrected 132 degree graph that segment is included too for DA.

So, the conductivities for the 81, 132 and 351 should be the following for both DA and NDA.

81 degrees: 5, 3, 1.5 and 0.1
132 degrees: 5, 4, 3, 2
351 degrees: 1, 0.5

We apologize for the inconveniences caused.

Very truly yours,

Wifredo G. Blanco P.

ENG. WIFREDO G. BLANCO-PI
PE Lic. 5130 (PR)

emailed to: Son Nguyen (son.nguyen@fcc.gov)1 ; Edward Lubetzky (edward.lubetzky@fcc.gov)

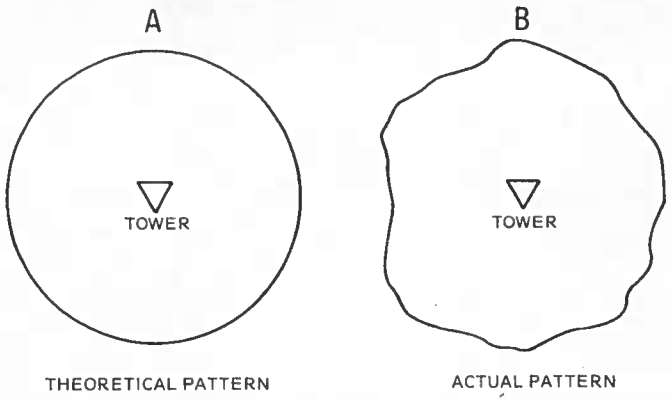

Fig. 1-4. The difference between theoretical and measured radiation from a typical tower.

discussed in the section on nondirectional and DA proof-of-performance measurement.

The term mV/m (millivolts per meter) has been thrown around rather freely in the past few paragraphs. It is a measure of voltage (signal strength) induced into a receiving antenna one meter long. The instrument used for measuring field strength, or radiated field, is called a *field intensity meter* (FIM). The modern field intensity meter uses a loop antenna. Its indicating instrument is calibrated in ranges from 100 uV/m (microvolts per meter) to 10 V/m (volts per meter) full scale.

For a moment, let's get back to the quarter-wave radiator described in the base impedance section. With a power of 1000W into this antenna, the *inverse* field produced at one mile from the antenna will approximate 190 mV/m. The actual *measured* field at one mile could be anywhere from very close to 190 mV/m (for very high ground conductivity) to considerably less than 190 mV/m)for very poor ground conductivity). If the frequency is low(e.g., 540 kHz), the actual measured field for this quarter-wave radiator over a given path will be higher in value than if the frequency were high (e.g., 1600 kHz).

Moving the point of measurement around the vertical radiator—keeping the distance between the radiator and

measuring point at one mile—we find that if ground conductivity remains constant, measured signal will remain constant (Fig. 1-4A). In other words, the radiation pattern produced along the ground from the single tower will be circular. Variations in the symmetry of the radiation pattern can be traced to such external influences upon the radiator as water tanks, other towers, etc., which can (and usually do) distort the circular pattern (Fig. 1-4B).

In actual practice, many measurements along each azimuth must be taken to determine field strength and ground conductivity. Single measurements at one mile can be in serious error due to external influence on the actual measuring point.

POWER vs RADIATED FIELD

In most antenna discussions, radiation in millivolts per meter is referred to a power of one kilowatt. For example, the inverse field of our previously described vertical radiator can be said to be 190 mV/m at *one mile per kilowatt*. If the same antenna is energized with 500W, the current in the antenna will drop to 0.707 of its previous value. The inverse radiation is proportional to antenna current, so it also falls to 0.707 of its previous value, or 134.5 mV/m at one mile. If we had actually measured 180 mV/m at one mile, it too would drop to 0.707 of its previous value, or to about 127 mV/m. On the other hand, if power is increased to 5000W, the antenna current, inverse field, and actual measured fields will increase to approximately 2.23 times those for a kilowatt.

Antenna current, inverse field, and actual measured fields increase or decrease in proportion to the square root of the power ratios.

Example 1. Power decreased from 1000W to 500W.

$$500/1000 = 0.5$$

Current, inverse field, and measured field decreased by $\sqrt{0.5}$ or 0.707.

