

APPLICATION FOR CERTIFICATION
On Behalf of
Dynamco Pty. Ltd.
Remote Relay (Transmitter)

Model : TX11

FCC ID : PJ9TX11

Prepared for : Dynamco Pty. Ltd.
10 Brown Street, East Perth,
Western Australia 6004 Australia

Prepared By : Taiwan Tokin EMC Eng. Corp.
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File Number : ATM-G90295
Report Number : TTEMC-F01035
Date of Test : Mar. 30 ~ Apr. 12, 2001
Date of Report : Apr. 13, 2001

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TEST REPORT CERTIFICATION

Applicant : Dynamco Pty. Ltd.
 Manufacturer : Tesor Plus Corp.
 FCC ID : PJ9TX11
 EUT Description : Remote Relay (Transmitter)
 (A) MODEL NO. : TX11
 (B) SERIAL NO. : N/A
 (C) POWER SUPPLY : DC 12V

Measurement Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART C, JANUARY 2001
 AND FCC / ANSI C63.4-1992
 (FCC CFR 47 Part 15C, §15.207 and §15.231)

The device described above was tested by TAIWAN TOKIN EMC ENG. CORP. to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart C limits both radiated and conducted emissions.

The measurement results are contained in this test report and TAIWAN TOKIN EMC ENG. CORP. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Taiwan Tokin EMC Eng. corp.

Date of Test : Mar. 30 ~ Apr. 12, 2001

Prepared by : Monica Chang Apr. 19, 2001
 (MONICA CHANG)

Test Engineer : Ben Cheng 4/9 2001
 (BEN CHENG)

Approve & Authorized Signer : Jackie Deng 4/20/01
 (JACKIE DENG)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Remote Relay (Transmitter)
Model Number	:	TX11
FCC ID	:	PJ9TX11
Applicant	:	Dynamco Pty. Ltd. 10 Brown Street, East Perth, Western Australia 6004 Australia
Manufacturer	:	Tesor Plus Corp. 37, Lane 136, Chung-Hsing N.St., San-Chung, Taipei Hsien, Taiwan
Fundamental Frequency	:	434MHz
Date of Receipt of Sample	:	Mar. 16, 2001
Date of Test	:	Mar. 30 ~ Apr. 12, 2001

1.2. Description of Test Facility

Site Description (No. 5 Open Site)	:	Jan. 29, 2001 re-file on Federal Communication Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, U.S.A. Registration Number : 90992
Name of Firm	:	Taiwan Tokin EMC Eng. Corp.
Site Location	:	No. 53-11, Tin-Fu Tsun, Lin-Kou, Taipei Hsien, Taiwan, R.O.C.
NVLAP lab. Code	:	200077-0

2. POWERLINE CONDUCTED TEST

【This EUT input voltage is DC power operated, so no conductive emissions were performed according to FCC Part 15 section §15.207】

3. RADIATED EMISSION TEST

3.1. Test Equipment

The following test equipment are used during the radiated emission tests :

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	HP	8593EM	3826A00248	Aug. 30, 00'	1 Year
2.	Test Receiver	R&S	ESVS10	849231/017	Dec. 01, 00'	1 Year
3.	Biconical Antenna (30MHz~1000MHz)	Chase	VBA6106A	1264	Jun. 03, 00'	1 Year
4.	Biconical Antenna (30MHz~1000MHz)	Chase	UPA6109	1035	Jun. 03, 00'	1 Year
5.	Pre-Amplifier (1GHz~5GHz)	HP	8449B	3008A01284	Jul. 03, 00'	1 Year
6.	Double Ridge Horn. Antenna (1GHz~5GHz)	EMCO	3115	9609-4927	Jul. 05, 00'	1 Year

