

CORRESPONDENCE

Marstech Limited

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Testing For FCC
Submissions/
Verifications

Engineering &
Administrative



Authorized by:
Professional Engineers
Ontario

Industry Canada
Industrie Canada
Approved Test Facility



To: Mr. Joe Dichoso **Date:** January 7, 1999
Company: FCC Lab - Maryland **Pages:** 12, including this cover sheet.
(FCC Application Processing Branch)
From: Bob Marshall
Reference: 98389D **Fax Log:** FCC-L002
Subject: FCC ID: AX292AJC215R
Applicant: Clarion Co. ltd.
Correspondence Reference No.: 5436
731 Confirmation No.: EA92004
Date of Original Email: 01/05/1999

COMMENTS:

- 1) Please see the attached Bank Draft dated October 13, 1998 and Fee Form submitted to Mellon Bank.
- 2) Please see attached E-mail from Jim Sims following your telecon with him Jan. 6/99.
- 3) Please see attached audio frequency response curves from Clarion.
- 4) & 5) Please see attached response from Clarion including transistor data sheets.

Please call us at (416) 246-1116, if you need further info.

Best Regards,

THE TORONTO-DOMINION BANK

1885 - 01527028

THE TORONTO-DOMINION BANK

WOODBRIDGE BRANCH

WOODBRIDGE, ONTARIO L4L 2G7

NO.

OCTOBER 13

98

19

- 1527028

PAYABLE FEDERAL COMMUNICATIONS COMMISSIO
TO

*****475.00

U.S. \$

475.00

DOLLARS

UNITED STATES CURRENCY

RECEIPT ONLY - NOT NEGOTIABLE

PLEASE RETAIN FOR PRESENTATION IN EVENT ORIGINAL LOST

AUTHORIZED OFFICER

NUMBER

COUNTERSIGNED

Clarion/JC-21TR #983890

READ INSTRUCTIONS CAREFULLY
BEFORE PROCEEDING

APPROVED BY OMB 3060-0589

ELECTRONIC FILING

FEDERAL COMMUNICATIONS COMMISSION
REMITTANCE ADVICE

SPECIAL USE

FCC USE ONLY

1) LOCKBOX # 358315

PAGE NO. 1 OF 1

SECTION A - PAYER INFORMATION

(2) PAYER NAME (If paying by credit card, enter name exactly as it appears on your card) Marstech Limited		(3) TOTAL AMOUNT PAID (dollars and cents) \$475.00 USD
(4) STREET ADDRESS LINE NO. 1 11 Kelfield Street		
(5) STREET ADDRESS LINE NO. 2		
(6) CITY Etobicoke, Ontario	(7) STATE	(8) ZIP CODE M9W 5A1
(9) DAYTIME TELEPHONE NUMBER (Include area code) (416) 246-1116	(10) COUNTRY CODE (if not in U.S.A.) CAN (CANADA)	

IF PAYER NAME AND THE APPLICANT NAME ARE DIFFERENT, COMPLETE SECTION B
IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159-C)

SECTION B - APPLICANT INFORMATION

(11) APPLICANT NAME (if paying by credit card, enter name exactly as it appears on your card) CLARION CO., LTD.		
(12) STREET ADDRESS LINE NO. 1 50 Kamitoda		
(13) STREET ADDRESS LINE NO. 2		
(14) CITY Toda Saitama	(15) STATE	(16) ZIP CODE 335-8511
(17) DAYTIME TELEPHONE NUMBER (include area code) 81 48 443 1111 Ext. 665	(18) COUNTRY CODE (if not in U.S.A.) JAPAN	

COMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEETS (FORM 159-C)

SECTION C - PAYMENT INFORMATION

(19A) FCC CALL SIGN/OTHER ID	(20A) PAYMENT TYPE CODE (PTC) E F T	(21A) QUANTITY 1	(22A) FEE DUE FOR (PTC) IN BLOCK 20A \$475.00 USD	FCC USE ONLY
(23A) FCC CODE 1		(24A) FCC CODE 2		
(19B) FCC CALL SIGN/OTHER ID	(20B) PAYMENT TYPE CODE (PTC)	(21B) QUANTITY	(22B) FEE DUE FOR (PTC) IN BLOCK 20B	FCC USE ONLY
(23B) FCC CODE 1		(24B) FCC CODE 2		
(19C) FCC CALL SIGN/OTHER ID	(20C) PAYMENT TYPE CODE (PTC)	(21C) QUANTITY	(22C) FEE DUE FOR (PTC) IN BLOCK 20C	FCC USE ONLY
(23C) FCC CODE 1		(24C) FCC CODE 2		
(19D) FCC CALL SIGN/OTHER ID	(20D) PAYMENT TYPE CODE (PTC)	(21D) QUANTITY	(22D) FEE DUE FOR (PTC) IN BLOCK 20D	FCC USE ONLY
(23D) FCC CODE 1		(24D) FCC CODE 2		