VERTICAL ANGLES OF RADIATION

Up to this point, when the term "radiated field" was mentioned, it referred to the ground-wave

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1580 KHZ., 1.0 KW DA-D / 1.0 KW NDA-N, U

FIGURE 2 (Sheet 2 of 2)
BP-20170327AAF
30-Aug-18
(curative ammend. Dec/2018)

SUMMARY OF MEASURED FIELD STRENGTH DATA
(includes measured radiation from atten. graphs)
DAYTIME PATTERN: 1.08 KW, PHASE: -93 DEG. / RATIO: 0.87
NIGHTIME NON-DIRECTIONAL ANTENNA: 1.0 kw

RADIAL (DEG)	MEAS. RADIATION mv/m @ 1km (from atten. graphs)	INVERSE FIELD NON-DA mv/m @ 1km	INVERSE FIELD DA mv/m @ 1 km	STANDARD DA mv/m @ 1km
30	230	299.7	385	424
81	240	299.7	401	455
132	240	299.7	384	427
171	240	299.7	285	321
196	270	299.7	195	220
***261**	240	299.7	33.2	58
326	180	299.7	195	211
351	125	299.7	293	314

*RADIAL TO BE MONITORED

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RADIO STATION WVOZ, AGUADILLA P.R.
1580 KHZ., 1.0 KW DA-D / 1.0 KW NDA-N, U

FIGURE 2 (Sheet 2 of 2)
BP-20170327AAF
30-Aug-18
(curative ammend. Dec/2018)

SUMMARY OF MEASURED FIELD STRENGTH DATA
(not including measured radiation from atten. graphs)
DAYTIME PATTERN: 1.08 KW, PHASE: -93 DEG. / RATIO: 0.87
NIGHTIME NON-DIRECTIONAL ANTENNA: 1.0 kw

RADIAL (DEG)	INVERSE FIELD NON-DA mv/m @ 1km	INVERSE FIELD DA mv/m @ 1 km	STANDARD DA mv/m @ 1km
30	299.7	385	424
81	299.7	401	455
132	299.7	384	427
171	299.7	285	321
196	299.7	195	220
***261**	299.7	33.2	58
326	299.7	195	211
351	299.7	293	314

