

## ***FCC EVALUATION REPORT FOR CERTIFICATION***

**Applicant: Ohsung Electronics Co.,Ltd.**

**#181 Gongdan-Dong, Gumi-Si,**

**Gyeongsangbuk-Do, South Korea.**

**Attn : Hak-Ki Kim / General Manager**

**Date of Issue: Apr. 26, 2017**

**Order Number: GETEC-C1-17-184**

**Test Report Number: GETEC-E3-17-015**

**Test Site: GUMI UNIVERSITY EMC CENTER**

**FCC Registration Number: 269701**

**FCC ID. : OZ5URCTKP5600**

**Applicant : Ohsung Electronics Co.,Ltd.**

**Rule Part(s) : FCC Part 15 Subpart B**  
**Equipment Class : Class B computing device peripheral (JBP)**  
**EUT Type : Network Keypad**  
**Type of Authority : Certification**  
**Model Name : TKP-5600**  
**Trade Name : UNIVERSAL remote control**

**This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4 (2014) / Canadian standard ICES-003**

**I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the vest of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.**

**Tested by,**



**Hyun Kim, Senior Engineer**  
**GUMI UNIVERSITY EMC CENTER**

**Reviewed by,**



**Jae-Hoon Jeong, Technical Manager**  
**GUMI UNIVERSITY EMC CENTER**



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*Scope: Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and / or unintentional radiators for compliance with technical rules and regulations of the Federal Communications Commission.*

## 1. General Information

**Applicant: Ohsung Electronics Co.,Ltd.**  
**Applicant Address: #181 Gongdan-Dong, Gumi-Si, Gyeongsangbuk-Do, South Korea**  
**Manufacturer: Ohsung Electronics Co., Ltd.**  
**Manufacturer Address: #181 Gongdan-Dong, Gumi-Si, Gyeongsangbuk-Do, South Korea**  
**Contact Person: Hak-Ki Kim / General Manager**  
**Telephone Number: +82-54-468-7281 Fax Number: +82-54-461-8368**

- **FCC ID** OZ5URCTKP5600
- **EUT Type** Network Keypad
- **Equipment Class** Class B computing device peripheral (JBP)
- **Model Name** TKP-5600
- **Trade Name** UNIVERSAL remote control
- **Serial Number** Prototype
- **Rule Part(s)** FCC Part 15 Subpart B
- **Type of Authority** Certification
- **Test Procedure(s)** ANSI C63.4 (2014)
- **Dates of Test** Mar. 21, 2017 ~ Mar. 30, 2017
- **Place of Test**  
**GUMI UNIVERSITY EMC CENTER**  
(FCC Test Firm Registration Number: 269701)  
37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 730-711, Republic of Korea.
- **Test Report Number** GETEC-E3-17-015
- **Date of Issue** Apr. 26, 2017



## 2. Introduction

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Nose Emissions From Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2014) was used in determining radiated and conducted emissions emanating from **Ohsung Electronics Co.,Ltd. Network Keypad (Model Name: TKP-5600)**

These measurement tests were conducted at **GUMI UNIVERSITY EMC CENTER**

The site address is 37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 730-711, Republic of Korea.

This test site is one of the highest point of Gumi UNIVERSITY at about 200 km away from Seoul city and 40 km away from Daegu city. It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures. The detailed description of the measurement facility was found to be in compliance with the requirements of §2.948 according to ANSI C63.4 (2014)

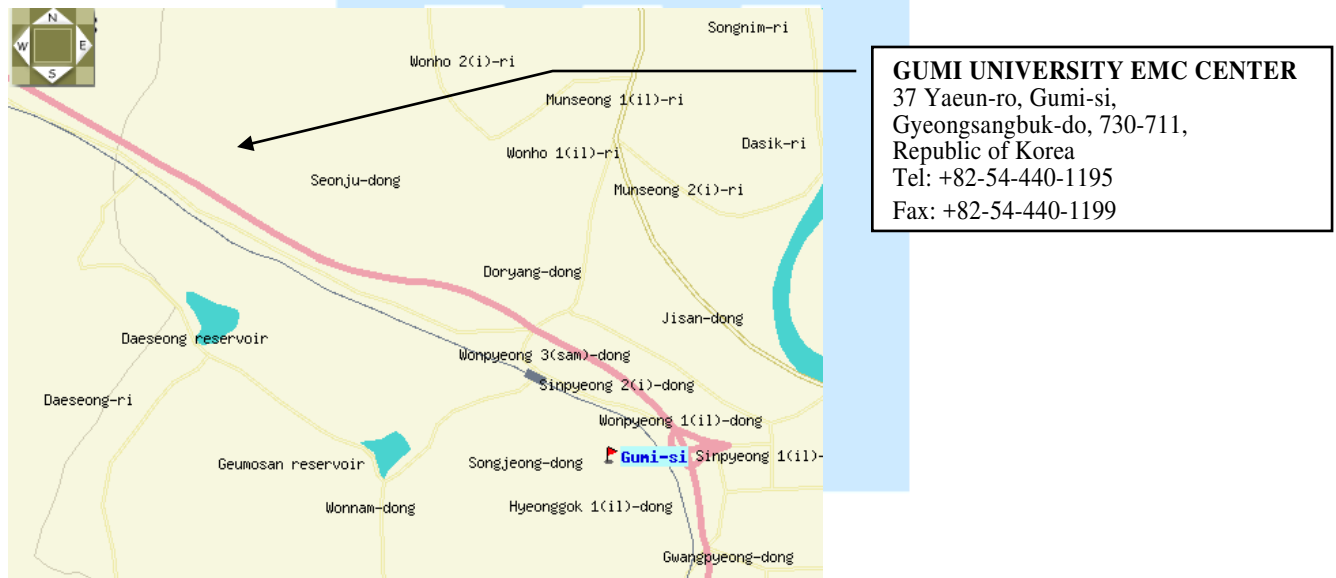


Fig 1. The map above shows the Gumi UNIVERSITY in vicinity area.



