

FCC TEST REPORT

Reference No. : G-44-2016-01032
Applicant : VARRAM SYSTEM Co., Ltd.
Equipment Under Test (EUT) :
Product Name: HOME CAMERA
Model Name: APPBOT-RILEY

Applied Standards : FCC Part 15 Subpart B
ANSI C 63.4:2009

Date of Receipt : March 22, 2016
Date of Test : April 6, 2016 ~ April 11, 2016
Date of Issue : April 15, 2016
Test Results : Complied

Tested by :



Emily Lee

Reviewed by :



Paul Kang

Remarks :

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1. General Information

1.1 Client Information

Applicant : VARRAM SYSTEM Co., Ltd.
Address of Applicant : 2 Floors, Dadong, 55-1, Techno 11-ro, Yuseong-gu, Daejeon, Republic of Korea

Manufacturer : VARRAM SYSTEM Co., Ltd.
Address of Manufacturer : 2 Floors, Dadong, 55-1, Techno 11-ro, Yuseong-gu, Daejeon, Republic of Korea

1.2 Test Laboratory

Name and Address : SGS Korea Co., Ltd.
Giheung 1 Laboratory : 35, Giheungdanji-ro 121beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
Giheung 2 Laboratory : 23, Giheungdanji-ro 24beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
Gunpo Laboratory : 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 435-040 Republic of Korea

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1.3 General Information of E.U.T.

Product Name	HOME CAMERA
Model Name	APPBOT-RILEY
Serial No.	-
FCC ID	2AF4XAPPBOT-RILEY
EMI Classification	Class B
Rated Voltage	100 - 240 V~, 50 / 60 Hz
Test Voltage	120 V~, 60 Hz(AC/DC ADAPTER), 5 Vd.c.
Highest Internal Frequency	12 MHz

1.4 Operating Modes and Conditions

Operating mode	Operating condition
Charging + Operating MODE	Charging by AC/DC adapter & operating continuously
Operating MODE	Operating continuously

1.4.1 Monitoring Method

- Monitored Charging and operating

1.5 Auxiliary Equipments

Description	Model	Serial No.	Manufacturer
mobile phone	-	-	Samsung Electronics

1.6 Cable List

- Test Mode : Charging + Operating

Start		END		Cable Spec.	
Name	I/O Port	Name	I/O Port	Length	Shield
EUT	DC IN	AC/DC ADAPTOR	USB	1.2	Unshield
AC/DC ADAPTER	AC IN	AC Source	-	-	-
mobile phone	-	-	-	-	-