*RADIAL TO BE MONITORED

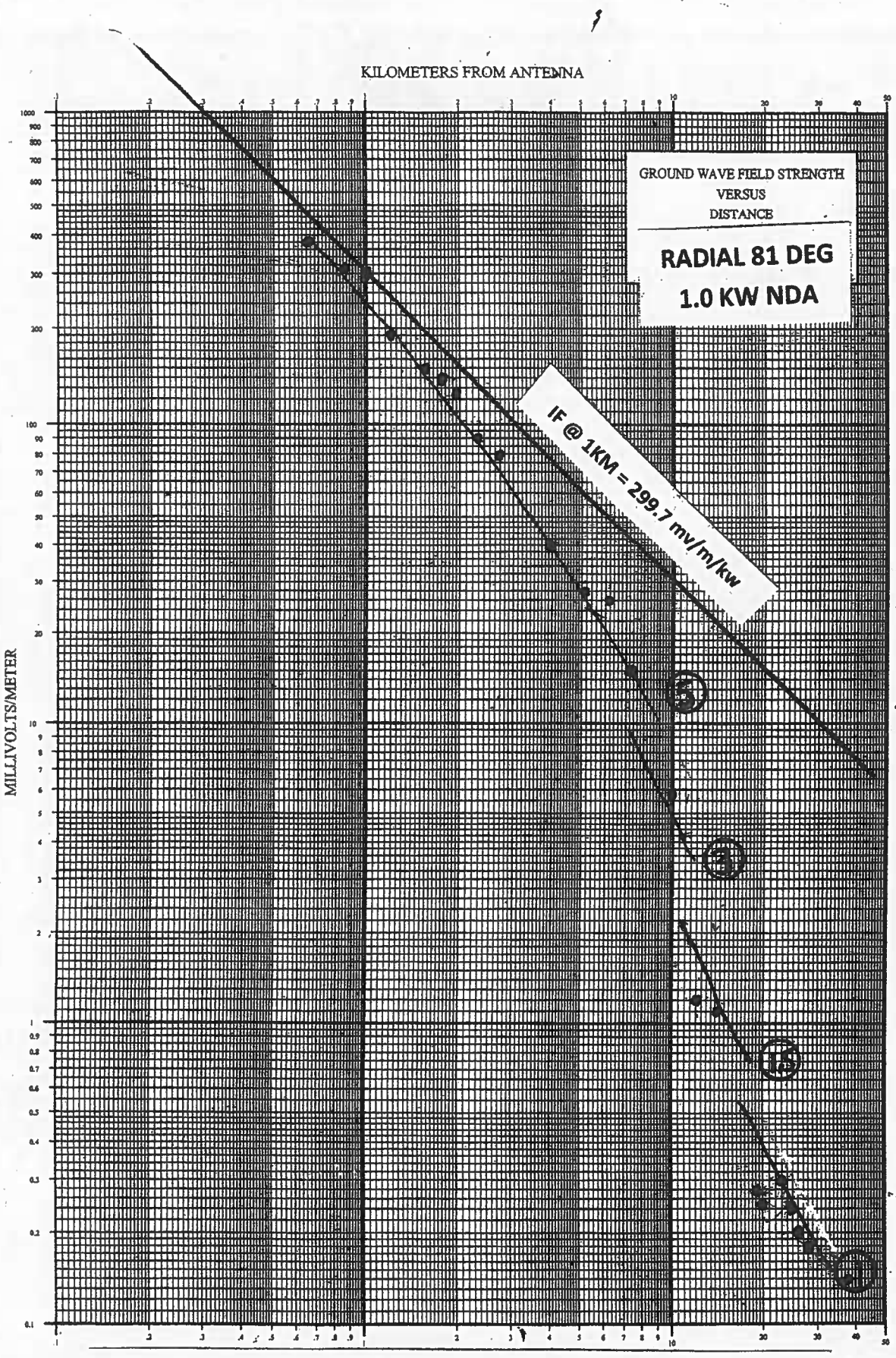

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FIGURE 4 (SHEET 3 OF 17)RADIO STATION WVOZ-AM AGUADILLA, P.R.

BP-20170327AAF - 1580 KHZ., 1.0 KW DA-D / 1.0 KW NDA-N, U

Oct. 5/2018 (Curative Ammendment)