SECTION D - TAXPAYER INFORMATION (REQUIRED)

(25) PAYER TIN 4 1 6 2 4 6 1 1 1 6	(26) COMPLETE THIS BLOCK ONLY IF APPLICANT NAME IN B-11 IS DIFFERENT FROM PAYER NAME IN A-2 APPLICANT TIN 8 1 4 8 4 4 3 11 11
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SECTION E - CERTIFICATION

(27) CERTIFICATION STATEMENT
I, Robert G. Marshall, P. Eng., Certify under penalty of perjury that the foregoing and supporting information
(PRINT NAME)
are true and correct to the best of my knowledge, information and belief. SIGNATURE Robert Marshall

SECTION F - CREDIT CARD PAYMENT INFORMATION

(28) MASTERCARD/VISA ACCOUNT NUMBER: MASTERCARD VISA	EXPIRATION DATE MONTH YEAR DATE	AUTHORIZED SIGNATURE I hereby authorize the FCC to charge my VISA or MASTERCARD for the services/authorizations herein described.
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SEE PUBLIC BURDEN ESTIMATE ON REVERSE

FCC FORM 159 JULY 1997 (REVISED)

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--- E-MAIL ---

TO: MR. BOB MARSHALL (Marstech Ltd.)
FROM: JIM SIMS (Com-Serve Corporation; TEL VOICE: 519 748-4890)
DATE: January 06, 1999
SUBJECT: Clarion JC215HMobile "CB" Transceiver Page 1 of 1.

BOB, AS PER OUR TELEPHONE CONVERSATION THIS MORNING, I HAVE THE FOLLOWING COMMENTS.

THE SPURIOUS RADIATED LIMITS WERE CALCULATED AS FOLLOWS:

- MAXIMUM TRANSMITTER OUTPUT TOTAL POWER or Pt = 3.4 Watts.
- ASSUME ALL MEASUREMENTS ARE RELATED TO ½ WAVE TUNED DIPOLE ANTENNAS AS PER FCC REGULATIONS.
- APPLY FORMULA TO ESTABLISH FIELD STRENGTH OF 3.4 W CARRIER (Pt) AT A DISTANCE OF 3 (THREE) METRES.

- FORMULA IS
$$\frac{\sqrt{49.2 * P_t}}{\text{Distance (M)}}$$

- RESULTS = $\text{sqrt}(49.2 * 3.4 = 167.28) = 12.93368 \div 3 = 4.311227 \text{ V/M}$
- AS PER FCC PART 90, REDUCE THIS LEVEL BY AT LEAST -60dB = **4,311 μ V/M**

AS FAR AS THE RADIO RECEIVER L.O. IS CONCERNED, THE APPLICABLE BAND WAS SCANNED; NO EMISSIONS WERE FOUND. WE ALSO MEASURED 25 MHz TO 30 MHz CAREFULLY, ONCE AGAIN THERE WERE NO RECEIVER L.O. EMISSIONS FOUND.

REGARDS

Jim

In response to your Fax CLA 002

I attached two curves of the audio frequency response.