### 3. Product Information

#### 3.1 Description of EUT

The Equipment under Test (EUT) is the **Ohsung Electronics Co.,Ltd.**  
**Network Keypad (Model Name: TKP-5600) FCC ID.: OZ5URCTKP5600**

**Microprocessor:** Coretex-A9 dual 1GHz  
**Memory:** 4GB eMMC, 1GB RAM  
**Devices:** Supports up to 255 Devices  
**Pages:** Supports up to 255 Pages on each Device  
**Macro Capability:** Up to 255 steps  
**Network:** One 10/100 Ethernet port (PoE)  
**LCD:** 5 inch (960x540)  
**Weight:** 6.28 oz  
**Size:** 3.15"(L) x 5.62"(H) x 0.96"(D)  
**Power:** Standard PoE Injector or PoE Switch (Purchased separately)



### 3.2 Support Equipment / Cables used

#### 3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID.
Network Keypad	Ohsung Electronics Co.,Ltd.	TKP-5600	S/N: None FCC ID.: OZ5URCTKP5600
8-Port Gigabit Desktop/Rackmount Switch with 8-Port PoE	TP-LINK Technologies Co.,Ltd.	TL-SG1008PE	S/N: 2166308000074 FCC ID.: None

See "Appendix D – Test Setup Photographs" for actual system test set-up

#### 3.2.2 System configuration

Description	Manufacturer	Model Name	S/N & FCC ID.
-	-	-	-

#### 3.2.3 Used Cable(s)

Cable Name	Condition	Description
LAN cable	Connected to the EUT and 8-Port Gigabit Desktop /RackmountSwitch with 8-Port PoE	1.80 m shielded

### 3.3 Modification Item(s)

- None



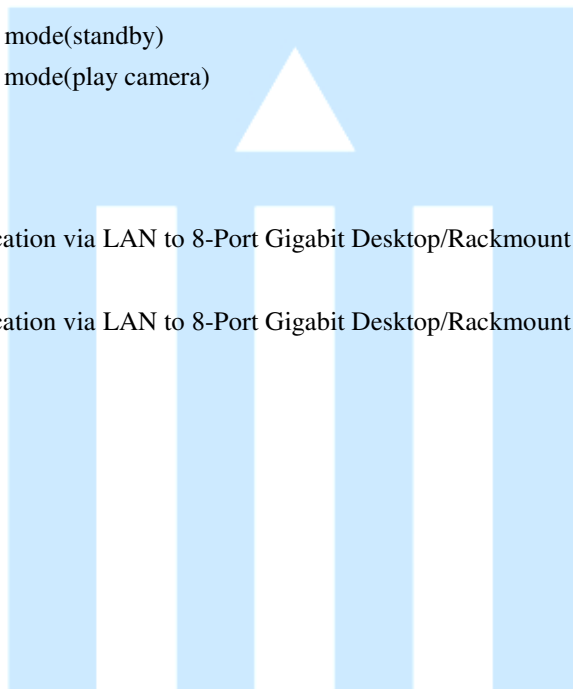
## 4. Description of tests

### 4.1 Test Condition

The EUT was installed, arranged and operated in a manner that is most representative of equipment as typically used. The measurements were carried out while varying operating modes and cable positions within typically arrangement to determine maximum emission level.

The test conditions of the noted test mode(s) in this test report are;

- Test Voltage / Frequency : AC 120 V / 60 Hz
  
- Test Mode(s)
  - . Network communication mode(standby)
  - . Network communication mode(play camera)
  
- Operating test pattern
  - . Conducted Emission:  
The EUT was communication via LAN to 8-Port Gigabit Desktop/Rackmount Switch with 8-Port PoE
  - . Radiated Emission:  
The EUT was communication via LAN to 8-Port Gigabit Desktop/Rackmount Switch with 8-Port PoE





## 4.2 Conducted Emission

The Line conducted emission test facility is inside a 4 m × 8 m × 2.5 m shielded enclosure. (FCC Test Film Registration No.: 269701)

The EUT was placed on a non-conducting 1.0 m by 1.5 m table, which is 0.4 m in height and 0.8 m away from the vertical wall of the shielded enclosure.

The EUT is powered from the Rohde & Schwarz LISN (ENV216) and the support equipment is powered from the Rohde & Schwarz LISN (ENV216). Powers to the LISN are filtered by high-current high insertion loss power line filter.

Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

The RF output of the LISN was connected to the EMI test receiver (Rohde & Schwarz, ESCI).

Exploratory measurements were conducted to identify the highest emission by operating the EUT in a range of typical modes of operation, cable positions, system configuration and arrangement.

Based on exploratory measurements, the final measurements were conducted at the worst test conditions.

Exploratory measurements were scanned using Peak mode of EMI Test receiver from 150 kHz to 30 MHz with 20 ms sweep time. The final measurements were measured with Quasi-Peak and Average mode.

The bandwidth of EMI Test Receiver was set to 9 kHz. Interface cables were connected to the available interface ports of the test unit. Excess cable lengths were bundled at center with 30 cm ~ 40 cm.

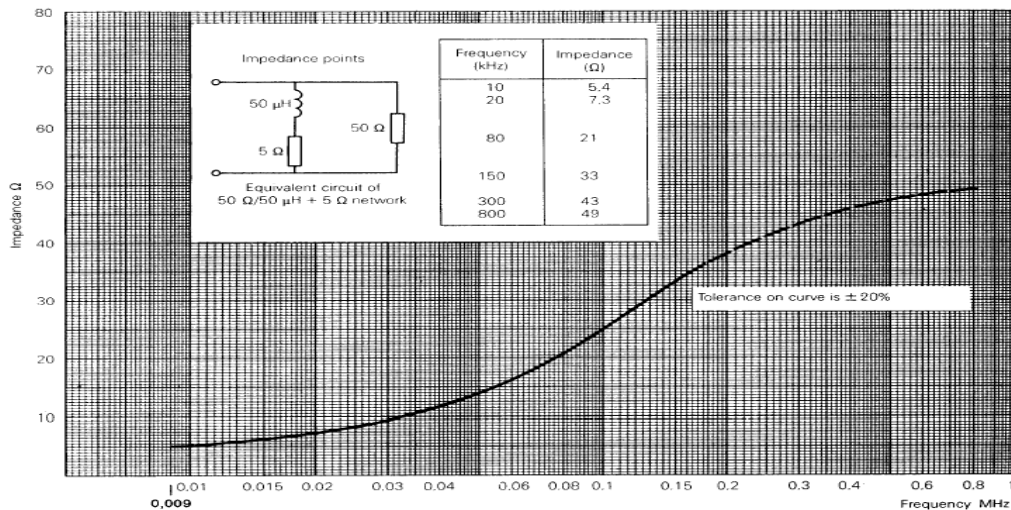


Fig 2. Impedance of LISN





### 4.3 Radiated Emission

Exploratory Radiated measurements were conducted at the 3 m or 10 m semi anechoic chamber in order to identify the highest emission by operating the EUT in a range of typical modes of operation, cable positions, system configuration and arrangement.

Based on exploratory measurements, the final measurements were conducted at the worst test conditions.

Final measurements of below 1 GHz were made at 3 m or 10 m Chamber (FCC Test Firm Registration No.: 269701) or Open area test site (FCC Test Firm Registration No.: 269701) that complies with CISPR 16/ANSI C63.4.

Above 1 GHz final measurements were conducted at the 3m Chamber (FCC Test Firm Registration No.: 269701) only.

For measurements above 1GHz, the bottom side of 3 m chamber was installed with absorbers in order to meet SVSWR Limit.

Exploratory measurements were scanned using Peak mode of EMI Test receiver and final measurements were measured with Quasi-Peak mode (Below 1 GHz) and Peak & Average mode (Above 1 GHz).

