

FCC TEST REPORT

according to

FCC Part 15, Subpart C (15.231) / ANSI C63.4: 2001

Applicant	COP Security System Corp.
Address	4-6F, NO.5, Lane 130, Min-Chung Rd., Hsin Tien City, Taipei Hsien, Taiwan, R.O.C.
Equipment	433.92MHz Wireless Transmitter / Receiver
Model No.	15-AU15/25TR
FCC ID	SK2AUXXTR
Trade Name	COP Security

- The test result refers exclusively to the test presented test model / sample.,
- Without written approval of **Exclusive Certification Corp.** the test report shall not be reproduced except in full.

Contents

1.	Report of Measurements and Examinations.....	4
1.1.	List of Measurements and Examinations	4
2.	Test of Conducted Emission	5
3.	Test of Radiated Emission	6
3.1.	Test Procedures.....	6
3.2.	Typical Test Setup Layout of Radiated Emission	6
3.3.	Limits of Radiated Emission.....	7
4.	20dB Occupied Bandwidth Measurement	8
4.1.	Test Procedure	8
4.2.	Test Setup Layout	8
4.3.	Limits of Band Edges Measurement	8
5.	Test Configuration of Equipment under Test.....	9
5.1.	Test Mode and Test Software.....	9
5.2.	Description of Test System	9
5.3.	Connection Diagram of Test System	9
5.4.	Feature of Equipment under Test	10
5.5.	RF Module Specifications	10
5.6.	History of this test report	10
6.	General Information of Test	11
7.	Test Result and Data.....	12
7.1.	Test Result of Radiated Emission.....	12
7.2.	20dB Occupied Bandwidth Measurement	13
8.	List of Measuring Equipment Used.....	13
	Appendix A. Photographs of EUT.....	A1 ~ A3

CERTIFICATE OF COMPLIANCE

according to

FCC Part 15, Subpart C (15.231) / ANSI C63.4: 2001

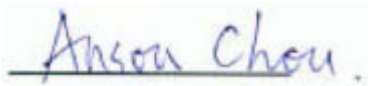
Applicant	COP Security System Corp.
Address	4-6F, NO.5, Lane 130, Min-Chung Rd., Hsin Tien City, Taipei Hsien, Taiwan, R.O.C.
Equipment	433.92MHz Wireless Transmitter / Receiver
Model No.	15-AU15/25TR
FCC ID	SK2AUXTR

I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4**. The equipment was **passed** the test performed according to **FCC Part 15, Subpart C (15.231) / ANSI C63.4: 2001**.

The test was carried out on Sep. 21, 2004 at *Exclusive Certification Corp.*

Signature



Anson Chou / Manager

1. Report of Measurements and Examinations

1.1. List of Measurements and Examinations

FCC Rule	Test Type	Result	Remark
15.207	Conducted Emission	N/A	9Vdc from batteries
15.209 15.231	Radiated Emission	Pass	Minimum Passing margin is -14.39dB at 434.20MHz
15.231	20 dB Occupied Bandwidth Measurement	Pass	Meet the requirement of limit

Note: the information of measurement uncertainty is available upon the customer' s request.