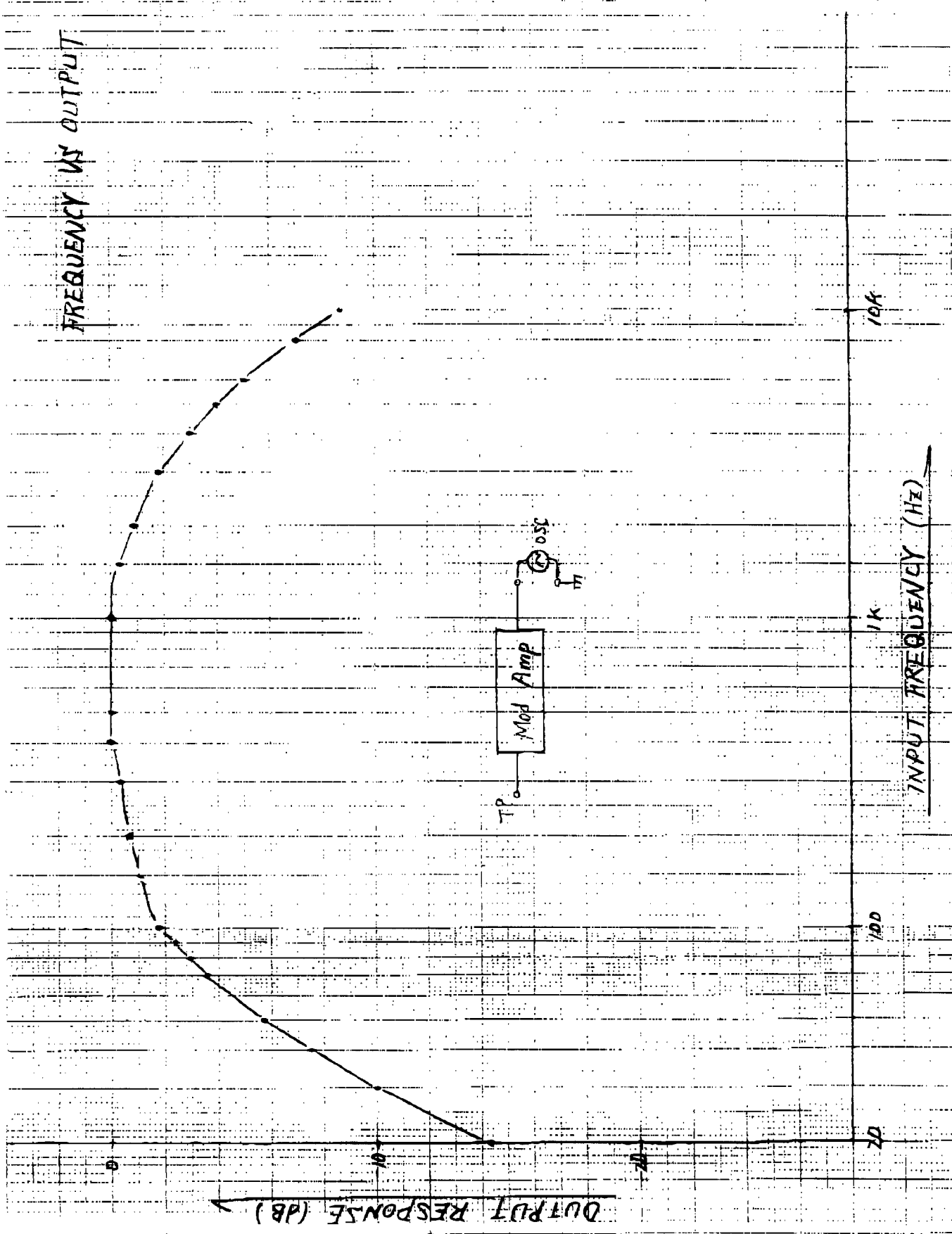
One is the curve of the response for Mod Amp in the block diagram which is located ALC and the modulated stage.