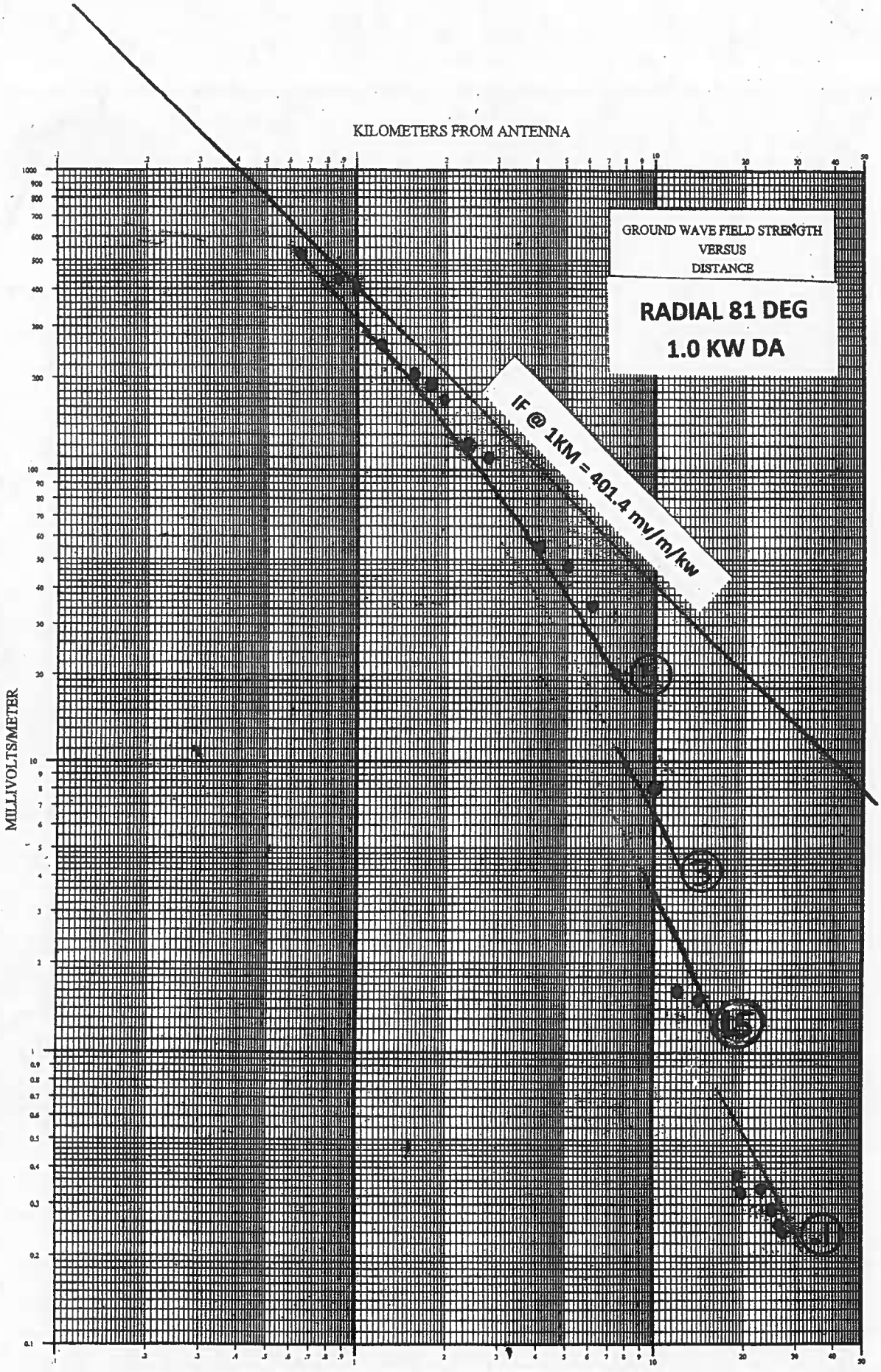

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FIGURE 4 (SHEET 11 OF 17)RADIO STATION WVOZ-AM AGUADILLA, P.R.

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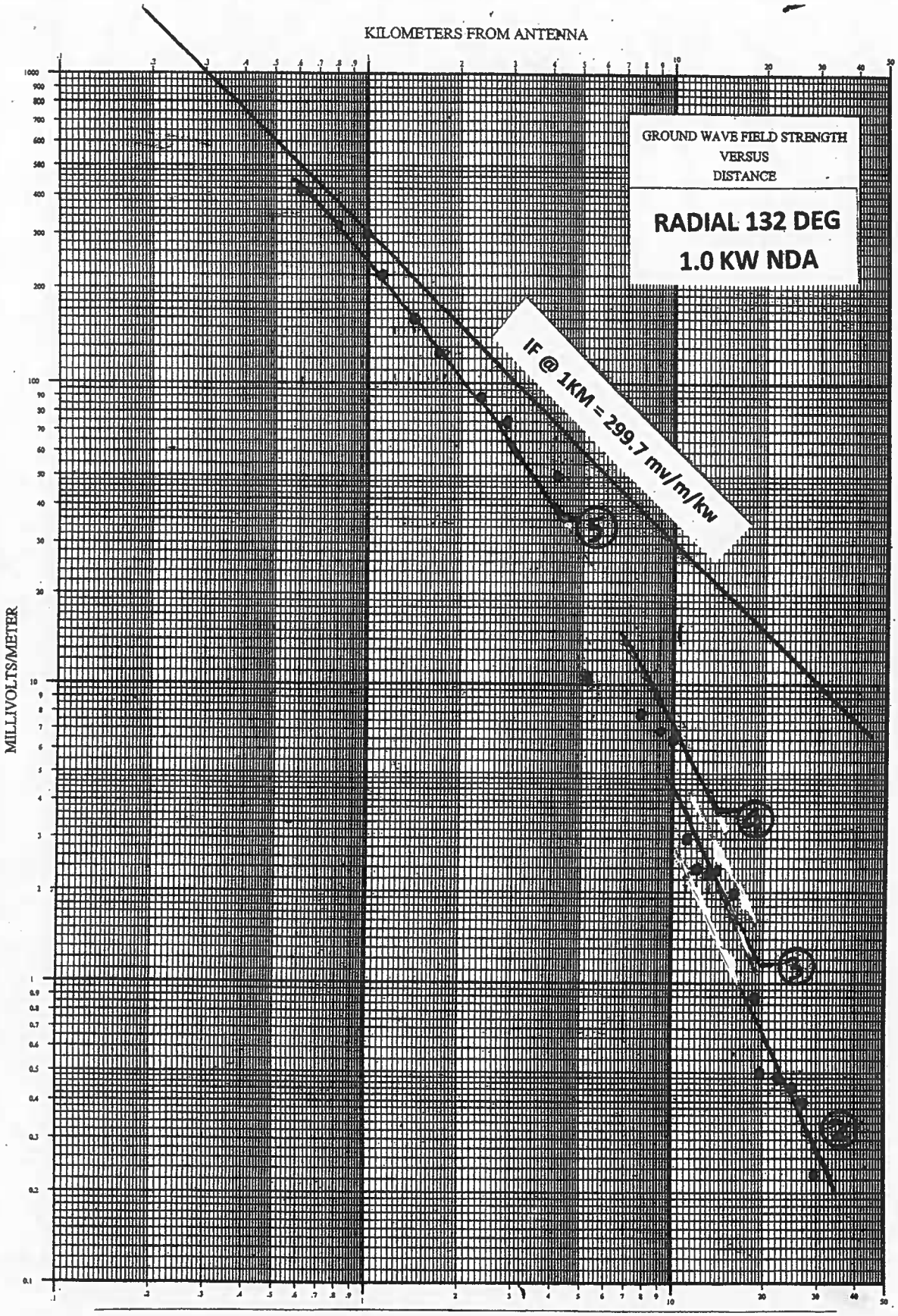