The measurements were performed by rotating the EUT 360° and adjusting the receive antenna height from 1.0 m to 4.0 m. All frequencies were investigated in both horizontal and vertical antenna polarity.

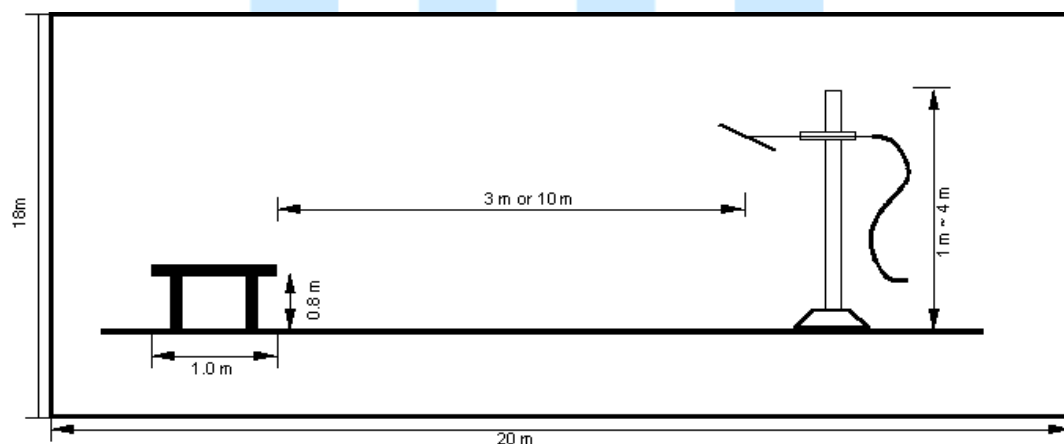


Fig 3. Dimensions of test site (Below 1 GHz)

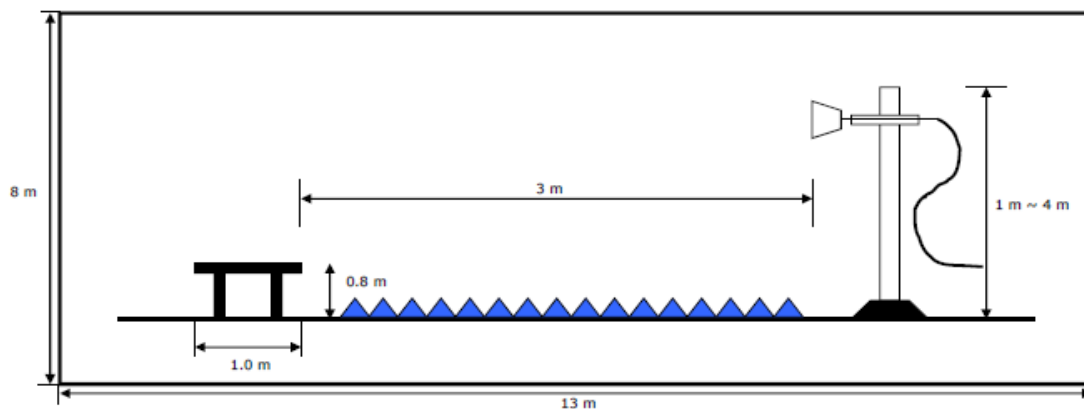


Fig 4. Dimensions of test site (Above 1 GHz)



## 5. Conducted Emission

### 5.1 Operating Environment

Temperature : 23.8 °C  
Relative Humidity : 36.1 % R.H.

### 5.2 Test Set-up

The conducted emission measurements were performed in the shielded room.

The EUT was placed on wooden table, 0.4 m heights above the floor, 0.8 m from the reference ground plane (GRP) wall and 0.8 m from AMN & ISN.

AMN is bonded on horizontal reference ground plane.

The ground plane, which was electrically bonded to the shield room, ground system and all power lines entering the shield room, were filtered.

### 5.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO "Guide to the expression of uncertainty in measurement."

The measurement uncertainty was given with a confidence of 95 %.

Test Items	Uncertainty	Remark
Conducted emission (9 kHz ~ 150 kHz)	3.85 dB	Confidence level of approximately 95 % ( $k = 2$ )
Conducted emission (150 kHz ~ 30 MHz)	3.32 dB	Confidence level of approximately 95 % ( $k = 2$ )

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

The listed uncertainties are the worst case uncertainty for the entire range of measurement. please note that the uncertainty values are provided for informational purposes only are not used in determining the PASS/FAIL results



#### 5.4 Limit

RFI Conducted	FCC Limit(dB $\mu$ V) Class B	
	Quasi-Peak	Average
150 kHz ~ 0.5 MHz	66 ~ 56*	56 ~ 46*
0.5 MHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50

\*Limits decreases linearly with the logarithm of frequency.

#### 5.5 Test Equipment used

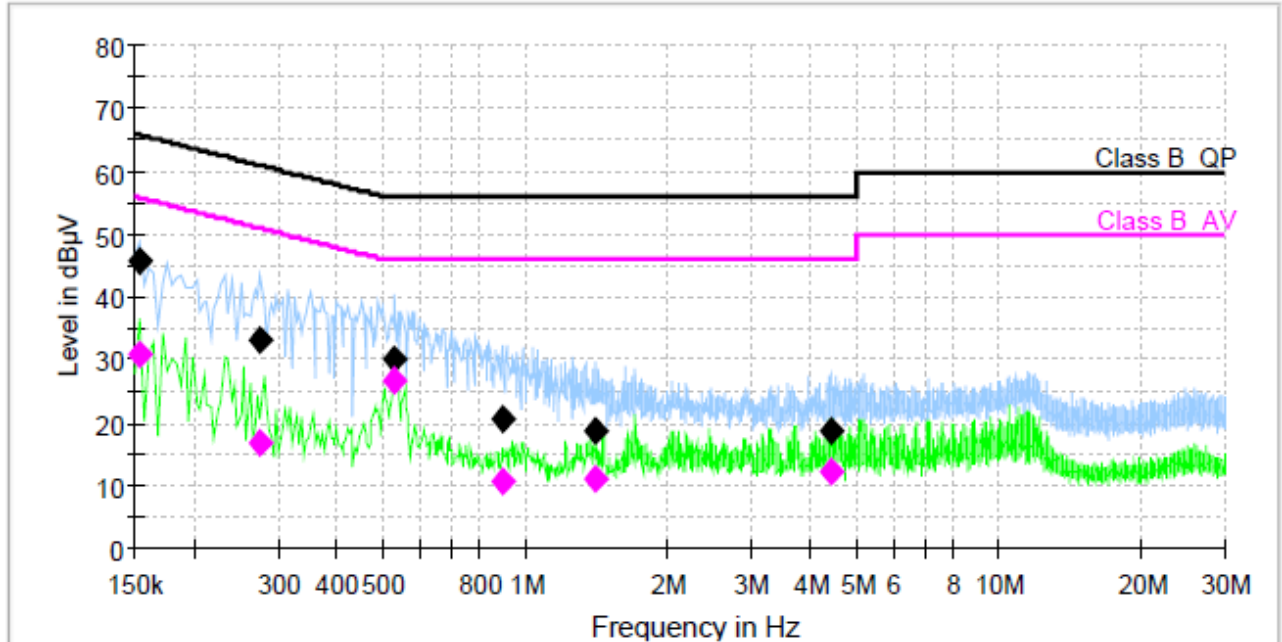
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESCI	Rohde & Schwarz	EMI Test Receiver	100237	Apr. 18, 2017
■ - ENV216	Rohde & Schwarz	LISN	100172	Apr. 19, 2017
□ - ENV216	Rohde & Schwarz	LISN	100173	Apr. 19, 2017
□ - ISN T8	TESEQ.GmbH	ISN	24568	Apr. 22, 2017
■ - ST 08	TESEQ.GmbH	ISN	42870	Jun. 09, 2017
■ - EMC 32	Rohde & Schwarz	Software	Ver 8.53	N/A

