



# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CERTIFICATION

**Test Report No.** : E055R-026

**Applicant** : SAROTECH CO., LTD.

**Address** : Sarotech Bldg. 320-15, Sungnae-Dong, Gangdong-Gu, Seoul, 134-851, Korea

**Manufacturer** : SAROTECH CO., LTD.

**Address** : Hanlim Venture Town #204, 689-6, Gumjeong-Dong, Gunpo-City, Kyungki-Do, Korea

**Type of Equipment** : Multimedia Player (FM Transmitter)

**FCC ID.** : PBCDVP-355

**Model Name** : DVP-355

**Serial number** : N/A

**Total page of Report** : 15 pages (including this page)

**Date of Incoming** : February 10, 2005

**Date of Issuing** : May 09, 2005

## SUMMARY

The equipment complies with the regulation of *FCC CRF 47 PART 15, SUBPART C, SECTION 15.239*.

This test report contains only the results of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

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**1. VERIFICATION OF COMPLIANCE**

- APPLICANT : SAROTECH CO., LTD.  
- ADDRESS : Sarotech Bldg. 320-15, Sungnae-Dong, Gangdong-Gu, Seoul, 134-851, Korea  
- CONTACT PERSON : Mr. Cheol-Young, Cho / Manager  
- TELEPHONE NO : +82-2-3471-4501  
- FCC ID : PBCDVP-355  
- MODEL NO/NAME : DVP-355  
- SERIAL NUMBER : N/A  
- DATE : May 09, 2005

DEVICE TYPE	Low Power Communication Device Transmitter
E.U.T. DESCRIPTION	Multimedia Player (FM Transmitter)
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	Charter 7 and 13 of ANSI C63.4: 2001
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SECTION 15.239
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	Yes
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

- This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 affected by the 15.37(j) transition provisions.
- The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



## 2. GENERAL INFORMATION

### 2.1 Product Description

The SAROTECH CO., LTD., Model DVP-355 (referred to as the EUT in this report) is Multimedia Player that has the FM transmitter from 88.1 MHz to 88.9 MHz for audio signal of FM radio receiver. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal
LIST OF EACH OSC. or CRY. FREQ.(FREQ.>=1MHz)	12 MHz and 27 MHz
NUMBER OF LAYERS	1 Layer: Power Board, 2 Layers: Key Board, 4 Layers: Main Board
FM TRANSMITTER	D & A Corp., Model TX-M201
EXTERNAL CONNECTOR	AC In, DC In, Ext. IR In, USB, Video Composite Out, Video Component Out, Video S-Vide Out, Audio R/L Out, Optical Out, Coaxial Out, FM Ant.

### 2.2 Model Differences

-. The difference(s) compared to the EUT is as follows: none

### 2.3 Related Submittal(s) / Grant(s)

-. Original submittal only

### 2.4 Test System Details

The model numbers for all the equipments which were used in the tested system is:

Model	Manufacturer	FCC ID	Description	Connected to
DVP-355	SAROTECH CO., LTD.	PBCDVP-355	Multimedia Player (EUT)	Monitor
LME-17S	HUMAX	DoC	MONITOR	EUT
N/A	SAROTECH CO., LTD.	N/A	FM Transmitter Antenna	EUT
N/A	SAROTECH CO., LTD.	N/A	Receiver	EUT

### 2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in chapter 7, 13 of ANSI C63.4: 2001. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

### 2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Commission on April 04, 2003. (Registration Number: 340658)

### 3. SYSTEM TEST CONFIGURATION

#### 3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
MAIN BOARD	SAROTECH CO., LTD.	DVP-355 Main	N/A
KEY BOARD	SAROTECH CO., LTD.	DVP-355 Key	N/A
FM TRANSMITTER	D & A CORP.	TX-M201	N/A
POWER BOARD	SEYANG TECH	SY0103	N/A

#### 3.2 EUT exercise Software

The EUT is included a FM transmitter designed to transmit function in the 88.1 ~ 88.9 MHz with 400 kHz step. During the testing, the EUT was set on audio setup with FM transmission and the transmitter function is activated and then the volume control of the EUT was set at maximized position during the testing.

#### 3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
Multimedia Player (EUT)	N	Y	1.2(P), 1.2(D)
Monitor	N	Y	1.5(P), 1.2(D)
FM Transmitter Antenna	N	N	1.2(D)
Receiver	N	N	1.2(D)

\* The marked “(D)” means the Data Cable and “(P)” means the Power Cable.

#### 3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
Multimedia Player (EUT)	N	N/A	Y	BOTH END
Monitor	N	N/A	Y	BOTH END
FM Transmitter Antenna	N	N/A	Y	EUT END
Receiver	N	N/A	Y	EUT END

#### 3.5 Equipment Modifications

-. The ground was connected between Key Board and enclosure.



### 3.6 Configuration of Test System

**Line Conducted Test:** The EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2001 7.2.3 to determine the worse operating conditions.

**Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2001 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter open area test site.

**Occupied Bandwidth Measurement:**

This measurement is performed with the antenna located close enough to give a full-scale deflection of the modulated carrier on the spectrum analyzer.

### 3.7 Antenna Requirement

For intentional device, according to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

**Antenna Construction:**

FM transmitter antenna of the EUT is fixed inside the EUT, no consideration of replacement by the user.



#### 4. PRELIMINARY TEST

##### 4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Transmit the RF Signal continuously	X

##### 4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Transmit the RF Signal continuously	X

**5. FINAL RESULT OF MEASUREMENT**

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

**5.1 Conducted Emission Test**Humidity Level : 41 %Temperature: 21 °CLimits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.207 (a)Type of Test : Low Power Communication Device TransmitterResult : PASSED BY -4.07 dB at 0.64 MHz under average mode

EUT : Multimedia Player

Date: March 25, 2005

Operating Condition : Transmit RF signal.


Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
0.64	H	46.36	56.00	-9.64
0.81	H	45.06	56.00	-10.94
1.98	H	46.30	56.00	-9.70
2.06	N	45.77	56.00	-10.23
19.80	H	49.95	60.00	-10.05
20.03	N	50.99	60.00	-9.01
Frequency (MHz)	Line	Average (dBuV)		Margin (dB)
		Emission level	Limits	
0.64	H	41.93	46.00	-4.07
0.81	H	38.23	46.00	-7.77
1.98	H	39.78	46.00	-6.22
2.06	N	37.79	46.00	-8.21
19.80	H	29.44	50.00	-20.56
20.03	N	29.06	50.00	-20.94

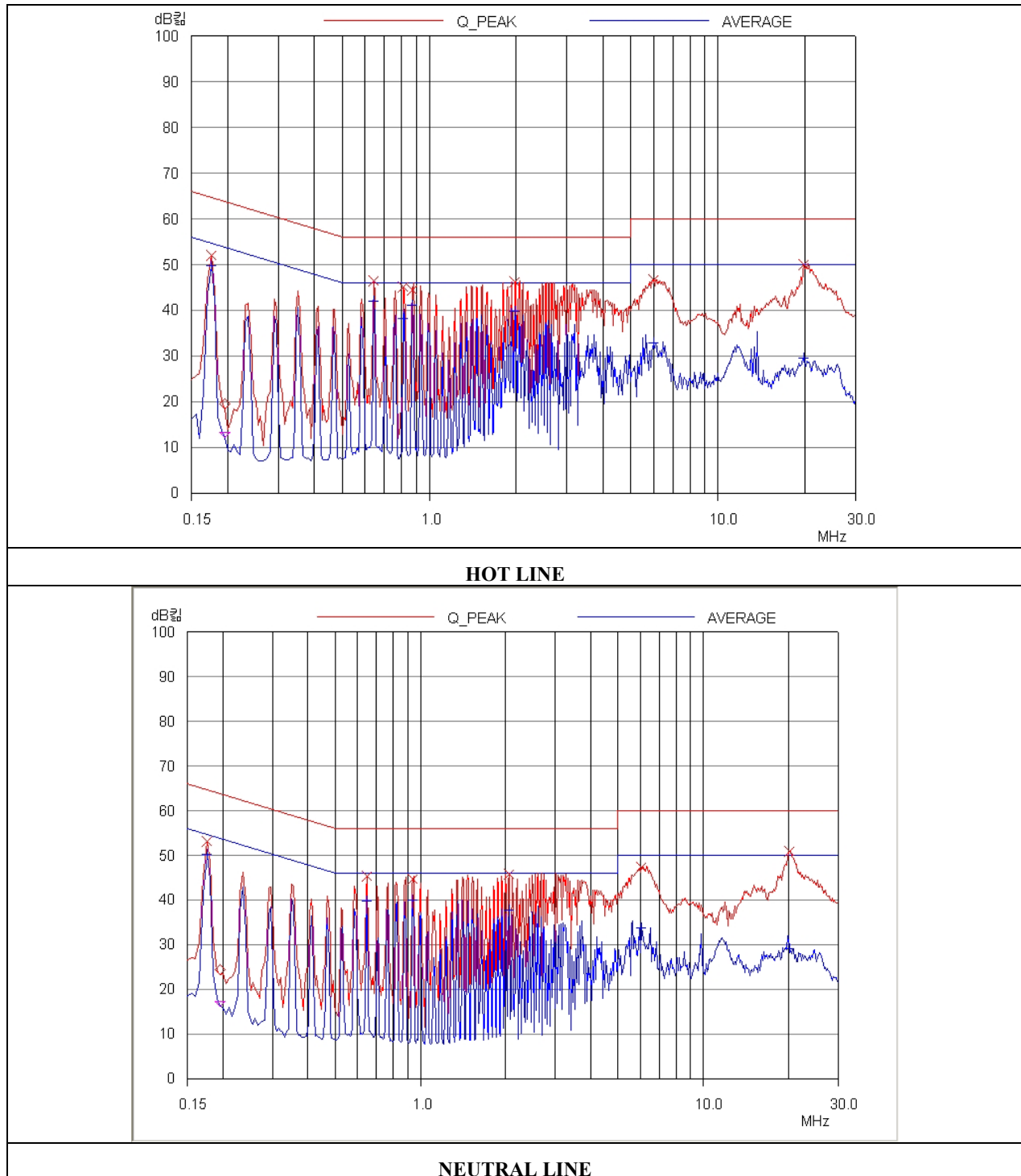
Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral line

See next page for an overview sweep performed with peak and average detector.

  
 Tested by: Young-Min, Choi / Project Engineer





**5.2 Radiated Emission Test (Within the permitted 200 kHz band)**

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 43 % Temperature: 21 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.239 (b)  
 Type of Test : Low Power Communication Device Transmitter  
 Result : PASSED BY – 3.77 dB at 88.90 MHz

EUT : Multimedia Player Date: April 04, 2005  
 Operating Condition : Transmit the RF signal.  
 Distance : 3 Meter

Radiated Emission			Ant	Correction Factors		Total	Limit (dBuV/m)	Margin (dB)
Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)		
88.50	30.20	Peak	H	10.16	1.00	41.36	47.96	-6.60
88.50	30.20	Peak	V	10.16	1.00	41.36	47.96	-6.60
88.90	32.90	Peak	H	10.29	1.00	44.19	47.96	-3.77
88.90	31.70	Peak	V	10.29	1.00	42.99	47.96	-4.97

Radiated Emission Tabulated Data

Remark: The EUT's frequency range is not more than 1 MHz, only middle channel shall be tested according to the Section 15.31(m), but middle and high frequencies were observed.

Average detector mode was not measured, because peak emission values were under average limit.

  
 Tested by: Young-Min, Choi / Project Engineer


**5.3 Radiated Emission Test (Outside of the specified 200 kHz band)**

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 42 % Temperature: 23 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209 (a)  
 Type of Test : Low Power Communication Device Transmitter  
 Result : PASSED BY -2.73dB at 646.00MHz

EUT : Multimedia Player Date: May 07, 2005  
 Operating Condition : Transmit the RF signal.  
 Frequency range : 30MHz – 1000MHz  
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)  
 Distance : 3 Meter  
 Remark : Other emissions

Radiated Emission		Ant	Correction Factors		Total	FCC	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dB/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
54.20	20.40	V	9.26	1.42	31.08	40.00	-8.92
86.60	22.20	V	7.71	1.77	31.68	40.00	-8.32
135.60	18.60	V	14.36	2.31	35.27	43.52	-8.25
182.20	15.90	H	15.96	2.80	34.66	43.52	-8.86
215.60	17.20	V	16.34	2.92	36.46	43.52	-7.06
239.60	22.10	H	16.78	3.23	42.11	46.02	-3.91
242.70	21.40	H	16.81	3.28	41.49	46.02	-4.53
260.60	20.10	V	17.35	3.44	40.89	46.02	-5.13
323.40	21.40	V	14.03	3.99	39.42	46.02	-6.60
480.00	20.70	V	17.03	5.10	42.83	46.02	-3.19
646.00	18.40	V	19.22	5.67	43.29	46.02	-2.73

  
 Tested by: Young-Min, Choi / Project Engineer



## 5.4 Bandwidth of the operating frequency

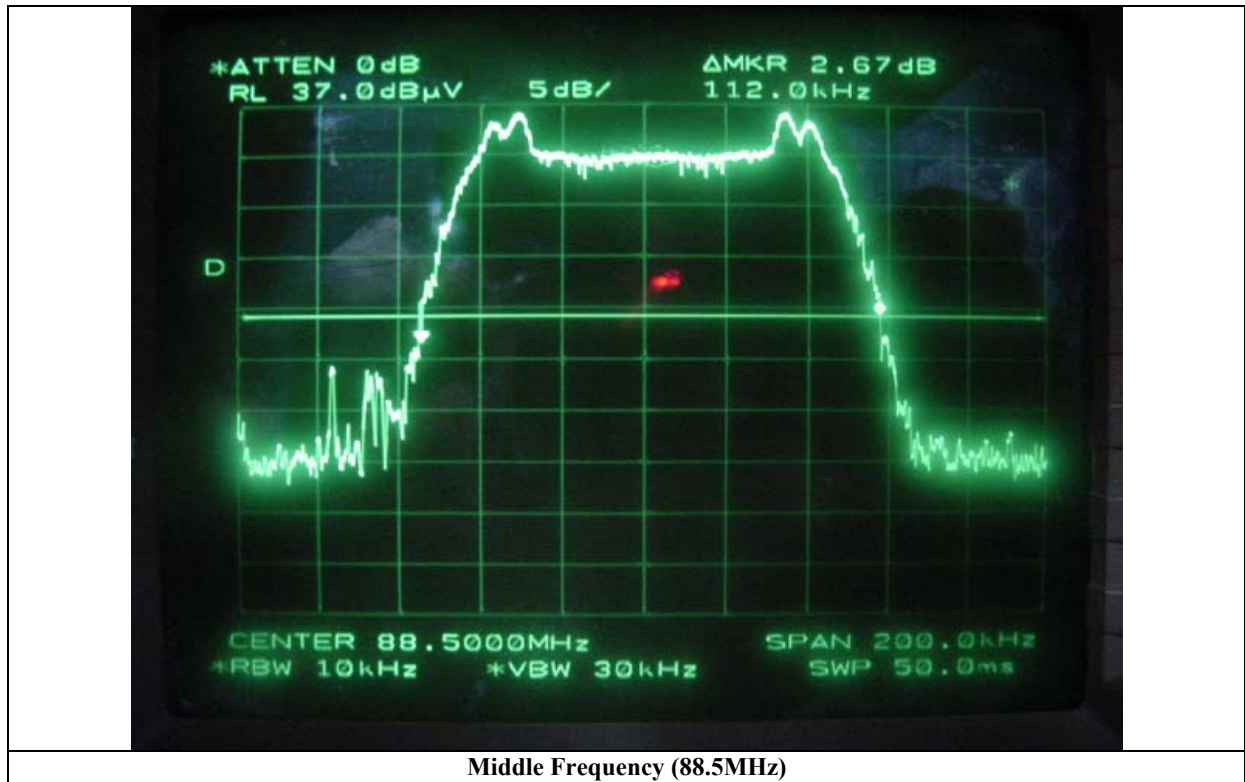
Humidity Level : 42 % Temperature: 23 °C  
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.239 (a)  
Result : PASSED

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EUT : Multimedia Player Date: May 07, 2005  
Operating Condition : Transmit the RF signal.  
Minimum Resolution  
Bandwidth : 10 kHz  
Remark : Refer to test data in next page.

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Tested by: Seung-Hyun, Nam / Project Engineer



According to Section 15.31(m), only middle channel was observed.



## 6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

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= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

**7. LIST OF TEST EQUIPMENT**

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	DEC/04	12MONTH	■
2.	Test receiver	Scwarzbeck	FCKL 1528	1528-170	JUN/04	12MONTH	■
3.	Spectrum analyzer	HP	8566B	3407A08547	JUL/04	12MONTH	
4.	Spectrum analyzer	HP	8568B	3109A05456	JUL/04	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	MAR/05	12MONTH	■
6.	Quasi-Peak Adapter	HP	85650A	3107A01542	JUL/04	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	FEB/05	12MONTH	
8.	Biconical antenna	EMCO	3104C	9109-4443	MAY/04	12MONTH	
		Schwarzbeck	VHA9103	91031852	JAN/05		■
9.	Log Periodic antenna	EMCO	3146	9109-3213	FEB/05	12MONTH	
				9109-3217	MAY/04		
		Schwarzbeck	9108-A(494)	62281001	FEB/05		■
10.	LISN	EMCO	3825/2	9109-1867	JUL/04	12MONTH	■
				9109-1869	OCT/04		■
11.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
12.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
13.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■