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FIGURE 4 (SHEET 4 OF 17)RADIO STATION WVOZ-AM AGUADILLA, P.R.

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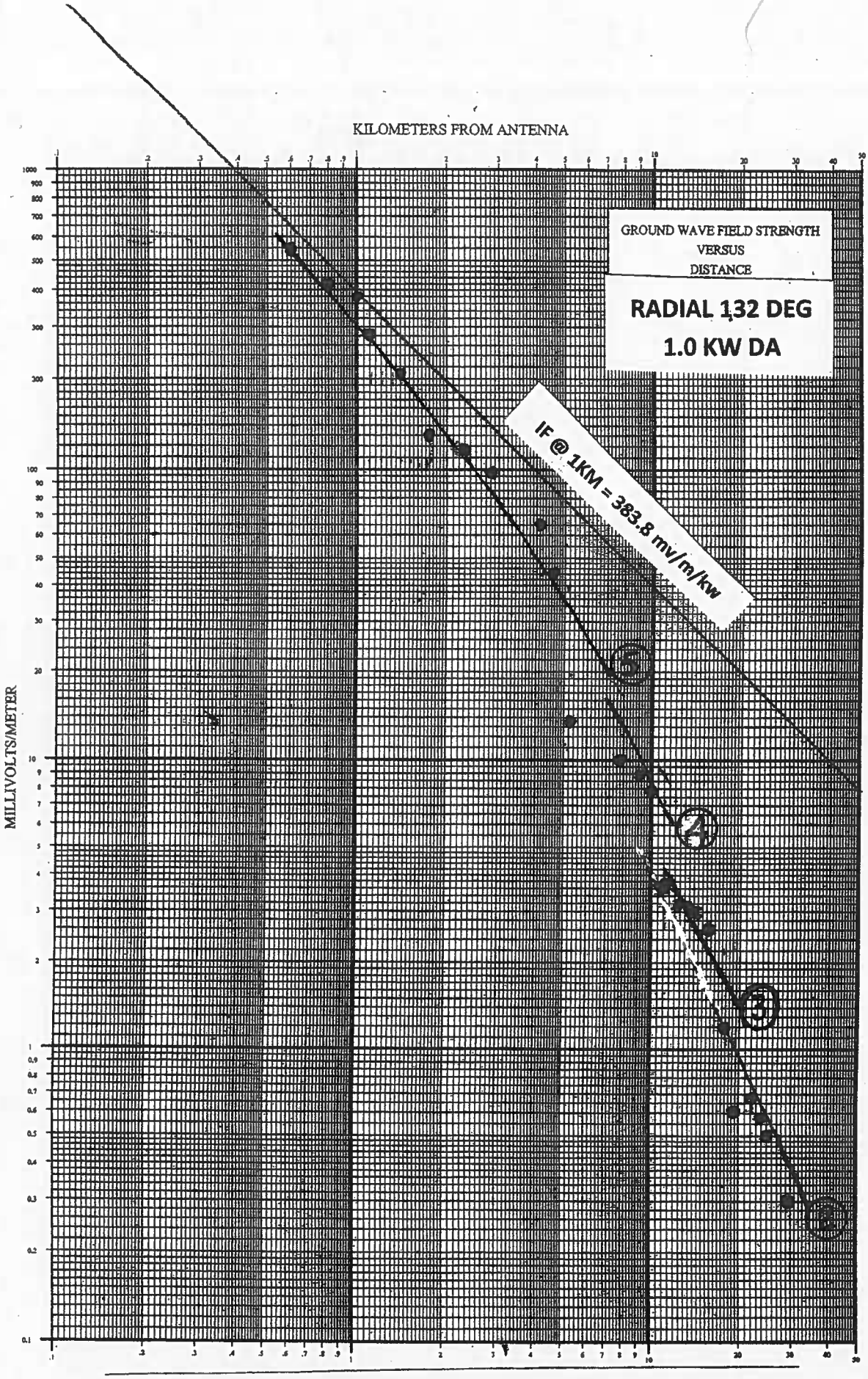