#### 5.6 Test data for Conducted Emission

- Test Date : Mar. 30, 2017
- Resolution Bandwidth : 9 kHz
- Frequency Range : 0.15 MHz ~ 30 MHz
- Line : L1: Live, N: Neutral



Operating condition: Network communication mode(standby)



— Class B\_QP      — Class B\_AV      — Preview Result 1-PK+  
— Preview Result 2-AVG      ◆ Final Result 1-QPK      ◆ Final Result 2-CAV

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.153731	45.5	200.0	9.000	Off	L1	9.6	20.3	65.8	
0.276863	33.0	200.0	9.000	Off	N	9.6	27.9	60.9	
0.530588	30.2	200.0	9.000	Off	L1	9.7	25.8	56.0	
0.892519	20.7	200.0	9.000	Off	L1	9.7	35.3	56.0	
1.403700	18.7	200.0	9.000	Off	N	9.7	37.3	56.0	
4.433475	18.6	200.0	9.000	Off	L1	9.8	37.4	56.0	

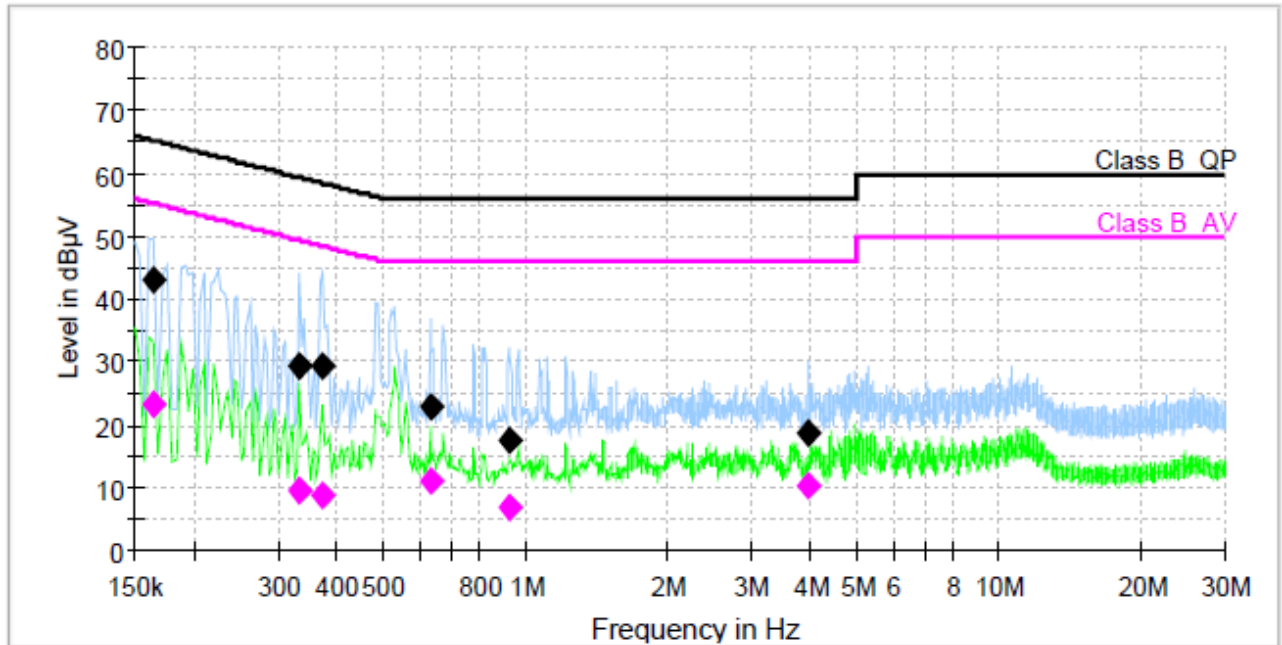
**Final Result 2**

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.153731	31.0	200.0	9.000	Off	L1	9.6	24.8	55.8	
0.276863	16.9	200.0	9.000	Off	N	9.6	34.0	50.9	
0.530588	26.8	200.0	9.000	Off	L1	9.7	19.2	46.0	
0.892519	10.7	200.0	9.000	Off	L1	9.7	35.3	46.0	
1.403700	11.2	200.0	9.000	Off	N	9.7	34.8	46.0	
4.433475	12.1	200.0	9.000	Off	L1	9.8	33.9	46.0	

< Fig 5. Graph of continuous disturbance >



Operating condition: Network communication mode(play camera)



— Class B\_QP      — Class B\_AV      — Preview Result 1-PK+  
— Preview Result 2-AVG      ◆ Final Result 1-QPK      ◆ Final Result 2-CAV

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.164925	42.9	200.0	9.000	Off	L1	9.6	22.3	65.2	
0.332831	29.2	200.0	9.000	Off	L1	9.6	30.2	59.4	
0.373875	29.3	200.0	9.000	Off	L1	9.6	29.1	58.4	
0.631331	22.9	200.0	9.000	Off	L1	9.7	33.1	56.0	
0.926100	17.7	200.0	9.000	Off	N	9.7	38.3	56.0	
3.974531	18.7	200.0	9.000	Off	N	9.8	37.3	56.0	

**Final Result 2**

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.164925	23.1	200.0	9.000	Off	L1	9.6	32.1	55.2	
0.332831	9.6	200.0	9.000	Off	L1	9.6	39.8	49.4	
0.373875	8.8	200.0	9.000	Off	L1	9.6	39.6	48.4	
0.631331	11.2	200.0	9.000	Off	L1	9.7	34.8	46.0	
0.926100	6.8	200.0	9.000	Off	N	9.7	39.2	46.0	
3.974531	10.5	200.0	9.000	Off	N	9.8	35.5	46.0	

< Fig 6. Graph of continuous disturbance >



## 6. Radiated Emission

### 6.1 Operating Environment

Temperature : 17.7 °C  
 Relative Humidity : 39.2 % R.H.