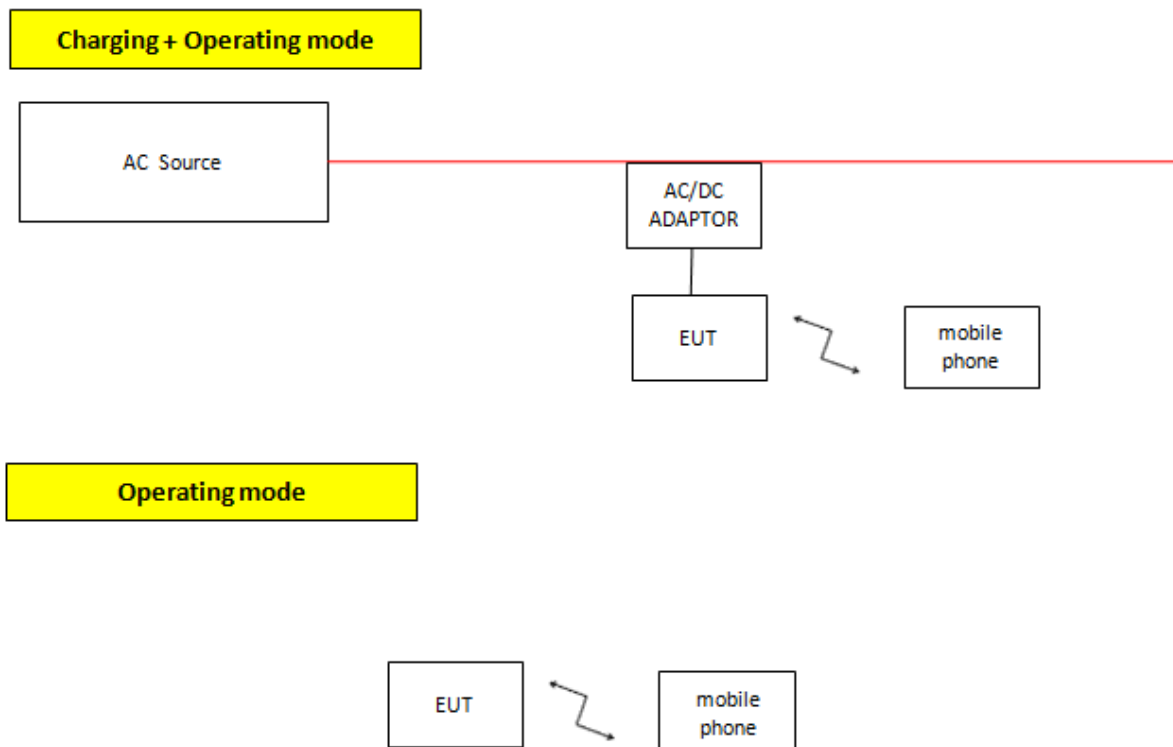
- Test Mode : Operating

Start		END		Cable Spec.	
Name	I/O Port	Name	I/O Port	Length	Shield
EUT	-	-	-	-	-
mobile phone	-	-	-	-	-

1.7 System Configurations

Description	Model	Serial No.	Manufacturer
Main Board	-	-	-
motor	-	-	-
motor Board	A01144	-	-
Lens Board	-	-	-
Sub Board	APL-HS V1.3	-	-
Battery	-	-	-
AC/DC ADAPTOR	RH-050100US	-	-
Cradle	-	-	-
USB Cable	-	-	-
Main Board	-	-	-
motor	-	-	-

1.8 Test System Layout



1.9 Modifications

There was no modified item during the test.

1.10 Applicable Standards for Testing

Standards	Status	Deviation
FCC Part 15 Subpart B	Applicable	No Deviation

1.11 Summary of Test Results

Test Item	Basic Standards	Results
Conducted Emission	ANSI C 63.4:2009 FCC Part 15 Subpart B	Complied
Radiated Emission	ANSI C 63.4:2009 FCC Part 15 Subpart B	Complied

Note: Test methods of all test items are performed according to the basic standards in this table.

EMISSION

2.1 Test Results

Test Items	Basic Standards	Test Results
Conducted Emission	ANSI C 63.4:2009 FCC Part 15 Subpart B	Complied
Radiated Emission	ANSI C 63.4:2009 FCC Part 15 Subpart B	Complied

2.2 Test Method and Limits

2.2.1 Test Method

Test Items	Measuring Frequency Range	RBW	Measuring Distance
Conducted Emission	0.15 MHz ~ 30 MHz	9 kHz	-
Radiated Emission	30 MHz ~ 1 GHz	120 kHz	10 m
	Above 1 GHz	1 MHz	3 m

2.2.2 Test Limits

-Conducted Emission Limits at Mains Port

Frequency Range	Limits(dB(μ V))		Class
	Quasi-peak	Average	
0.15 MHz ~ 0.5 MHz	79	66	Class A
0.5 MHz ~ 30 MHz	73	60	
0.15 MHz ~ 0.5 MHz	66 to 56	56 to 46	Class B
0.5 MHz ~ 5 MHz	56	46	
5 MHz ~ 30 MHz	60	50	

Note : The lower limit shall apply at the transition frequencies. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

-Radiated Emission Limits below 1 GHz

Frequency Range	Limits(dB(μ V/m))	Class
	Quasi-peak	
30 MHz ~ 88 MHz	39.1	Class A
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 960 MHz	46.4	
960 MHz ~ 1 GHz	49.5	
30 MHz ~ 88 MHz	40	Class B
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 960 MHz	46	
960 MHz ~ 1 GHz	54	

-Radiated Emission Limits above 1 GHz (3m method)

Frequency Range	Limits(dB(μ V/m))		Class
	Average	Peak	
Above 1 GHz	59.5	79.5	Class A
Above 1 GHz	54	74	Class B

2.3 Conducted Emission

The initial preliminary exploratory scans were performed over the measuring frequency range(0.15 MHz to 30 MHz) using a max hold mode incorporating a Peak detector and Average detector and using the software of ES-K1(Version V1.71 from R&S). The final test data was measured using a Quasi-Peak detector and Average detector.

2.3.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Cal Due. Date
Two-Line V-Network	ENV216	R & S	100190	2016.12.21
Test Receiver	ESCI 7	R & S	100911	2016.12.22

Note : The calibration period of every equipment is 1 year.

2.3.2 Test Site

Shield Room in Gunpo Laboratory

2.3.3 Environment Conditions and data

- Conducted Emission at AC Mains Port

Temp. (Minimum 21.1 °C, Maximum 21.4 °C) ,

Humidity (Minimum 32.0 % R.H., Maximum 33.0 % R.H.)

Atmospheric Pressure : (Minimum 101.9 kPa, Maximum 101.9 kPa)

Test Date : April 11, 2016

- Test Mode : Charging + Operating

Freq. (MHz)	Line (H/N)	Level (dB μ V)		CL (dB)	LISN (dB)	Result (dB μ V)		Limit (dB μ V)		Margin (dB)	
		Q/P	A/V			Q/P	A/V	Q/P	A/V	Q/P	A/V
0.17	H	40.48	25.48	0.02	9.60	50.10	35.10	64.96	54.96	14.86	19.86
0.18	N	38.29	24.29	0.01	9.70	48.00	34.00	64.72	54.72	16.72	20.72
0.22	H	36.68	26.78	0.02	9.60	46.30	36.40	63.01	53.01	16.71	16.61
0.45	H	34.40	24.30	0.10	9.60	44.10	34.00	56.88	46.88	12.78	12.88
0.50	N	34.28	22.68	0.12	9.70	44.10	32.50	56.08	46.08	11.98	13.58
1.84	N	33.64	22.04	0.36	9.70	43.70	32.10	56.00	46.00	12.30	13.90

Measurement Uncertainty : ± 3.21 dB (The confidential level is about 95%, $k=2$)

Note : • Line (H) : Hot • Line (N) : Neutral
• CL: Cable Loss • LISN : LISN Factor
• Result = Level + CL + LISN • Margin = Limit – Result

See Appendix A (Conducted Emission at AC Mains Port)

2.4 Radiated Emission

The initial preliminary exploratory scans were performed at 3 m distance over the measuring frequency range(30 MHz to 1 GHz) using a max hold mode incorporating a Peak detector and using the software of EP5RE(Version Ver3.10.20 from TOYO). The final test data was measured using a Quasi-Peak detector below 1 GHz at 3 m distance. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency.

2.4.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Cal Due. Date
Test Receiver	ESU26	R & S	100109	2017.03.07
Bilog Antenna (RRA)	VULB9163	SCHWARZBECK MESS- ELEKTRONIK	396	2016.06.16
Amplifier	8447F	HP	2944A03909	2016.08.27

Note : Only the calibration period of Antennas is 2 years but the period of every equipment is 1 year.

2.4.2 Test Site

3 m Semi-Anechoic Chamber in Gunpo Laboratory

2.4.3 Environment Conditions and data

Below 1 GHz (3 m method)

Temp. (Minimum 21.0 °C, Maximum 21.4 °C) ,

Humidity (Minimum 22.0 % R.H., Maximum 23.0 % R.H.)

Atmospheric Pressure : (Minimum 101.8 kPa, Maximum 101.8 kPa)

Test Date : April 06, 2016

- Test Mode : Charging + Operating

Freq. (MHz)	Level (dB μ V)	Pol. (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp. (dB)	F/S (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
47.14	46.00	V	16	200	14.12	0.75	27.81	33.06	40.00	6.94
575.99	42.60	V	317	100	19.57	2.62	28.45	36.34	46.00	9.66
600.04	45.90	V	350	200	20.05	2.59	28.50	40.04	46.00	5.96
624.04	43.60	V	699	100	20.25	2.70	28.48	38.07	46.00	7.93
930.12	37.10	V	358	100	23.33	3.32	27.58	36.17	46.00	9.83
942.04	39.00	V	64	100	23.40	3.28	27.53	38.15	46.00	7.85

Measurement Uncertainty (Horizontal) : ± 5.31 dB (The confidential level is about 95%, $k=2$)

Measurement Uncertainty (Vertical) : ± 5.73 dB (The confidential level is about 95%, $k=2$)

Note: • AF = Antenna Factor • CL = Cable Loss • F/S = Field Strength
• Pol.(H) = Horizontal • Pol.(V) = Vertical • Amp. = Amplifier Gain
• Margin = Limit – F/S • F/S = Level + AF + CL – Amp.
• A : Angle • H : Height

- Test Mode : Operating

Freq. (MHz)	Level (dB μ V)	Pol. (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp. (dB)	F/S (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
455.99	46.30	V	0	100	17.36	2.31	28.12	37.85	46.00	8.15
504.01	42.80	V	348	100	18.14	2.43	28.31	35.06	46.00	10.94
552.02	43.10	V	22	100	19.10	2.54	28.40	36.34	46.00	9.66
575.99	42.50	V	274	100	19.57	2.62	28.45	36.24	46.00	9.76
834.01	38.20	H	107	100	22.50	3.09	28.03	35.76	46.00	10.24
989.98	39.30	V	228	100	23.71	3.46	27.34	39.13	54.00	14.87

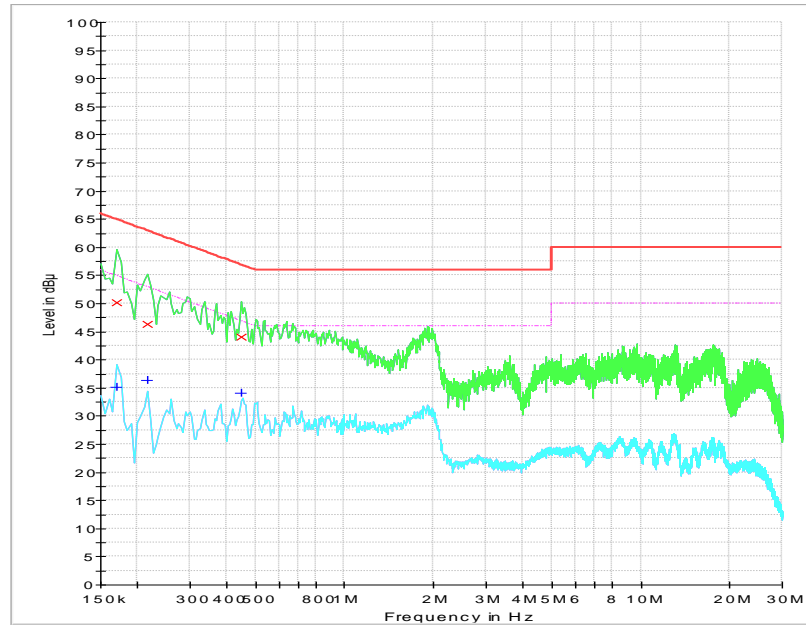
Measurement Uncertainty (Horizontal) : ± 5.31 dB (The confidential level is about 95%, $k=2$)

Measurement Uncertainty (Vertical) : ± 5.73 dB (The confidential level is about 95%, $k=2$)

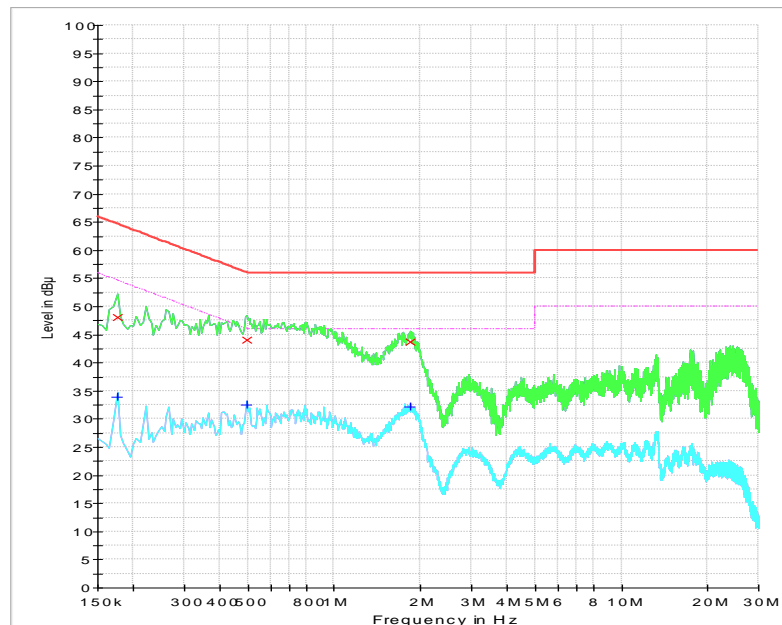
Note: • AF = Antenna Factor • CL = Cable Loss • F/S = Field Strength
• Pol.(H) = Horizontal • Pol.(V) = Vertical • Amp. = Amplifier Gain
• Margin = Limit – F/S • F/S = Level + AF + CL – Amp.
• A : Angle • H : Height

See Appendix B (Radiated Emission)

Appendix A : Conducted Emission at Mains Port Neutral



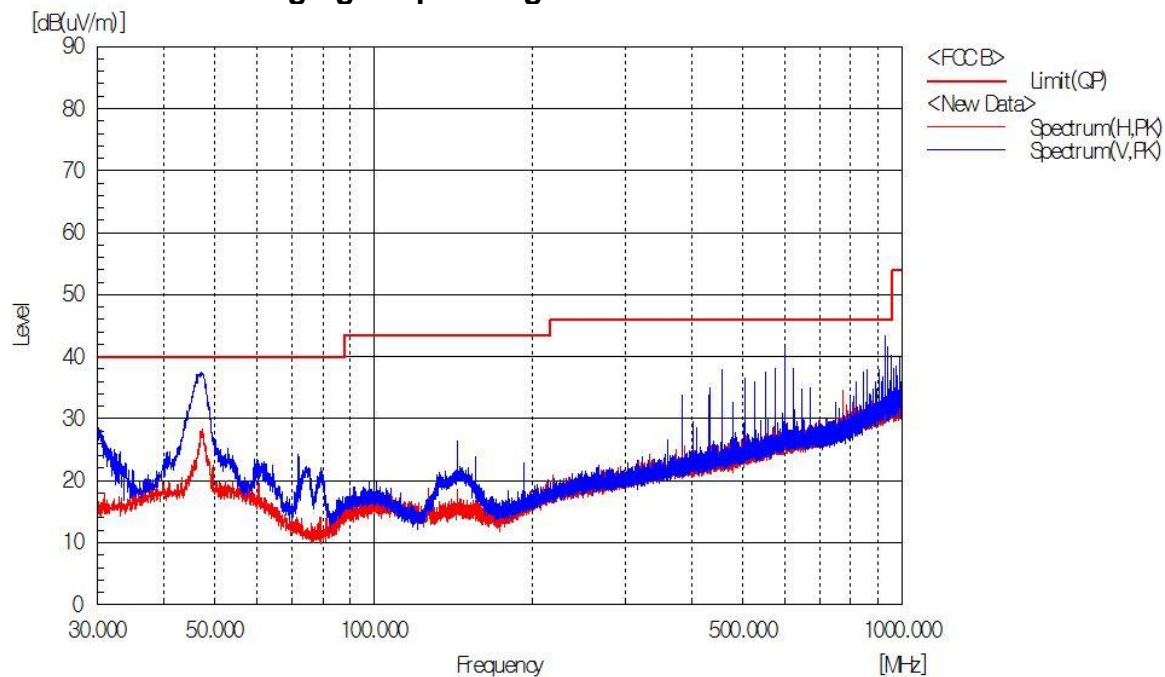
Hot



Appendix B : Radiated Emission (3 m Scan Data)

Below 1 GHz

- Test Mode : Charging + Operating



- Test Mode : Operating