ENGINEERING EXHIBIT - APPLICATION FOR LICENSE

FIGURE 4 (SHEET 12 OF 17)RADIO STATION WVOZ-AM AGUADILLA, P.R.

BP-20170327AAF - 1580 KHZ., 1.0 KW DA-D / 1.0 KW NDA-N, U

Oct. 5/2018 (Curative Ammendment)

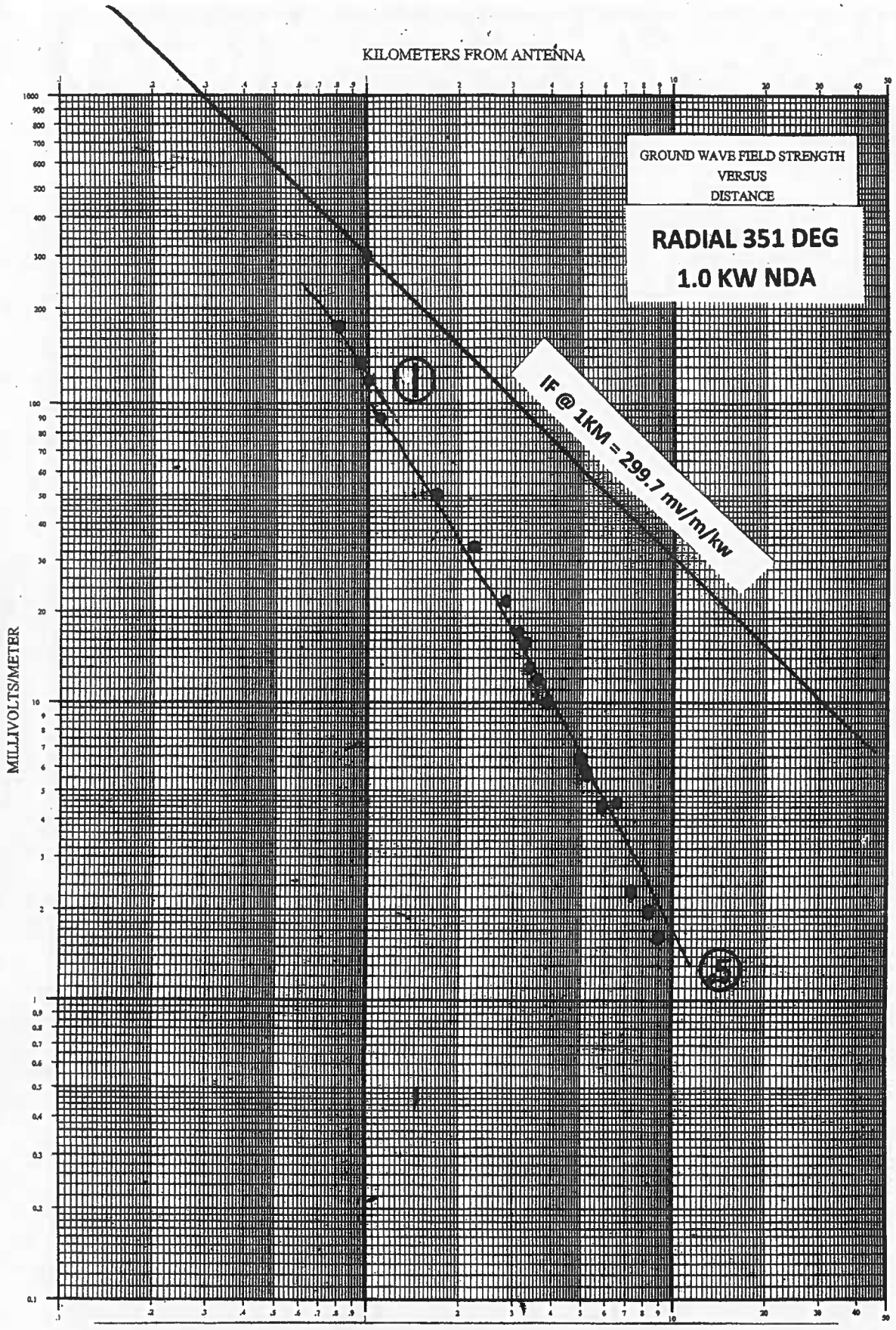

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FIGURE 4 (SHEET 9 OF 17)RADIO STATION WVOZ-AM AGUADILLA, P.R.