### 6.2 Test Set-up

A preliminary and final measurement was at 3 m & 10 m anechoic chamber.

The EUT was placed on a non-conductive turntable approximately 1.0 m above the ground plane.

The turntable with EUT was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels.

This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

### 6.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO “Guide to the expression of uncertainty in measurement”.

Test Items(3 m Anechoic Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	4.78 dB	Confidence level of approximately 95 % ( $k = 2$ )
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	4.77 dB	Confidence level of approximately 95 % ( $k = 2$ )
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	5.06 dB	Confidence level of approximately 95 % ( $k = 2$ )
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	5.03 dB	Confidence level of approximately 95 % ( $k = 2$ )
Radiated emission (1 000 MHz ~ 6 000 MHz, 3 m)	5.42 dB	Confidence level of approximately 95 % ( $k = 2$ )
Radiated emission (1 000 MHz ~ 18 000 MHz, 3 m)	5.64 dB	Confidence level of approximately 95 % ( $k = 2$ )
Test Items(10 m Anechoic Chamber)	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	4.36 dB	Confidence level of approximately 95 % ( $k = 2$ )
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	4.37 dB	Confidence level of approximately 95 % ( $k = 2$ )
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	4.49 dB	Confidence level of approximately 95 % ( $k = 2$ )
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	4.47 dB	Confidence level of approximately 95 % ( $k = 2$ )
Radiated emission (1 000 MHz ~ 6 000 MHz, 3 m)	5.27 dB	Confidence level of approximately 95 % ( $k = 2$ )

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

The listed uncertainties are the worst case uncertainty for the entire range of measurement. please note that the uncertainty values are provided for informational purposes only are not used in determining the PASS/FAIL results



#### 6.4 Limit

Frequency (MHz)	FCC Limit @ 3 m. dB $\mu$ V/m	CISPR Limit @ 10 m. dB $\mu$ V/m
30 ~ 88	40.0	30.0
88 ~ 216	43.5	30.0
216 ~ 230	46.0	30.0
230 ~ 960	46.0	37.0
960 ~ 1 000	54.0	37.0

Frequency (MHz)	FCC Class B Peak Limit @ 3 m dB $\mu$ V/m	FCC Class B Average Limit@ 3 m dB $\mu$ V/m
> 1 000	74.0	54.0

Frequency (MHz)	CISPR Class B Peak Limit @ 3 m dB $\mu$ V/m	CISPR Class B Average Limit@ 3 m dB $\mu$ V/m
> 1 000	70.0	50.0



### 6.5 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
<input type="checkbox"/> - ESIB26	Rohde & Schwarz	EMI Test Receiver	830482/010	Apr. 18, 2017
<input checked="" type="checkbox"/> - ESU40	Rohde & Schwarz	EMI Test Receiver	100266	Jul. 20, 2017
<input type="checkbox"/> - ESR7	Rohde & Schwarz	EMI Test Receiver	101382	Apr. 18, 2017
<input type="checkbox"/> - VULB9160	Schwarzbeck	Broad Band Test Antenna	3099	Aug. 03, 2017
<input checked="" type="checkbox"/> - BBHA9120D	Schwarzbeck	Horn ANT	207	Oct. 13, 2017
<input checked="" type="checkbox"/> - MCU066	maturu GmbH	Position Controller	1390306	N/A
<input checked="" type="checkbox"/> - TT2.5SI	maturu GmbH	Turntable	1390307	N/A
<input checked="" type="checkbox"/> - AM 4.0	maturu GmbH	Antenna Mast	1390308	N/A
<input type="checkbox"/> - BBHA9120D	Schwarzbeck	Horn ANT	597	May. 13, 2017
<input type="checkbox"/> - CO3000	Innco system GmbH	Position Controller	1390306	N/A
<input type="checkbox"/> - DT3000	Innco system GmbH	Turntable	1390307	N/A
<input type="checkbox"/> - MA4000-EP	Innco system GmbH	Antenna Mast	1390308	N/A
<input type="checkbox"/> - MA4640-XP-ET	Innco system GmbH	Antenna Mast	MA4640/558	N/A
<input checked="" type="checkbox"/> - AFS 44 00101800-25-10P-44	MITEQ	Preamplifier	1258943	Dec. 06, 2017
<input type="checkbox"/> - 87405A	Agilent	Preamplifier	MY39500777	Dec. 06, 2017
<input checked="" type="checkbox"/> - EMC 32	Rohde & Schwarz	Software	Ver.9.15	N/A

### 6.6 Test data for Radiated Emission

- Test Date : Mar. 21 ,2017
- Measurement Distance : 3 m
- Note : The EUT was tested made up 6 GHz, because, it was required from the client.
- Measurement

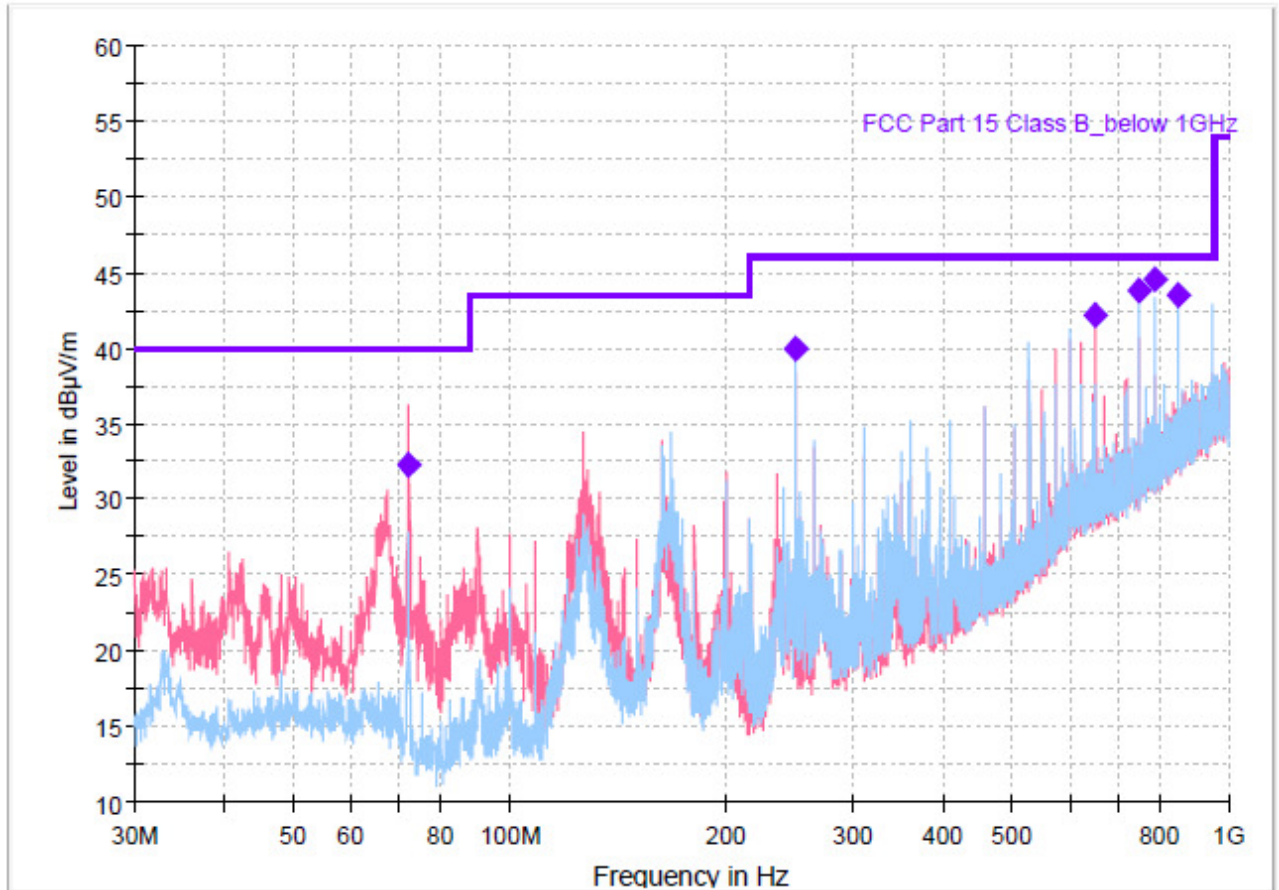
Frequency range	30 MHz ~ 1 GHz	Above 1 GHz
Detector mode	Quasi peak	Peak / Average
Resolution bandwidth	120 kHz	1 MHz





