

Measurement of MPE

1. Foreword

In adopt with the Human Exposure IEEE C95.1, and according to the FCC 1.1310. The *Maximum Permissible Exposure (MPE)* is obligated to measure in order to prove the safety of radiation harmfulness to the human body.

The *Gain* of the antenna used is measured in an *Anechoic chamber*. The *maximum total power to the antenna* is to be recorded. By adopting the *Friis Transmission Formula* and the *power gain of the antenna*, we can find the distance right away from the product, where the limit of the MPE is.

2. Description of EUT

EUT	:	2.4GHz Wireless LAN Access Point
Classification	:	Mobile Device
		(i) Under normal use condition, the antenna is at least 20cm away from the user;
		(ii) Warning statement for keeping 20cm separation distance and the prohibition of operating next to the person has been printed in the user's manual
Model No.	:	PCWA-A220
Granted FCC ID	:	NUSTMW1003S1
Frequency Range	:	2.412 GHz ~ 2.462GHz
Antenna Kit	:	2 space diversity antennas
Supported Channel:		11 Channel
Modulation Skill	:	DBPSK, DQPSK, CCK
Power Type	:	Powered by the AC-DC Switching Adapter
		Input: 100~240VAC / Output: +5VDC, 3A
Applicant	:	TOKO Inc.
		18, Oaza Gomigaya, Turugashima City,
		Saitama pref. 350.2281, Japan.

3. Limits for *Maximum Permissible Exposure (MPE)*

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	100	6
3.0-30	1842/f	4.89/f	900/f ²	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposure				
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
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

[The EUT is tested in transmit and receive modes and in the first, middle and the last channel separately. The following shows only our observation have the greatest emissions.]

According to **OET BULLETIN 56 Fourth Edition/August 1999, Equation for Predicting RF Fields:**

$$\text{Friis Transmission Formula: } S = \frac{PG}{4\pi R^2} = \frac{31.70 \times 0.832}{4\pi(20)^2} = 5.247 \times 10^{-3} \text{ mW/cm}^2$$

Where: S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

The Numeric gain G of antenna with a gain specified in dB is determined by:

$$G = \text{Log}^{-1} (\text{dB antenna gain}/10)$$

$$G = \text{Log}^{-1} (-0.8 / 10) = 0.832$$

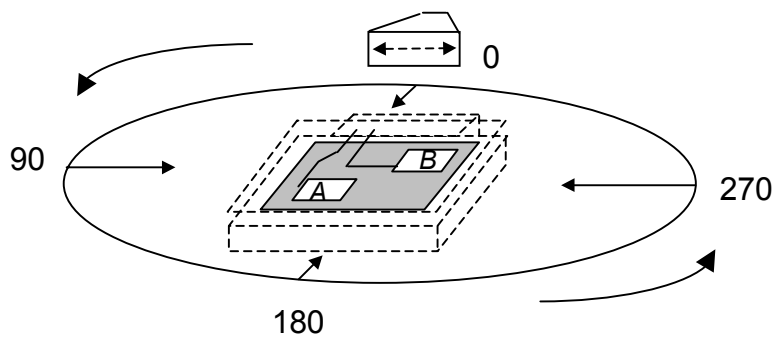
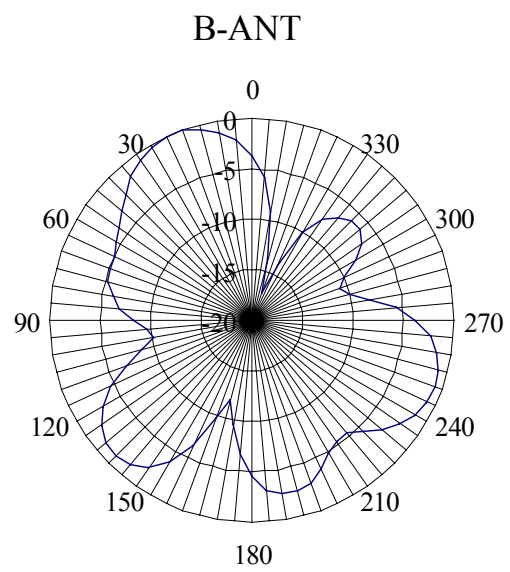
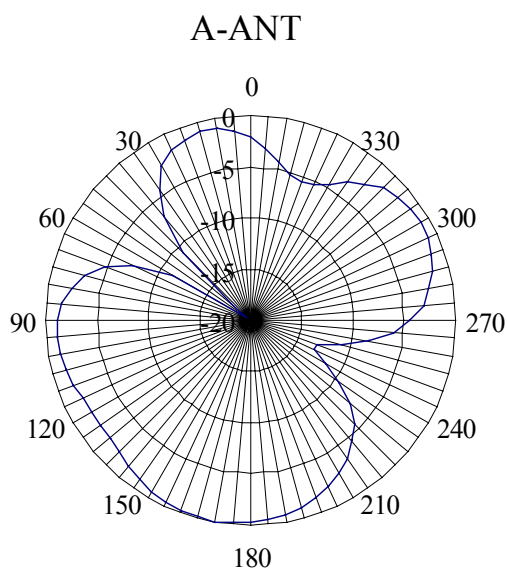
Radiation pattern Testing (1)