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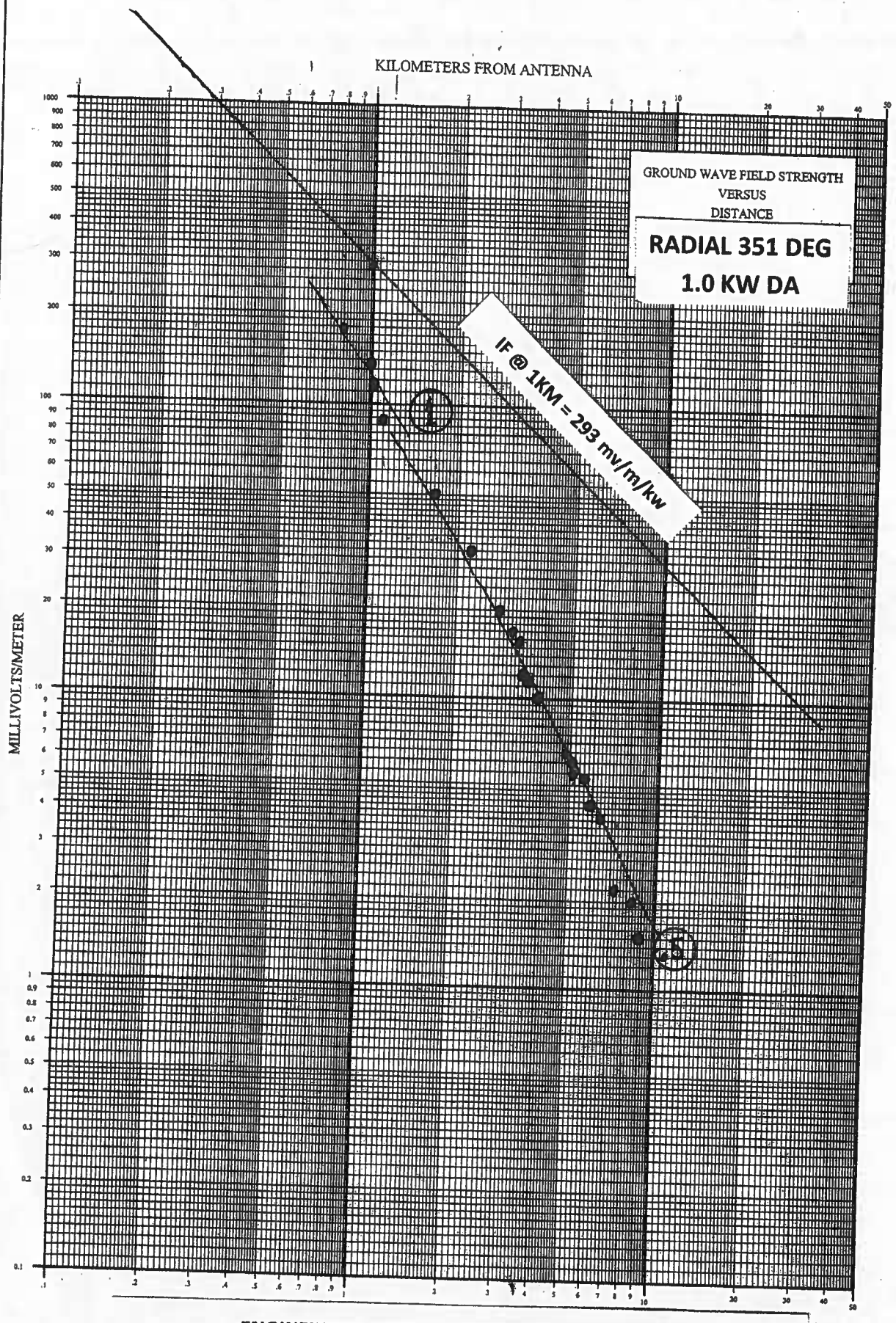

