



Test Report:

2W04669

Applicant:

Multitone Electronics PLC
Multitone House,
Beggarwood Lane,
Kempshott Hill,
Basingstoke,
Hampshire, England RG23 7LL

**Equipment Under Test:
(EUT)**

Multitone UHF Radio – RPE673
447-470MHz

FCC ID:

E86RPE673

In Accordance With:

FCC Part 90

Tested By:

Nemko Canada Inc.
3325 River Road, R.R. 5
Ottawa, Ontario K1V 1H2

Authorized By:

J. Harrington, RF Group Manager

Date:

28 March 2002

Total Number of Pages:

24

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EQUIPMENT: RPE673
FCC ID: E86RPE673

Section 1. Summary of Test Results

General

All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 90.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit



Equipment Code

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See " Summary of Test Data".



NVLAP LAB CODE: 100351-0

TESTED BY: Glen Westwell, Wireless Technologist

DATE: 28 March 2002

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This report applies only to the items tested.

*EQUIPMENT: RPE673**FCC ID: E86RPE673*

Summary Of Test Data

Name Of Test	Para. No.	Result
RF Power Output	2.1046	Complies
Occupied Bandwidth	2.1049	Complies
Spurious Emissions at Antenna Terminals	2.1051	Complies
Field Strength of Spurious Emissions	2.1053	Complies
Frequency Stability	2.1055	Complies
Transient Frequency Behavior	—	Complies

Footnotes For N/A's:

Indoor Temperature: 24°C
 Humidity: 44%

Outdoor Temperature: 5°C
 Humidity: 48%

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EQUIPMENT: RPE673

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Section 2. General Equipment Specification