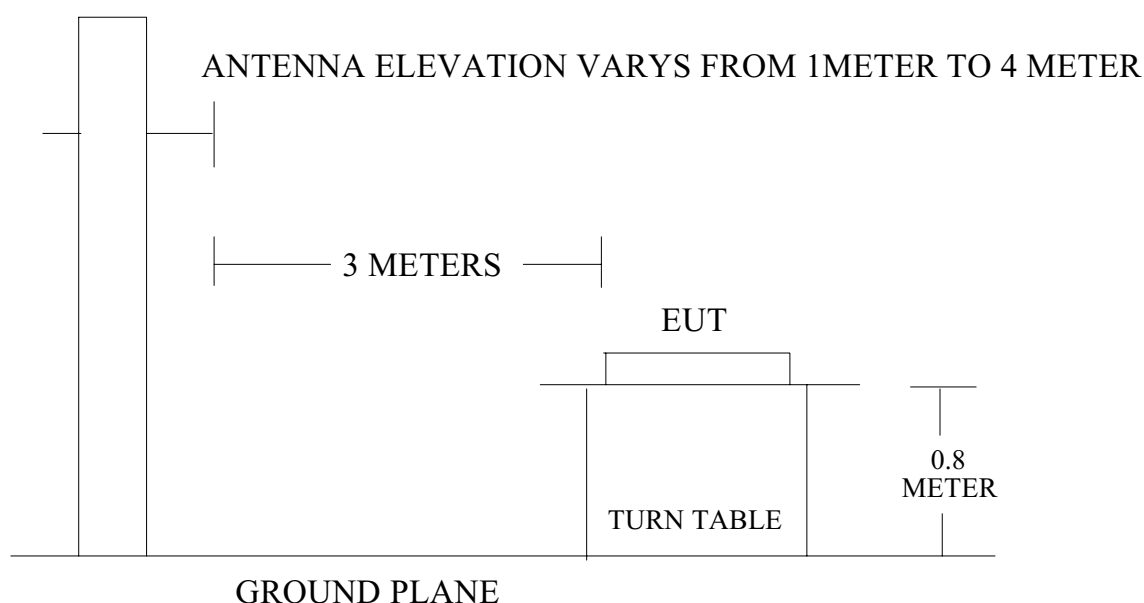
3.2. Test Setup

3.2.1. Block Diagram of connection between EUT and simulators

REMOTE RELAY
(TRANSMITTER, EUT)

3.2.2. Open Field Test Site Setup Diagram

ANTENNA TOWER



3.3. Section §15.231 Radiation Limit

FREQUENCY MHz	DISTANCE Meter	FIELD STRENGTHS LIMITS	
		dBuV/M	uV/M
Fundamental Freq.	3	80.8	11000.0
Spurious Emissions	3	60.8	1100.0
1GHz ~ 5GHz	3	73.9 (Peak)	500(AV)+20dB

- Remark :
- (1) Emission level (dBuV/M) = 20 log Emission level (uV/M)
 - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 - (3) There is no over 1GHz limit in CISPR 22 standard. Therefore, a FCC limit is used based on CFR 47 Part 15.35 (b) and Part 15.109 (g).

3.4. EUT Configuration

The following equipment were installed on radiation measurement to meet the Commission requirement and operating in a manner which tended to maximize its emission characteristics in a normal application.

3.4.1. Remote Relay (Transmitter, EUT)

Model Number	:	TX11
Serial Number	:	N/A
FCC ID.	:	PJ9TX11
Manufacturer	:	Tesor Plus Corp.

3.5. Operating Condition of EUT

3.5.1. Setup the EUT as shown on 3.2

3.5.2. Turn on the power of all equipment.

3.5.3. The Remote Relay (Transmitter, EUT) emitted the fundamental frequency at the standing, side and lying conditions.

3.6. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. For 30MHz to 1000MHz frequency range and 1GHz ~ 5GHz frequency range, EUT was set at 3 meters away from the receiving antenna which was mounted on a antenna tower. The antenna moved up and down between 1 to 4 meters for 30MHz to 1000MHz frequency range and 1GHz to 5GHz frequency range to find out the maximum emission level. Broadband antenna such as calibrated biconical and log- periodical antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4-1992 regulation.

The bandwidth of test receiver ESVS10 was set at 120KHz and resolution bandwidth of spectrum analyzer was set at 1MHz.

The frequency range from 30MHz to 5GHz was checked.

3.7. Test Results

PASSED. Please refer to the following pages.

3.8. Radiated Emission Noise Measurement Results

3.8.1. 30MHz to 1GHz Frequency Range Measurement Results

The frequency spectrum from 30 MHz to 1GHz is investigated. All the emissions not reported below are too low against the FCC part 15 subpart C limit.

Date of Test : Mar. 30, 2001 Temperature : 15.9°C

EUT : Remote Relay Humidity : 69%

Fundamental Freq. : 434MHz

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB

Stand Mode						
434.214	17.28	3.90	41.55	62.73	80.80	18.07
868.173	24.37	5.96	-1.56	28.77	60.80	32.03
Side Mode						
433.929	17.37	3.93	45.86	67.16	80.80	13.64
867.938	24.37	5.96	2.52	32.85	60.80	27.95
Lying Mode						
434.010	17.37	3.93	56.29	77.59	80.80	3.21
867.931	24.37	5.96	2.08	32.41	60.80	28.39

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB

Stand Mode						
434.107	17.20	3.93	49.73	70.86	80.80	9.94
868.119	24.37	5.96	0.79	31.12	60.80	29.68
Side Mode						
434.062	17.20	3.93	43.13	64.26	80.80	16.54
868.079	24.37	5.96	3.12	33.45	60.80	27.35
Lying Mode						
434.089	17.20	3.93	40.98	62.11	80.80	18.69
868.113	24.37	5.96	-1.50	28.83	60.80	31.97

Remark : All readings are Quasi-peak values.