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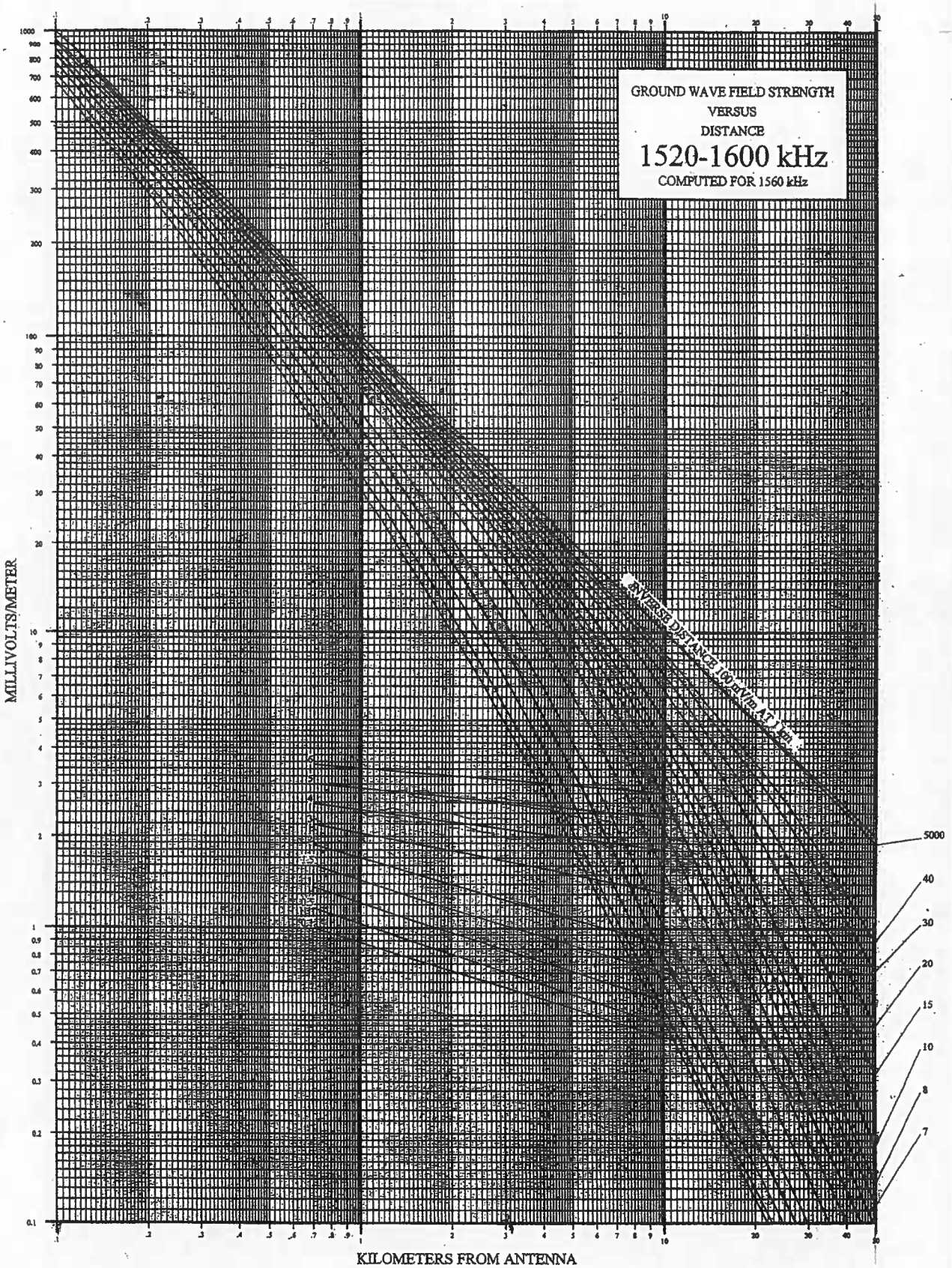
FIGURE 4 (SHEET 17 OF 17)RADIO STATION WVOZ-AM AGUADILLA, P.R.

BP-20170327AAF - 1580 KHZ., 1.0 KW DA-D / 1.0 KW NDA-N, U

KILOMETERS FROM ANTENNA



KILOMETERS FROM ANTENNA

GRAPH 19-A