- 30 MHz ~ 1 GHz

- Operating condition: Network communication mode(standby)



— Preview Result 1V-PK+      — Preview Result 1H-PK+  
 — FCC Part 15 Class B\_below 1GHz      ◆ Final\_Result QPK

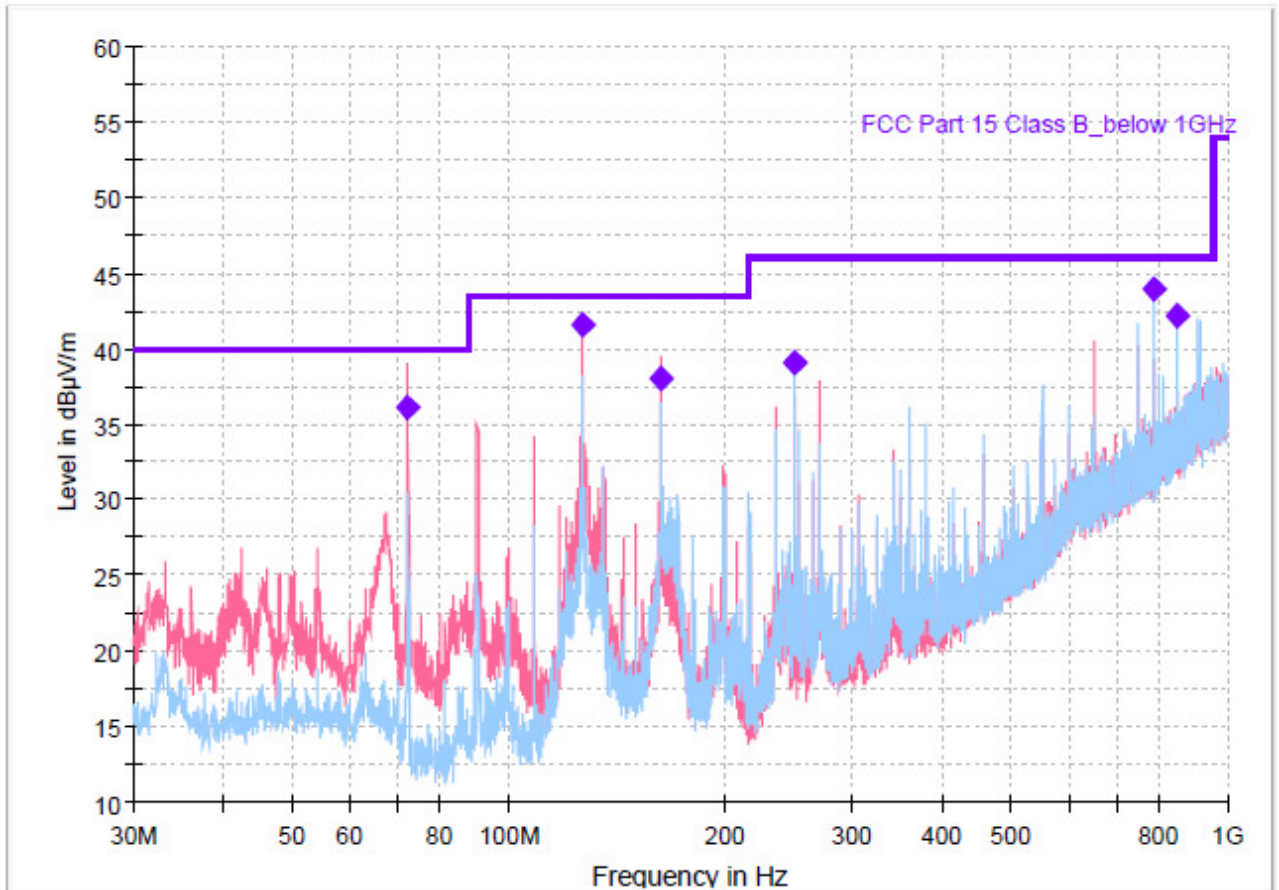
### Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
72.376875	32.34	40.00	7.66	1000.0	120.000	125.0	V	272.0	11.2
250.008125	39.93	46.00	6.07	1000.0	120.000	181.0	H	104.0	15.1
650.011875	42.20	46.00	3.80	1000.0	120.000	100.0	V	43.0	26.9
750.003125	43.76	46.00	2.24	1000.0	120.000	225.0	H	183.0	28.6
791.976250	44.57	46.00	1.33	1000.0	120.000	185.0	H	21.0	29.3
850.013750	43.55	46.00	2.45	1000.0	120.000	113.0	H	178.0	30.6

< Fig 7. Radiated emission result (30 MHz ~ 1 000 MHz) >



- Operating condition: Network communication mode(play camera)



— Preview Result 1V-PK+      — Preview Result 1H-PK+  
— FCC Part 15 Class B\_below 1GHz      ◆ Final\_Result QPK