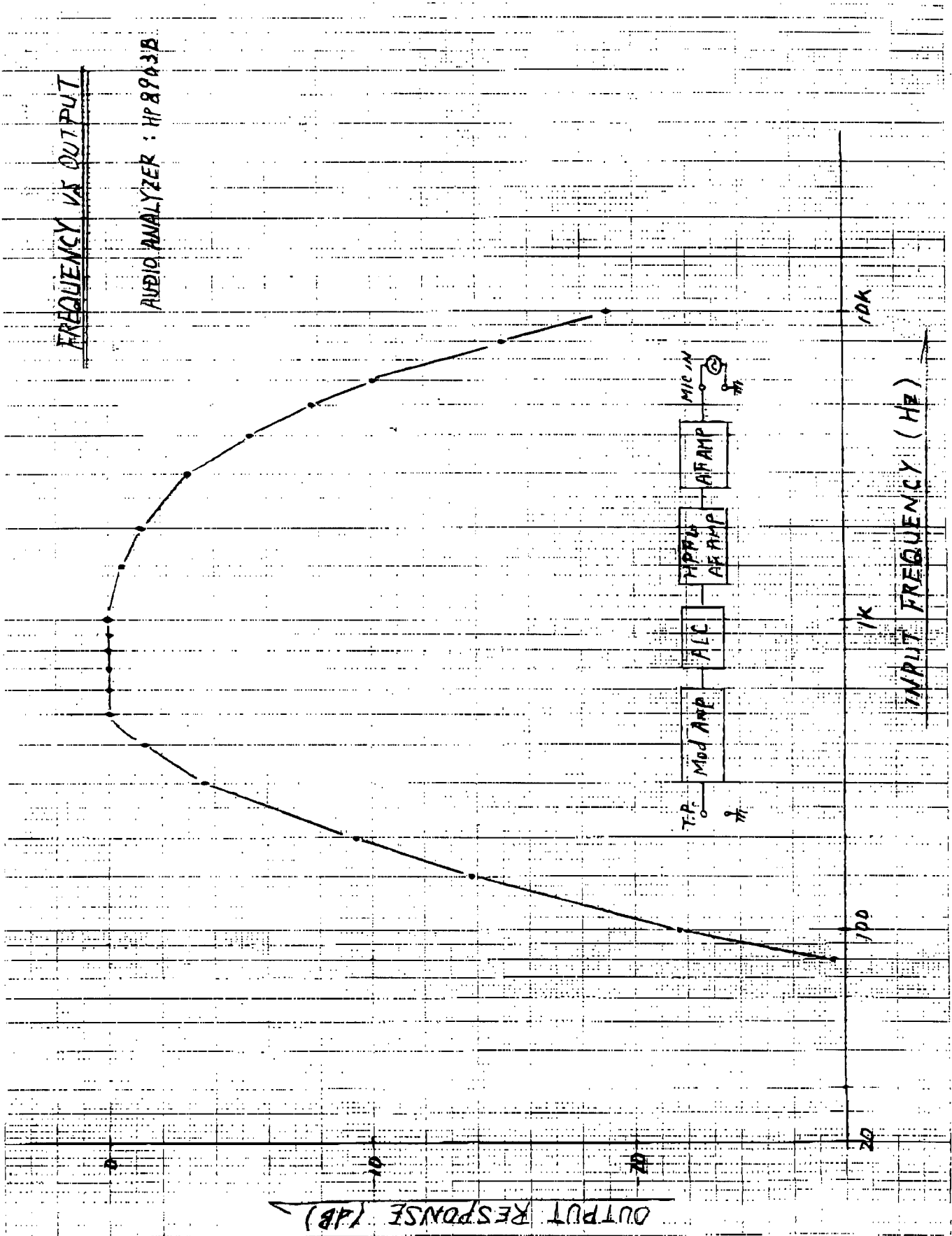
The other is one between the microphone input and the modulated stage.

But I don't quite understand what FCC intends by knowing the curve.

Usually an audio limiter followed by a low pass filter are provided in the audio circuit cause some harmonic distortion due to clipping signal when it is large enough. I assumed that this was concerned by FCC.

But our CB unit doesn't have an audio limiter. Instead of the limiter it has a ALC automatic level control circuit to control the audio level without generating any harmonic distortion.





In response to your Fax CIA 001,

1. Protection against out-of-band operation

First the generation of the radio waves in the CB band are performed by a PLL (phased locked loop) synthesizer based on the fully strict timebase of the crystal oscillator. The setting of the channel is performed by sending the channel data from the microprocessor to the PLL circuit in accordance with the user operation in the controller unit. The microprocessor has a memory table with a relation between the channel numbers and frequency datas sent to the PLL just listed as CB transmitter channel frequencies in Section 95.625.

So it is impossible to generate to send out-of-band frequencies.

Secondly when something wrong happened with the PLL synthesizer, unlock signal is detected by the microprocessor and the transmission should be prohibited automatically.

2. CB transmitter power

I attached a datasheet for 2SC1945.

We designed the collector supply voltage between 6 and 7volts and input power is around 0.2w. That concludes that the transmitter power can not exceed 10 watts from the curve of output power vs. collector supply voltage .

2SC1945**NPN EPITAXIAL PLANAR TYPE****DESCRIPTION**

2SC1945 is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers on HF band mobile radio applications.