Test by: Jerry

2. Test of Conducted Emission

N/A

3. Test of Radiated Emission

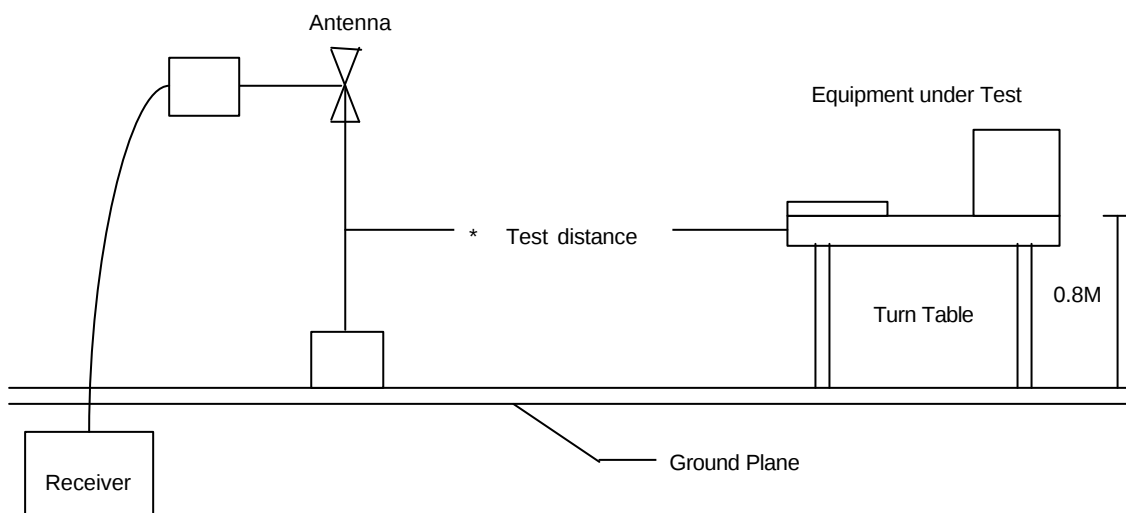
3.1. Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

NOTE:

- (1) The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
- (2) The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
- (3) The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

3.2. Typical Test Setup Layout of Radiated Emission



3.3. Limits of Radiated Emission

According to 15.231 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious	
	$\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m}$	$\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m}$
40.66 ~ 40.70	2250	67.04	225	48.04
70 ~130	1250	61.94	125	41.94
130 ~ 174	1250 ~ 3750	61.94 ~ 71.48	125 ~ 375	41.94 ~ 51.48
174 ~ 260	3750	71.48	375	51.48
260 ~ 470	3750 ~ 12500	71.48 ~ 81.94	375 ~ 1250	51.48 ~ 61.94
Above 470	12500	81.94	1250	61.94

NOTE:

- (1) Where F is the frequency in MHz, the formula for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V}/\text{m}$ at 3 meters = $56.81818(F)-6136.3636$; for the band 260-470 MHz, $\mu\text{V}/\text{m}$ at 3 meters = $41.6667(F)-7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.
- (2) The above field strength limits are specified at a distance of 3meters. The tighter limits apply at the band edges.

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequency (MHz)	Distance	Limit ($\mu\text{V}/\text{m}$)
0.09 ~ 0.490	300m	$2400/F(\text{kHz})$
0.490 ~ 1.705	30m	$24000/ F(\text{kHz})$
1.705 ~ 30	30m	30
30 ~ 88	3m	100
88 ~ 216	3m	150
216 ~ 960	3m	200
Above 960	3m	500

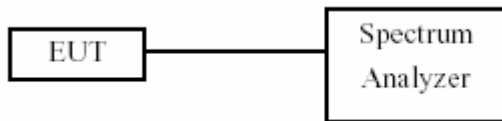
As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4. 20dB Occupied Bandwidth Measurement

4.1. Test Procedure

- The EUT placed on the turning table.
- The signal was coupled to the spectrum analyzer through an antenna.
- Set the resolution bandwidth to 100kHz and video bandwidth to 100kHz then select Peak function to scan the channel frequency.
- The 20dB bandwidth was measured and recorded.

4.2. Test Setup Layout



4.3. Limits of Band Edges Measurement

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for device operating above 70 MHz and below 900 MHz.

Frequency (MHz)	Limit of 20dB Bandwidth (KHz)
433.92	1084.8

5. Test Configuration of Equipment under Test

5.1. Test Mode and Test Software

One channel is provided in the EUT:

Channel	Frequency
1	433.92 MHz

NOTE: Since the EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane. There for only the test data of this Z-plane was used for Radiated test.

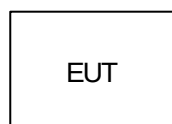
5.2. Description of Test System

Device	Manufacturer	Model No.	Description
N/A			

Use Cable:

Cable	Description
N/A	

5.3. Connection Diagram of Test System



5.4. Feature of Equipment under Test

TRANSMITTER (15-AU15/25T)

- Transmission frequency: 433.92MHz
- 16 code setting
- Transmission range: 300M in open area
- 9V battery operation
- Size: 141x50x30mm

5.5. RF Module Specifications

Modulation	99 % ASK
Resonance	Saw Resonator
Dimension (L x W x H)	8*20*2.9mm
Power Supply (Nominal)	3 ~ 12 VDC
RF Freq. Tolerance	±75KHz
Temperature Range	Operation: -10 ~ +60
	Storage: -20 ~ +70
Radiated Power (Min.)	18dBm @ 12V
Power Consumption (Maximum Operational Supply Current)	27mA @ 12V
Data Rate (Nominal)	1200 bps
Frequency	433.92 MHz

5.6. History of this test report

ORIGINAL.

6. General Information of Test

Test Site:	Exclusive Certification Corp. 4F-2, No. 28, Lane 78, Xing-Ai Rd. Nei-hu, Taipei City 114 Taiwan R.O.C.
Test Site Location (OATS1-SD):	No.68-1, Shihbachongsi, shihding Township, Taipei County 223, Taiwan, R.O.C.
Test Voltage:	9Vdc form batteries
Test in Compliance with:	FCC Part 15, Subpart C (15.231) / ANSI C63.4: 2001
Frequency Range Investigated:	Radiation: from 30 MHz to 433.92 MHz
Modulation Type:	ASK
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.

7. Test Result and Data

7.1. Test Result of Radiated Emission

Test Mode: X axis

Test Date: Sep. 21, 2004 Temperature: 26 Humidity: 59% Atmospheric Pressure: 991 mbar

a) Emission frequencies below 1 GHz

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result@3m (dBuV/m)	Limit@3m (dBuV/m)	Margin (dB)	Remark	Table Deg.	Ant High (m)
*434.20	H	85.69	-8.23	77.46	100.8	-23.34	Peak	290	1.0
*434.20	H	77.86	-8.23	69.63	80.8	-11.18	Ave	282	1.0
867.80	H	38.33	1.85	40.18	80.8	-40.62	Peak	70	1.0
867.80	H	30.50	1.85	32.35	60.8	-28.45	Ave	70	1.0
*434.40	V	79.90	-8.23	71.67	100.8	-29.13	Peak	272	1.5
*434.40	V	72.07	-8.23	63.84	80.8	-16.96	Ave	268	1.5
867.70	V	33.39	1.85	35.24	80.8	-45.56	Peak	85	1.5
867.70	V	25.56	1.85	27.41	60.8	-33.39	Ave	85	1.5

b) Emission frequencies above 1 GHz

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result@3m (dBuV/m)	Limit@3m (dBuV/m)	Margin (dB)	Remark	Table Deg.	Ant High (m)
1724.5	H	52.88	-3.56	49.32	74	-24.68	Peak	166	1.5
1301.0	V	56.27	-6.39	49.89	74	-24.11	Peak	120	1.5
1735.0	V	57.56	-4.09	53.47	74	-20.53	Peak	145	1.0
2169.0	V	52.59	-2.05	50.55	74	-23.45	Peak	130	1.0
2603.0	V	51.17	-0.53	50.65	74	-23.35	Peak	180	1.0

NOTE:

- (1) Result@3m (dBuV/m) = Meter Reading (dBuV) + Correction Factor(dB)
- (2) Correction Factor(dB) = Antenna Factor (dB) + Cable Factor (dB) – Amplifier (dB)
- (3) The other emission levels were very low against the limit.
- (4) Margin = Result@3m – Limit value.
- (5) “*” = Fundamental frequency
- (6) The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle)

Where the duty factor is calculated from following formula:

$$20\log (\text{Duty cycle}) = 20\log \frac{(1.04\text{ms} \times 10 + (0.54\text{ms} \times 7))}{34.94\text{ms}} = -7.83\text{dB}$$

please see page 15,16 for plotted duty

Test Mode: Y axis

Test Date: Sep. 21, 2004 Temperature: 26 Humidity: 59% Atmospheric Pressure: 991mbar

a) Emission frequencies below 1 GHz

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result@3m (dBuV/m)	Limit@3m (dBuV/m)	Margin (dB)	Remark	Table Deg.	Ant High (m)
*433.90	H	84.68	-8.23	76.45	100.8	-24.35	Peak	272	1.0
*433.90	H	76.85	-8.23	68.62	80.8	-12.18	Ave	276	1.0
867.90	H	38.03	1.85	39.88	80.8	-40.92	Peak	90	1.0
867.90	H	30.20	1.85	32.05	60.8	-28.75	Ave	90	1.0
*434.40	V	76.10	-8.23	67.87	100.8	-32.93	Peak	270	1.5
*434.40	V	68.27	-8.23	60.04	80.8	-20.76	Ave	272	1.5
867.70	V	33.04	1.85	34.89	80.8	-45.91	Peak	80	1.5
867.70	V	25.21	1.85	27.06	60.8	-33.74	Ave	85	1.5

b) Emission frequencies above 1 GHz

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result@3m (dBuV/m)	Limit@3m (dBuV/m)	Margin (dB)	Remark	Table Deg.	Ant High (m)
1301.0	H	56.07	-5.89	50.18	74	-23.82	Peak	130	1.0
3037.0	H	48.53	1.89	50.42	74	-23.58	Peak	165	1.5
1301.0	V	54.55	-6.39	48.16	74	-25.84	Peak	120	1.5
1735.4	V	58.79	-4.09	54.70	74	-19.30	Peak	145	1.0
1735.4	V	43.08	-4.09	39.00	54	-15.00	Ave	145	1.0
2169.0	V	54.42	-2.05	52.37	74	-21.63	Peak	120	1.0
2603.0	V	52.09	-0.53	51.57	74	-22.43	Peak	196	1.0

NOTE:

- (1) Result@3m (dBuV/m) = Meter Reading (dBuV) + Correction Factor(dB)
- (2) Correction Factor(dB) = Antenna Factor (dB) + Cable Factor (dB) – Amplifier (dB)
- (3) The other emission levels were very low against the limit.
- (4) Margin = Result@3m – Limit value.
- (5) “*” = Fundamental frequency
- (6) The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle)

Where the duty factor is calculated from following formula:

$$20\log (\text{Duty cycle}) = 20\log \frac{(1.04\text{ms} \times 10 + (0.54\text{ms} \times 7))}{34.94\text{ms}} = -7.83\text{dB}$$

please see page 15,16 for plotted duty

Test Mode: Z axis

Test Date: Sep. 21, 2004 Temperature: 26 Humidity: 59% Atmospheric Pressure: 991mbar

a) Emission frequencies below 1 GHz

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result@3m (dBuV/m)	Limit@3m (dBuV/m)	Margin (dB)	Remark	Table Deg.	Ant High (m)
*433.90	H	77.20	-8.23	68.97	100.8	-31.83	Peak	280	1.0
*433.90	H	69.37	-8.23	61.14	80.8	-19.66	Ave	282	1.0
867.70	H	31.91	1.85	33.76	80.8	-47.04	Peak	85	1.0
867.70	H	24.08	1.85	25.93	60.8	-34.87	Ave	85	1.0
*434.20	V	83.72	-8.23	75.49	100.8	-25.31	Peak	275	1.5
*434.20	V	75.89	-8.23	67.66	80.8	-13.14	Ave	275	1.5
867.90	V	37.90	1.85	39.75	80.8	-41.05	Peak	75	1.5
867.90	V	30.07	1.85	31.92	60.8	-28.88	Ave	75	1.5

b) Emission frequencies above 1 GHz

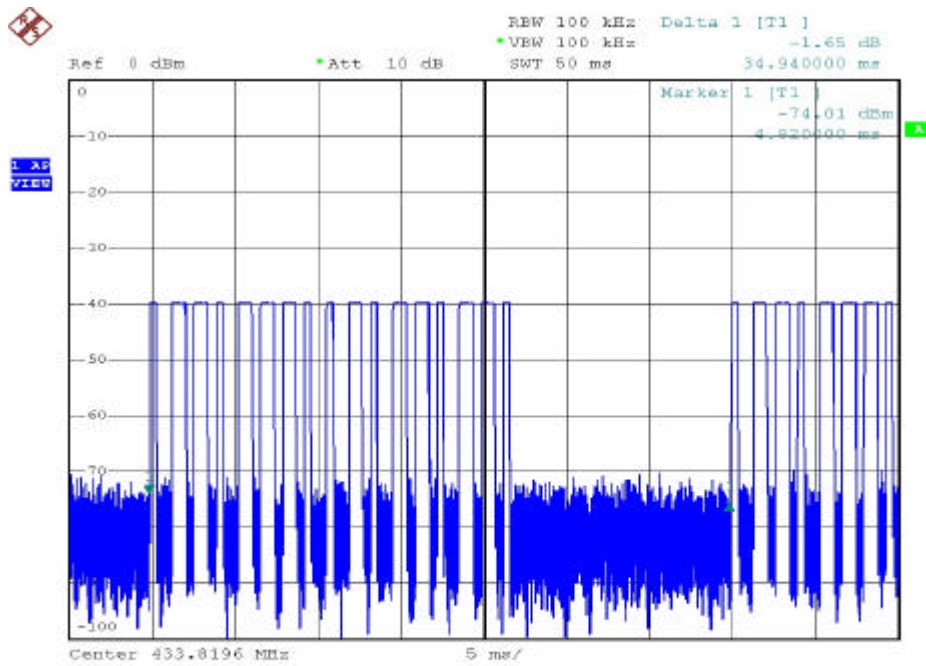
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result@3m (dBuV/m)	Limit@3m (dBuV/m)	Margin (dB)	Remark	Table Deg.	Ant High (m)
1301.00	V	57.07	-6.39	50.68	74	-23.32	Peak	115	1.5
2169.00	V	55.06	-2.05	53.01	74	-20.99	Peak	150	1.0
2603.00	V	52.97	-0.53	52.45	74	-21.55	Peak	175	1.0
4339.00	V	48.87	5.23	54.10	74	-19.90	Peak	188	1.5
4339.00	V	38.13	5.24	43.37	54	-10.63	Ave	192	1.5
2169.00	H	53.44	-1.35	52.09	74	-21.91	Peak	162	1.0
2603.00	H	49.81	0.19	50.00	74	-24.00	Peak	195	1.0

NOTE:

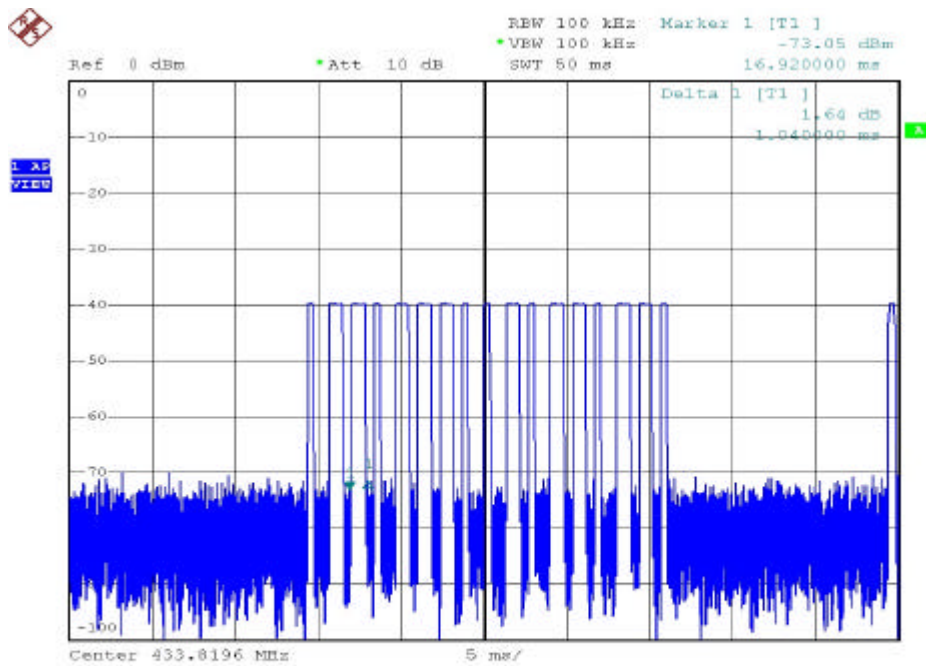
- (1) Result@3m (dBuV/m) = Meter Reading (dBuV) + Correction Factor(dB)
 - (2) Correction Factor(dB) = Antenna Factor (dB) + Cable Factor (dB) – Amplifier (dB)
 - (3) The other emission levels were very low against the limit.
 - (4) Margin = Result@3m – Limit value.
 - (5) “*” = Fundamental frequency
 - (6) The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle)
- Where the duty factor is calculated from following formula:

$$20\log (\text{Duty cycle}) = 20\log \frac{(1.04\text{ms} \times 10 + (0.54\text{ms} \times 7))}{34.94\text{ms}} = -7.83\text{dB}$$

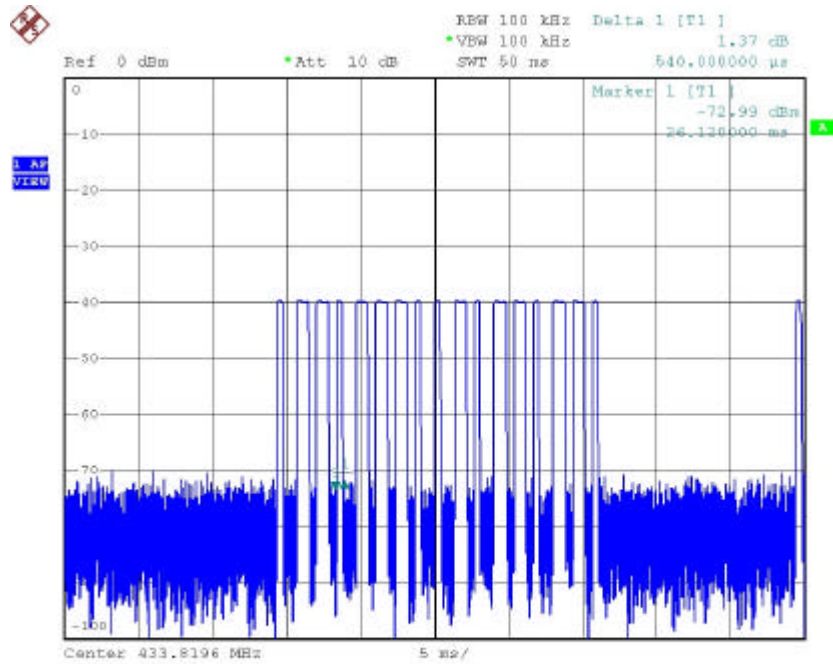
please see page 15,16 for plotted duty



Date: 21.SEP.2004 21:36:56



Date: 21.SEP.2004 21:38:16



Date: 21.SEP.2004 21:49:04

7.1.1. Photographs of Radiated Emission Test

For X axis

FRONT VIEW



REAR VIEW



For Y axis

FRONT VIEW



REAR VIEW



For Z axis

FRONT VIEW



REAR VIEW



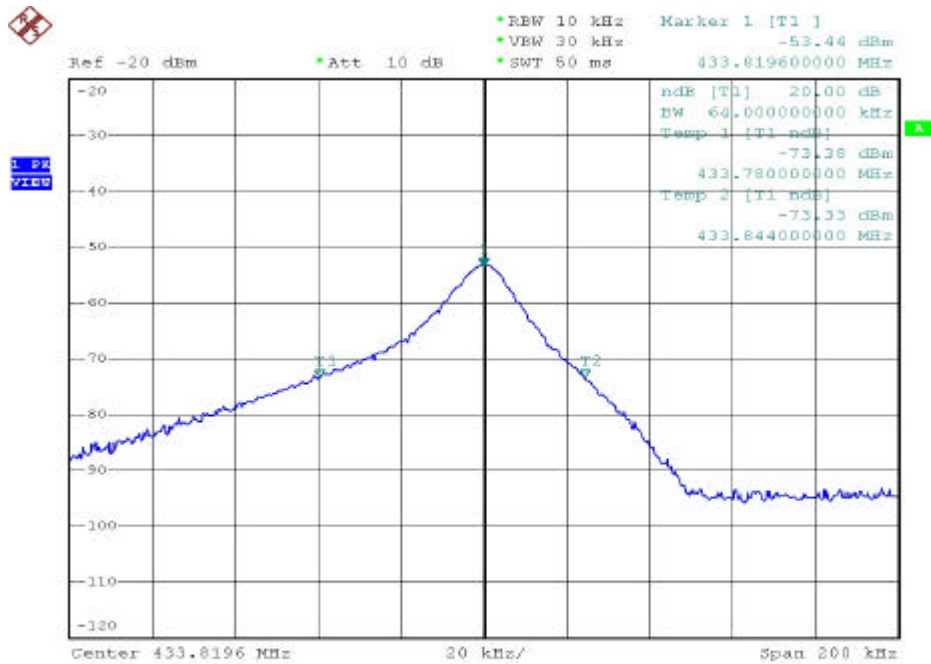
7.2. 20dB Occupied Bandwidth Measurement

7.2.1. Test Result

Test Date: Sep. 21, 2004 Temperature: 26 Humidity: 59% Atmospheric Pressure: 991 mbar

Frequency (MHz)	20 dB bandwidth (KHz)	Maximum (KHz)	PASS / FAIL
433.92	64	1084.80	PASS

7.2.2. The plot of test result is attached as below:



Date: 21.SEP.2004 21:09:06

8. List of Measuring Equipment Used

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Valid Date.
1	Bilog Antenna	CBL6111C	Schaffner	2762	2004/11/03
2	Preamplifier	RFP4002	Schaffner	010	2004/11/03
3	Receiver	SCR3501	Schaffner	437	2004/11/03
4	Signal Generator	8648B	HP	3629U00612	2006/02/09
5	Spectrum Analyzer	8594E	HP	3520A01913	2005/01/15
6	Amplifier	8447D	Agilent	2944A10593	2004/10/09
7	Amplifier	8447D	Agilent	2944A10531	2005/06/30
8	Series Power Meter	E4416A	Agilent	GB41292146	2004/11/05
9	Power Sensor	E9327A	Agilent	US40441392	2004/10/06
10	Dipole Antenna	AD-100	COM-Power	721011	2004/12/02
11	Dipole Antenna	AD-100	COM-Power	721010	2004/12/02
12	Spectrum Analyzer	R3131A	Advantest	131000021	2004/11/24
13	Spectrum Analyzer	FSP40	R&S	100047	2004/12/16
14	Preamplifier	8449B	Agilent	3008A01954	2005/01/04
15	Horn Antenna	3115	EMCO	31601	2005/01/13
16	Horn Antenna	3115	EMCO	31589	2005/01/13
17	Horn Antenna	3116	EMCO	31970	2005/01/29
18	Horn Antenna	3116	EMCO	31974	2005/01/29
19	EMI Receiver	8546A	HP	3807A00454	2005/02/12
20	RF Filter Section	85460A	HP	3704A00386	2005/02/12
21	Signal Generator	83640A	HP	2927A00107	2006/04/02
22	Attenuator	8491B	Agilent	50703	2004/12/16
23	Attenuator	8491B	Agilent	50705	2004/12/16
24	Temperature Chamber	TMJ-9712	T Machine	T-12-040111	2005/02/05
25	High Pass Filter	84300-80038	HP	002	N/A
26	High Pass Filter	84300-80038	HP	006	N/A
27	DC Power Supply	GPD-3030	GM	7020936	N/A
28	AC Power Converter	AFC-11005	APC	F103120008	N/A