3.8.2. 1GHz ~ 5GHz Frequency Range Measurement Results

Date of Test :	Mar. 30, 2001	Temperature :	15.9°C
EUT :	Remote Relay	Humidity :	69%
Fundamental Freq. :	434MHz		

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Pre-Amp Factor dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	(Peak) Limits dBμV/m	Margin dB

Harmonic/ Spurious							
Stand Mode							
1300.00	25.43	4.56	32.36	47.07	44.70	73.90	29.20
1734.65	26.35	5.43	32.16	44.81	44.43	73.90	29.47
2168.20	27.10	6.33	32.11	32.57	33.89	73.90	40.01
2602.05	27.77	6.97	32.23	28.41	30.92	73.90	42.98
Side Mode							
1298.00	25.43	4.56	32.36	45.30	42.93	73.90	30.97
1732.90	26.34	5.42	32.16	50.50	50.10	73.90	23.80
2172.95	27.11	6.33	32.11	32.29	33.62	73.90	40.28
2602.25	27.77	6.97	32.23	31.72	34.23	73.90	39.67
Lying Mode							
1302.00	25.44	4.56	32.36	49.74	47.38	73.90	26.52
1732.05	26.34	5.42	32.16	42.63	42.23	73.90	31.67
2168.60	27.10	6.33	32.11	34.46	35.78	73.90	38.12
2598.45	27.77	6.97	32.23	30.20	32.71	73.90	41.19

Remark : 1. All readings are peak values.
 2. Measurement was up to 10th harmonic (~5GHz), but the emission level are too low against the official limit and not report.

Date of Test : Mar. 30, 2001 Temperature : 15.9°C

EUT : Remote Relay Humidity : 69%

Fundamental Freq. : 434MHz

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Pre-Amp Factor dB	Meter Reading Vertical dBμV	Emission Level (Peak) Vertical dBμV/m	Limits dBμV/m	Margin dB

Harmonic/ Spurious							
Stand Mode							
1301.20	25.43	4.56	32.36	52.53	50.16	73.90	23.74
1733.60	26.34	5.42	32.16	46.52	46.12	73.90	27.78
2166.90	27.09	6.32	32.11	35.92	37.22	73.90	36.68
2599.65	27.77	6.97	32.23	31.38	33.89	73.90	40.01
Side Mode							
1301.90	25.44	4.56	32.36	52.17	49.81	73.90	24.09
1736.20	26.35	5.43	32.16	45.07	44.69	73.90	29.21
2170.00	27.10	6.33	32.11	37.72	39.04	73.90	34.86
2600.40	27.77	6.97	32.23	29.93	32.44	73.90	41.46
Lying Mode							
1302.00	25.44	4.56	32.36	47.88	45.52	73.90	28.38
1735.70	26.35	5.43	32.16	42.19	41.81	73.90	32.09
2169.65	27.10	6.33	32.11	33.69	35.01	73.90	38.89
2600.35	27.77	6.97	32.23	30.14	32.65	73.90	41.25

Remark : 1. All readings are peak values.
 2. Measurement was up to 10th harmonic (~5GHz), but the emission level are too low against the official limit and not report.

4. EMISSION BANDWIDTH TEST

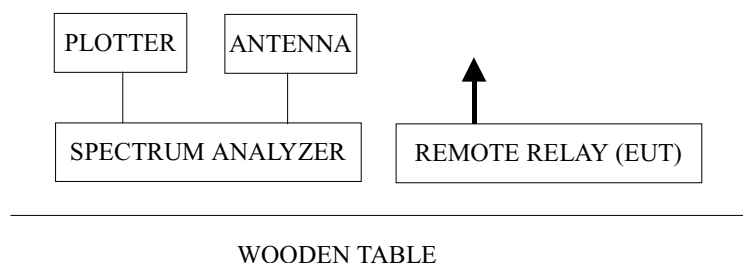
4.1. Test Equipment

The following test equipment are used during the radiated emission tests :

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	HP	8595E	3829A03489	Oct. 30, 00'	1Year
2.	Antenna	EMCO	4610	9410-1274	N/A	N/A

4.2. Test Setup

Block Diagram of test setup



4.3. Specification Limits

The authorized bandwidth of the emission is no wider than 25% of the center frequency, according to §15.231 (C).

4.4. EUT Configuration

The configuration of EUT and its simulators were the same as those used in radiated measurement. Please refer to 3.4.

4.5. Test Procedure

- 4.5.1. Set the EUT and test equipment as shown on 4.2.
- 4.5.2. Set a reference level on the measuring instrument at any location that will allow measuring the specified bandwidth.
- 4.5.3. Supply the EUT with modulation to observe and record with plotted graphs. Bandwidth was determined at the points 20dB down from the modulated carrier.

4.6. Emission Bandwidth Measurement Results

PASSED.