FEATURES

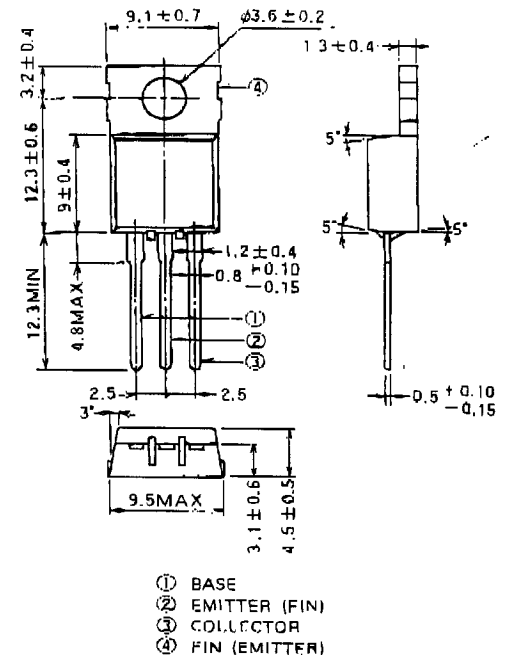
- High power gain: $G_{pe} \geq 14.5\text{dB}$
@ $V_{CC} = 12\text{V}$, $P_O = 14\text{W}$, $f = 27\text{MHz}$
- Emitter ballasted construction for high reliability and good performances.
- TO-220 package similarly is combinient for mounting.
- Ability of withstanding infinite load VSWR when operated at $V_{CC} = 16\text{V}$, $P_O = 18\text{W}$, $f = 27\text{MHz}$.

APPLICATION

10 to 14 watts output power class AB amplifiers applications in HF band.

OUTLINE DRAWING

Dimensions in mm

**ABSOLUTE MAXIMUM RATINGS** ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Rating	Unit
V_{CBO}	Collector to base voltage		80	V
V_{EBO}	Emitter to base voltage		5	V
V_{CE0}	Collector to emitter voltage	$R_{\theta E} = \infty$	40	V
I_C	Collector current		6	A
P_C	Collector dissipation	$T_a = 25^\circ\text{C}$	1.5	W
		$T_C = 25^\circ\text{C}$	20	W
T_j	Junction temperature		+150	$^\circ\text{C}$
T_{stg}	Storage temperature		-55 ~ +150	$^\circ\text{C}$
$R_{\theta a}$	Thermal resistance	Junction to ambient	83.3	$^\circ\text{C/W}$
$R_{\theta c}$		Junction to case	6.25	$^\circ\text{C/W}$

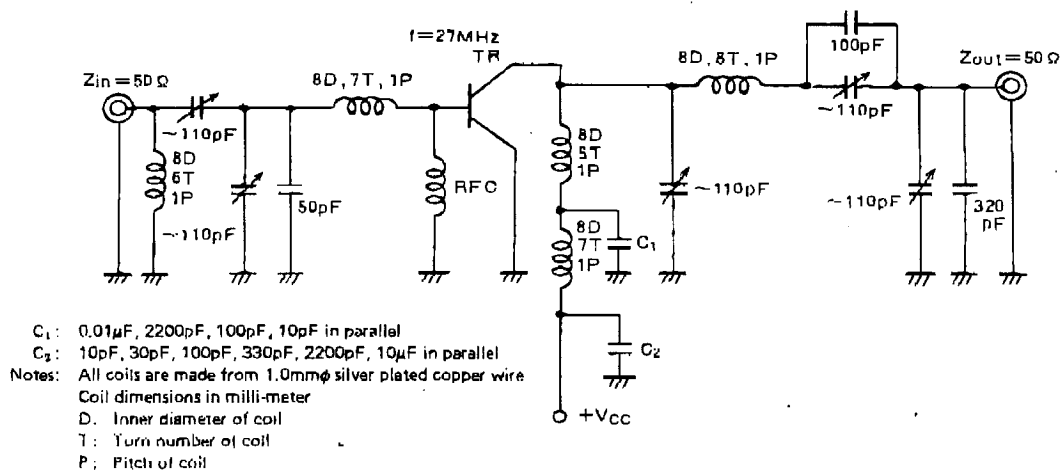
ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$V_{(BR)EBO}$	Emitter to base breakdown voltage	$I_E = 5\text{mA}$, $I_C = 0$	5			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	$I_C = 1\text{mA}$, $I_E = 0$	80			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	$I_C = 10\text{mA}$, $R_{\theta E} = \infty$	40			V
I_{CBO}	Collector cutoff current	$V_{CB} = 30\text{V}$, $I_E = 0$			100	μA
I_{EBO}	Emitter cutoff current	$V_{EB} = 4\text{V}$, $I_C = 0$			100	μA
h_{FE}	DC forward current gain *	$V_{CE} = 10\text{V}$, $I_C = 0.1\text{A}$	10	50	180	—
P_O	Output power	$V_{CC} = 12\text{V}$, $P_{in} = 0.5\text{W}$, $f = 27\text{MHz}$	14	16		W
η_C	Collector efficiency		60	70		%