Manufacturer: Multitone Electronics PLC

Model No.: RPE673

Serial No.: 8551:03

Date Received In Laboratory: 25 Feb. 2002

Nemko Identification No.: #1

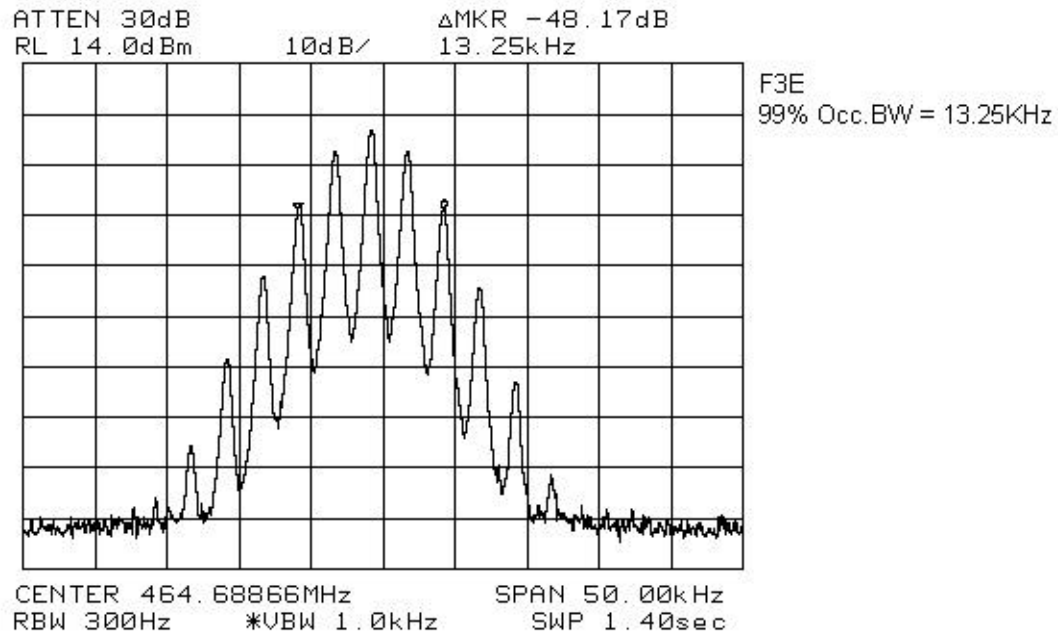
Transmit Frequency: 464.6875MHz

RF Power Output: 2.5W

Emission Designator: 16K0F1D, F3E

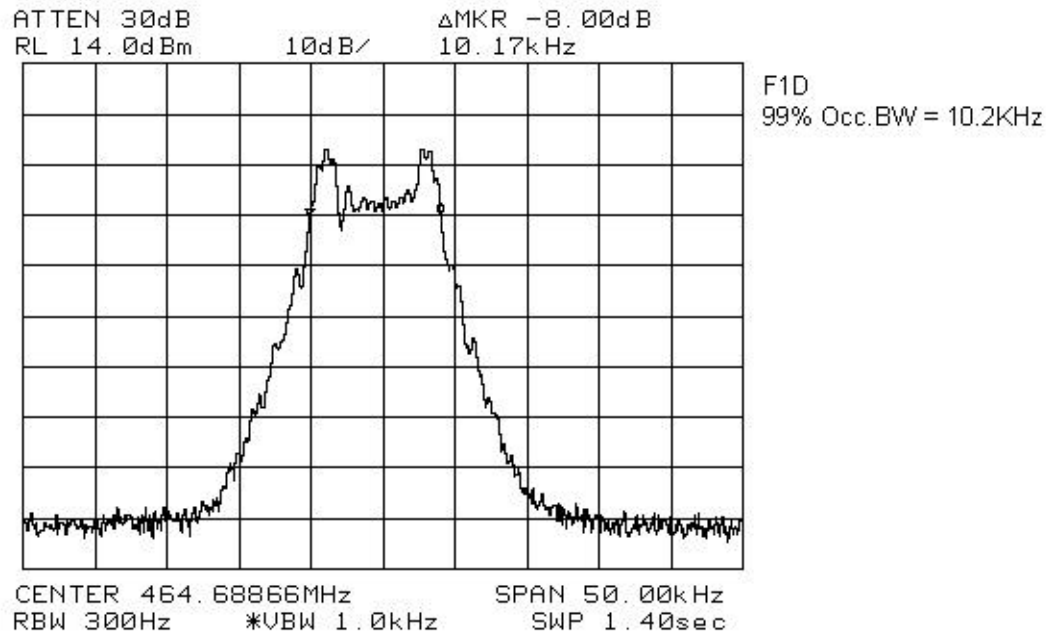
EQUIPMENT: RPE673

FCC ID: E86RPE673



EQUIPMENT: RPE673

FCC ID: E86RPE673



EQUIPMENT: RPE673
FCC ID: E86RPE673

Section 3. RF Power Output

Para. No.: 2.1046

Test Performed By: Glen Westwell	Date of Test: 22 March 2002
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Minimum Standard: 90.205

Test Results: Complies.

The RF power output is 33.8dBm, 2.39W. This is within +/- 1dB of the manufacturers rating.

Measurement Data: 2.39W (33.8dBm)

EQUIPMENT: RPE673
FCC ID: E86RPE673

Section 4. Occupied Bandwidth

Para. No.: 2.1049

Test Performed By: Glen Westwell	Date of Test: 23 March 2002
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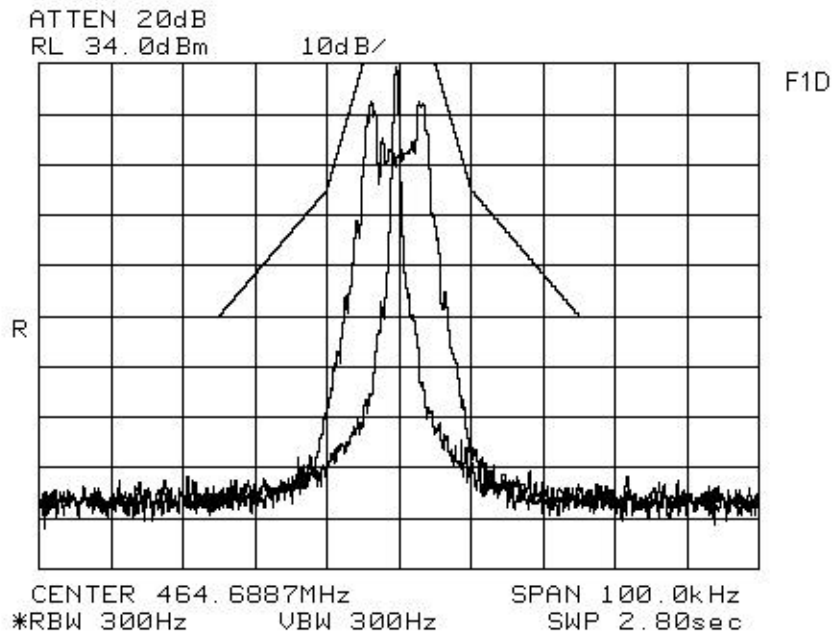
Minimum Standard: 90.210

Test Results: Complies

Measurement Data: See Attached Plots.