Data of Test : Apr. 12, 2001

Center Frequency	432.470MHz
Emission Bandwidth	600KHz (0.6MHz)
Bandwidth (%)	0.138%

※ The bandwidth test data is attached in the following graph.

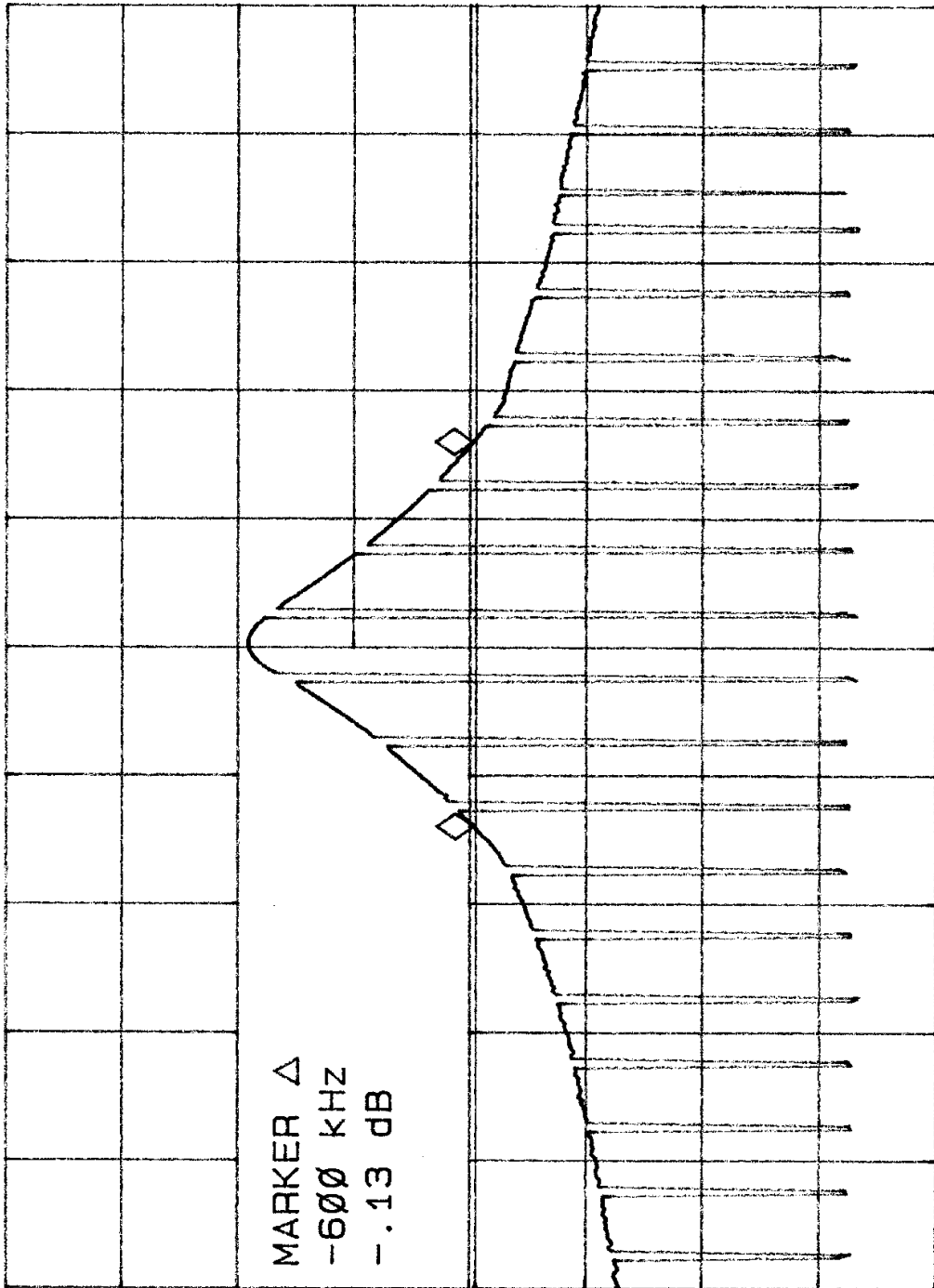
20:30:21 APR 12, 2001

REF 107.0 dBμV AT 10 dB MKR Δ -600 KHz
- .13 dB

PEAK
LOG
10
dB/

MARKER Δ
-600 KHz
- .13 dB

DL
66.5
dBμV



VA SB
SC FC
CORR

CENTER 432.470 MHz SPAN 2.000 MHz
#RES BW 100 KHz #VBW 1 MHz #SWP 2.00 sec

MARKER
NORMAL

MARKER
Δ

MARKER
AMPTD

SELECT
1 2 3 4

MARKER 1
ON OFF

More
1 of 2

5. DEVIATION TO TEST SPECIFICATIONS

【NONE】