* Note: Pulse test, $P_w = 150\mu\text{s}$, duty = 5%

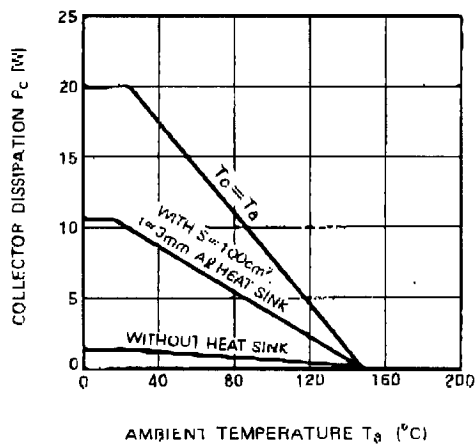
NPN EPITAXIAL PLANAR TYPE

TEST CIRCUIT

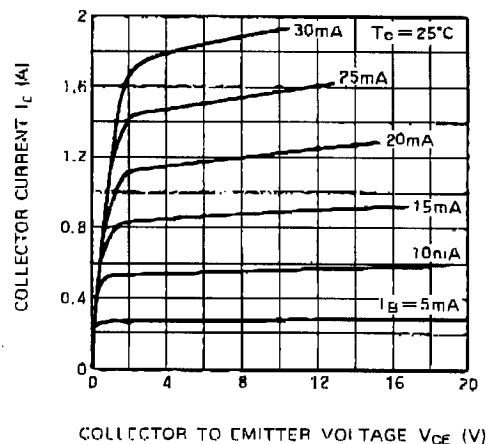


TYPICAL PERFORMANCE DATA

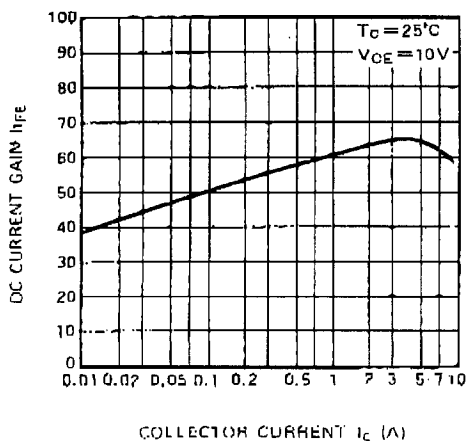
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