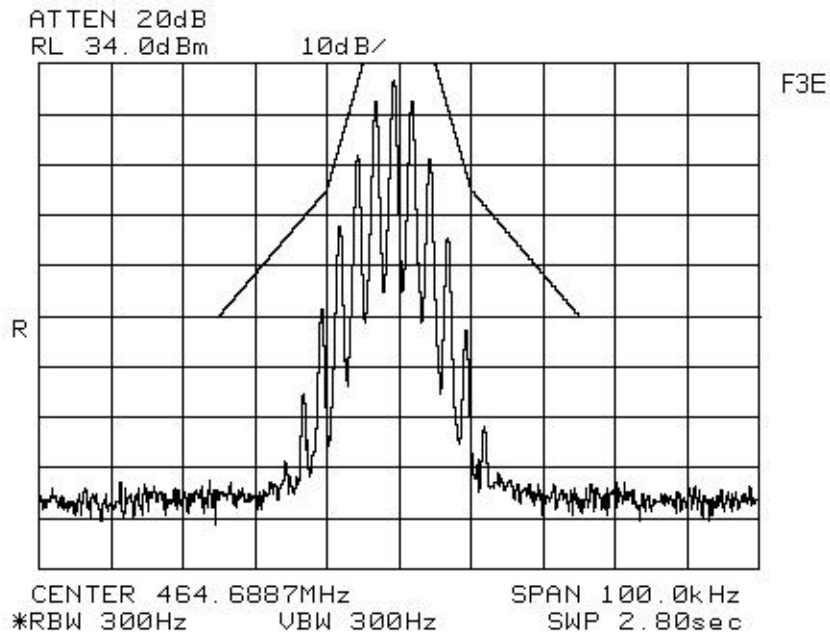
EQUIPMENT: RPE673

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FCC ID: E86RPE673



EQUIPMENT: RPE673
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Section 5. Spurious Emissions at Antenna Terminals

Para. No.: 2.1051

Test Performed By: Glen Westwell	Date of Test: 25 March 2002
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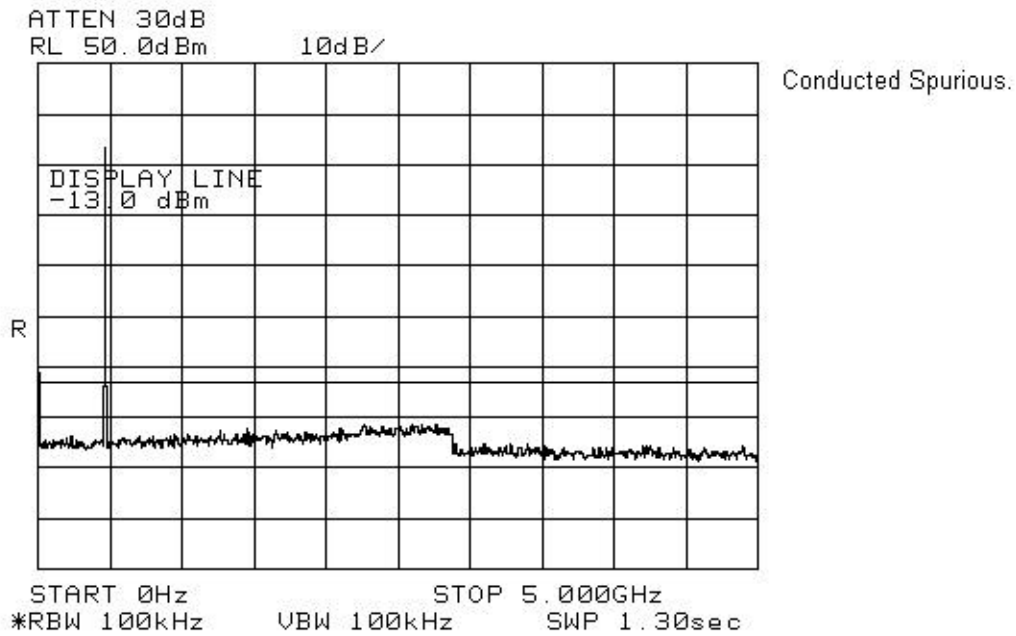
Minimum Standard: 90.210, -13dBm

Test Results: Complies.

Measurement Data: See Attached Plot.

EQUIPMENT: RPE673

FCC ID: E86RPE673



EQUIPMENT: RPE673

FCC ID: E86RPE673

Section 9. Field Strength of Spurious Emissions

Para. No.: 2.1053

Test Performed By: Glen Westwell	Date of Test: 26 March 2002
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Minimum Standard: 90.210, -13dBm

Test Results: Complies.

Measurement Data: See Attached Table.

EQUIPMENT: RPE673

FCC ID: E86RPE673

Test Data - Radiated Emissions

Test Distance (meters) : 3		Range: A		Receiver: 8564E	RBW(kHz): 100/1000	Detector: Peak	
Freq. (MHz)	Ant. *	Pol. (V/H)	RCVD Signal (dBµV/m)	Conversion Factor (dB)**	Field Strength (dBm)	Limit (dBm)	Margin (dB)
929.4	SSV	V	23.0	-64.2	-41.2	-13.0	28
929.4	SSH	H	25.4	-67.8	-42.4	-13.0	29
1394.06	SSV	V	77.7	-118.2	-40.5	-13.0	27
1394.06	SSH	H	78.1	-118.8	-40.7	-13.0	27
1858.75	SSV	V	69.5	-115.2	-45.7	-13.0	32
1858.75	SSH	H	69.4	-115.6	-46.2	-13.0	33
2323.44	SSV	V	92.2	-124.1	-31.9	-13.0	18
2323.44	SSH	H	92.8	-124.7	-31.9	-13.0	18
2788.13	SSV	V	87.2	-122.6	-35.4	-13.0	22
2788.13	SSH	H	87.7	-124.3	-36.6	-13.0	23
3252.82	SSV	V	78.7	-119.7	-41.0	-13.0	28
3252.82	SSH	H	78.5	-120.0	-41.5	-13.0	28
3717.5	SSV	V	82.7	-118.3	-35.6	-13.0	22
3717.5	SSH	H	83.2	-119.7	-36.5	-13.0	23
4182.19	SSV	V	69.0	-113.4	-44.4	-13.0	31
4182.19	SSH	H	70.0	-113.1	-43.1	-13.0	30
4647.05	SSV	V	79.3	-114.0	-34.7	-13.0	21
4647.05	SSH	H	79.5	-114.3	-34.8	-13.0	21
5111.65	SSV	V	69.5	-111.6	-42.1	-13.0	29
5111.65	SSH	H	69.9	-110.0	-40.1	-13.0	27

Notes:

B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole

* Re-measured using dipole antenna.

** Includes cable loss when amplifier is not used.

*** Includes cable loss.

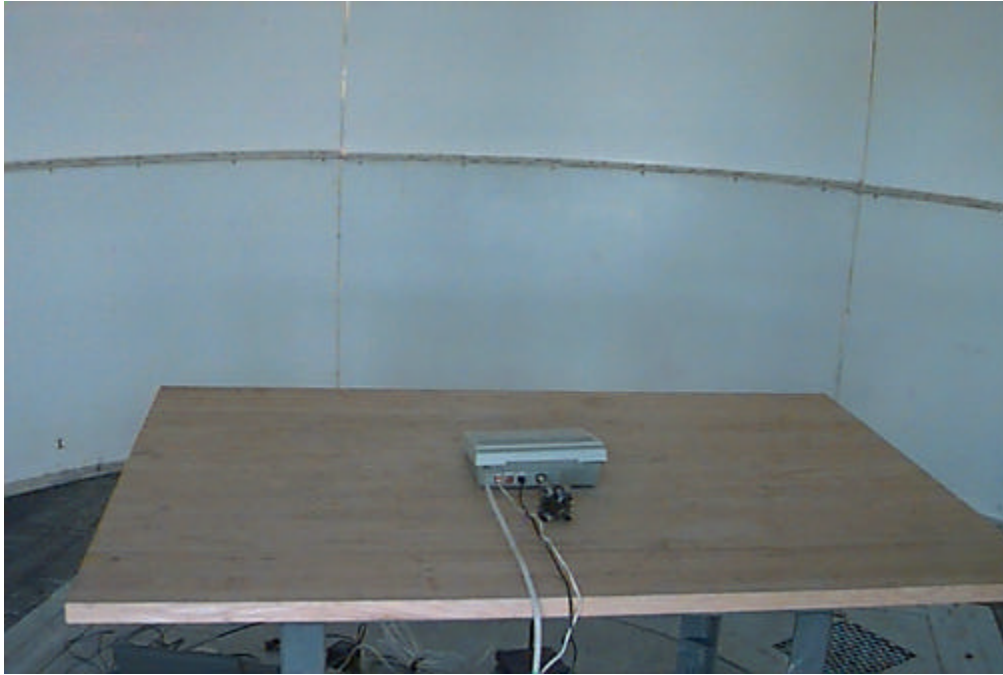
() Denotes failing emission level.

N.D. = Not Detected

EQUIPMENT: RPE673

FCC ID: E86RPE673

RPE673



EQUIPMENT: RPE673
FCC ID: E86RPE673

Section 10. Frequency Stability

Para. No.: 2.1055

Test Performed By: Glen Westwell	Date of Test: 25 March 2002
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Minimum Standard: 90.213, 2.5ppm.

Test Results: Complies.

The maximum frequency drift is 783Hz. This is 1.7ppm.

Standard Test Voltage: 120Vac.
Standard Test freq.: 464.6875MHz

Measurement Data:

Test Condition	Frequency Drift (Hz)
STV	748
115% STV	755
85% STV	750
-30°C	51
-20°C	172
-10°C	359
0°C	783
+10°C	758
+30°C	689
+40°C	552
+50°C	489

EQUIPMENT: RPE673

FCC ID: E86RPE673

Section 11. Transient Frequency Behaviour

Para. No.: N/A

Test Performed By: Glen Westwell	Date of Test: 27 March 2002
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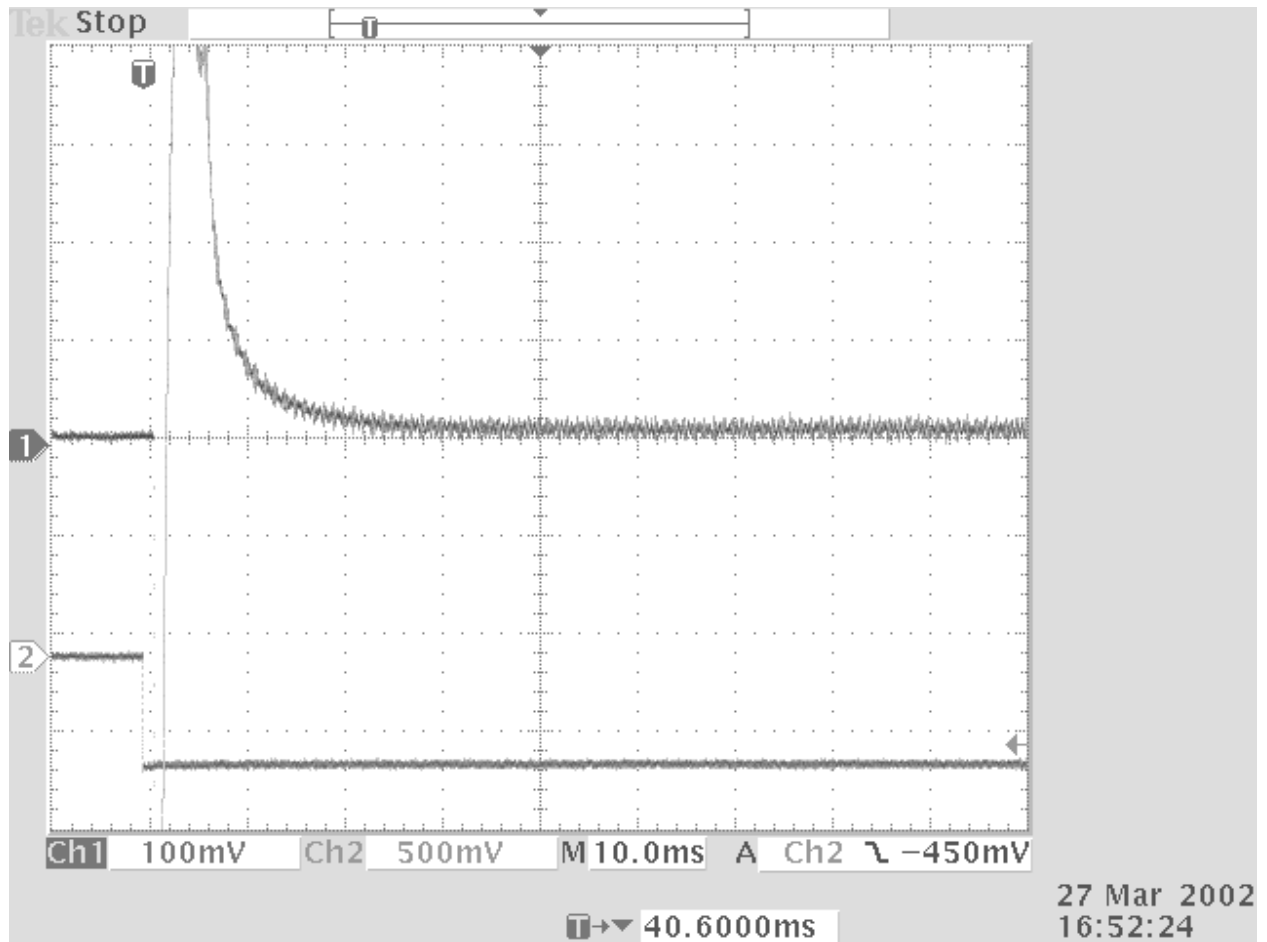
Minimum Standard: 90.214

Test Results: Complies.