### Final Result

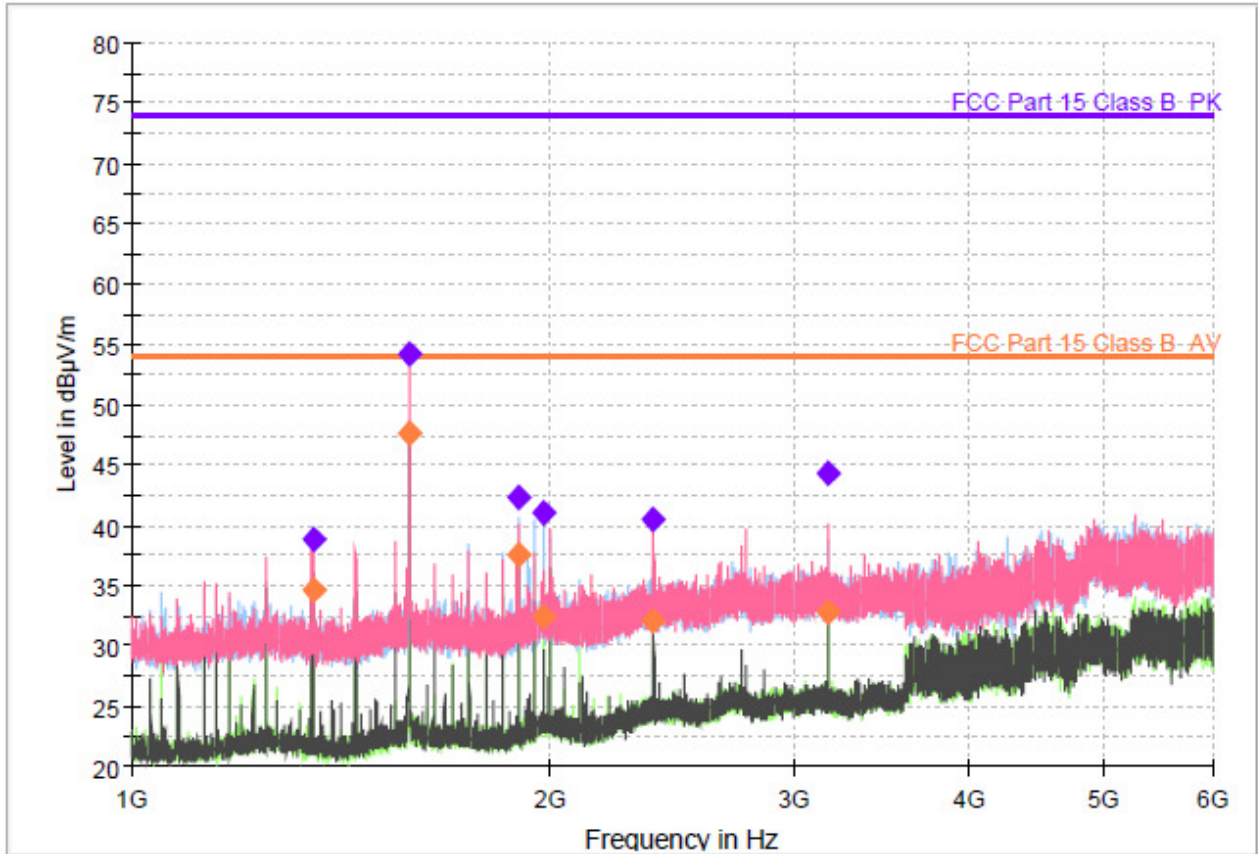
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
72.376875	36.08	40.00	3.92	1000.0	120.000	188.0	V	0.0	11.2
126.676250	41.49	43.50	2.01	1000.0	120.000	125.0	V	14.0	13.7
162.850000	38.03	43.50	5.47	1000.0	120.000	109.0	V	6.0	15.2
250.008125	39.02	46.00	6.98	1000.0	120.000	175.0	H	109.0	15.1
792.016250	43.85	46.00	2.15	1000.0	120.000	100.0	H	44.0	29.3
850.013750	42.10	46.00	3.90	1000.0	120.000	120.0	H	150.0	30.6

< Fig 8. Radiated emission result (30 MHz ~ 1 000 MHz) >



-. 1 GHz ~ 6 GHz

▪ Operating condition: Network communication mode(standby)



— Preview Result 2H-AVG      — Preview Result 1H-PK+      — Preview Result 2V-AVG  
— Preview Result 1V-PK+      — FCC Part 15 Class B\_PK      — FCC Part 15 Class B\_AV  
◆ Final\_Result PK+      ◆ Final\_Result CAV

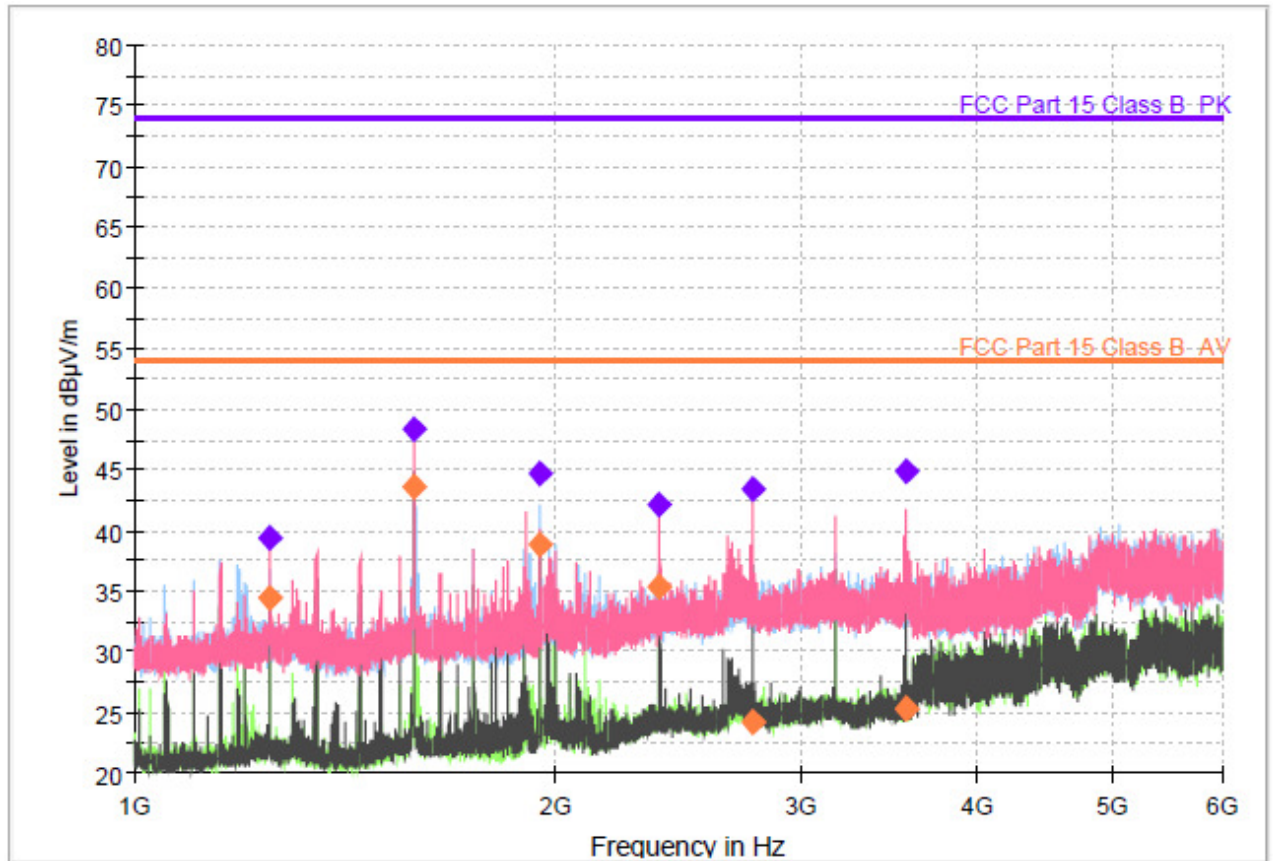
### Final\_Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1350.200	---	34.71	54.00	19.29	1000.0	1000.000	100.0	V	350.0	-13.1
1350.200	38.81	---	74.00	35.19	1000.0	1000.000	100.0	V	350.0	-13.1
1584.033	54.23	---	74.00	19.77	1000.0	1000.000	100.0	V	39.0	-12.7
1584.033	---	47.60	54.00	6.40	1000.0	1000.000	100.0	V	39.0	-12.7
1900.200	---	37.57	54.00	16.43	1000.0	1000.000	125.0	H	210.0	-12.0
1900.200	42.40	---	74.00	31.60	1000.0	1000.000	125.0	H	210.0	-12.0
1979.867	---	32.51	54.00	21.49	1000.0	1000.000	109.0	H	203.0	-11.9
1979.867	40.98	---	74.00	33.02	1000.0	1000.000	109.0	H	203.0	-11.9
2376.033	40.48	---	74.00	33.52	1000.0	1000.000	100.0	V	9.0	-10.4
2376.033	---	32.13	54.00	21.87	1000.0	1000.000	100.0	V	9.0	-10.4
3167.867	---	32.77	54.00	21.23	1000.0	1000.000	121.0	V	153.0	-8.8
3167.867	44.36	---	74.00	29.64	1000.0	1000.000	121.0	V	153.0	-8.8