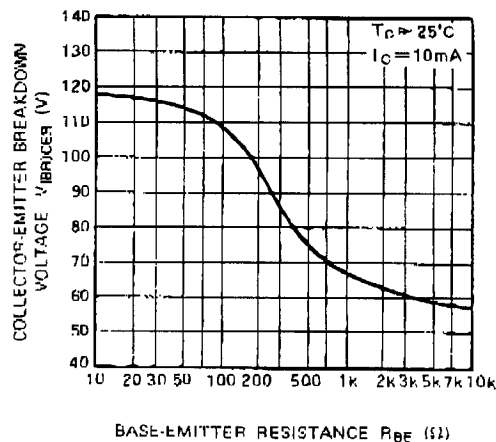
OUTPUT CHARACTERISTICS, COMMON EMITTER



DC CURRENT GAIN VS. COLLECTOR CURRENT

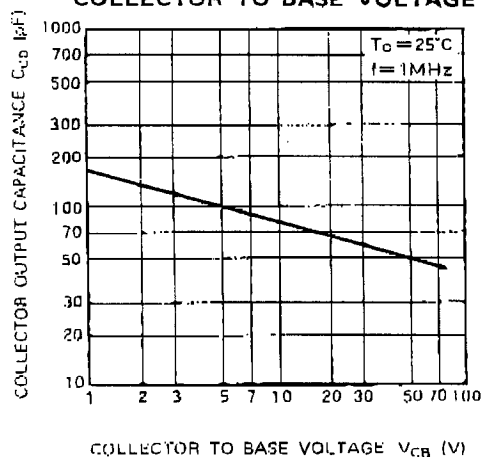


COLLECTOR-EMITTER BREAKDOWN VOLTAGE VS. BASE-EMITTER RESISTANCE

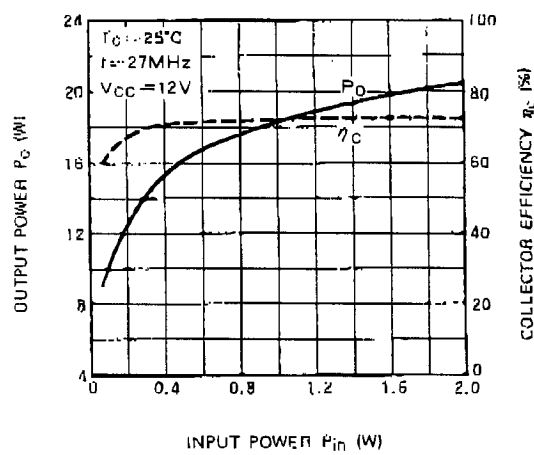


NPN EPITAXIAL PLANAR TYPE

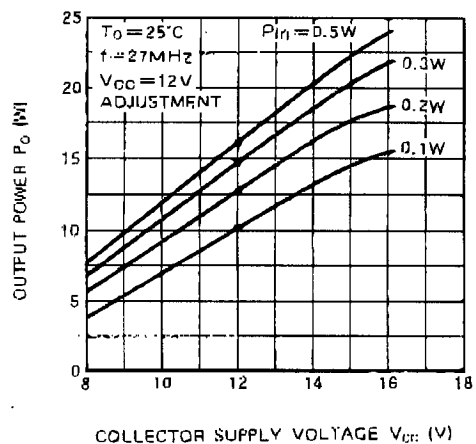
**COLLECTOR OUTPUT CAPACITANCE VS.
COLLECTOR TO BASE VOLTAGE**



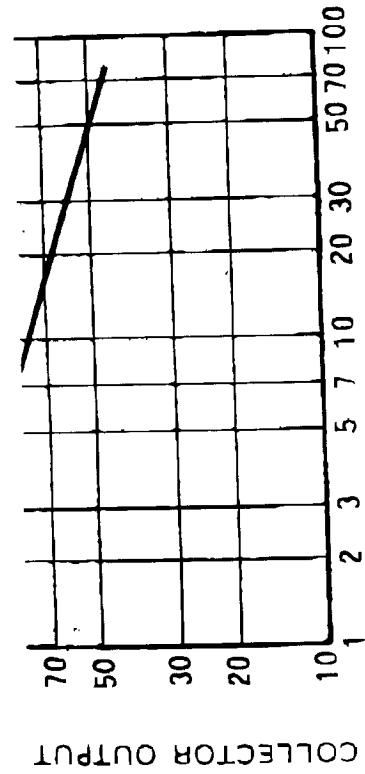
**OUTPUT POWER,
COLLECTOR EFFICIENCY
VS. INPUT POWER**



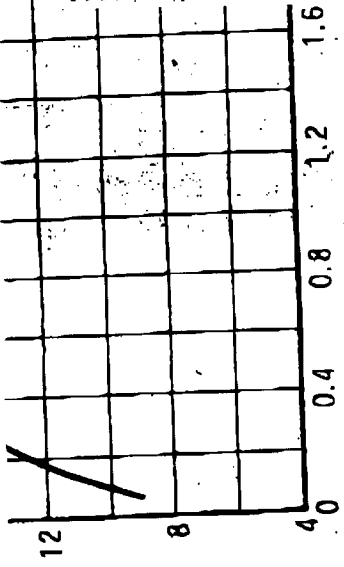
**OUTPUT POWER VS. COLLECTOR
SUPPLY VOLTAGE**



OUTPUT POWER



INPUT POWER P_{in} (W)



OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE