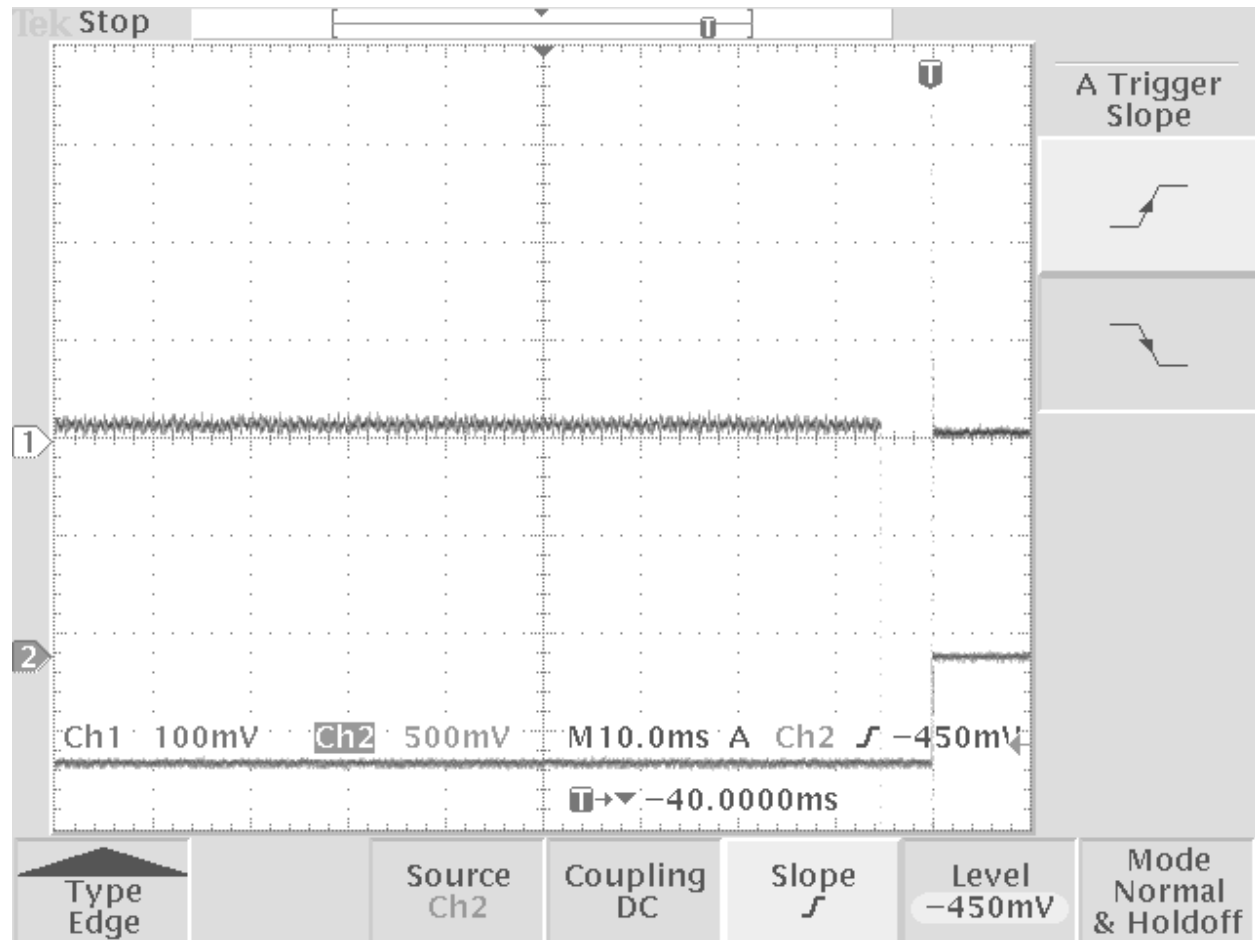
Measurement Data: See Attached plots.

EQUIPMENT: RPE673

FCC ID: E86RPE673



EQUIPMENT: RPE673
FCC ID: E86RPE673



EQUIPMENT: RPE673

FCC ID: E86RPE673

Section 12. Test Equipment List

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.
1 Year	Spectrum Analyzer	Hewlett Packard	8564E	3846A01407	Jun. 8/01	Jun. 8/02
1 Year	Spectrum Analyzer-1	Hewlett Packard	8566B	2311A02238	Nov. 27/01	Nov. 27/02
1 Year	Spectrum Analyzer Display-1	Hewlett Packard	8566B	2314A04759	Nov. 27/01	Nov. 27/02
1 Year	Quasi-peak adapter-1	Hewlett-Packard	85650A	2043A00302	Mar. 21/01	Mar. 21/02
1 Year	Radio Communications	Rohde & Schwarz	CMTA 54	840343/013	Mar. 23/01	Mar. 23/03
1 Year	Climate Chamber	Thermotron	SM-16C	15649-S	COU	COU
1 Year	Attenuator	Narda	768-10	9709	COU	COU
1 Year	Attenuator	Narda	769-20	4153	COU	COU
1 Year	Attenuator	Narda	776B-20	FA001400	June 10/01	June 10/02
3 Year	RF Millivoltmeter	Rohde & Schwarz	URV5	FA001570	July 3/00	July 3/03
1 Year	Biconical (1) Antenna	EMCO	3109	9204-2708	Aug. 22/01	Aug. 22/02
3 Year	Signal Generator	Rhode & Schwarz	SM1Q03E	FA001269	Oct. 4/99	Oct. 4/02
1 Year	RF Pick Up	Tegam	95241-1	11175	COU	COU
1Year	Frequency Counter	Hewlett Packard	HP5350A	2444A00135	May 7/00	Feb. 4/02
1 Year	Plotter	Hewlett Packard	7550A	FA001129	NCR	NCR
1 Year	oscilloscope	Tektronix	TDS3012	FA001560	29 Jun. 01	29 Jun. 02
1 Year	Hrn. Antenna	EMCO	3115	FA000825	01 Dec. 01	01 Dec. 02