< Fig 9. Radiated emission result (1 000 MHz ~6 000 MHz) >



- Operating condition: Network communication mode(play camera)



— Preview Result 2H-AVG      — Preview Result 1H-PK+      — Preview Result 2V-AVG  
— Preview Result 1V-PK+      — FCC Part 15 Class B\_PK      — FCC Part 15 Class B\_AV  
◆ Final\_Result PK+      ◆ Final\_Result CAV

### Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1250.033	---	34.40	54.00	19.60	1000.0	1000.000	106.0	V	-16.0	-13.4
1250.033	39.47	---	74.00	34.53	1000.0	1000.000	106.0	V	-16.0	-13.4
1584.033	---	43.57	54.00	10.43	1000.0	1000.000	106.0	V	72.0	-12.7
1584.033	48.37	---	74.00	25.63	1000.0	1000.000	106.0	V	72.0	-12.7
1949.800	---	38.81	54.00	15.19	1000.0	1000.000	125.0	H	208.0	-11.9
1949.800	44.65	---	74.00	29.35	1000.0	1000.000	125.0	H	208.0	-11.9
2376.033	---	35.32	54.00	18.68	1000.0	1000.000	106.0	V	278.0	-10.4
2376.033	42.22	---	74.00	31.78	1000.0	1000.000	106.0	V	278.0	-10.4
2771.967	---	24.24	54.00	29.76	1000.0	1000.000	114.0	V	141.0	-9.3
2771.967	43.44	---	74.00	30.56	1000.0	1000.000	114.0	V	141.0	-9.3
3563.900	---	25.32	54.00	28.68	1000.0	1000.000	114.0	V	110.0	-8.3
3563.900	44.85	---	74.00	29.15	1000.0	1000.000	114.0	V	110.0	-8.3

< Fig 10. Radiated emission result (1 000 MHz ~6 000 MHz) >



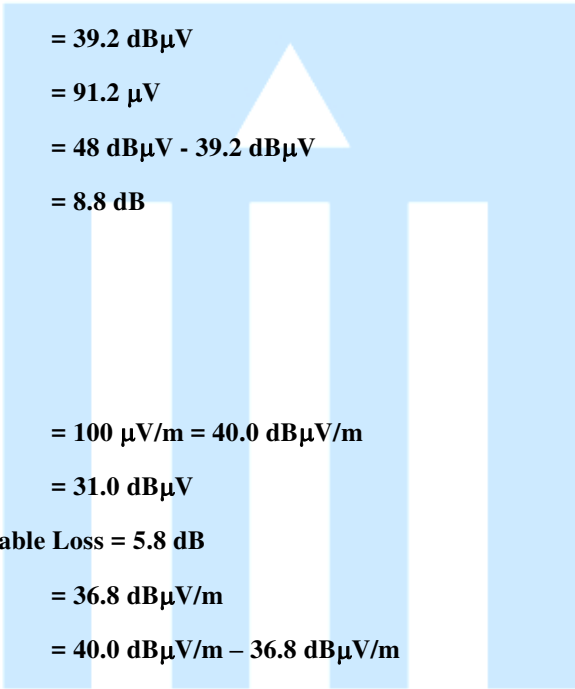
## 7. Sample Calculations

$$\begin{aligned} \text{dB}\mu\text{V} &= 20 \text{ Log}_{10}(\mu\text{V}/\text{m}) \\ \text{dB}\mu\text{V} &= \text{dBm} + 107 \\ \mu\text{V} &= 10^{(\text{dB}\mu\text{V}/20)} \end{aligned}$$

### 7.1 Example 1 :

■ 20.3 MHz

<b>Class B Limit</b>	= 250 $\mu\text{V}$ = 48 dB $\mu\text{V}$
<b>Reading</b>	= 39.2 dB $\mu\text{V}$
$10^{(39.2\text{dB}\mu\text{V}/20)}$	= 91.2 $\mu\text{V}$
<b>Margin</b>	= 48 dB $\mu\text{V}$ - 39.2 dB $\mu\text{V}$
	= 8.8 dB



### 7.2 Example 2 :

■ 66.7 MHz

<b>Class B Limit</b>	= 100 $\mu\text{V}/\text{m}$ = 40.0 dB $\mu\text{V}/\text{m}$
<b>Reading</b>	= 31.0 dB $\mu\text{V}$
<b>Antenna Factor + Cable Loss</b>	= 5.8 dB
<b>Total</b>	= 36.8 dB $\mu\text{V}/\text{m}$
<b>Margin</b>	= 40.0 dB $\mu\text{V}/\text{m}$ - 36.8 dB $\mu\text{V}/\text{m}$
	= 3.2 dB



## 8. Recommendation & Conclusion

The data collected shows that the **Ohsung Electronics Co.,Ltd.**  
**Network Keypad (Model Name: TKP-5600)** was complies with §15.107, 15.109 of the FCC Rules.

- The end -