Antenna : 106-7586-00

Horizontal X-Y axis

Horizontally Radiated Emission

Test Frequency : 2.44GHz



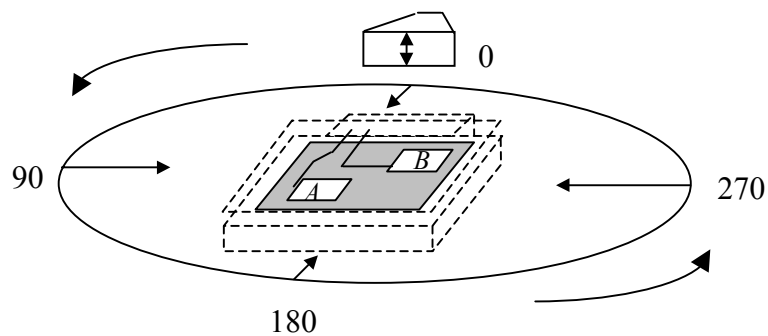
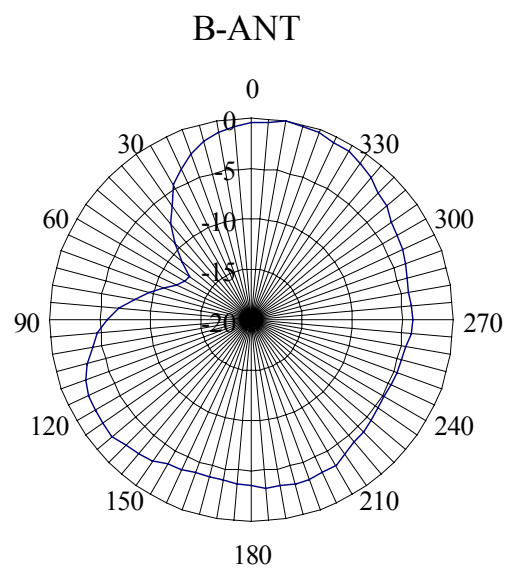
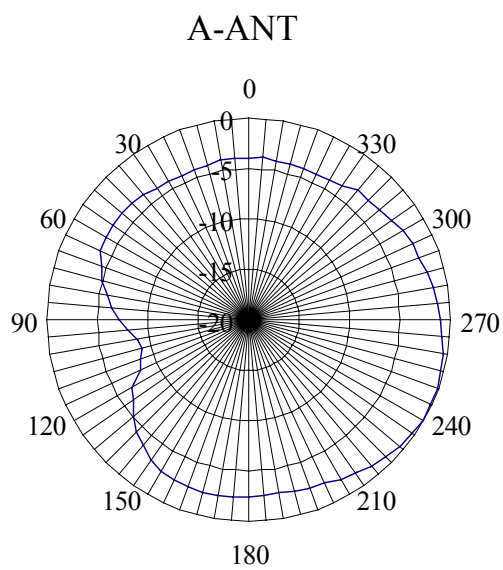
Radiation pattern Testing (2)

Antenna : 106-7586-00

Horizontal X-Y axis

Vertically Radiated Emission

Test Frequency : 2.44GHz



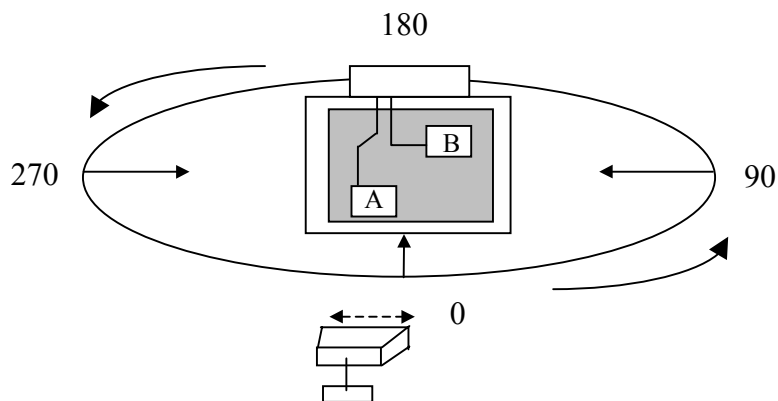
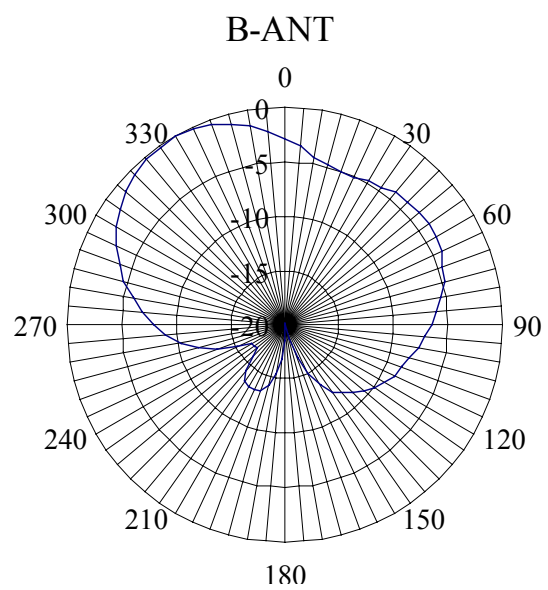
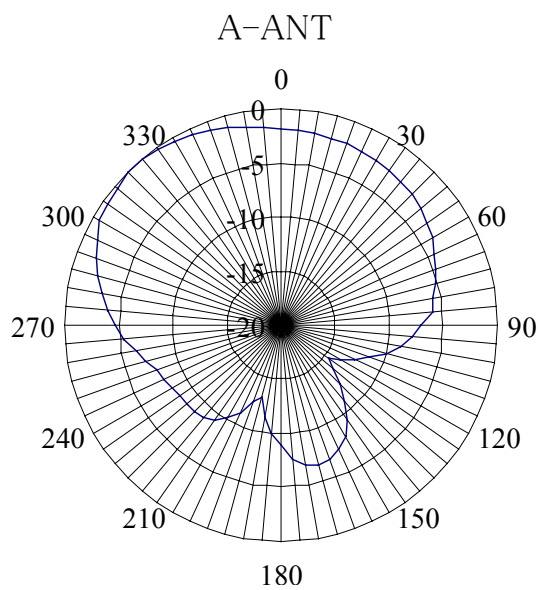
Radiation pattern Testing (3)

Antenna : 106-7586-00

Vertical Axis

Horizontally Radiated Emission

Test Frequency : 2.44GHz



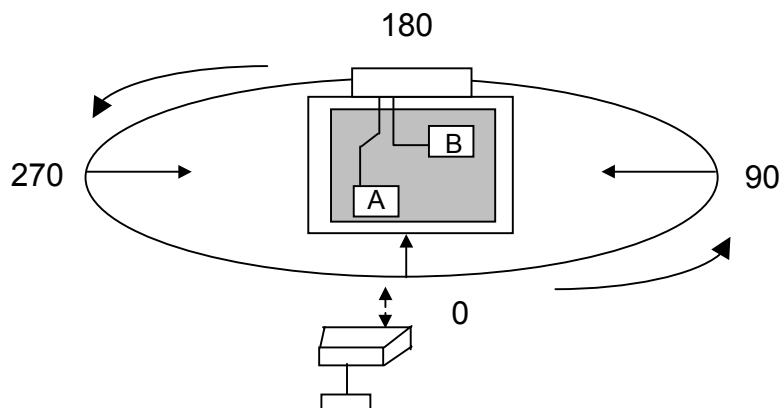
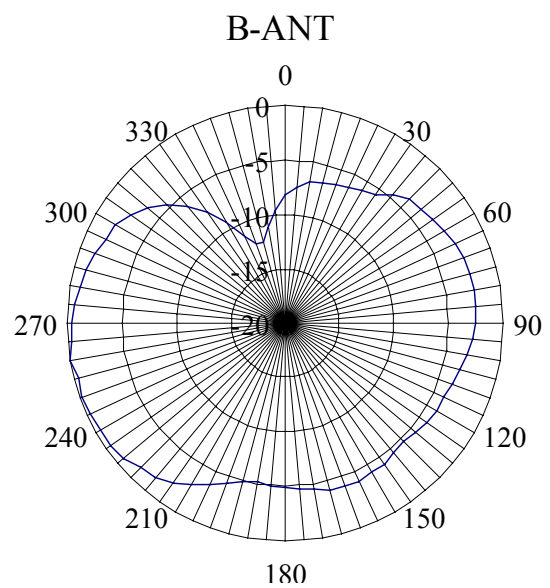
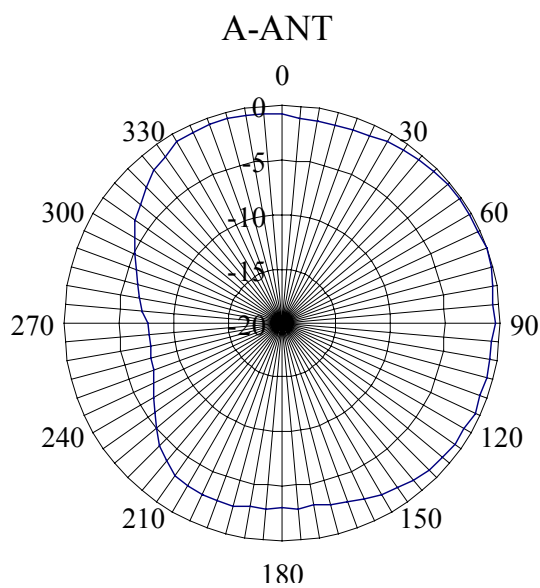
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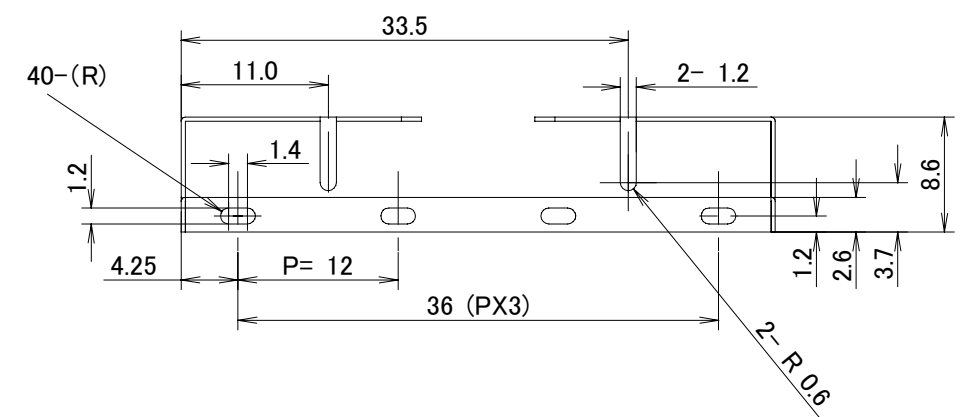
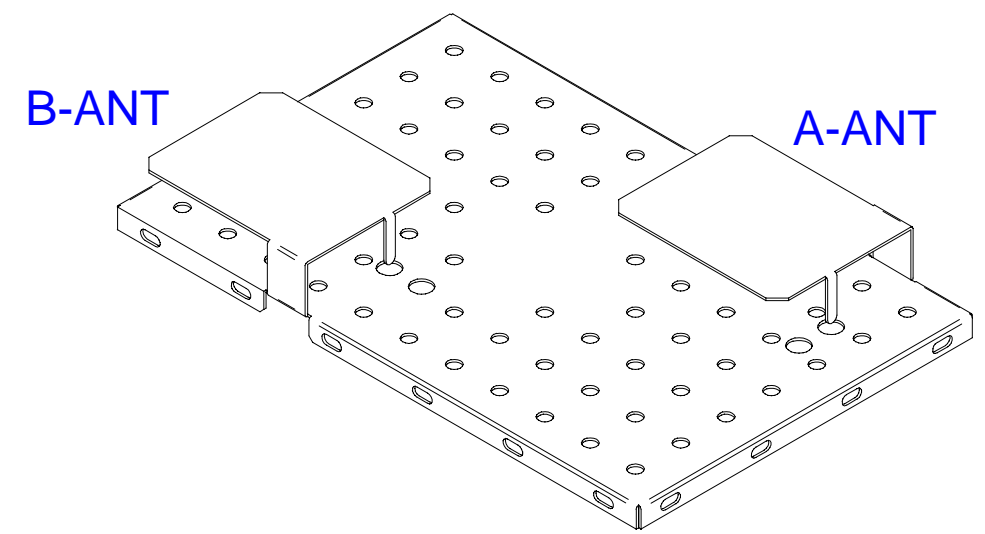
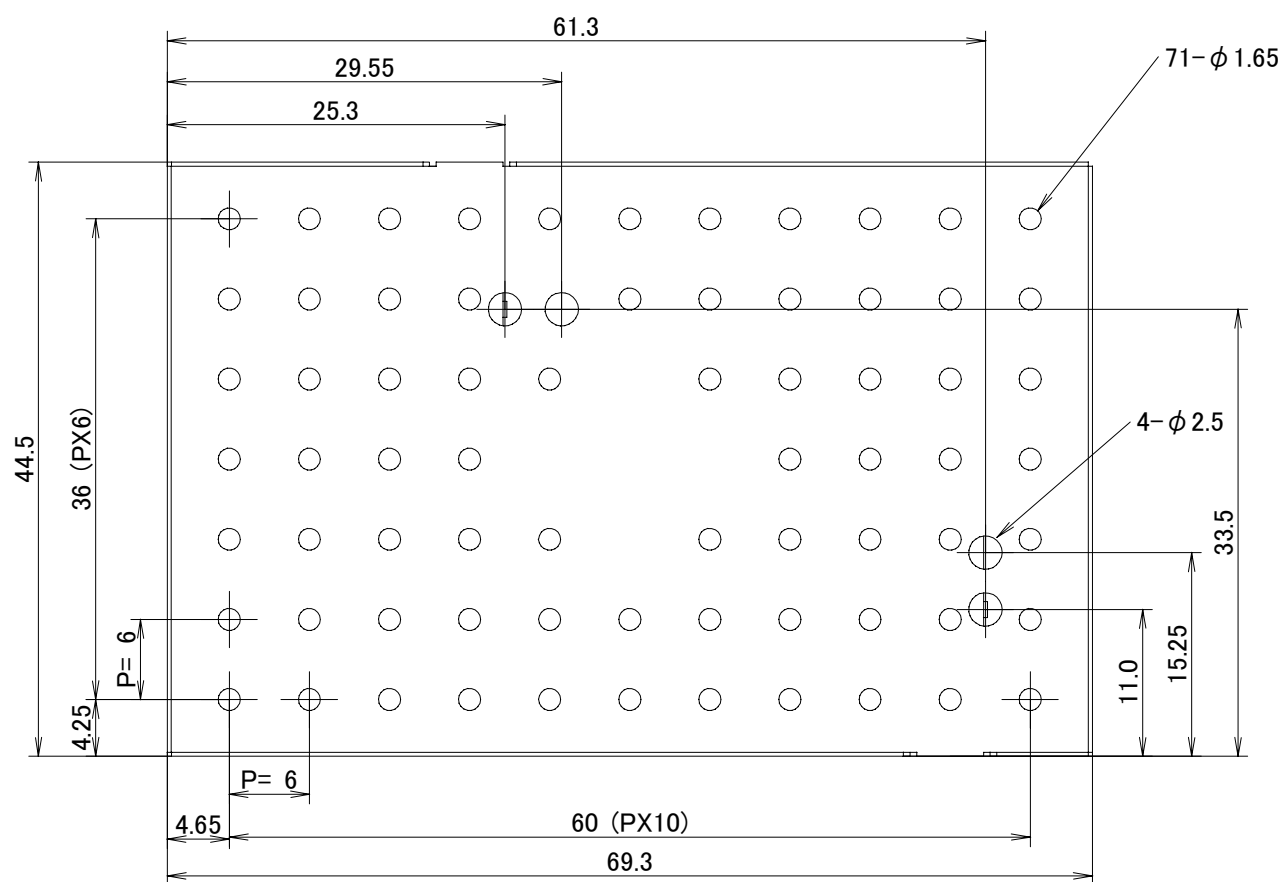
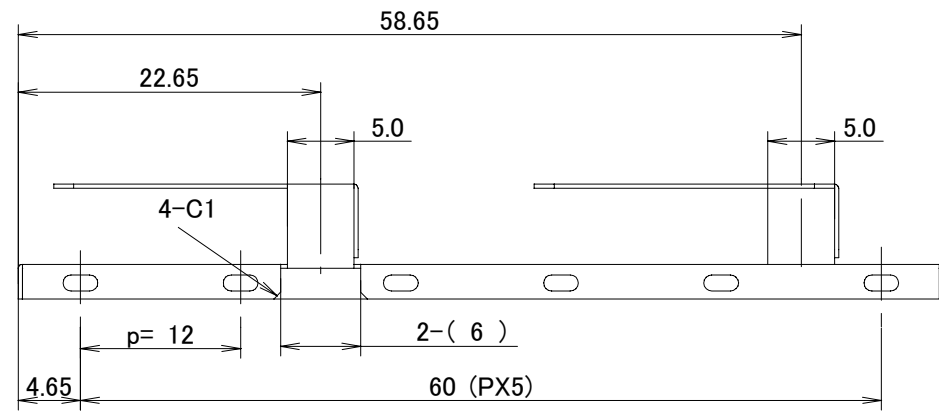
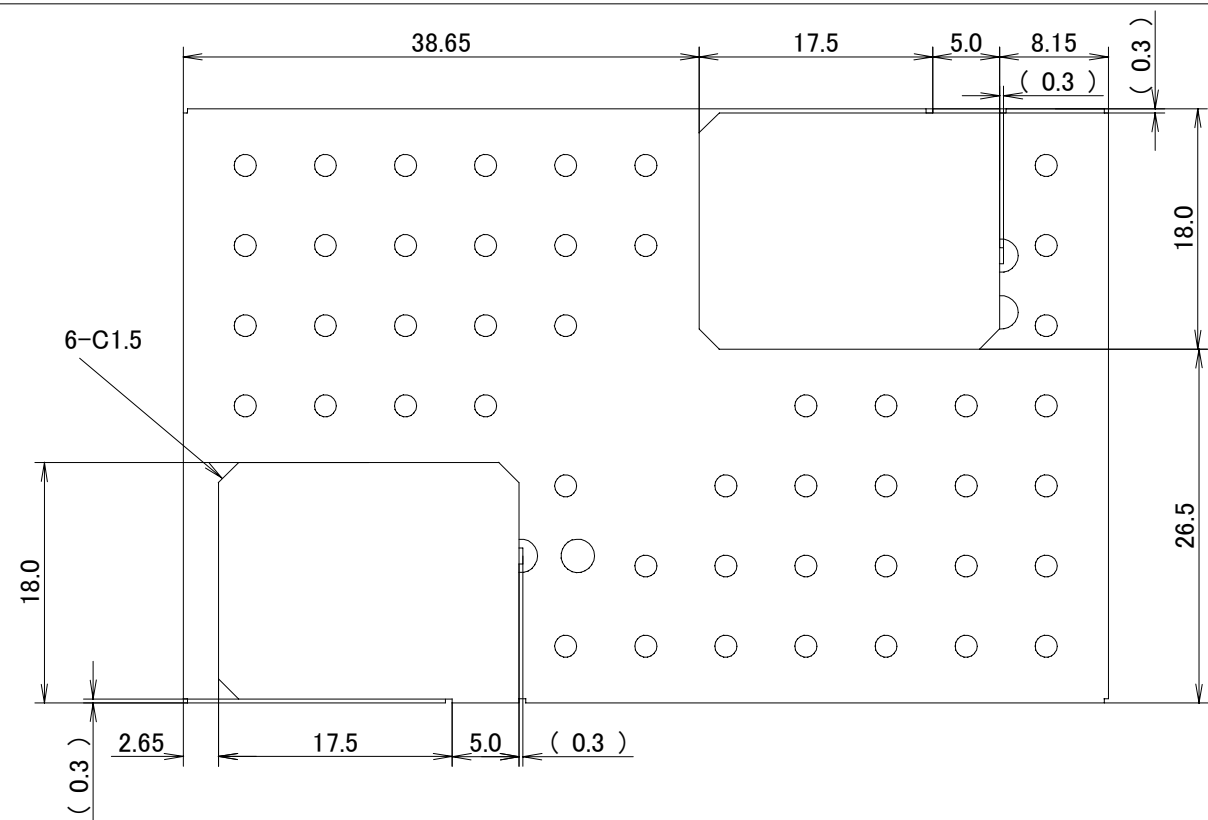
Antenna : 106-7586-00

Vertical axis

Vertically Radiated Emission

Test Frequency : 2.44GHz





注記

1. 反りは0.3以下のこと
2. バリ無きこと

				TOLERANCES	x.xx: ±0.1 x.x : ±0.1	MATERIALS	SPTE 2.8/2.8 t=0.3	
				TOLERANCES	x : ±0.2	FINISH		
				UNIT	mm	TENTATIVE No.		
				SCALE	/ free	PART No.	106-7586-00	
HISTRY	REVISION	APPROVED REVIEWED	DATE	APPROVED CHECKED	kan noguchi	2002 . 2 . 27 2002 . 2 . 27	TITLE	逆F ANTENNA付き Shield Case上
TOKO,INC.		THIRD ANGLE PROJECTION		DRAWN DESIGN	tsukamoto tsukamoto	2002 . 2 . 25 2002 . 2 . 25	DRAWING No.	3-106-7586