NA: Not Applicable

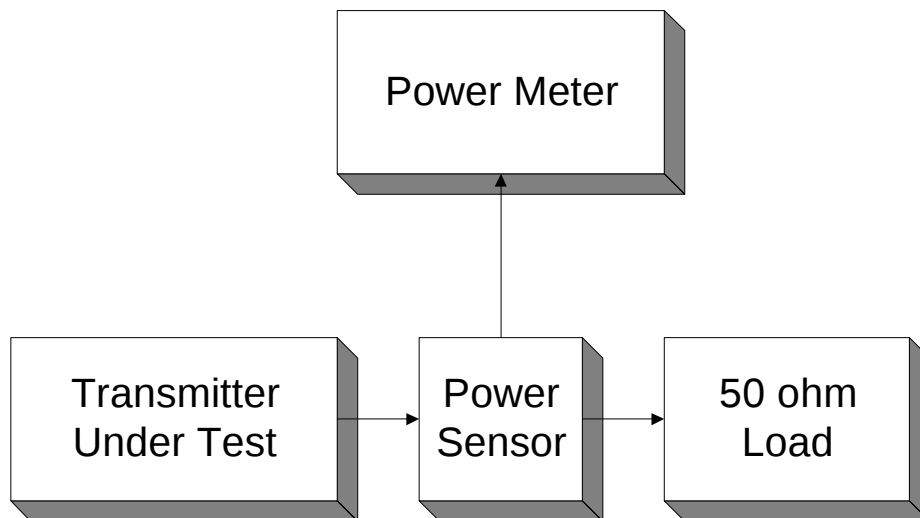
NCR: No Cal Required

COU: CAL On Use

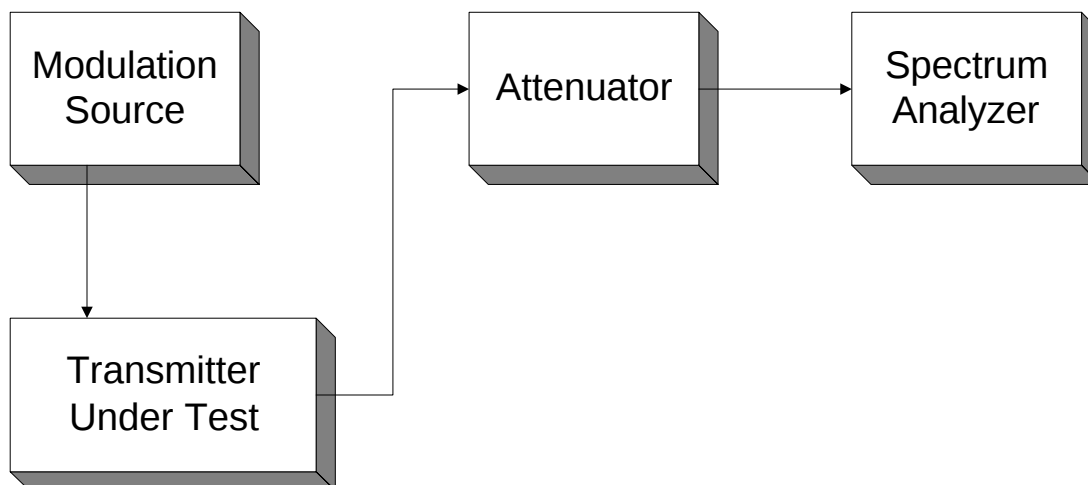
EQUIPMENT: RPE673
FCC ID: E86RPE673

Section 13. Test Diagrams

Para. No. 2.1046 - R.F. Power Output

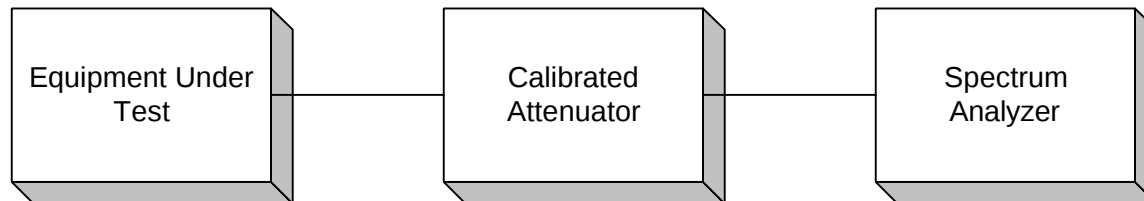


Para. No. 2.1049 - Occupied Bandwidth

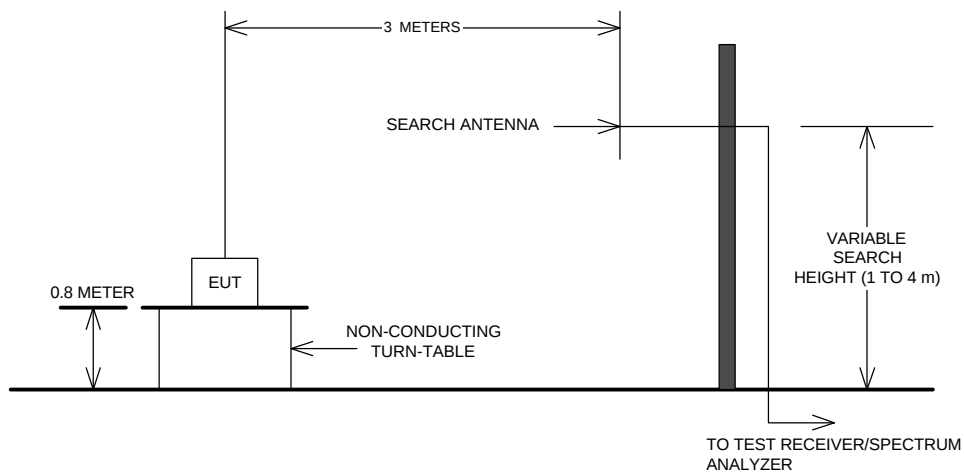


EQUIPMENT: RPE673
FCC ID: E86RPE673

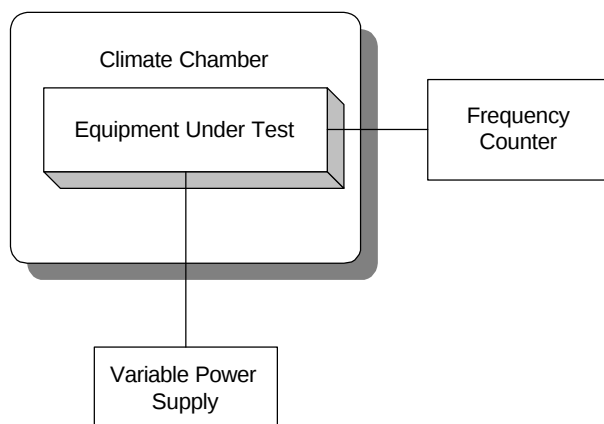
Para. No. 2.1051 - Spurious Emissions at Antenna Terminals



Para. No. 2.1053 - Field Strength of Spurious Radiation



Para. No. 2.1055 - Frequency Stability



EQUIPMENT: RPE673
FCC ID: E86RPE673

Transient Frequency Behaviour:

